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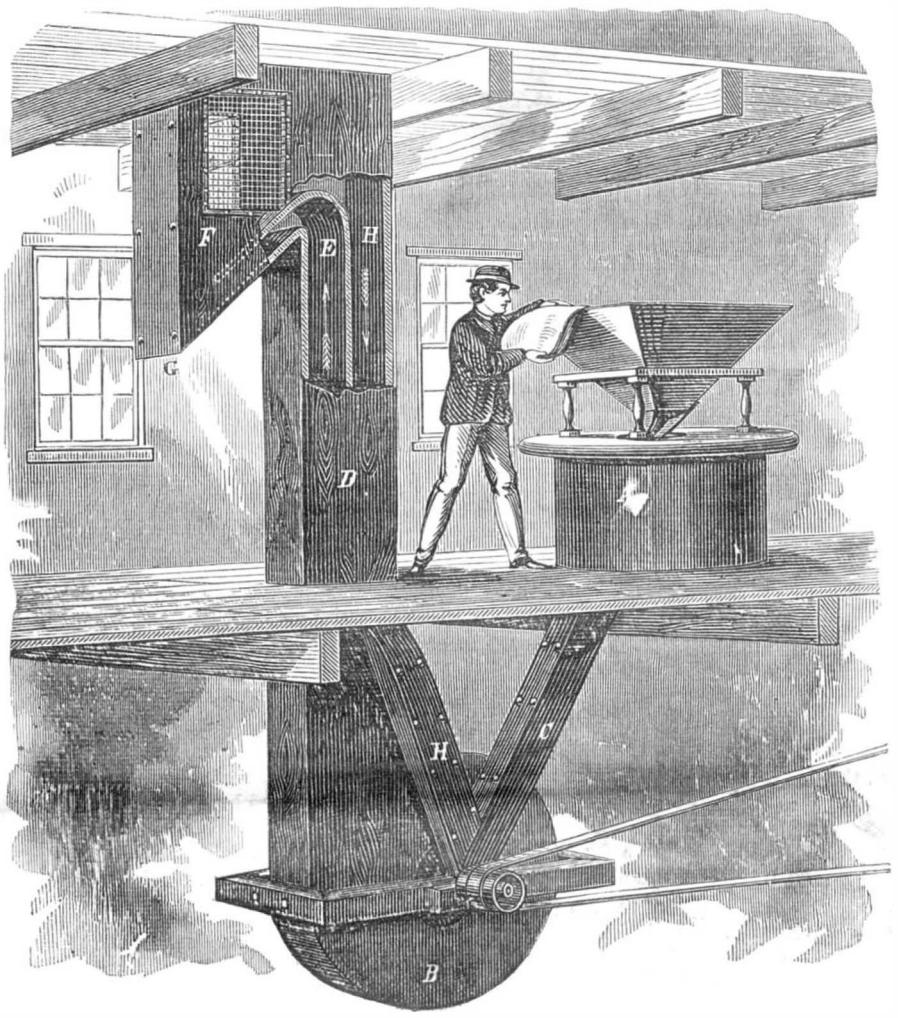
Improvement in Cooling Mill Stones and Flour.

Every miller knows how desirable it is to deposit the flour or meal as it comes from the stones in a perfectly cool condition, and that one of his principal annoyances is the heating of the stones. The inventor of the device herewith illustrated intended to subserve these two purposes, says that practical tests show a saving over the ordinary mode of elevating of about one pound of flour on each bushel ground.



RANEY'S PATENT PNEUMATIC ELEVATOR

A represents a mill stone and hoop, beneath which is a scroll, B, containing a fan blower, the blades of which, instead of forming a gradual curve, turn at right angles, this form being considered preferable. From the stone a discharge pipe, C, leads to the eye or center of the fan, conveying the flour. The spout or pipe, D, is double, or divided longitudinally by a partition shown in the space broken away. The portion, E, leads from the periphery of the fan or blower to the chamber, F, the upper portion of the tube being shortened to permit the escape of surplus air. The flour or meal is forced upward through the pipe, E, from the fan, and is discharged at G, directly into the bolt, conveyer, or hopper boy. The chamber, F, is made of any suitable size and is covered, or partially so, on its sides with gauze or muslin. From this chamber a return spout, H, leads to the fan and through it the surplus air is returned, and also many particles of flour which would otherwise be lost.

The fan being revolved rapidly receives its supply of air through the spout, C, from between the stone and hoop, drawing all the heated air away, thus keeping the stone cool and dry, and preventing the formation and accumulation of dough around the hoop. The flour, soon as discharged from the stone, falls into a current of cool air which prevents evaporation. For simply elevating grain only the fan and spout, E, are used.

This apparatus was patented May 5, 1868, by James Raney, assignor to himself, L. Raney, and B. Raney, either of whom may be addressed for rights or further information at New Castle, Pa.

Learning to Telegraph.

According to the *Telegraph*, the institutions known as Telegraph Colleges are unmitigated humbugs. They purport to teach the art of telegraphing so that any young man or woman can become efficient in three months, obtain a good situation, large salary, &c. Fees payable in advance. Our contemporary remarks:

"We wish to impress upon the minds of those who desire to become telegraphers, that only upon telegraph lines, and in the practical daily practice of an office, can they become qualified for telegraphic positions.

Another fact is sedulously kept out of sight by the proprietors of these colleges, which is patent to every practical telegrapher, that is, that probably less than fifty per cent. of those who seek to learn telegraphy, even in the regular and proper manner, become good, reliable operators. The profession requires a quickness of perception and a certain amount of mechanical skill and facility of manipulation which is not generally possessed. Very few become good, practical telegraphers, unless they commence the study of the art before they reach their twentieth year. For those of over that age to endeavor to do so, is, in a majority of cases, pure waste of time. We do not mean to say that instances are unknown of persons more advanced becoming first-rate telegraph operators, but they are so few as not to offer encouragement to such to seek admission into the telegraphic ranks.

We have heretofore pointed out the deficiencies in scientific knowledge of a large proportion of the practical telegraphers. This we should be glad to see corrected, and we should regard any means of education in this particular afforded to telegraphers, and a disposition to avail themselves of such facilities by operators generally, with favor and gratification."

New Brunswick Hematite Iron.

We have received some specimens of white fibrous iron from hematite ore mined in New Brunswick. It is of extreme hardness, capable of scratching glass, and of remarkable purity. It is also exceedingly tough, Robert Mushet of Coleford,, England, stating that he has twisted nail-rod cold, made from it, which exhibited a toughness equal to the best Llondross or Tevoitdale iron. Charles Sanderson says he is using the iron as samples. He is the well known steel maker, and says "the steel made from it hardens perfectly at a moderate heat and is well suited for file making." The Pembroke Iron Works, Pembroke, Me., is using it with great success for ax iron and all edge tools. We understand the deposits of this ore in the vicinity of Woodstock, New Brunswick, are practically inexhaustible. It has been largely and successfully tested in the casting of chilled car wheels, both in England and in this country, and in the former country by John Brown & Co., of Sheffield, for armor plates. We give an analysis of the ore.

Peroxide of iron	45.200	Soda	.541
Protoxide of iron	3.658	Sulphuric acid	.588
Alumina	5.448	Phosphoric acid	
Oxide manganese	11.381	Silica	14.126
Peroxide manganese	1.093	Carbonic acid and water	11.781
Lime	1.756		
Magnesia	3.740	Total	100.000
Potash	.688		

FOOTE'S PATENT PORCELAIN LINED ICE PITCHER.

Considerable has been said about the chemical action of different drinking waters on the metal of which the interior

wall of ice pitchers is composed, their being productive of oxides inimical to health, etc. It is well known, however, that the porcelain lining of iron kettles and the glaze on our table ware is unaffected by ordinary acids. Acting on these facts the inventor of the pitcher shown in the engraving has succeeded in coating the inner wall of metallic ice pitchers with a liquid enamel, fused and attached to the metal by heat, in one smooth, complete coating without seam. Prof. Hayes says "it is entirely free from anything poisonous or injurious. A quart of acidulated well water was boiled in one of these pitchers without perceptible action upon the enamel, and water to which caustic alkali had been added was afterward boiled in it with a similar result. When submitted to sudden changes of temperature the enamel did not crack or separate from the iron, and sharp strokes with pieces of ice failed to make any impression upon it."

It will be readily understood that the pitcher may be made of any form desired. Its freedom from unpleasant odor, as well as its perfect cleanliness and certain safety, seems to give this improved pitcher a deserved commendation.

It was patented through the Scientific American Patent Agency June 30, 1868, and assigned to the Meriden Britannia Company, West Meriden, Conn., by whom they are manufactured, to whom all orders should be addressed, D. C. Wilcox, Secretary. The commendatory letter of Prof. Hayes may be found in full on the last page of this paper.

FUTURE PROSPECTS OF MACHINE MANUFACTURING IN RUSSIA.

If we take the map of Russia, and set one leg of a pair of compasses upon the spot occupied by the town of Kharkoff, setting the compasses to a radius of 370 miles, then this radius will reach to the extreme northern end of the the rich agricultural government (or province) of Orel, inclosing at the same time the equally rich government of Koursk.

Sweeping around to the northeast we cut off part of the government of Tula, the Russian Sheffield, as also part of Tambov, inclosing the whole of the government of Voronej, with its rich stores of corn and oil. To the northeast we cut into the borders of the government of Kaluga, inclose the whole of the government of Poltava with a great part of that of Tchernigon, and join up to the borders of the government of Kiev. In a right line south from our starting point, we, with the same radius, cut into the sandbanks in the Sea of Asoph near the port of Berdiansk (for the removal of which said sandbanks, by the way, the future factory may have to provide dredgers, so they may as well be included in the circle), while at the same time we include the government of Tausidia, along with that of Ekaterinoslav with its coal bearing strata. Sweeping to the southeast, we inclose the whole of the territory of the Cossacks of the Don, with its vast beds of anthracite and iron ore. The same radius takes us in this direction across to the opposite shore of the sea of Asoph, fronting Taganrog and Rostov. To the southwest we come again upon the greater part of the government of Tausidia, with the greater part of that of Kherson, sweeping to within twenty miles of the ancient town of Kiev.

For enterprising men with capital this is an immense field for labor; and commercial energy might easily square this circle, even by means of a circumscribed square to enlarge the area. The principal railways (not merely projected, but actually being constructed) cutting into this circle are, first, the main line direct from St. Petersburg to the Sea of Asoph, passing through two coal fields in its course, namely, the northern or Kaluga-Tula and the southern or Donetz basin. (The Donetz is a river falling into the Don after a course of about 270 or 280 British miles, and forming a sort of border to the coal field; its repeated attempts to cut into the hard strata of the coal basin induced geologists to call the coal district by its name, the Donetski Kpaj). This main line of railway after leaving Moscow passes through the towns of Tula, Orel, Koursk, Kharhoff, and many towns of smaller note, and will end, after passing through the whole of the southern future mining district, at Taganrog and Rostov.

From this main line there will be numerous branches to different places, the names of which are as yet unknown to fame, but which, in consequence of their stores of mineral wealth, are capable of becoming great industrial centers. Communication with Europe, through Poland, will be secured by the line from Kiev joining into the main line at Koursk. The main line will also communicate with the Black Sea, by means of the line from Kharkoff through Poltava and other important towns, to Kiev and Odessa. In like manner, by the extension of the Riga-Dinaburg-Vitebsk railway to Orel, the south of Russia will be put into communica-

tion with the Baltic. There is also the inland line completed as far as Vorouej from Moscow, afterwards to be extended to the anthracite mines at Grushevka, which last are already in communication with the river Volga by means of a short railway. Independently of the proposed branch lines, which from their situation may well be called mineral lines, it is proposed to lay another main line from a point about 100 miles south of Kharkoff to far-famed Sevastopol.

The imaginary circle thus drawn incloses the whole of the southern coal fields, and cuts into the border of the northern. As the northern coalfield is beyond the boundary line chosen little need be said about it, although it is far from being an unimportant one. The coal is inferior in quality to that of the southern field, while at the same time the iron found there makes very good castings. According to the report of the latest investigations published last year, the northern coalfield is 114 miles long by 80 miles wide, or about 9,120 square miles. Within this boundary there are no fewer than 113 known places favorable for mining; and four of the best known of them are estimated to contain a supply for 150 to 200 years, at the rate of 400,000 tuns annually. The price at present at the pit mouth is about one dollar per tun.

The southern basin with which we have more immediately to do is more extensive, and the coal is of a better average quality. The coal seems to crop up to the surface in the government of Kharkoff so that in many places coal is turned up by the plow, and they extend to within less than 60 miles to the shores of the Sea of Asoph. The northern or Kharkoff end of this field contains coal similar to that of the Tula-Kaluga field; while in the center of the basin the best caking and steam coal is found, and at the southern extremity anthracite, containing, according to reported analysis, 98 per cent. of carbon. That part of the coalfield lying in the government of Ekaterinoslav is bounded by the rivers Dneiper, Don, and Donotz, and has a surface of over 10,000 square miles. Adjoining this in the territory of the Don Cossacks, and bordering on the Sea of Asoph, there are still 7,100 square miles under which lies the best coal and anthracite.

The now, in Russia at least, well known mines of Grushevka contain no fewer than 269 allotments, out of which, in 1866, 83, containing 93 pits or shafts, were being worked, and produced 150,152 tuns of anthracite against 85.401 tuns in 1865. The estimated quantity for the 42 square miles of this district alone is 24,000,000 of tuns. In the 7,100 square miles of the territory of the Don Cossacks, reckoning only the upper seams and only those which are more than one assheen (2ft. 4in.) thick, the estimated quantity is 700,000,000 of tuns. The seams vary from 2½ feet to 8 feet in thickness. In this black country there is much work yet to be done for both the mining and mechanical engineer. The 93 before mentioned pits are, with one or two exceptions, mere holes, and in the district generally, until within the last two years, the black diamond was left in the depths of the mine undisturbed; as soon as the water grew troublesome, another hole was struck, and the former one abandoned. At the present time, however, at Grushevka three shafts are being, or have been, sunk deeper in the water-bearing strata, and eight steam engines, from 6 to 75-horse power, are either at work or are in the course of erection. The price of the coal averages from one dollar and thirty cents to two dollars and seventy-five cents per tun at the pit mouth, according to quality.

This district is no less rich in iron ore than it is in coal. Geologists and mineralogists of different nations all agree in their statements as to the immense quantity of ore, and also to its high quality. The thickness of the layers varies in some places from 9 inches to 21 inches, and in others from 14 inches to 3 feet. The layers of ore extend in many places in an unbroken line for many miles, and are interspersed with layers of coal, limestones, and schists. The ore lies in many parts, especially in the ravines, at a depth of from only 14 feet to 28 feet from the surface, while almost the only mining as yet has been that of the aforesaid geologists. There is indeed one iron works in the district, belonging to Government; but from a mistake in the choice of a situation, caused by the wish to take advantage of water power, it is too far from the mines connected with it, and its rate of production has not as yet been very great.

The other subterranean products of this mine of wealth are in connection with iron smelting, limestone and good fireclay, while for purposes connected with other manufactures are potter's clay, kaolin, gypsum, and the materials for good cement. There are also beds of the stone generally used here for millstones, also paving stones, and in some parts thick beds of roofing slate. Specimens of this slate were sent to the Paris Exhibition, along with specimens of the anthracite near which it was found. Limestones and sandstones for building purposes are also here, together with an inferior sort of marble. Clays of all sorts abound, suitable for brick-making, both fire and common red and yellow, and chalk enough to score up the reckonings of all the miners and puddlers in the world for centuries to come.

Lead ore, with a percentage of silver, is also to be found; while last, but not least, one of the great necessaries of life, common salt, has formed a staple article of commerce for more than a century. The yearly quantity of this article supplied by this district within the past thirty years has varied from 5,000 to 16,700 tuns. With the exception of this salt, this immense treasure vault has been little more than peeped into by scientific men; the full opening up has been as yet unattainable, not having had as in other countries, the assistance of the iron horse. The time of opening is however, now near at hand; the iron horse is on his way down south with the keys. The first sod of the Kharkoff-Taganrog railway was cut June 2d, 1868, although work had been commenced upon the line generally some time before. The question now must be who will be the first to ravish this almost virgin treasure.

It must not be thought that the mineral wealth of Russia is confined within the boundaries of the imaginary circle drawn; on the contrary, the northern coalfield might, by deep mining, yield a better quality of coal, and it is supposed dip a great depth under Moscow and some of the other northern governments, as it has been found to make its appearance again in the government of Archangel. There is then the eastern or Ural system, and the still richer western or Polish, where coal seams have been found from 35 feet to 42 feet, and in one instance even 49 feet in thickness, made up of layers of different qualities of coal, divided by very thin layers of clay. Then we have in Siberia, the Tomsk field, estimated at 170 miles long and 70 broad, and coal of an inferior quality, but still usable, at the foot of the Caucasus. Among other projected railways, first on the list stands one to connect the frontiers of Siberia with the interior of Russia. Railway communication has commenced in the Caucasus with the opening of the Poti and Tiflis railway, and Kharkoff is looked upon as the future central station for direct communication with the Caucasus.

All these places may, at a future time, become seats of manufactures, but in the part of the country above described everything is favorable to enterprise; even at present, the climate is wholesome, and peace and plenty reign around. Some difficulty would be experienced at first in getting together workmen, but when once found and settled, the real Russian likes to remain in one place if he finds himself at home, and generally likes to stick to a good master. There is one thing, however, although trades unions and general strikes are unknown there, still the workmen taken singly are very independent and firm in their demands; the being thrown out of work does not seem to frighten them much—they can be led easier than they can be driven.

THE AINOS, OR HAIRY MEN OF YESSO AND SAGHALIEN.

In Notes on the Expedition against the Settlements in Eastern Siberia, published in London in 1856, is an account of a peculiar race of people, of which some specimens were seen to the north of Cape Lamanon, on the western coast of the island of Saghalien, the most northerly of the Japanese group. The author, Mr. Whittingham, who accompanied the expedition, thus describes the people and their manner of living: "As we came near the shore, four dark men with very long black hair flying in the wind, and clothed in seal-skin jackets, kilts, and boots, waved their arms and hands, warning us to another landing-place, toward which they waddled with a peculiar clumsy gait. With many demonstrations of respect they led the way to their huts of rough logs, covered and the interstices filled with birch bark and dry leaves; they were low on the ground, and could only be entered by stooping on the hands and knees. The larger huts were used as store houses for their fishing apparatus. One of the men was a magnificent savage, tall, lithe, straight, and strong, with hair, beard, and mustaches never desecrated by the touch of the scissors; with a high broad brow, dark eyes, straight nose, and oval face, he was a far nobler creature than the Red Indian who, I had always fancied, was the pride of wild men. His fellows were less manly in their bearing, and smaller; and as far as dirt, mal-odor, and want of light permitted me to see, the women were ugly and little." Rollin, in La Pérouse's voyage, gives the following valuable measurements of the head of one of these people:—circumference, 23·80 inches; its longest diameter, 10·30; and its shortest diameter, 6 83 inches.

In a recent communication to the Boston Society of Natural History, Mr. Albert S. Bickmore, A. M., gives the results of his late investigations in regard to the origin of this peculiar race, and adds important and interesting particulars of their manners, customs, and religion.

The first of these strange people seen by Mr. Bickmore were at Mori, on Volcano Bay, at the western side of the island of Yesso. Along the shore to the north of Mori they were met with, sometimes at work with the Japanese, but more frequently in companies by themselves.

At Urope, twenty miles north of Mori, is a village of about two dozen houses only, three or four of which are Japanese, the rest belonging to the Ainos. Mr. Bickmore describes this village as follows:

"The houses were scattered irregularly near the shore over a broad belt of sand, that has been drifted back by the easterly winds. They all have the same rectangular form, and are similarly situated in respect to the shore.

"The best are composed of a house part about thirty feet long and twenty broad. To this is attached a porch about twelve feet long and eight broad, and around the whole is a straw fence. The house and porch are built of a frame work of small poles, fastened together with strips of bark and covered with millet straw. The walls are about four feet high, and slightly sloping. The roofs project a few inches at the eaves, and rise from each side to a point in the center. In the walls under the eaves, there are two or three holes a foot in diameter, which serve as windows. In entering, you pass through the straw fence into the porch, and thence through the door into the house. The house part is generally one room, and also the porch; but in a few, a kind of partition is made in the larger room by hanging up mats. Most of the houses have no floors, but instead the sand is covered with mats of coarse straw, and on one side of the room there is a platform of boards on stones or blocks of wood, where the occupants lounge and sleep. They usually sit on the mats on the sand. In the center of the room the fire is made on the sand, and over this and about three feet above it, is a kind of frame work held up by strings from the rafters, where they place the fish they wish to smoke. It also serves for a cupboard or dresser, where the smaller iron pans and kettles may be put away. There is no chimney, and I did not even see a hole in the roof for the smoke to escape. Everything overhead is, therefore, black with smoke, and generally has a shining, oily appearance. Each house is provided with a few iron pans and kettles of Japanese manufacture, and these with two or three wooden dippers, and some large valves of the pecten, comprise their cooking utensils. They make a fire by means of a flint, steel, and tinder, which are usually kept in a bag of undressed deer skin. In several houses I saw a considerable number of lacquered dishes, which they had evidently obtained from the Japanese. Near each house there is another small one about eight feet square, perched on a platform five or six feet high, in which they store their fish, in much the same manner as the natives of Sumatra preserve their rice. In the first house we entered, the man was sitting cross-legged in one corner making spears, with a fire of charcoal and a Japanese bellows. The woman was crouched near the fire, twisting up thin strips of the inner layer of the bark of a tree into a continuous line of the size of a mackerel line. It is from such material, and in this way, that all the lines for their fishing nets are made. They had four children, all boys, the youngest two and the eldest ten. The two younger ones were without clothing, and the others had only each a long jacket, though it was quite chilly.

"In the next house we entered—the dimensions of which I have given above as a model—we found an old man, his son, and three women. The old man said he was seventy five, and his white hair and white beard made it appear probable, yet a young woman, apparently of twenty, was presented to me as his wife. She was demurely at work in one corner, making a straw mat after the Japanese style. The other young woman was weaving a piece of cloth about ten inches wide, from strings made of bark as already described. These strings, which represented the warp, were fastened at one end to a post and at the other end to a board which she kept leaning against while she changed them and pushed through the filling and pressed it down with a sharp edged board. This kind of cloth seems to be the only one they have, and it is all made in this slow and laborious manner. In front of this house, that is, on the side toward the shore, there was a kind of rack filled with sticks, each having on its top the skull of a bear. In this single place I counted twenty-nine skulls of this animal, a number that must make our old friend and his son rank high in the estimation of his Aino companions. In another house we entered, we found a man and his wife seated by the fire. The woman was sewing, but the man was doing nothing, and yet the bay was swarming with fish. He showed us the bow he used in hunting the bear, but would only sell a model of it, declaring that in their estimation it was most disgraceful for an Aino to part with the bow he was accustomed to use. However I secured a real arrow. The after part of the shaft was of reed, the fore part of solid wood to make it fly point foremost, and the barbed part of bamboo. They carry short knives, but they appear to rely on their bows and arrows when they attack a bear or kill a deer. I saw no lances, nor any implements of stone or bronze. I also purchased of this man a pair of snow shoes, each made of two strips of wood bent like an ox bow, with the straight part fastened together with deer skin. The woman sold me a short knife, with a scabbard of wood and ivory rudely chased. It was the only piece of ornamental work I saw. As I was anxious to ascertain the hight, the distance round the chest, and the length of the arm, hand, and foot of an Aino woman, my interpreter bribed the husband with a small piece of silver to make the desired measurements, but the paper was unfortunately lost, and now I can only state from memory, that the peculiarity which struck me most was that the regions of the waist and chest did not appear as separate as in most women, but it remains to be seen whether this is a permanent character. The mammæ were very largely developed, and gourd shaped.

"When a woman marries they tattoo her upper lip and sometimes the under one also. A favorite pattern has the ends curved up, in just the way exquisites sometimes curl up the ends of their mustaches. Several times I inquired what was the cause or origin of this strange custom, but invariably received the unsatisfactory answer—'because it is the Aino fashion,' which is, perhaps, as good a reason as could be assigned for a thousand foolish customs in the most civilized lands. At all events it gives these Aino women the appearance of trying to add to their charms by artificially making up for what they seem to consider a defect in nature's handiwork. The women also tattoo the backs of their hands in narrow transverse bands, but no other parts of the body. They never blacken their teeth or compress the feet. In each Aino village, the oldest man, or a very old man, is the chief, and he in turn is responsible to a Japanese official styled the 'Aino Interpreter.' As the chief was away fishing, we called on the Interpreter, who was also absent, but a subofficial gave me some further items in regard to the strange people under his charge. They cultivate millet and potatoes, but no rice. In one hut I saw the thick midrib of some wild plant finely chopped. When they kill a bear, they are allowed the head, but the skin belongs to the Interpreter. They are permitted however to wear deer skin, and the woman I saw first at Mori had on an outer dress of that kind. It is said that when young cubs are found they are brought home and nursed by the Aino women like their own children, but this is quite incredible.

"On my return to Hakodaki I found that eight Ainos had just arrived in a couple of junks from a place on the south coast, a short distance east of Endermo Bay. With the prospect of a small present they readily came to the residence of Colonel Rice, whose kind hospitality I was then enjoying.

They all sat down cross-legged, in the Turkish style, not in a semicircle, like our American Indians, but in a straight line, the oldest man on the extreme left, the highest position of honor; the rest arranging themselves according to their ages, to the youngest on their right. They could not tell, however, how old they were, but said that the Japanese officials kept a record of their ages. As soon as they were seated they began their salutation, which consists in slightly inclining the body forward, at the same time raising both hands as high as the eyes, with the palms inward and the fingers extended and nearly touching each other. The hands then pass down along the beard to the chest. This is repeated three times, and when they wish to show still greater respect they accompany these motions with a low guttural muttering. Saki (Japanese rice whiskey) being their favorite drink, each was offered a glass and a chop stick. Taking the glass in the left hand and the stick in the right, they dip the end of the stick into the liquor they are about to drink, and slightly raising it, describe a circle with an upward and inward motion. While describing these motions with the stick, they uttered a long prayer, in a low monotonous tone. This prayer, they afterward informed us, was not in our behalf, in return for the saki, but addressed to the god of the sea, asking that they might be preserved in their boats, and find an abundance of fish. One of their number spoke Japanese fluently, and Mr. James J. Enslie, the Japanese interpreter at the British Consulate, and himself the author of two interesting papers on the Ainos, kindly volunteered to ask them a list of questions I had prepared. In this way the following information was obtained directly from the Ainos themselves. As some of the questions proved quite perplexing, they became tired before the list was completed, and I failed therefore to get replies to all my queries.

"They have many gods, but fire—not the sun, the moon, or the stars—is the principal one, and they are accustomed to pray to it in general terms for all they may need. They do not buy their wives, but are expected to make presents to the parents of saki, tobacco, and fish. At their marriages they make no great rejoicing or display. Their only feast is at the beginning of the new year, when they make offerings to all the gods. When a wife dies they burn the house in which she lived, but when a man dies they bury him without any funeral ceremony (perhaps the interpreter meant if he was a common man). To inter a body they dig a hole in the ground and lay in planks in the form of a box. The body is then clothed in white, and placed in at full length, with the head to the east, 'because that is where the sun rises.' A widower may marry again in two or three years, but a woman can only marry once. (This the interpreter probably intended to say was their law but not the universal custom.) A man can have only one acknowledged wife, but any number of concubines, each of whom always lives in a separate house. At present they have no king, but a great chief living in Saru. The interpreter had met other Ainos whom he could not understand (that is to say, there are at least two different dialects in the Aino language). They keep no cats, but catch rats in traps. They have 'only Japanese horses.' They keep fowls but no ducks. They eat their fowls and what wild birds they can take, but never eat eggs. They have no special burying grounds, and they desire only to forget their deceased relatives as soon as possible. They never speak of the dead, and if a man should call on a friend, and inquire for his deceased wife and say, 'Oh! is she dead?' such an act would be considered the grossest breach of good breeding. They say that they can make poison, but refused to tell how, and further declared that they kept it such a secret that even the Japanese officials knew nothing of the process. They have sorcerers whose advice they are accustomed to ask. They have no written characters, and only oral traditions.

"After this questioning I took measurements of two of them. These measurements were made from men of medium size. They show, that although the Ainos are stout and strong, they are hardly taller than the Japanese, and not near as tall as the average of the people in the north of China. The relative size of the hands and feet to the rest of the body seems to vary considerably.

"One of their chief peculiarities is the great development of their hair, not only the head and face, but over the whole body. Their eyebrows and eyelashes are very thick, and like their beards and hair, always of a jet black, till past middle life, when, as with us, they change to gray and in extreme old age to white. Their hair appears coarse compared with ours or with that of the Japanese. They wear it long—down to the shoulders. The men wear theirs as long, or longer than is the custom with their women. Their eyelids are horizontal and open widely, as in the Indo-European races, and are not oblique and open, but partially, as in the Mongols, Manchus, Chinese, Japanese, and also the Coreans. Their eyes are bright and sparkling, and always black. The fine development of their chests, with their full heavy beards, gives them the appearance of noble and hardy men as compared with their effeminate Japanese rulers. They seem to be endowed with great vitality, and the fact that they so successfully resisted the repeated attacks of a more enlightened race for eighteen hundred years, sufficiently proves their daring and perseverance.

"The dress of the men consists of a strip of cloth covering the loins in the same way as is customary among coolies in the East. In summer this is their only clothing, but in winter they wear long, loose coats, or dressing gowns woven from strings of bark. This is folded over from right to left, and bound at the waist with a sash. Their heads, feet, and legs are usually bare. The women have a shorter dressing-gown coming down to the hips, and beneath this a piece of cloth wrapped around the waist and hanging down nearly to the knee.

"As they have no written records, the earliest accounts of this people have come down to us through Japanese histories. According to a Japanese chronology, compiled from the best sources, and translated by Father Nicholai, for the Russian Legation, Jin-mu, the first Japanese emperor appeared on Kiusiu at Hunga (or Hewng-nga) in B. C. 667. In B. C. 663, he first came to Niphon, but was defeated and driven back by the aborigines. In B.C. 660, he returned and effected a permanent settlement on the southeast part of that island. In most of the Japanese histories, at least, no mention appears of the arrival of any new people, and the Japanese all believe that these aborigines were the ancestors of the present Ainos. Thus, these people, although so little known to this day, are mentioned half a century before the time of Nebuchadnezzar, and six hundred years before the northern and western parts of Europe were first described by Cæsar in his Commentaries, and more than two thousand one hundred years before the discovery of this continent by Columbus. In A.D. 272 the Ainos, for the first time, brought presents to the Japanese authorities, and acknowledged them as their rulers. In A.D. 352 they rebelled, and in the year 366 they defeated the Japanese and killed their general. During the next two centuries, however, they appear to have been completely subjugated; for an educated Japanese states that as early as A D. 655, the Japanese sovereign then reigning established a kind of government over the Ainos in Yesso, which was located near Siribets, a volcano on the north shore of Volcano Bay. In A. D. 1186, Yoritomo usurped the ruling power in Niphon, and becoming jealous of his brothor Yosi Tsunay, had him put to death according to history, at a headland on the east coast, now called Shendai. But according to tradition, Yosi Tsunai escaped to Yesso, and treating the Ainos here with the greatest kindness, was deified by them and is now their chief hero.

"In their eyelids which are horizontal and open widely, in the abundance of their hair, and in the full development of their chests, these people differ totally from the Chinese, the Japanese, and the Coreans on the South, the Manchus on the west, and the Gilyaks and Kamtschadales on the north; but in these same characters they call to mind the bearded peasants in Russia of the Slavonian branch of the Aryan family.

"Are they, therefore, an extreme branch of the North Turanian family, or, as is more probable, in the same manner that the Indo-European races migrated from the high plateau of Central Asia through the plateau of Iran to the west, and the Persians and Indians to the south, did another part of that same family pass on to the east until they finally reached the islands now forming the empire of Japan; and do their living representatives now appear before us in the persons of this ancient and isolated people, the Ainos?"

Subsequently, Mr. Bickford was enabled to visit the Ainos of Saghalien, whose habits of living resemble those of their brethren at Yesso, in all important particulars. The following details of their customs in regard to marriage and the burial of the dead were learned of a Cossack who had been sent to live among them in order to acquire their language and learn their customs:

"The Aino name for Saghalien is Karapto. They have no written characters, but the old men can send intelligence to each other by means of sticks notched in different manners. They are superstitiously afraid of the Japanese, and believe that they have supernatural power to injure them, and can at pleasure cause them to sicken and even die. When a man dies they bury him clad, not necessarily in white, but in the best suit he may happen to have, and usually in furs when he possesses any. The bodies of persons of all ages are placed at full length in boxes, with the face upward. At such times they cry and mourn very bitterly, even to the children. The Cossack said that one time he wanted a little child that was visiting her parents, and when he came to their house he found her crying with the others over the loss of a friend. When a widow laments, they do not beat her with sticks as a Japanese doctor reported to me was the custom of the Ainos on Volcano Bay. Every friend who comes to mourn with a widow is very careful not to mention her husband's name; not from any superstitious fear of the dead, but for fear of reminding her of her loss, and thus adding to her sorrow. When a man dies, the next youngest brother takes the widow as his wife, either for life or until she has an opportunity to marry again. A widower may marry again in a month, but a widow is expected to remain single somewhat longer. They have no marriage ceremonies. A man does not buy his wife, but works for her father. A man may have two or three wives; the Cossack did not know any man who had more than three. (The Gilyaks, their immediate neighbors, usually have two.) If a woman is unfaithful, the husband merely reproves her, and if no one but he and the guilty parties knew of it, he would probably not mention it to any one. When a woman is in labor, she remains with the other members of the family, but is kept from her husband for one month afterward."

"They keep dogs to travel with in winter and also use them for food. They have no cattle, and do not cultivate the soil. They reckon time by twelve moons or months, and three seasons: when the snow melts, when the flowers appear, and when they fade.

"These people are undoubtedly passing away. Even during the last century and a half that the northern of the Kurile chain has been a part of the Russian empire, their numbers on those islands have been ascertained to have greatly diminished, though the Russians have unquestionably treated such obedient subjects with the greatest kindness. The causes of this decrease are supposed to have been the ravages of the small-pox, and the considerable numbers lost while crossing from island to island in their frail boats over those stormy seas."

Artificial Crystals and Minerals.—"The Crosse Mite."

Among the experimenters on Electricity in our time who have largely contributed to the "Curiosities of Science," Andrew Crosse is entitled to special notice. In his school-days he became greatly attached to the study of electricity; and on settling on his paternal estate, Fyne Court, on the Quantock Hills, in Somersetshire, he there devoted himself to chemistry, mineralogy, and electricity, pursuing his experiments wholly independently of theories, and searching only for facts. In Holwell Cavern near his residence, he observed the sides and the roof covered with Arragonite crystallizations, when his observations led him to conclude that the crystallizations were the effects, at least to some extent, of electricity. This induced him to make the attempt to form artificial crystals by the same means, which he began in 1807. He took some water from the cave, filled a tumbler, and exposed it to the action of a voltaic battery excited by water alone, letting the platinum wires of the battery fall on opposite sides of the tumbler from the opposite poles of the battery. After ten days constant action, he produced crystals of carbonate of lime; and on repeating the experiment in the dark, he produced them in six days. Thus Mr. Crosse simulated in his laboratory one of the hitherto most mysterious processes of nature.

He pursued this line of research for nearly thirty years at Fyne Court, where his electrical room and laboratory were on an enormous scale: the apparatus had cost some thousands of pounds, and the house was nearly full of furnaces. He carried an insulated wire above the tops of the trees around his house to the length of a mile and a quarter, afterwards shortened to 1800 feet. By this wire, which was brought into connection with the apparatus in a chamber, he was enabled to see continually the changes in the state of the atmosphere, and could use the fluid so collected for a variety of purposes. In 1816, at a meeting of country gentlemen, he prophesied that, "by means of electrical agency, we shall be able to communicate our thoughts simultaneously with the uttermost ends of the earth." Still, though he foresaw the powers of the medium, he did not make any experiments in that direction, but confined himself to the endeavor to produce crystals of various kinds He ultimately obtained forty-one mineral crystals, or minerals uncrystallized, in the form in which they are produced by nature, including one sub-sulphate of copper—an entirely new mineral, neither found in nature nor formed by art previously. His belief was that even diamonds might be produced in this way.

Mr. Crosse worked alone in his retreat until 1836, when, attending the meeting of the British Association at Bristol, he was induced to explain his experiments, for which he was highly complemented by Dr. Buckland, Dr. Dalton, Professor Sedgwick, and others.

Shortly after Mr. Crosse's return to Fyne Court, while pursuing his experiments for forming crystals from a highly caustic solution out of contact with atmospheric air, he was greatly surprised by the appearance of an insect. Black flint, burnt to redness and reduced to powder, was mixed with carbonate of potash, and exposed to a strong heat for fifteen minutes; and the mixture was poured into a black-lead crucible in an air furnace. It was reduced to powder while warm, mixed with boiling water, kept boiling for some minutes, and then hydrochloric acid was added to supersaturation. After being exposed to voltaic action for twenty-six days, a perfect insect of the Acari tribe made its appearance, and in the course of a few weeks about a hundred more. The experiment was repeated in other chemical fluids with the like results; and Mr. Weeks of Sandwich, afterwards produced the Acari in ferrocyanuret of potassium. The Acarus of Mr. Crosse was found to contribute a new species of that genus, nearly approaching the Acari found in cheese and flour, or more nearly, Hermann's *Acarus dimidiatus*.

This discovery occasioned great excitement. The possibility was denied, though Mr. Faraday is said to have stated in the same year that he had seen similar appearances in his own electrical experiments. Mr. Crosse was now accused of impiety and aiming at creation, to which attacks he thus replied:

"As to the appearance of the Acari under long continued electrical action, I have never in thought, word, or deed, given any one a right to suppose that I considered them as a creation or even as a formation, from inorganic matter. To create is to form a something out of a nothing. To annihilate is to reduce that something to a nothing. Both of these, of course, can only be the attributes of the Almighty. In fact, I can assure you most sacredly that I have never dreamed of any theory sufficient to account for their appearance. I confess that I was not a little surprised, and am so still, and quite as much as I was when the Acari made their first appearance. Again, I have never claimed any merit as attached to these experiments. It was a matter of chance; I was looking for silicious formations, and animal matter appeared instead."

These Acari, if removed from their birthplace, lived and propagated; but uniformly died on the first recurrence of frost, and were entirely destroyed if they fell back into the fluid whence they arose.

One of Mr. Crosse's visitors thus describes the vast electrical room at Fyne Court:

"Here was an immense number of jars and gallipots, containing fluids on which electricity was operating for the production of crystals. But you are startled in the midst of your observations by the smart crackling sound that attends the passage of the electrical spark; you hear also the rumbling of distant thunder. The rain is already plashing in great drop against the glass, and the sound of the passing sparks continues to startle your ear; you see at the window a huge brass conductor, with a discharging rod near it passing to the

floor, and from the one knob to the other sparks are leaping with increasing rapidity and noise, every one of which would kill twenty men at one blow, if they were linked together hand in hand and the spark sent through the circle. From this conductor wires pass off without the window, and the electric fluid is conducted harmlessly away. Mr. Crosse approached the instrument as boldly as if the flowing stream of fire were a harmless spark. Armed with his insulated rod, he sent it into his batteries; having charged them, he showed how wire was melted, dissipated in a moment, by its passage; how metals—silver, gold, and tin—were inflamed and burnt like paper, only with most brilliant hues. He showed you a mimic aurora and a falling star, and so proved to you the cause of those beautiful phenomena."

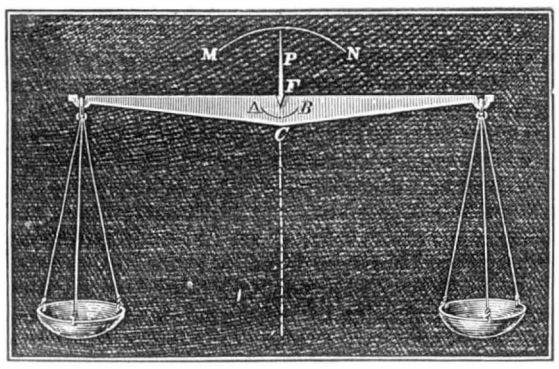
Mr. Crosse appeares to have produced in all "about 200 varieties of minerals, exactly resembling in all respects similar ones found in nature." He tried also a new plan of extracting gold from its ores by an electrical process, which succeeded, but was too expensive for common use. He was in the habit of saying that he could, like Archimedes, move the world "if he were able to construct a battery at once cheap, powerful, and durable." His process of extracting metals from their ores has been patented. Among his other useful applications of electricity are the purifying by its means of brackish or sea water, and the improving bad wine and brandy. He agreed with Mr. Quekett in thinking that it is by electrical action that silica and other mineral substances are carried into and assimilated by plants except fungi; and positive electricity he ascertained to be injurious to fungi, but favorable to everything else.

Mr. Crosse died in 1855. His widow has published a very interesting volume of *Memorials* of the ingenious experimenter.—*Timbs' Curiosities of Science.*

THE BALANCE.

The balance is an instrument so universally used that it seems strange that the principles of its construction should not be generally understood, yet such is the case. To satisfy ourselves that we are correct in this statement, we have conversed with a large number of grocers, druggists, and others, and have only in a very few instances found them posted. Chemists, assayers, and others who have occasion to use very fine balances, are always acquainted with the subject; but we do not write with the view of giving such any information. Our intention is simply to be the means of popular instruction.

The center of gravity in a body is a point so situated that, if the body be suspended from it, the mass may be revolved about this point and will remain at rest wherever it is placed. The balance is a lever having its fulcrum *above* the center of gravity of the beam. When it is balanced the center of gravity lies on a line joining the point of support and the earth's center of attraction. If either end is depressed, the center of gravity describes an arc the radius of which is the distance between the point of support or fulcrum and the center of gravity in the beam. This center of gravity is thus raised or carried away from the earth's center of attraction, and consequently tends to return to it as soon as the weight or other depressing force is removed.



In the engraving, F represents the point of support or fulcrum, C, the center of gravity of the scale beam, and A B, the arc of oscillation. The dotted line represents a line drawn from the fulcrum to the earth's center of attraction, and M N, the arc described by the pointer, P. C, being the lowest point to which the center of gravity can attain, it will remain there unless some force acts upon it. The shorter the distance between F and C, the less will the center of gravity be raised in describing any number of degrees of arc, and the less force will be required to move it. Hence the nearer the center of gravity in the beam lies to the fulcrum, the more delicate will be the action of the balance, all other things being equal. If the beam were suspended from a point coincident with its center of gravity, the latter would not be raised, however much the beam might oscillate; the beam would not then return to its original level, but would remain wherever it was placed. Such a balance would show differences in the weights of bodies, but any difference in weights attached to the ends of the beam, sufficiently great to overcome friction, would continue to move it until it assumed a perpendicular position. The only basis for the estimation of the difference would be the rapidity of this motion, and not the angle which the pointer, P, makes with the perpendicular, as is the case with the properly constructed balance.

If the point of support should be placed below the center, the beam would be reversed by any difference in weight sufficient to overcome friction. Friction is as much as possible avoided by the use of knife edges for supports, and in very delicate balances these edges rest upon pieces of polished agate. A delicate balance with from one to 2,000 grains on each dish should be sensitive to a difference of from .001 to .0005 of a grain.

CAPEWELL'S REVOLVING CARRIAGE WHEEL FENDER AND STEP.

In turning an ordinary carriage short, the wheel is liable to cramp against the body of the wagon, endangering its overturn and wearing and defacing the vehicle. To prevent this is the design of the device exhibited in the engravings. It is a roller, A, turning in projections under one edge of an open work triangular frame, B, of metal which is secured to the under side of the carriage rail. The sides of the frame are of such an angle that the wheel, when backed toward the wagon for turning around, shall engage the face of its tire squarely with the roller, thus effectually preventing cramping or friction. The construction of the roller is seen in Fig. 2, which is a longitudinal vertical section. It consists of alter-

Fig. 1

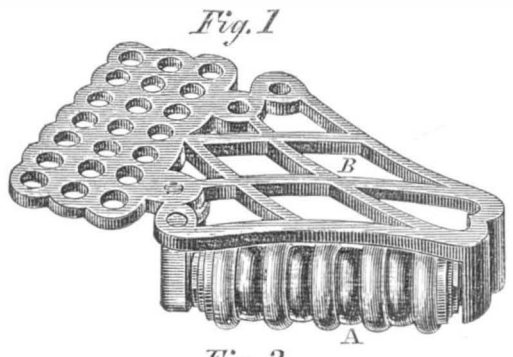
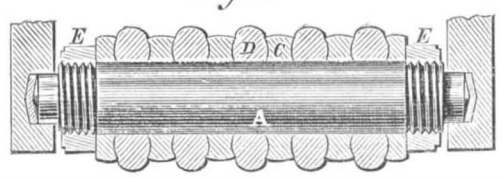


Fig. 2



nate disks of iron, C, and rubber, D, the latter cushioned or compressed by nuts, E, at either end. As the rubber stands above the iron washer rims, it receives the pressure of the wheel and renders the action noiseless. The roller may be placed on either side of the frame, B, to suit either the right or left side of the carriage. Besides its use as a fender, it makes an elegant and handy step to the carriage.

Patented through the Scientific American Patent Agency, September 17, 1867, by Geo J. Capewell, whom address, at West Cheshire, Conn.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents

Provincial Protection to Inventors.

MESSRS. EDITORS:—A question which interests many persons in this Province, is the manner in which the Dominion will treat the Patent question. A Government measure was introduced at the recent session, passed the Commons, was amended in the Senate in an important feature, and was consequently withdrawn by the Government. The matter, therefore, stands open to the next session, some eight months hence; and meanwhile it is important that correct notions on the subject should be sent abroad.

Each Province has, at present, a different system. That of the late Province of Canada is, as you know, exclusive—giving no right to a Canadian, the assignee of a foreign inventor, to obtain a patent in Canada. In New Brunswick, on the contrary, our system is most liberal. Here, any assignee of a foreign inventor can obtain a patent for the invention, subject to precisely the same regulations and under the same conditions which are applied in the case of New Brunswickers patenting their own inventions. The fees, too, are moderate, and the mode of application simple. Now, what we desire in respect to a patent law for the whole Dominion is, that it should copy the liberality and simplicity of our local Act. The present law of the Dominion should give its protection to the *creations* of genius, skill, and application, whether the possessor of these qualities lived on one side of the line or the other. We have always found fault with the United States Congress for not passing a copyright law, by which the intellect and the labors of British writers would be protected in the Republic. Not that it would have been of much service to us, for New Brunswick literature is not very extensive; but because we consider it right, just, and politic. What applies to literary creations, applies equally to inventions and discoveries in the arts and sciences.

But beyond this, we think that the Dominion Patent Act should make patents already existing in each Province, patents for and throughout the whole Dominion. Objections to this there may be, but we conceive that the reasons in its favor are overwhelming. It would make what is property in one Province, property throughout the Confederacy; it would simplify the settlement of the patent law question; and it would prevent conflicts of jurisdiction, of local patent laws with the Dominion patent law, of local patents with Dominion patents—which must otherwise arise. We cannot see that it would work injustice to any person, because, of course, all existing rights would be protected in any legislation for the purpose.

Your experience in the matter of patents and patent laws, will enable you to give us advice and assistance in this matter. Although of very great importance, the subject of patent laws is little understood in New Brunswick. J. E.

Woodstock, N. B.

Water Test for Boilers.

MESSRS. EDITORS.—I have a second-hand steam boiler and am desirous of knowing whether it will stand inspection or not, and I have no way of ascertaining except by sending to Chicago, a distance of one hundred miles, which would be an unnecessary expense in case of its not being strong enough to stand the test.

I propose to fill the boiler full of cold water, and then heat, it until it expands sufficient to produce the desired pressure which I think will take place before the water becomes very warm and before any steam has generated. I conversed with several machinists and engineers in regard to this way of testing, all of whom seemed to think it would not answer, but they could not give any reasons for thinking so. I cannot consistently place much reliance on such groundless opinions, and therefore would like to get your opinion and advice on the matter before trying the experiment.

De Pue, Ill. J. H. HASSLER

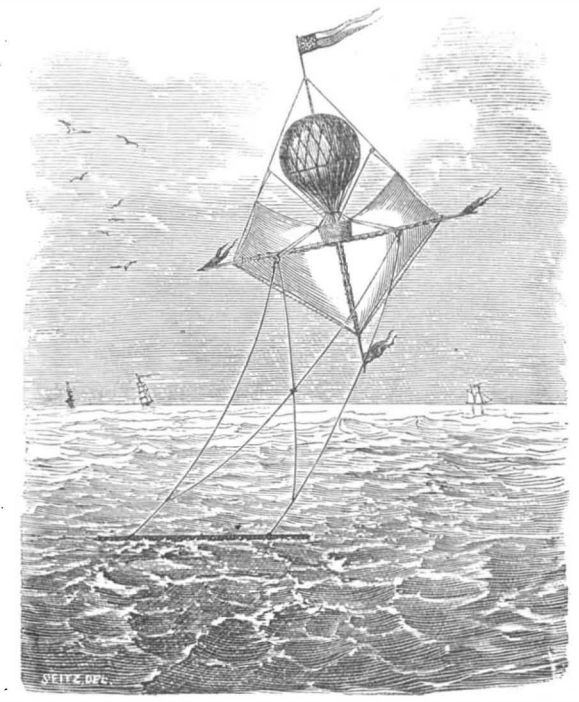
[We cannot advise the plan proposed; we do not think it would work. Dalton says that 1,000,000 parts of water at 32° Fah., becomes 1,046,600 at 212° Fah.; 1 in 23.3. Will not the shell of the boiler expand as much as the water and render nugatory the attempt to determine pressure? The boiler must be fitted with a force pump for feed, and it would be very easy to rig a contrivance to work it by hand so that you could apply the usual hydraulic test. If there is no steam gage to indicate pressure, the weight of the safety valve can be set to the point to which the boiler is to be tested and then the pump used until it rises.—EDS.

Marine Aeronautics.

MESSRS. EDITORS:—In your last number I notice an article entitled "The Great Aeronautical Exhibition." One paragraph particularly attracted my attention, and I quote it:

"In this class we notice only the following, chiefly on account of its absurdity. The expectation that a body floating in a current of air, and propelled by no other force, could be guided by sails, is a folly which our readers will appreciate without further remark."

Probably the most of your readers concur in your opinion, that it is folly to suppose that a body floating along in a current of air or water, propelled only by the force of the current itself, would exert any resisting force upon the fluid by which its direction could be changed. It is a fundamental principle of mechanics, that a body, moved by a single force in a given direction, requires a second force, acting in another direction, to produce any change in its course. A ship propelled through the water by means of sails, can be guided by her sails alone, to some extent. The second force in this case is the resistance upon her keel. If the keel were movable upon a central pivot—proper strength and other difficulties not being considered—the ship might be guided by its keel so as to sail as close to the wind as it now does by the use of the rudder. Many of your readers are acquainted with the old method of utilizing the force of river currents to propel ferry-boats across streams; the ends of the boat being connected by ropes to grooved pulleys running upon a rope stretched from one bank to the other. The end



of the boat lying in the direction the boat is required to move, is hauled up stream by shortening the rope at that end, so that the boat makes an oblique angle with the direction of the current. The force of the current upon the side of the boat propels it across.

So far no means have been discovered of guiding vessels—not locomotive—except by the resistance of one medium to the force of propulsion afforded by another. The difficulties of effecting locomotion in air-navigation are very great, for reasons which I need not here mention.

It occurred to me, some years since, that an application of the principles to which I have alluded, might be made to the guidance of balloons over large bodies of water. Since I first conceived the idea, I have made some experiments which have confirmed my first opinion, and as the subject of aeronautics is now attracting much attention, I have ventured to send you a drawing and a description of the apparatus which I have been experimenting with, representing it, however, as I should suppose it would appear when made upon a suitable scale for actual use. The sails are, however, probably too

large for the balloon as represented in the drawing, but that will not affect the elucidation of the proposed plan.

The vertical axis of the balloon is occupied by a mast extending to some distance below it, to which is attached a yard crossing the mast at right angles, directly beneath the car. Rope stays or braces are attached to, and connect the upper and lower extremities of the mast with the ends of the spar. To these stays and also to the mast are attached suitable blocks and other appliances for furling and extending the sails. On the spar, at about one fourth its length from either end, are blocks through each of which pass two guy ropes. One of these guy ropes passes directly to the corresponding end of a floating keel, and the other passes through a ring placed at the point where it intersects the opposite guy rope to the opposite end of the keel. By shorteuing or letting out these guy ropes a proper inclination is given to both the sails and the keel. The guy ropes are so attached to the keel as to have no tendency to keep it otherwise than perpendicular. The keel is composed of a hollow metallic tube which floats upon the surface of the water, with a thin plate of metal attached to its under side of sufficient depth to prevent drifting by the force of winds. Its cross section would be so small as to oppose little resistance to motion, while by the use of the guy ropes it could be made to assume such a position as to guide the balloon in any required direction. It could not probably be held so close to the wind as a well rigged sailing vessel, still my experiments have demonstrated to me that it can be brought much closer to it than I at first anticipated. The keel not only acts as a means for steering the balloon, but it also takes the place of ballast. It might easily be made to carry the materials for the generation of gas to supply leakages which are liable to occur. These materials could be separated and confined in appropriate receptacles which, by means of a stop cock with a cord attached, could be made to communicate with each other, and the gas thus generated could be conveyed by a flexible tube to the balloon. Enough of these compartments could be provided to furnish the gas in quantities as it would be required.

So confident am I that this apparatus will answer the purpose, that I am willing to undertake the voyage from New York to Liverpool provided a proper person will volunteer to accompany me, and some one can be found to furnish the means for the construction of the "air-ship" under my direction, my own resources being inadequate to meet the necessary expenses. AERONAUT.

Plan for Index Plates.

MESSRS. EDITORS:—I send herewith a plan for an index or dial-plate for a gear-cutting machine. If you or your correspondents know of a better combination, please inform me through the SCIENTIFIC. I propose to make the index-plate twenty-eight inches in diameter, the first circle of holes (commencing at center of plate) four inches diameter, and the last circle twenty-seven inches diameter. There will be sixty-nine circles in all, containing the following number of holes, and in the following order:

77	87	99	109	118	127	135	143	280	420
78	89	101	111	119	128	136	144	300	440
79	91	102	112	121	129	137	145	320	460
81	93	103	113	122	131	138	146	340	480
82	94	106	114	123	132	139	147	360	500
83	97	107	116	124	133	141	148	380	520
86	98	108	117	126	134	142	149	400	

In the above I have left out the number 75, 150, and some between them, because they are factors of other numbers used, viz:

75 is a factor of 300, 85 of 340, 95 of 380, 105 of 420, 125 of 500,
76 " " " 380, 88 " 440, 96 " 480, 110 " 440, 130 " 520,
80 " " " 480, 90 " 360, 100 " 500, 115 " 460, 140 " 280,
84 " " " 420, 92 " 460, 104 " 520, 120 " 480, 150 " 300.

All numbers below 75 are factors of the even numbers between 75 and 150. Consequently, I can cut a gear of any number of teeth below 150; above 150 I can cut as follows:

160 is a factor of 320, 190 of 380, 220 of 440, 250 of 500,
170 " " " 340, 200 " 400, 230 " 460, 260 " 520.
180 " " " 360, 210 " 420, 240 " 480.

Total number of holes in index-plate would be 12,690; number of different gear that could be cut from six teeth upwards, 169; distance from center to center of holes in four-inch circle, 0·1632 inch; distance from center to center of holes in largest circle, 0·1666+ inch; distance from any circle to next adjoining, 0·172+ inch.

Kalamazoo, Mich. E. H. H.

Breech-loading Cannon in Russia.

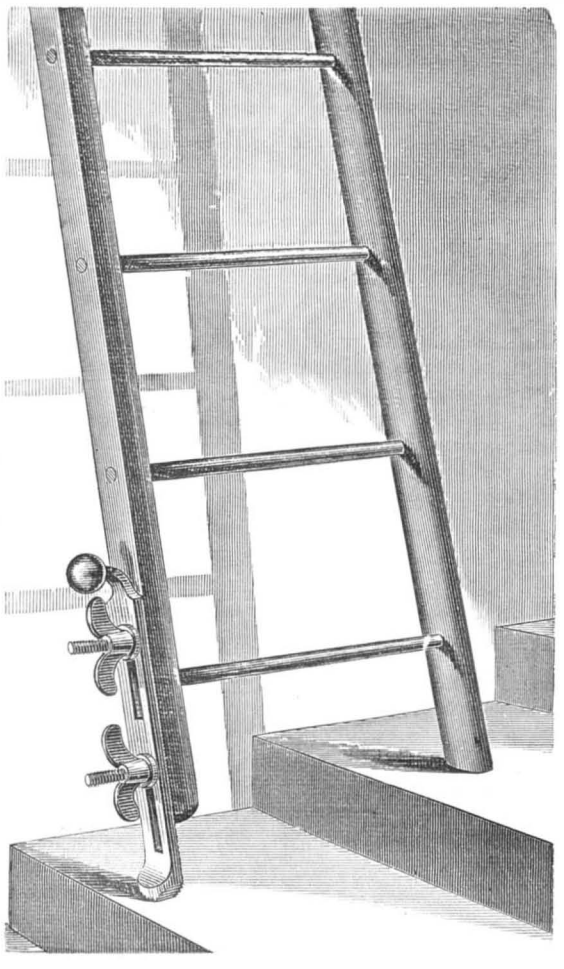
ST. PETERSBURG, RA., July 9, 1868.

MESSRS. EDITORS:—In your number of June 27th ult., you say that Russia had adopted the Prussian system of breech-loading cannon. This is a mistake. The Prussian system, together with the Armstrong and Broadwell systems of breech-loading cannon, was elaborately tried by a Russian Commission in the presence of the undersigned. The Armstrong gun, first, and the Prussian Krupp gun, second, broke down, and could not longer be loaded or fired without cleaning; while the *American* system of J. W. Broadwell proved a perfect success—his gun being as fresh and quick in loading, and accurate in fire, as at the commencement. As a consequence, Russia gave up the Krupp and Armstrong guns, and bought the Broadwell patent, giving him a decoration and a large sum of money, and now uses it both in the army and navy, in large and small bores. AMERICANUS.

RICH or poor, it is every man's and every woman's duty to earn his or her own living. Everybody is a consumer; therefore, everybody should be a producer. The world's wealth is so much less by everything that is consumed or worn out. The idleness of individuals in all stations and places, makes salaries lower and bread higher; so it is the idle in any community who should be despised, and not they who labor.

THOMAS & RAYMOND'S PATENT ADJUSTABLE LADDER.

Serious injury to body or limb, if not permanent crippling or loss of life, sometimes results from the slipping of the foot of a ladder, when, on account of the unevenness of the ground, it is necessary to "block up." This is usually done by means of brick, stone, pieces of wood, etc., liable to slip at any moment. The invention here illustrated is intended to obviate any such disaster. The engraving shows plainly a simple attachment effectual, cheap, and handy, which can be



applied to both feet of the ladder, which would seem to be preferable, as it would obviate the necessity of turning the ladder to suit its changed position to the surface of the ground.

In the engraving the attachment is very plainly seen. It is a strap of malleable, cast, or wrought iron, with two slots cut longitudinally, and is secured to the ladder by means of two bolts through the ladder leg, the attachment being held in position by nuts. For better security the foot of the attachment is corrugated, and the inside surface where it meets the ladder may be similarly corrugated if deemed necessary. When lifted up, the appendage is entirely out of the way, but it may be dropped to any extent desired to suit circumstances.

The patent for this device was issued June 30, 1868. The entire right or territorial rights are for sale by Thomas & Raymond, Beverly, Mass.

Dyspepsia---Its Symptoms and Causes.

We extract from a communication by Dr. E. P. Miller to the *Herald of Health*, the substance of an interesting article on Dyspepsia, a disease which prevails to an incredible extent in this country, and which is the fruitful source of many complaints often attributed to other causes.

"In persons whose digestion is perfectly healthy, there is, during the digestive process, more or less gas accumulated. This gas is generally all absorbed and used in the system, so so that in the highest state of health no gas will accumulate in the body, it should all be taken up by absorbents and used.

"Flatulence, then, is due to an excess of gas. The cause of this excess may be either a failure of the absorbents to take up what naturally accumulates in the digestive process, or to its being produced in excess. The introduction of a certain amount of air into the stomach in the frothy saliva, by mastication, and in the act of swallowing food, may be considered a physiological process. This air undergoes a change by being interchanged or mixed with the digestive fluids and gases, and in this change it gives up a portion of its oxygen, which is finally absorbed. In the dyspeptic's stomach the absorbents are not active, and this gas accumulates, giving rise to flatulence.

"The chief origin of the gases which produce flatulence, however, is due to the decomposition or putrefaction of food in the alimentary canal, and those persons who are habitually troubled with flatulence, either eat at their meals a quantity of food which is absolutely much too large for their powers of digestion, or they are taking a quality of food that is not well adapted to the diseased condition of their digestive organs.

"Some authors think that the fluids which are thrown back into the intestinal canal from the blood to be excreted, generate gases which give rise to flatulence. This opinion has not, as yet, been so clearly established. The gas in the stomach differs from that in the intestines, and that in the small intestines differs from that in the large. There is a much larger proportion of oxygen in that found in the stomach, being much more like atmospheric air than those intestinal gases.

"Hydrogen is formed in much larger proportion, however, in the gases of the intestines than in those of the stomach. This hydrogen is not found in the blood to any great extent, and is not extracted from the blood into the intestines, so that it must arise from the chemical changes going on in the food after it leaves the stomach. This chemical change is doubtless due to obstructions in the function of the liver. MM. Bidder and Schmidt have tried repeated experiments upon dogs, by tying the duct which conveys the bile from the liver to the intestines, and they have invariably found that rapid chemical changes took place in all sorts of food when this was done. When animal food was fed to these dogs the feces smelled like carrion; there was a continual rumbling in the abdomen, and an evacuation of fetid air.

"From the experiments made, it is supposed that one of the functions of the bile is to act as an antiseptic, and prevent the putrid decomposition of albuminous food, and also to check the acid fermentation of vegetable foods. Dr. Chambers states 'the condition produced in dogs by mechanically stopping the functioning of the liver, answers exactly to the intestinal flatulence of dyspeptics in our species.'

"Flatulence of the small intestines generally occasions the greatest annoyance. There is usually considerable difficulty in this gas passing the ilio-colic valve into the large intestines, and for this reason it often rolls about in the abdomen, causing a very distressing rumbling noise, sometimes remaining several days without being able to escape or to be absorbed. In addition to this rumbling and motion, it often greatly distends the abdomen, causing severe pain in the in the side and other distressing symptoms. At times, when there is but slight pain or discomfort, it occasions much inconvenience by preventing sleep.

"When gas is expelled by the mouth, that has a strong odor of sulphureted hydrogen, it is intestinal gas that has passed up through the pyloric orifice into the stomach. When gas is belched up that has neither taste nor smell, it usually comes from indigestion of starchy food; when it is fetid with the odor and flavor of sulphureted hydrogen, or rotten eggs, it is from the indigestion of albuminous food. Flatulence arising from the indigestion of albuminous food is often attended with diarrhea, while that caused from starchy food is attended with constipation. Flatulence of the colon or large intestines is not near so troublesome as that of the small intestines. It is readily distinguished from that of the small intestines by percussion, by the absence of rumbling, and by its passing off more readily from the bowels.

"Constipation is one of the obstinate and very troublesome symptoms accompanying dyspepsia. It is often so formidable as to be almost the only symptom complained of. Patients often say: 'Doctor, if I could only get my bowels to move freely, I should be all right; but I can't get them to move at all without I first take something to start them.' This taking 'something to start them' is very often the sole cause of their extreme constipation. There are tens of thousands of dyspeptics in the country who have almost ruined the mucous coats of the alimentary canal by the constant habit of resorting to physics to cure them of every slight indisposition they may have.

"If people would only realize that in every dose of physic they swallow they are taking into their systems an irritant and dangerous poison, which the vital instincts hasten to expel from the body by this rapid purging, and that this poison must leave its damaging effects in the blood, on the nerves, bones, muscles, and particularly on the mucous membrane of the alimentary canal, it seems to me they would see a reason for not being in quite so much haste to defile the beautiful bodies God has given them.

"Constipation and costiveness are usually regarded as synonymous terms, yet some authors make the distinction, that in costiveness there is less fecal matter formed than in constipation. In both there is a default in the repulsive power of the bowels, allowing the fecal matter to accumulate, but in costiveness there is less accumulation than in constipation. In this difficulty there is evidently a great deficiency of expulsive power in the lower bowels. The causes of course are various. Purgative medicines, I think, should head the list. Imperfect digestion of the food before it reaches the colon; sedentary habits; acute diseases, which confine the patient to the bed for a long time; general debility; neglect to attend to the natural call to evacuate the bowels, thus keeping them too long dilated or distended; imperfect mastication; eating indigestible and insoluble articles of food, such as skin, gristle, stones and seeds of fruits, and half-cooked vegetables, highly seasoned food, new bread, starchy food that is imperfectly digested, alcoholic stimulants, tobacco, vinegar, and whatever interferes with the healthy action of the liver, will produce constipation.

"Too highly concentrated food is often a cause. A certain amount of innutritious material seems necessary to complete digestion, and thus, while we should not exclude the innutricious entirely, we should avoid the extreme of swallowing too much of the coarse and indigestible. The exclusive use of fine flour bread is a prolific cause of constipation. It prevails more among Americans than any other class of people; the reason for this being, they use more concentrated food, take more physic, and less exercise. Old people are most most liable to constipation."

OUR Secretary of the Navy within a few days past, has sent in a communication to the Senate in reference to the acquisition of the Midway Islands, belonging to the West Indies group, and the opinion is expressed that the acquisition will prove a highly important one. The principal harbor is said to be equal to that of Honolulu, the soil is good and fish are abundant in the bays.

The Aniline Blue---An Instructive Lesson.

It is an old maxim that "Fortune favors the brave." It might be appropriately added that it also favors the persevering. Many important discoveries have been made in consequence of the dogged perseverance of men, who, when they have asked from nature a revelation of her mysteries, would not accept a negative answer, until it would seem that almost on account of their very persistence they were rewarded by success. An interesting treatise on Aniline and its its Derivatives, from the pen of M Reimann, contains the following anecdote of the way in which the fugitive blue formerly considered as practically of no value, was rendered permanent It presents a marked contrast to an instance of good abilities wasted on account of unfixedness of purpose, which we give in another column:

"A dyer, like all others of his craft at that time, was busily occupied experimenting with the aniline dyes. Amongst other things, he tried a reaction described by M Lauth, viz., that of aldehyd on a sulphuric solution of aniline red. In this reaction, a substance is produced which gives to solutions an extremely evanescent blue color. M. Lauth had given up all idea of utilizing this blue color in practice; and M. Cherpin endeavored to fix the same color on silk or wool with similar want of success. His attempts, although fruitless, were incessantly renewed. exhausting his purse, but not his patience. One day, however, discouraged at the want of success attending some recent experiment on which he had founded great hopes, he was on the point of relinquishing the attempt at conquest over this fugitive blue, when the idea struck him to confide his troubles to an old friend, a photographer. 'A trouble shared is a trouble halved,' says the proverb. Cherpin proceeded to test this saying, and experienced the reward of his perseverance and his confidence in the consolations of friendship. He found his photographic friend, and confided to him the history of all his hopes, his experiments, and his fruitless results. 'Fix the blue?' said his friend. 'Is that the only difficulty? Why it's the easiest thing in the world! Have you tried hyposulphite of soda?' 'Hyposulphite of soda? *Mon Dieu*, no! Do you think it will fix my color?' 'Of course it will. Don't you know that hyposulphite of soda is the fixing agent *par excellence*, and that when we want to fix anything in photography, that is the substance we always employ.'

"Happy is he who possesses faith! Cherpin tried hyposulphite of soda, and his joy and admiration of the chemical knowledge of his friend may be imagined when he saw his blue color metamorphosed into a splendid green, this time perfectly stable. It is scarcely necessary for us to add, that the mode of action of action of hyposulphite of soda in this case is entirely different from its photographic action, and that it would be quite impossible to predict the one by knowing the other.

"This anecdote contains a moral. It shows, in our opinion, not the result of chance, for that is common to all the world,—for where is the discovery to which chance has not more or less contributed?—but it shows the power of will, the power of perseverance. Chance only favors two kinds of persons—those sufficiently instructed, or endowed with talents eminent enough to observe it, to seize it, and to profit by it; and those who, by patience, perseverance, and the power of their will, force it in time to become useful to them."

What a grand moral this ludicrous episode ought to convey to our students if they will only read it aright?

Editorial Summary.

CHICAGO was visited July, 21st, by countless numbers of the sand-fly, an insect about the size of the gallinippers which infest the Southern swamps. Their advent was sudden, and many of the saloons on the north and south sides were compelled to close up in order to prevent their ingress. Wherever a light was placed the flies gathered around it in millions, and covered the glass in the windows so as to render it almost an impossibility to see the gas jet. The street lamps were besieged, and in many instances the streets were as dark as if no gas were employed. The sidewalks were covered, and many were crushed to death beneath the feet of pedestrians. But still they increased, and about 10 30 o'clock they covered everything. They then commenced to disappear, and at two o'clock in the morning scarcely one was to be seen. This is about the usual time for their annual visit, but never before were so many seen at any one time at a particular point.

AN IRON MOUNTAIN IN WEST VIRGINIA.—The Pittsburgh *Gazette* says: "We are informed by Hon. D. D. T. Farrensworth, State senator from Upshur county, West Virginia, that an iron mountain exists in the upper portion of that county, of greater extent and purity than any other known body of iron in the world, not excepting the famous iron mountain of Missouri; and that under this vast body of iron there is a vein of bituminous coal, measuring on the face, where the Buchanan river cuts through, twenty-five feet in thickness. He declares this ore to be so pure that a blacksmith took a piece and forged a horse-shoe from it. This deposit is up the west branch of the Monongahela river, and can be reached from this city by a railway not exceeding one hundred and fifty miles in length."

IN the southeast corner of the Territory of Wyoming is situated Cheyenne. This, the "Magic City," was laid out by General Dodge, on the 20th and 21st of July. 1867. In one short year it has gained a resident population of over five thousand, having had, perhaps, in the flourishing times of gamblers, roughs, and prostitutes, as many more. The citizens now are mostly of a very respectable class, though, like all the western towns, it has a full quota of rum-shops and their patrons.

THE solvent power of glycerin upon several substances commonly used in medicine and the arts, is as follows: One part of sulphur requires 2,000 parts of glycerin; iodine, 100 parts; red iodide of mercury, 340 parts; corrosive sublimate, 14 parts; sulphate of quinine, 48 parts; tannin, 6 parts; veratria, 96 parts; atropia, 50 parts; hydrochlorate of morphia, 19 parts; tartar emetic, 50 parts; iodide of sulphur, 60 parts; iodide of potassium, 3 parts; sulphide of potassium, 10 parts.

A COMMUNICATION to the Royal Society gives an account of some observations upon the small comet discovered on the 13th of June by Winecke. The spectrum of this comet is resolved into three broad bright bands, corresponding to the spectrum of carbon in the combustion of olefiant gas. From this it is not improbable that carbon will hereafter be determined to be a general constituent of cometary matter.

A WRITER in the London Quarterly Review urges the construction of the Euphrates Valley Railway by the British Government. It is probable that the demands of commerce will soon cause the construction of a railroad from the Caspian to the Indus valley by way of Muhad, Herat, and Candahar, that is to say a route through Russian territory and opening the way for Russian armies to India. Such a road, too, would compete with our Pacific Railroad for the commerce of Eastern Asia.

A METHOD of refining sugar has recently been submitted to the French Academy. It consists merely in adding milk of lime to the sirup, mixing intimately in quantities dependent on degree of impurity. The lime is afterward separated by a current of carbonic acid (passed as long as the liquid is alkaline). followed by boiling for a short time to decompose the resulting bicarbonate. The filtered and decantered liquid yields pure white sugar. The quantity of lime varies from four per cent. upward.

THE boxes in Boston post office have been provided with metallic doors and patent bank locks. The advantage of this innovation is that each box-holder can have access to his box at all times, and on any day. The lock is the property of the box-holder. and, on the box changing owners, the lock is removed, and a new and different one substituted.

ANILINE poisoning can be detected as follows: Macerate the contents of the stomach with water containing a little sulphuric acid, add an excess of solution of potassa, and distil; add a little sulphuric acid to the distillate and evaporate. If aniline is present, a purple or red margin will be formed at the top of solution where it touches the vessel

M. LARTET, at the last session of the *Sociétés Savantes*, presented an account of some human bones discovered by him in Dordogne. The bones of the limbs were of remarkable size and prodigious strength. Three skulls were found also of great size. The age of these bones is judged to be equal to the mammoth, and they are considered to belong to the same geological period.

IT is estimated that fire in the woods, this season, has destroyed in the Ottawa District, standing pine lumber, to the value of $4,000,000, and the woods are still burning. The boats on the Montreal route, it is said, are seriously detained by the smoke on the river.

ON the Erie Canal, a boat has been placed, which is propelled on a new principle. The propelling power is a wheel in the centre, fixed upon a frame which allows it to rise and fall according to the depth of water, and permits the circumference always to come in contact with the bottom of the canal. Satisfactory results are said to be obtained.

A RESIDENT of Martigny, Switzerland, has lately organized a considerable trade in ice at Lausanne. The ice from the glaciers having been sawn into regular cubes of small volume and perfect transparency, is placed in boxes and sent off by fast trains to various centres of population in France, and arrives with very little waste.

THE boundaries of the new territory of Wyoming are as follows: On the north is situated Montana; on the south, Colorado; on the east, Dakota and Nebraska; and on the west, Montana, Idaho, and Utah. It lies between the 27th and 34th meridians of longitude west from Washington, and the 41st and 45th parallels of latitude.

No doubt the cheese factories of the country add much to the cheese product in the market; neither is there any doubt that the quality of the article decreases as the quantity increases. The rich productions which once made Goshen and Herkimer county famous, are now buried beneath the leathery and tasteless productions of the cheese factories.

THE parallel rod of the first locomotive run over the Boston and Providence road in 1834 is preserved in the Company's workshop at Boston. The parallel rods of their engines now in use weigh 249 pounds.

A NEW tunnel under the Thames is contemplated, at a point near the Tower of London, to be lined with blue brick and iron, and with hydraulic lifts at the ends to raise a carriage and ten passengers.

THE *Reporter* estimates the shoe business at Lynn, for the past year, at $17,000,000.

NATURE was thoughtful in her arrangement of coal and iron. Generally, wherever she laid down a stratum of iron ore, she accompanied it with a layer of coal to smelt it.

THE largest sawmill in the world, but one, is at Clinton, Iowa, and when under full way employs 1,000 men. Its engine is of 900 horse power.

A MAN in East Thompson, Conn., is building two tenement houses, framed like ordinary buildings, but which are to be covered, sides and roof, with Manilla paper instead of boards.

APPLES carried from this country to China, packed in ice, sell at Hong Kong for $2 a dozen, gold.

BEET sugar cultivation is a growing interest in the Western States. At Montgomery, Ill., a company has purchased this season 500 acres, on which they are raising beets for sugar.

NEW ELGIN, Ill, is a forest of pine and birch, the trees 20 feet high, and "raised from the seed," where ten years ago was only a shrubless prairie.

THE Foreign Associateship of the French Academy of Sciences, vacant by the death of Sir David Brewster, has been filled it is reported, by the election of the eminent mathematician, Professor Krummer, of Berlin.

A PHYSICIAN of Illinois reports a case of blindness of the right eye completely cured by the extraction of the first bicuspid of the upper jaw. The tooth was carious, and its interior was filled with pus.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

THE WORKING PEOPLE.—*The Labor Exchange*, at Castle Garden, N. Y. makes the following report of the first twelve working days of July: Applicants for employment, 1,804; consisting of males, 1,182; females, 622; orders, for employés, 2,012; males, 1,390; females, 622; persons employed, 1,804; males, 1,182; females, 622. Among these were 41 families comprising 134 persons. Average number of orders each day, 168; average number of applications for employment, 150; average rate of monthly wages paid to the males, $25; average rate of monthly wages paid to females, $9. Classification of the applicants: Males, mechanics, 129; agriculturists, 1 053; females, skilled labor, 24; unskilled labor, 598. Males able to read and write, 877; not able, 305; females able to read and write, 456; not able, 166.

A distinguished experimental chemist of Paris announces that he has taken advantage of the property possessed by fluoride of calcium (common fluor spar) of dissolving alumina at a high temperature to obtain magnificent crystals of corundum (sapphire, rubies, &c.) He promises shortly to give a full account of the experiment.

The roof the Metropolitan station, now being erected for the Midland Railway at King's Cross, London, is to ordinary roofs what the Great Eastern was to ordinary vessels. Its span is 240 feet, and the hight of the central portion of the arch from the level of the rails is 99 feet. It covers eleven lines of rails and four acres of cellars.

The statistics of cigar manufacture show that Great Britain and her colonies and the United States consume half the crop of the world, and that Cuba produces one-third of the whole supply of the world.

The descent of the Union Pacific railroad from the Black Hills to Laramie Plains, is every way sensational. The grade is 90 feet to the mile, so winding that 24 miles are traveled to reach a point 12 miles distant, and Medicine Bow Mountain, capped even in the summer time with snow, appears at the right of the traveler one minute, and at the left a minute later.

The Winsted Hoe Company which was employed wholly in the manufacture of hoes for southern plantations, has shut up shop for want of orders. The scythe factories of the same place have also a dull season, a circumstance with which the mowing machines may have much to do.

The Pacific slope intends to provide itself with iron. San Francisco has built a rolling mill, and Oregon has sent down 1,000 tuns of pig iron to start with.

The patent on Hoe's rotary presses expired on Friday, 24th July. An application for its extension for seven years was not acted upon by Congress owing to the lateness of the time at which it was introduced.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the most important home and foreign patents.

BUILDING MATERIAL.—Thomas J. Lowry, Conncantville, Pa.—The nature of my invention relates to improvements in the composition of matter for forming building material and in molds for forming the same.

LEVELS.—Wm. P. Cutter, Chelsea, Mass.—This invention consists is an ordinary stock of wood which is provided with a circular metallic ring made in two parts and inserted within a central circular opening on the said stock within the said ring a weighted pendulum is suspended upon a central axis and provided with arms which swing between cross arms of the ring, and always maintaining a verticle position no matter what position the stock may be in.

INDICATOR FOR BOILERS.—Robert Berryman, Philadelphia, Pa.—This invention relates to a new indicator, which is to be attached to steam boilers, and its object is to produce a perfect safety guard against all accidents that may arise from having too much or too little water or too high or too low a pressure of steam in the boiler.

DEVICE FOR HOLDING TOOLS AGAINST GRINDSTONES.—Edwin Fernald, Turner, Me.—This invention relates to a device by which tools having a long cutting edge, can be held against grindstones, and can be sharpened; the device being so arranged that the bevel formed on the tool will be entirely uniform, and that its edge will be ground perfectly straight.

CARRIAGE.—Job Whitehead, Ames Station, Iowa.—This invention consists in the arrangement upon the frame-work of the body or box of a carriage of one or more coiled springs which may be wound up with a crank and arranged to transmit motion to the axle of the hind wheels and belts.

OINTMENT FOR VETERINARY PRACTICE.—Richard Jones, New York city.—This invention and discovery relates to a composition designed for healing purposes in the treatment of horses. cattle, and other domestic animals, and which may also be used with good effect upon the human body for the cure of wounds, bruises, and for other purposes.

WATER WHEEL.—La Fayette Lyons, Bennington, Vt.—This invention consists of a horizontal wheel provided with vertical curved buckets against which the water flows in a right angled direction and is discharged through two or more openings in the cover into a circular chamber of the diameter of the wheel, from which lateral tubes convey it away out of the chamber through the curb which supplies the water to the wheel.

DUMPING CAR.—Philander Daniels, Jackson, Mich.—This invention consists in the arrangement on the platform of a car, of a dumping bed fixed on wheels and provided with racks and pinions, whereby the operator by turning a crank may move the said bed over the edge of the car until it will dump by the action of momentum and gravitation, the said bed being provided with staples which are caught by hooks suitably placed at the edges of the car and to hold it as on a pivot to be restored to a level position by the oper

ator previous to being returned by the racks or pinions to its normal position on the car.

HOOP SKIRT.—Louis Feldheimer, New York city.—This invention relates to the manufacture of hoop skirts and particularly to the method of fastening the tape to the steel spring, and it consists in passing the steel spring transversly through one eyelet and then clinching or passing down the inner end of the eyelet on to the steel.

BOLT TRIMMER.—Henry Howe, Oneonta, N. Y.—This invention relates to a new device for trimming bolts, rivets and other suitable articles, and consists of a cutter sliding within the lower part of a slotted plate, so that its bottom is flush with the under side of the plate. Reciprocating motion is imparted by means of an oscillating cam, working on the said plate, and by means of a spring catch projecting from the rear end of the cutter. The cutter is supported in the plate by having beveled edges which rest upon the similar-shaped inner edges of the slot in the plate. The cutting edge of the tool and the corresponding abutting edge of the plate are set diagonal, so that a drawing cut is produced on a reciprocating cutter.

LOCK.—John G. Spathlef, Sandusky, Ohio.—This invention relates to certain improvements which are applicable to door locks, safe locks, trunk locks, spring locks, pad locks, and all other kinds of locks.

WOOD SAWING MACHINE.—Henry A. Daniels, Thomaston, Conn.—This invention consists in arranging the bearings of the crank shaft in the same slide to which the swinging saw frame is pivoted, so that the distance between the working and swinging centers cannot be varied. The invention also consists in the use of a reciprocating block, which turns loose on the wrist pin of the crank and which slides between two parallel bars that form part of the swinging frame.

COFFEE ROASTER.—Freiderich Max Bode, Vienna, Austria.—This invention relates to a new coffee roaster, which consists of a spherical shell hung in a semi spherical jacket, its one axis being hollow and serving as a filling and discharge opening. The shell can be revolved by means of a handle attached to the cover of the aforesaid hollow axis, which cover can be removed to allow the filling in and discharge of the coffee.

CARRIAGE CLIP.—Thomas McCreary, Matteawan, N. Y.—This invention relates to a new device for connecting the shaft of a carriage with the front axle of the same by means of a pivot which will not rattle, which cannot easily get out of order, and which can be readily removed to allow the shaft to be taken off. The invention consists in securing the pivot to the end of the shaft and not to the clip, as usual, and in then hanging it loose in the ears of the clip and in locking it to the same by means of a spring catch.

SEWING MACHINE.—Stephen French, Orange, Mass.—This invention relates to a new shuttle sewing machine, and consists in so combining with each other an oscillating shuttle driver, a double cam-feed motion, and a slotted plate for moving the needle up and down; that in one machine the main advantages of many different kinds of sewing machines are contained whereby a complete and satisfactory operation, as well as great simplicity of construction can be obtained.

HAND PUNCH.—J. D. Higgins, Greenville, Conn.—This invention consists in arranging a sliding tubular punch in an arm that is parallel with, and projects from the lower jaw, and in holding the punch by means of a spring constantly against the upper or pressing jaw. When the punch is to be used it is by the upper jaw forced toward the lower one, but is at the same time always guided in the aforesaid arm so as to remain perpendicular to the face of the lower jaw.

MACHINE FOR DRIVING FENCE POSTS.—Isaac J. Parker, Buffalo Grove, Iowa.—This invention relates to a machine for driving fence posts and is designed to be placed upon a wagon or any suitable frame mounted on wheels; the device being constructed in such a manner that it may be operated while on the wagon and, drawn from place to place where the posts are to be driven.

SWITCH LOCK.—John V. Chamberlain, Cincinnati, Ohio.—This invention relates to a lock for railroad switches, and it consists in a novel construction and arrangement of parts, whereby the lock is rendered self-locking and a very simple and durable lock obtained; all springs and small parts which are liable to get out of repair being avoided.

LIQUID MEASURE.—Ward Sprague, Sandy Creek, N. Y.—This invention is designed to obviate the difficulty attending the measuring in cold weather of thick viscid liquids, such for instances molasses, sirups, etc., etc.; and to this end the invention consists in constructing the measure with double walls with a space allowed between to receive water or other suitable fluid, while, by placing the measure on a stove it is kept warm and whenever the measure is used the heat radiated from the walls of the measure will render the contents of the same sufficiently fluid to flow readily.

FLATTENING AND BENDING RODS FOR CHAIN LINKS.—Peter Hendricks, Trenton, N. Y.—This invention relates to a machine for flattening and bending rods for the manufacture of links for chains such as are used more especially for mining purposes. The invention consists in a peculiar construction and arrangement of parts whereby the two different sized links required for the manufacture of each chain may have the rods of which they are formed, flattened and bent on one and the same machine.

CENTERING LATHE.—Benjamin F. Bee, Harwick, Mass.—This invention relates to a new centering lathe designed for centering articles, that is, adjusting their ends centrally in line with the bit of the lathe so that the article may be drilled centrally or leave center holes made properly in their ends in order that they may be fitted centrally in a turning lathe.

AUGER FOR.—H. D. Pennoyer, Athens, N. Y.—This invention relates to an improvement in augers, and it consists in providing a top piece to fit on the upper end of the auger shank and receive the handle, said top-piece being composed of two parts and provided respectively with pawls and a ratchet, whereby the auger may be turned and holes bored in close proximity to any vertical fixtures where an ordinary fixed handle cannot be turned, and at the same time admit of the handle being adjusted and turned as usual in places where there is room to allow it.

SULKY PLOW.—Benj. Slusser Sidney, Ohio.—The object of this invention is to simplify the construction of sulky plows so as greatly to reduce their cost, while yet enabling them to be capable of easy operation, of ready adjustment, and of yielding to immovable obstacles without breaking.

LOW-WATER INDICATOR.—T. G. Eiswald, Providence, R. I.—The object of this invention is to furnish a neat and convenient instrument, which, being attached to the head of a steam boiler, will enable the engineer at any time to try the condition of the water in the boiler, and will, of itself, sound an alarm whistle when the water gets too low for safety.

COMBINED LOW-WATER INDICATOR AND TRY COCK.—T. G. Eiswald, Providence, R. I.—This invention relates to that class of low-water indicators in which a fusible plug is employed, and consists in a simple and convenient device by which the interior of such indicators can be kept clear from the accumulation of dirt, sediment, or scale, and by which, when such foreign substances have accumulated in the indicator, they may be blown out at any time and the interior of the indicator left perfectly clean and free. The device by which these important objects are attained, can at other times be employed conveniently as a try cock.

CLOTHES WRINGER.—P. Cramer, Providence, R. I.—This invention relates to a new clothes wringer, which consists of four rollers, one of which is an elastic roller, held loose between the three other rigid rollers. The elastic roller is not hung in bearings, and need therefore not be formed on a metallic or wooden or other axle, but will be soft and elastic throughout.

WINDOW WIPER.—B. F. Burgess, Boston, Mass.—This invention relates to a new and improved method of cleaning windows, and it consists in arranging on a handle, of any desired length, a revolving frame made of tin or other suitable material, and attaching rollers thereto on which wiping or washing cloths are wound and unwound.

PAIL EAR.—Geo. E. Eastman, New Hartford, N. Y.—This invention relates to an improvement in bail ears for pails or buckets, and for other vessels of a similar construction, whereby they are rendered much more durable than the ordinary bail ear, and the invention consists in forming the ear with a branch exterior stay and and an interior stay, which are connected with the main plate of the car, whereby the main plate is guarded and protected from injurious lateral strain and rendered strong and durable.

COMBINED WINDOW AND BLIND FASTENING.—Wm. L. Barnes, Irvington, N. Y.—This invention consists in a device by which the blind and sash of a window can securely be fastened on the inside by combining the two fastenings.

OIL CUP.—Sylvester Charnley, Portage City, Wis.—This invention consists in so arranging a valve in an oil cup that it can be raised by the motion of the part to which the cup is attached and closed by its own gravity, so that the discharge of the oil will depend upon the rapidity of the motion up and down.

EXTENSION LADDER.—John A. Smith, Lacon, Ill.—This invention has for its object to furnish an improved extension ladder, designed especially for firemen, painters, and tinners' use, but which shall be equally applicable for other uses, which shall be simple in construction, easily adjusted, extended, and moved from place to place.

DOOR MAT.—Wm. Young, Franklin, Mass.—This invention has for its object to furnish a simple, cheap, and serviceable door mat, which may be made single or double, large or small, in one piece or in sections, and which, when worn, may be refilled with little trouble and at trifling expense.

EVAPORATOR.—N. Evinger, Terre Haute, Ind.—This invention has for its object to furnish an improved apparatus for evaporating cane or other saccharine juice for the manufacture of molasses and sugar.

TRACK CLEARER.—John Callaghan, St. Louis, Mo.—This invention has for its object to furnish an improved device for attachment to street railroad cars, by means of which the cars may be made to clear the track for themselves.

TABLE CUTLERY.—Wm. Clayton, Bristol, Conn.—This invention relates to a new manner of attaching the bolsters to the shanks and handles of knives and forks, and consists in attaching a wrought or cast metal bolster to the shank and handle by means of Babbet or other metal, cast around the lower part of the bolster. The shank is perforated, and the upper edges of the scales or handle are recessed, as well as the lower edge of the bolster, so that a slot is formed through handle, bolster, and shank, through which the metal is cast; its two parts being thereby connected to lock the two parts of the bolster firmly together, and to the handle.

TANNERS' HOOK.—James Hoffman, Belvidere, N. J.—This invention has for its object to furnish an improved hook for tanners' use in handling hides in the vat, which shall be so constructed and arranged as to handle the hides without injuring their grain.

APPARATUS FOR CLARIFYING CANE JUICE.—Wm. Dill, Houma, La.—The object of this invention is to provide a simple and effective apparatus for straining and clarifying cane juice.

CRAYON HOLDER.—Rufus Wright, Brooklyn, N. Y.—This invention relates to improvements in the cases or holders for crayons which are used in drawing by artists, and in schools and institutions of learning for demonstrating problems on the blackboard.

GIB AND SELF-OILER.—Cyrus B. White, Port Richmond, N. Y.—This invention relates to an improvement in self-lubricating gibs for steam engines, and is an improvement on a device for that purpose patented by Wm. A. Devon, Nov. 19, 1867. The object of the invention is to avoid the waste of oil caused by the motion of the cross head, and while effecting this end to obtain a perfect or reliable bearing at all times of the friction roller against the guide.

BACK-BAND HOOK.—Charles Waek, Evansville, Ind.—This invention relates to harnesses used on horses for plowing and other purposes, and consists in forming the hook in such a manner that the chain which it supports is securely kept in place when in use.

CORN SHELLER.—A. C. Mills, Oaktown, Ind.—This invention has for its object to furnish a simple, convenient, and effective instrument for shelling corn, and which shall at the same time be durable and cheap.

BOOTS AND SHOES.—William Smith, Whitehall, Bridesburg, Pa.—This invention consists in inserting in the sole of a boot or shoe strips of wood, metal, or other suitable material, in such a manner as to preserve the sole from wear, and to admit of said material being readily withdrawn or detached from the sole when, from wear or other causes, it becomes necessary to have new ones attached. The object of the invention is to protect the sole of the boot or shoe from wear by a means which will not disfigure the same or be at all conspicuous even when applied to light or "dress" boots and shoes.

SMUT MACHINE.—E. McLane, Young America, Ill.—This invention relates to a machine for depriving grain of smut and other impurities, and it consists in a securing device of peculiar construction and a novel arrangement of a suction blast, whereby a very powerful and efficient blast is obtained without wasting or blowing away the grain, and the grain secured in the most thorough manner by a very compact device.

MACHINE FOR DRESSING SLATE FRAMES.—W. F. Mosser, Allentown, Pa.—This invention has for its object to so improve the construction of slate frame machines that each slate may be automatically fed from a pile, have their corners rounded off and their edges dressed, and may then be fed cornerwise to the revolving planers by which both sides of the frame are dressed, so that the slates may come from the machine completely dressed.

CYLINDRICAL FILTERING PRESS.—Pierre du Rieux and Edouard Roettger, Lille, France. Patented July 21, 1868.—This invention relates to an improved construction and arrangement of the parts of filtering presses, designed especially for use in sugar houses, whereby a more efficient working is obtained and all danger of the machine exploding under pressure is avoided, and the operations of filtering the liquid parts and casking the solid parts of semi-liquids may be conducted with more speed, regularity, and efficiency.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. A., of N. Y., asks: 1st, Whether a weak solution of carbolic acid applied with a watering pot to garden walks will be an effectual mode of preventing the growth of weeds. 2d, What should be the strength the solution. 3d, In what form can the article be procured. 4th, Is there anything in the nature of the substance requiring precaution in using it. Answer, 1st, It will. 2d, The solution must be very weak, 1 part carbolic acid in 1,000 to 2,000 parts of water. 3d, It may be procured pure, in the form of white crystals, very fusible by a slight heat, and very volatile. It may also be had impure and much cheaper, as a solution contaminated with hydrocarbon oils and naphthalin, which however are no objection to the use proposed, for these last substances are not soluble in water, and therefore easily separated when dissolving the acid. 4th, Pure carbolic acid is a virulent poison. When applied in too strong a solution larger plants may suffer; very weak solutions destroy only very small plants and animals, as parasites, miasma. Even flies and musketoes avoid its odor and may be driven away by it.

L. J. S., of Mass.—There is at present no book published on the details of the subject you inquire about, it being quite new. Chemists apply the carbonic acid either as a gas, or dissolved in water, or combined with a volatile base as carbonate of ammonia. The pure liquid carbonic acid is a most intractable substance, as it requires some 40 atmospheres pressure to prevent its volatilization, and when this pressure is removed it volatilizes so rapidly that the remaining liquid solidifies.

W. G., and T. S. H., of Ill.—A reference to the ordinary treatises on physics will enable you to answer for yourselves the questions you ask. We do not wish to burden our columns with answers to questions which have no practical utility and answers to which may be found in any text book.

A. W. H., of Pa.—We cannot recommend any process for preventing the fermentation of milk.

E. P., of N. Y.—1st, Leather can be covered with a film of india-rubber varnish, and still retain its strength and pliability. Such leather may be had in this market. It is perfectly waterproof at the side where the varnish is applied. 2d, Pens of hard rubber or vulcanite have been made. They are tolerably good, but they wear out too soon. Lately they have been improved with gold and irridium points. We use such pens, and they give great satisfaction. Those of gutta percha do not keep; they become brittle by oxydation.

S. W. W., of Mass., sends us some fine specimens of iron pyrites in cubic crystals and asks their value. Their marketable value is nothing; as mineralogical specimens some may esteem them.

G. M., of Ill., thinks there may be something in the electrical theory of steam boiler explosions because there have been a great number of boiler explosions and accidents by lightning this season occurring at about the same time. He believes there is yet some unknown cause or causes for boiler explosions, and prudently suggests investigation, etc., We believe a boiler constructed on correct principles, of good material, with good workmanship, and managed by a competent person is as safe from explosion by "mysterious" causes as a cooking stove. But let us have the facts of these mysterious explosions. The mystery generally disappears when the facts attending an explosion are discovered by investigation.

T. W. B., of Pa., sends a diagram and explanation of the relative positions of crank and piston of steam engines. His problem is solved by trigonometry, and we differ from him when he says his explanation is "free from the usual objectionable intricacy of algebraic mathematics." Our mechanics generally understand more of algebra than of trigonometry, We think our explanation on page 20, current volume, preferable to his more ambitious attempt.

J. S. R., of Pa., writes of a "perpetual motion" (more correctly designated a "self-mover)" which is running in his neighborhood, it being a "combination of wheels, levers, and rolling balls," and is a puzzle to all mechanics who have seen it. He wants some competent expert to come and examine it. When "combinations of wheels, levers, and rolling balls" will generate and develop power we shall be glad to "make a note on't."

P. J., of N. Y.—We cannot give a recipe for a preventive and defence against musketoes. A remedy for the pain of the sting is aqua-ammonia. The preventives used are various. Hunters and fishers in the woods of Maine and the wilds of the Adirondacks make a "smudge," a smoke of birch and hemlock bark, etc., in which they sit and into which the winged pests dare not venture; or, they smear their faces and hands with lard or other grease, neither of which remedies are applicable to civilized society. Some persons have faith in bunches of pennyroyal hung in their windows and doors; others use spearmint, in the herb or as an extract—oil or essence. We have no sure preventive but "grin and bear it."

D. P. B., of Mass., says, "I am a machinist of a dozen years' experience, yet I must acknowledge that I find difficulty in turning tapers of the same dimensions even when the pieces are of exactly the same length. Can you help me?" If the hight of the point of the turning tool is not changed when one piece is taken out of the lathe and replaced by one of exactly the same length, the taper on both will be the same. The best course is to keep the point of the tool exactly at the center. This can be done by testing the point by the points of the centers of the "live" and "dead" arbors at each change of pieces, or whenever the tool is removed for grinding and replacing. In ordinary turning the point of the cutter may be above the center, but not in turning a taper.

E. A. B., of Conn.—Will air be exhausted from an air chamby water running under a heavy head? Ans., It will. Is there any automatic device for replacing it when thus exhausted? Ans., We think not,

S. H. E., of Ill.—"Will anything except the limestone now used prevent the slag from sticking to the sides of cupolas?" Fluor spar marine shells and other substances will answer, but limestone is the cheapest material known.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,973.—MACHINERY FOR DRAWING ROVINGS AND SPINNING YARNS.—Geo. W. Philip, Philmont, N. Y. June 18, 1868.

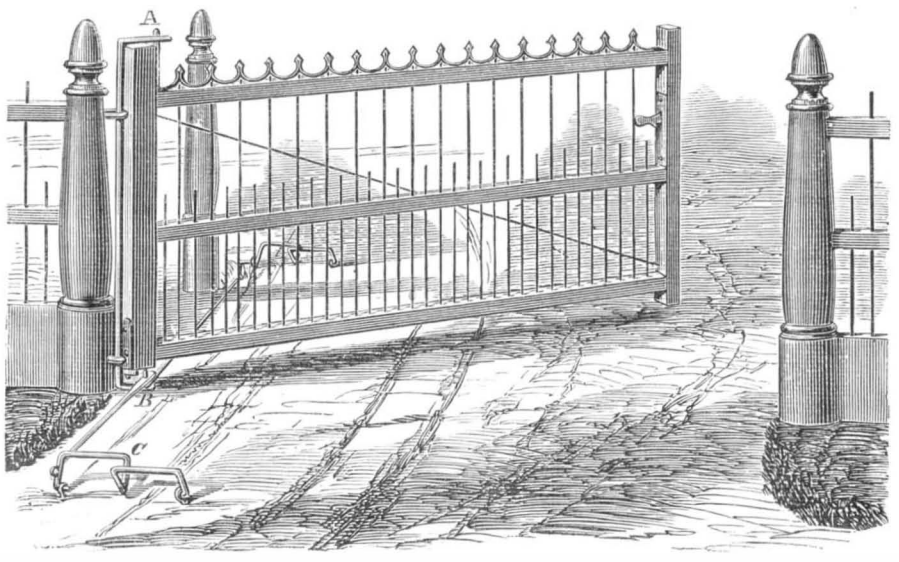
2,008.—MACHINE FOR POLISHING NEEDLES.—Chauncey O. Crosby, New Haven, Conn. June 22, 1868.

2,022.—CONSTRUCTION OF FOLDING CHAIRS.—C. O. Collignon and Nicholas Collignon, Closter, N. J. June 23, 1868.

2,023.—CONSTRUCTION OF BRICK MACHINES.—Peter Hayden, Pittsburg, Pa. June 23, 1868.

Improved Self-Acting Gate.

The gate which the engravings illustrate has no springs or similar mechanical devices, but opens and closes simply by its own gravity. The main peculiarity is its method of hanging, not depending, from hinges placed in a vertical line, but from two points considerably removed from the vertical, in their relations one to the other. The foot is pivoted to a ring or staple fixed in the lower end of a post, and the top of the gate to the arm of an upright crank, as at A. This crank turns in staples secured to the post, the lower one a little out of the perpendicular. It will be seen that the lower gate hinge is at the back of the upright, and the upper at the front. The lower end of the upright crank has a horizontal foot, B, to which is pivoted two horizontal rods connected with two double right-angled cranks, C, one on each side of the gate. When one of these cranks is in a horizontal position the other is upright. The elevation or depression of one or the other partially rotates the upright crank at the gate post, elevates the forward or latch end of the gate, and throws the top of the hinge end of the gate at an angle toward the direction in which the gate will swing This change of position changes the center of gravity, and the gate swings swiftly by its own weight to place, where it is held by a latch, shown enlarged in Fig. 2. This latch is without rivet, and closes by a simple flat spring, which having very little action and being concealed in the gate upright, is not liable to derangement. A diagonal brace extending from the lower front of the gate to the upper part of the rear upright serves, by means of nut and screw, to keep the gate in position if it should at any time tend to sag. In the engraving, for convenience of illustration, the lower hinge and the rods connecting it with the right-angled cranks are shown above the surface; but, in fact, they are below the ground, the rods being inclosed in gas pipe so that no water can reach them, and the lower pivot is guarded by a suitable casing of cast iron. The double cranks are operated by the wheels of a carriage or the pressure of the pedestrian's foot, and are placed at a sufficient distance from the gate to permit it to swing without interfering with the team.



NICHOLSON'S PATENT AUTOMATIC GATE.

An adaptation of the principle of the gate may be used, by which the gate is operated by means of handles or levers on posts connected to the operating crank by stout wires, the handles being touched by the rider in passing. Small hand gates, hung in the same manner, may be constructed to be opened by a latch in the ordinary way.

Patented July 9, 1867. All applications for rights, gates, etc., should be addressed to the American Gate Company, 225 Superior st., or box 2,156, Cleveland, Ohio.

Method of Locking the Nuts of Fish Plates.

Frequent jarring will rapidly loosen nuts however tightly they may be screwed up. Ordinary check or outside nuts are not proof against it under usual circumstances; but the jarring of the rails on a road over which frequent trains pass, is a harder trial than that of any ordinary machinery. Nuts holding the bolts of fish-plates on rails are continually requiring adjustment.

The improvement herewith illustrated provides blocks placed between the nuts which effectually prevent them from turning. The letters, A, represent the adjacent ends of two contiguous rails, held in place by the fish plates, B. These are secured on the sides of the rails, by bolts, C, which pass through them and the web of the rails, and are held by the nuts, D. Blocks, E, of wood or other suitable material, are made of suitable size and shape to fit into the space between the opposite sides of the two adjacent nuts to be locked. The block or locking piece is held in place by a rivet headed screw or nail, F, which may pass through the fish-plate its head being between the fish-plate and the rail, and should have a small nut screw on its outer end, which end should then be slightly riveted down on the nut. In case old fish-plates are used, a plate, G, of wrought or cast iron may be placed on the outside of the fish-plate, through which the bolts, C, and the screws, F, pass, the head of the screw being between the plate, G, and the outer side of the fish-plate. These explanations may be readily understood by reference to the sections, Figs. 2 and 3.

Fig. 2

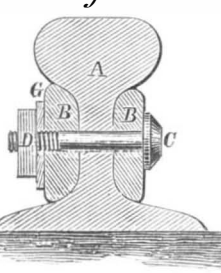


Fig. 1

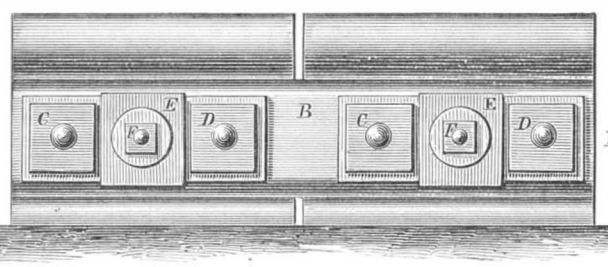
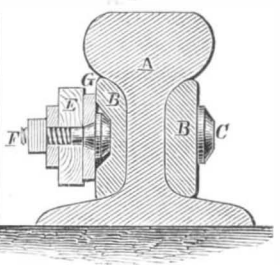


Fig. 3



GARBER'S PATENT LOCK-NUTS FOR RAILWAYS.

Patented through the Scientific American Patent Agency, July 7, 1868, by Samuel Garber, who may be addressed at Greenville, Mercer County, Pa. [See advertisement on back page.]

PERSEVERANCE ONE GREAT ELEMENT OF SUCCESS.

It may be doubted if the statement, too commonly accepted as truth, that "success is the real evidence of ability" is just; yet it must be conceded that, generally, success attends well-directed and persistent endeavor, and that the qualities of discretion, prudence, and perseverance are proofs of ability in their possessor. That a "rolling stone gathers no moss" is correct in fact, and the sentiment, properly applied, is also true. Not only does human experience in these days teach the necessity of "sticking to one's business," the fact that vacillation and irresolution, and want of perseverance are ruinous to success, but the Scriptures teach the same truth. Jacob said of Reuben: "Unstable as water, thou shalt not excel." St. Paul said: "To them who by *patient continuance* in well-doing, seek for glory, and honor, and immortality—God will render—eternal life." If a young man has decided upon the business he intends to follow through life and serves an apprenticeship to it, he should consider carefully before he allows a brilliant offer to embark in some other business to move him. His road to success lies through the routine of his chosen business. Life is too short, even in this fast age and this fast country, for a man to attain eminence or even success in two or more branches of business. Exceptions there are, of course, but they only prove, from the prominence given them in the public prints, that they are exceptional. The case is very well stated in the following, cut from an exchange. Many who have been close observers of life can recall instances similar in kind if not degree:

"I am writing a play," said an intimate friend to us one day years ago. "I'd like you to hear it, you have had some experience in literary matters." We found the play in an unfinished condition, but so far as it was in a form to be heard, it was very interesting and sufficiently witty. Its writer had undoubted talent.

"How comes on the play?" we asked as we met our friend, four weeks from that time. "Pretty well; but, by the way, come around to my room this afternoon; I have a plan to talk over." The play was not brought out that afternoon. Its writer talked medicine to us an hour or two. He had learned of a remarkable root, grown in the East Indies and very scarce, but a certain cure for rheumatism and consumption, scarlet fever and sore throat. One man in England, an M. D., had introduced it there. He knew its secret, and would probably sell it to him at a low figure. He intended to start for England directly.

"When do you go away?" we asked, not many weeks after this. "Away? Where?" "To England." "Oh—yes—I'm not going just now—by the way—I've got a plan. When I was in Cuba I saw how this sugar business was conducted—do you know there are immense profits in it? I have a friend who sails between here and the Island. I'm going to get him to buy some sugar for me, and I'll get a little corner store—live cheaply, you know—and in less than two years—"

We wished him success with his new plan and have not met him since. We received a letter from him, however, not many weeks ago. He was living in a little country town, where he had gone for his health, and was studying for the ministry. This reminded us of the fact that ten years ago he prepared himself for the ministry of another denomination. He actually went to Europe to finish his education, gave up the idea, returned to this country, and went into the navy. He afterward engaged in business pursuits for a few years, then took up literature; then came the various plans which we have noticed, and now a friend informs us that he had given up the ministry again, and is about to go on a farm and raise honey.

This reads like a fiction or a burlesque; every word of it is literally true, and the man to whom it refers will read this article. He has talents which are admitted by every friend he has ever had. He might find a name in literature. He would succeed in business; he would make an excellent minister. He is an exceedingly agreeable companion. His life, however, will be an absolute and total failure. It will be failure simply because he has no continuity of purpose. He cannot control his judgment and his taste. He tires of everything as soon as the novelty is lost.

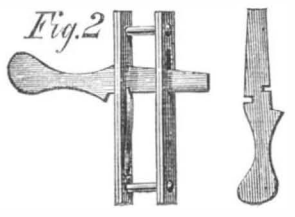
An Engineering Feat.

Quite a remarkable piece of engineering is being accomplished on the Harlem Railroad at Yorkville. A substantial archway is being constructed, extending from Eighty-eighth to Ninety-second street, and covering an open space which has been the scene of several accidents, and is in itself exceedingly dangerous. The work was prescribed at the time of granting the charter to the road, and is now being completed in spite of the many obstacles to be overcome. The nature of these may be estimated from the fact that the cutting is not only very deep, but also so narrow that that the space between the sides and the cars, when passing, does not exceed twenty inches. This stone has been widened so as to erect masonry. The widening is done by small blasts, in order that no great mass of rock may be thrown on the track, and thus delay the constantly passing trains. A portion of the space excavated is used for building the walls, while the arch is constructed of five layers of brick placed side by side. Shafts will be placed at intervals for ventilation and the escape of smoke. These will rise ten feet above the grade of Fourth avenue, and have a light iron cover to prevent anything falling through. On account of the want of space below, all the stone blasted out has to be hoisted up by derricks to the level of the street, cut into shape, and then lowered when needed in the erection of the wall. About 830 linear feet of mason work has already been completed, leaving 270 feet more to be built. The total length will be 1,600 feet, including the solid rock section between Ninety-second and Ninety-fourth streets. This last will be the most difficult portion of the whole, as the work will all have to be done from below with scarcely any means for removing the *debris*.—*Sun.*

The Chemistry of Sunstroke.

The effects and the treatment of sunstroke are well understood in this country, where the malady is one of frequent occurrence—more frequent, probably, in the hottest months, than in any other parts of the world. But the cause of the sunstroke is as yet a mystery. The intense heat (merely as heat) of the solar rays is not the agent of mischief. The human body may be exposed to the Turkish bath of 140°, and remain in it for an hour without injury. This is a much higher range of heat than that of the atmosphere at which sunstroke often occurs, viz.: from 100° to 110° (in the sun). Men working in zinc furnaces or iron foundries are subjected to a heat above 120°, but they are not prostrated to the ground with the phenomena of the sunstroke. The human organization is fitted to endure a much higher pitch of heat than any we have named. Experiments are recorded of men sitting quite comfortable in ovens while chickens were slowly browning by their side. How does it happen, then, that at a temperature of the open air, comparatively so low, men melt away (as the popular saying is) with heat?

Fig. 2



A writer in the *Journal of Commerce* says, the reason must be looked for in the character of the sun's rays. The heat of the sun differs from every other heat, as the light of the sun differs from every other kind of light. This is a fact so well known as to need no demonstration. The effect of the sun's heat upon plants—as contrasted with artificial heat—is the most familiar, and, perhaps, the most striking illustration at hand. All animate and inanimate things are subject to precisely the same great laws of nature; and the solar heat which makes the flowers droop and close their petals, as if to shut out the dazzling rays, is not without its marvelous chemical effect upon the sensitive brain of man. The effect, we say, is chemical—just like the effect of poison. Strychnine, cyanide of potassium, arsenic, morphine, and the other deadly drugs do not work more marked organic changes in the system than a sunstroke. The countenance of the victim is dark-clouded and injected with blood, and a *post mortem* examination discloses congestion of the brain, lungs, and heart. These are the effects, varying in degree, of the administration of poisons. The chances of recovery from poisoning are far better, if remedies are seasonably applied, than from sunstroke. The latter is almost always fatal with persons of delicate health or full habit.

As to remedies, there is no improvement on the old ones. The application of ice to the head and under the armpits, brandy and water, or other stimulants, administered internally, a mustard plaster on the stomach, vigorous chafing of the body and especially the hands and feet, fanning, and plenty of air—these are restoratives efficacious where anything is of avail.

Bleaching and Granulating Sugars.

In No. 4, current volume, we illustrated on the first page a device for purifying and bleaching cane juice. Since then we have received some specimens of the sugar purified by that process which seem to be of very excellent quality, even inferior cane delivering superior juice which granulates easily and makes a good quality of sugar. The process is well worthy attention by those interested in the manufacture of sugar. The address of the inventor was incorrectly given in our description of the illustrations; it should have been Evan Skelly, Plaquemine, Iberville Parish, La.

Toronto has produced a traction engine for drawing wagons over common roads, and it is said to work well. Brazil also puts in an appearance with a traction engine which runs easily on Macadamized roads, dragging a loaded omnibus up a steep hill with ease and speed, and the Emperor uses it for his country excursions from his summer palace at Petropolis.

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VOL. XIX., No. 7....[NEW SERIES.].... *Twenty-third Year.*

NEW YORK, WEDNESDAY, AUGUST 12, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

ATHLETIC SPORTS AND COLLEGIATE INSTITUTIONS.

Since Milo of Crotona astonished the ancients by his six victories at the Olympic games, the world has been spasmodically given to getting on its muscle. We are now in the midst of one of these spasms. Base ball, rowing matches, and feats of pedestrianism seem to rival in the public prints the attention which is claimed by political conventions, elections, and—scandal. We have a suspicion that many of those who engage in these matches, and who plead in their favor the old cant about the general promotion of health, and all the rest of it, will find in the end that in their particular cases they have been otherwise than beneficial. Exercise is useful and necessary, but like every thing else it becomes injurious when carried to excess.

No one supposes that a horse driven until he drops, has his strength or powers of endurance increased by such usage, and a man who should, except in emergency, thus use his horse, would justly merit the indignation which, in this humane age, he would receive. Is the constitution of man so vastly superior to that of the horse, or do the laws of physical development, exhibit such variations in his favor that he can violate them with impunity? All the exhibitions of muscular power and skill at the present, seem to have for their chief end the display of the utmost endurance which is possible, and the training which is undergone preparatory to such displays is of a severe and excessive character. By such training men are able to attain to superior power over their fellows, but it is a power which leaves them in middle age with stiffened sinews and rheumatic joints, hobbling about, like broken-down canal horses. The fact is simply that these public matches are exercising no more good influence upon the public health or morals than the races at Saratoga or Fordham. Violent exercise exhausts, it does not permanently strengthen, although perhaps it may give a temporary accession of strength. To use the language of a cotemporary: "We always like to seize the opportunity, or even to make opportunity, to say a word for physical sports, and for all manly rivalry in athletic games. Whether it be shooting, or yachting, or rowing, or riding, or whatever else that gives strength, nerve, grace, address, to our American youth, we support it, believing that this is what they sorely need. For the physical training of the people, we must rely on the popular national sports."

It is the vicious system of matching that we complain of, from its very nature leading to excess. Most of these matches are made at the hottest season of the year, when excesses in anything are most dangerous, and we regret to add that they are too often accompanied by adjuncts of betting and gambling. Their tendency is to lead young men into expensive habits, and to absorb the time which they ought to give to business or study. No false coloring that can be thrown upon this subject can disguise these facts, and the verification of their demoralizing influences is at hand in the reports of the rowdyism, lawlessness, and utter disregard of other people's rights and privileges shown at the recent regatta at Worcester.

The formation of boat clubs in the colleges and seminaries of the United States has, in our opinion, indirectly done more to injure them in public estimation, by their effect upon the morals and habits of the young men who congregate within them, than any other cause. The effect is not confined to the clubs themselves, but extends to those who are outside of their immediate organizations, and leads not only to the pernicious practice of betting, but the other concomitant evils—neglect of study and dissipation. The fact is becoming every day more apparent, that a man who sends a son to one of these institutions is exposing him, to the worst temptations, while he is, at the same time, removing him from the safeguards which parental supervision and the sacred influences of home throw around the critical period of transition from youth to manhood. The chances are vastly against his returning with any acquirements that will be an equivalent for the four years of time and the money expended upon his collegiate career. There is no hope for these institutions except in immediate and thorough reform. If the ends which they were originally intended to subserve are kept constantly and persistently in view in their discipline, and all things calculated to obstruct or defeat their accomplishment rigidly proscribed, they may regain the confidence which (we speak advisedly) they have been of late rapidly losing. But unless the public can see something else in them than mere training schools for physical contests and other results than the riotous conduct which is the pest of almost every town in which one of them chances to be located, they will soon meet with the condemnation of all right-minded citizens.

WATER ON THE PLANETS.

In an article in our last number we stated that hereafter the use of the spectroscope was destined to throw light upon the nature of cometary matter. Prof. Hinrichs, of the Iowa State University, thus describes its application to the determination of water upon the surfaces of the planets.

When the sunlight passes through a glass prism it is transferred into a beautifully colored band of light, the so-called *solar spectrum.* When observing this by means of a spectroscope, a multitude of dark lines are observed. These lines are called *Fraunhofer's Lines.*

A considerable portion of these dark lines are produced by the light passing through the atmosphere. They are accordingly most prominent when the sun is low, and they are almost invisible when the observations are made on the top of a high mountain. But the greater number of dark lines are always equally prominent. They have, by Bunsen and Kirchhoff, been proved to be produced by the various substances constituting the atmosphere of the sun.

We may at some other time refer to the latter kind of dark lines and the unity of matter in the universe which they prove. Here we only intend to give some of the results obtained by a close study of the former or the atmospheric lines in the spectrum.

Among the lines produced by the earth's atmosphere, some have long ago been ascribed to the presence of watery vapor in the atmosphere.

To identify these lines, Janssen took a large iron tube of somewhat more than one hundred feet in length, and closed at both ends by means of strong glass plates. The whole tube was packed in sawdust and filled with steam under a pressure of seven atmospheres. At the one extremity sixteen gas jets sent their light into the tube. At the other extremity of this tube a proper apparatus for the accurate observation of the spectrum of these gas flames was placed. Janssen found that the spectrum of these gas flames contained all the lines peculiar to the solar spectrum at sunset.

By observations in localities distinguished for a very transparent atmosphere (such as Marseilles, Palermo, Athens), and by observations on the summit of Mount Etna, Janssen has proved the absence of water from the atmosphere of the sun, but its presence in the atmospheres of Mars and Saturn.

This latter result is particularly interesting. It may be remembered, that the planet Mars shows bright areas at its poles, alternately increasing and decreasing, appearing precisely in the same manner as our own earth would look at a great distance; having, during the winter season, its northern polar region covered with snow and ice much farther toward the equator than during our summer season. Hence it has long been concluded that the planet Mars is covered with water, just like our earth. From other observations it has long been known that Mars, Jupiter, and Saturn are surrounded by gaseous atmospheres. By the above observations of Janssen, the presence of water on Mars is now finally proved; as the seasons change on the planet, its polar regions are more or less enveloped in ice, just as here on the earth, and at all times the watery vapor in the atmosphere of Mars is seen in the spectrum of the planet as we notice the vapor of our atmosphere in the spectrum of the setting sun.

Janssen concludes his report with the following remarks: "To the close analogies which already unite the planets of our system, a new and important character has just been added. All these planets form accordingly but one family; they revolve around the same central body giving them heat and light. They have each a year, seasons, an atmosphere, and on many of the planets clouds have been observed in these atmospheres. Finally, *water*, which plays so important a part in all organized beings, is also an element common to the planets. These are powerful reasons to think that *life* is no exclusive privilege of our little earth, the younger sister in the great planetary family.

THE NEW COMMISSIONER OF PATENTS.

Hon. Elisha Foote, of New York, who, for some time past, has filled the important position of Examiner-in-Chief, has been appointed and confirmed Commissioner of Patents. The appointment is an excellent one in every respect. Judge Foote is not only a high-toned gentleman, well qualified to discharge the duties of the Commissionership, but he is in full sympathy with inventors, and will see to it that their interests are well cared for. We speak in this matter from a personal acquaintance with the new Commissioner of many years' standing, and we anticipate an energetic and popular administration of the duties of the office, which need a most prompt and careful revision.

PRESERVATION OF BRICK STRUCTURES.

We are in receipt of several communications desiring information upon the subject of the preservation of brick walls, chimneys, etc.; also, in regard to the use of soluble glass as a protective coating, and its effect upon the strength and durability of different kinds of mortars. It has been supposed that the use of the latter material would confer hydraulic energy upon lime, or upon mortars containing lime deficient in silica. Experiments have, however, proved that it is of little value. Gilmore, in his Practical Treatise on Limes, Cements, and Mortars, says, "It may and probably can be advantageously applied to the reclamation of the intermediate limes (those in which the hydraulic energy is exerted powerfully and rapidly when first mixed, but which soon yield and fall down under the action of the sluggish free lime present), but for fat limes it is unsuitable. When added to the intermediate limes, it appears to exert its influence by giving up its silica to the free lime present, thus neutralizing or perhaps only retarding its action, until the hydraulic principle has time to exert its indurating power." From extensive experiments, the following conclusions have been arrived at:

The addition of soluble glass to common mortar, while it renders it hydraulic, injures its strength and adhesive properties. It is at the same time greatly inferior to cement as an hydraulic agent, in both efficiency and economy. It may, however, be applied to hardening soft and porous stones, and concrete walls or stucco work, after these are well dried, but its utility depends so much upon the peculiar nature of the material to which it is applied, that the utmost care and judgment are needed in its application, not to say some chemical knowledge of the nature of the alkaline silicates, and their reactions upon clays, limes, etc. Most cases in which its use has been attempted for such purposes have secured unsatisfactory results, and it is therefore not to be generally recommended. For walls of concrete brick, a paint made by mixing hydraulic cement with oil is highly recommended, and it is also a good water proof paint for roofs and walls of cisterns. The action of the acids produced by combustion of wood, coal, and other fuels upon the mortar of chimneys, often act as disintegrating agents, and for this we know of no efficient remedy.

Large chimneys may have their interior surfaces painted white which, being a non-radiant surface, tends to promote a draft, while at the same time the mortar or cement is protected from the action of the gases of combustion.

CARE OF GRINDSTONES.

A correspondent, who writes himself a farmer, complains that his grindstone, which for several years has proved of uniform grit, has deteriorated in this necessary quality. He has kept it heretofore under a shed, but lately removed it to an open space in his back yard, and asks whether this exposure has changed the character of the stone. One side is soft, as the whole stone was formerly, but the other side is hard and rigid.

We think the removal of the stone is the cause of its change of character. Exposure to sunlight is always injurious to a grindstone. The substance of the stone is porous, and it contains a considerable amount of water; this being evaporated, the stone becomes granulated, harsh, and hard. It is not altogether for personal comfort that the farmer places his grindstone under the friendly protection of a wide-spreading apple tree or elm. He knows, almost intuitively, that the summer's sun's rays are inimical to the qualities of the stone, and he shelters it from this too fervid light and heat. The stone that in the shop of the mechanic runs in water through all the hours of daylight, will preserve its homogeneity better than one that is used only occasionally, and is exposed to the sunlight.

The red or brown freestone, so much used in New York city, New Jersey, and Connecticut, is a sandstone similar in structure to the ordinary grindstone, differing, mainly, in being of coarser texture and colored with an oxide of iron. It is an aggregation of particles of sand, agglutinated by clay, and compressed. Yet this stone, which is such a resistant to the action of the elements on exposure, may be easily cut with a knife when first removed from the quarry. In fact it is so saturated with water, that, when quarried in the fall, it must be preserved from the action of frost during the winter, by being sunk under water or otherwise protected, else it will burst by the freezing of the water contained in it. Exposure to heat, or to the sun's rays, evaporates the water and leaves it quite hard.

So with the grindstone, and, in a lesser degree, with the oilstone. Notwithstanding the close grain of the best oilstones, they deteriorate by long exposure to the sunlight.

SUB-MARINE EXPLORATION ---- THE WRECK OF THE FRIGATE "HUSSAR."

Nov. 25th, 1780, was a day of rejoicing to American patriots. The French fleet had approached the harbor of New York, and were preparing to enter. The British forces were obliged to evacuate the city. In their haste, the whole of the treasure for their army was placed on board the frigate *Hussar*, which, with its rich freight, a number of British officers, and eighty American prisoners of war, started up the East River, her only avenue of escape. In passing Hell Gate she struck what is commonly known as "Pot Rock," and stove her bottom. The injury was not, at first, considered very serious, and the vessel pursued her course. After proceeding about a mile, however, she was found to be filling, and her head was turned toward Stony Point, upon which, at that time, stood the mansion of Governeur Morris, that being the nearest land, and, as they supposed, a sloping, sandy shore. Upon nearing the point, however, they realized their mistake,

the water being at low tide, about twelve fathoms at not more than a ship's length from the shore. When about seventy-five yards from the point the stern commenced to settle rapidly. A hawser was thrown out and attached to a tree upon the point, but so great was the tension created by the rapidly sinking vessel, that the tree was snapped asunder, and the attempt to warp the vessel failed. A general stampede ensued, and it was only by the most urgent efforts that the crew and the officers reached the shore. The prisoners of war, manacled and helpless, all perished. The officers were received at the house of Governeur Morris, where they remained during the night, the disaster having taken place at about 5 o'clock, P. M. So great had been their haste that their swords were left in the cabin, and no attempts were made to save the treasure, supposed to have been placed in her run and walled in with brick, as was the custom at that time in the shipment of treasure.

For eighty-eight years the waves have rolled over the wreck, and shrouded the remains of the unfortunate men so suddenly engulfed. The treasure amounted to 900,000 guineas, worth about 5,000,000 dollars in American gold. The English government fitted out two brigs, and sent them to the spot, in 1794, to attempt its recovery; it having been previously proved, by the united testimony of the officers, before the Court of Admiralty, that it went down with the vessel; and so far from being able to make any efforts to save it, they could not, from the rapidity with which the vessel sunk, even rescue the prisoners or save their most ordinary personal effects. This evidence is corroborated by the fact that the swords of the officers, guineas, and other articles, have been rescued since, from her cabin. Many of these articles are now preserved in historical collections and museums. Porter bottles, corked, and probably containing the original fluid more or less changed, have been obtained from time to time. Some of these bottles were exhibited in Barnum's collection previous to its destruction by fire. In 1848 a company was formed, under charter from the State of New York, to attempt the recovery of the bullion. This company was called the "Frigate Hussar Company," and, under their direction, divers have visited the wreck, daily, from June first to September first of each year since 1848 to the present time. They have succeeded in removing her decks, and have hoisted up twenty-six cannons, 4,000 balls, and buckets bearing the name "*Hussar*." The bones of the arms of the drowned prisoners, with the manacles attached, have in some instances been recovered. The perseverance of this company, and the positive knowledge that the treasure was sunk in the vessel derived from the circumstances of the case, the testimony of the officers as recorded in the British archives, added to a second attempt on the part of that Government to recover the treasure in 1819, at which time they were ordered off by the American Government, have kept the stock of this company from ever selling at less than twenty-five per cent. The company have this season made a contract with Wm. R. Taylor and Dr. J. A. Weisse, owners of the improved Submarine Explorer, to raise the treasure at a salvage of thirty per cent. They are now at work, and, by invitation, we were permitted to witness the operation, of the "Explorer," on Thursday, July 30th.

Before describing this machine, however, it may not be amiss to refer briefly to some features of marine exploration as hitherto conducted. The first attempts at penetrating below the surface of water were confined to diving; and many marvelous stories of the feats of divers, the depths reached by them, and the time they could remain beneath the surface, have been handed down, bearing the impress of romance rather than sober fact. The truth is, that two minutes is probably the utmost limit of time at which any unaided diver has remained under water. Admiral Hood tested the powers of the famed Indian divers with watch in hand, but found that none of them could remain under water more than one minute at a time. It is probable that ten or twelve feet is the greatest depth to which divers unaided by apparatus can reach, and remain so as to perform any useful service. We have not room to notice the different kinds of submarine armor which have been devised to enable divers to remain at greater depths, and for longer periods under water. They all have for their object the supplying of air for respiration, and the protection of the body from external pressure; and are more or less cumbersome to the wearer, and inimical to freedom of motion. In many of them the air contained within the walls of the armor prevents the stooping of the diver, as when he attempts to stoop it rises suddenly to those parts of the apparatus which are higher than his head, thus destroying his equipoise, and making him unwillingly perform a somersault. The only remedy is to get down upon his knees, and, in this awkward position, his working efficiency is necessarily much impaired.

The substitution of the diving-bell for such apparatus leaves the operator unencumbered to make observations at length, to drill rocks, to make excavations, and to perform any of the engineering operations, or other work for which submergence is necessary. The diving-bells hitherto used have, however, been attended by some objections; the principal of which was the fact that the divers were entirely dependent upon their assistants above for the supply of air as it was required, and also in case of emergency the ascent of the bell was a slow and tedious process. The pressure also varying with the depth reached, was beyond their control, and they were unable to graduate it to suit the circumstances of the case. The accumulation of carbonic acid gas from respiration was also imperfectly removed, and caused much inconvenience to the divers. The absorption of the gas by water forced into the cavity of the bell by pumping removed the gas, but the water was itself a great inconvenience. In case communication with the surface should become interrupted, they could neither rise, sink, nor change the position of the bell.

The Submarine Explorer, invented by William Mont Storm, and improved by Wm. R. Taylor, was built at Secor's Iron Works. Its exterior consists of a cylinder, also of boiler iron, surmounted by a truncated cone of the same material. Within this cylinder is another concentric cylinder, of boiler iron, surmounted by another truncated cone which meets the external cone at the top, the inclination of its sides being less than the sides of the external cone. The distance from the bottom of the cylinders to their junction with the cones, is about seven feet. The top of the double cone has a man-hole provided with a tight cover. The space between the concentric cylinders is separated by an iron diaphragm into two compartments. The lower of these compartments forms a hollow ring entirely around the bell, and is called the "ballast ring." It communicates freely with the external water, and of course when the air it contains is allowed to escape, it becomes filled with the water which replaces the air. The upper of these two chambers, which is called the "air-chamber," communicates with the "ballast-ring" by means of a stop-cock, worked from the interior of the inner cylinder, and it also is connected by a stout, one and a quarter-inch hose to two powerful air-pumps placed upon the deck of the attendant vessel or dock, or otherwise situated according to circumstances. The pumps are worked by steam power, which constantly force air into the air chamber while the bell is descending or rising, as well as when it remains at the bottom. That portion of the bell within the interior cylinder is separated by a circular iron floor into two compartments, an upper chamber in which the workmen place themselves in ascending or descending, and a lower or "working chamber," into which they descend through a man-hole, after they have arrived at the bottom. These chambers have a lining of felt, four inches thick, upon the inside of which is placed a lining of perforated zinc. Water is admitted through a pipe leading from the ballast-ring to the upper portions of the felt, and filtering through it, oozes through the perforations in the zinc, and trickles down along its surface, absorbing in its progress the carbonic acid without subjecting the occupants to a continual shower bath. The air, as it is rendered unfit for breathing, is discharged through a cock provided for that purpose, and rises to the surface with great violence; its place being supplied from the air-chamber, which is kept constantly filled with condensed air by the action of the air-pumps above the surface.

The capacities of these chambers are as follows: "Ballasting," 109 cubic feet; "air-chamber," 135 cubic feet; "working-chamber," 304 cubic feet. The entire hight of the bell is 10½ feet, its diameter at the bottom 9 feet, and the hight of the working-chamber about 7 feet. The bell operates on the same principle by which a fish raises or lowers himself in water, by altering the specific gravity. The air-chamber takes the place of the bladder in the fish. It will now be readily seen how the divers in this bell can rise or descend at their option. The air-chamber contains 135 cubic feet of air compressed to four atmospheres; this pressure is more than equal to a pressure of a column of water 90 feet in depth, and the additional pressure of the atmosphere upon its surface. Communication between it and the ballast-ring being established by the opening of the stop-cock above described, the expansion of the compressed air will force out the water from the ballast-ring, so that the specific gravity of the entire mass of iron, occupants, and contained air, becomes less than water, and it will consequently rise. A suitable stop-cock being opened to allow the air to escape from the ballast-ring, at the same time closing the stop-cock between the air-chamber and the ballast-ring, the water replaces the air in the latter, and the specific gravity of the mass is thus increased until it will descend at the required rate. When at the bottom, they can so nicely poise the bell as to be able to easily shift it from place to place, notwithstanding its entire weight in air is 32,000 lbs.

The operation of this bell, as we witnessed it, was interesting in the extreme. The sloop *Confidence*, anchored over the wreck, was thronged by eager spectators. The time fixed upon for its descent having arrived, Mr. Owen Kenny and two workmen, provided with picks, sperm candles in glass lanterns, bags, and the other paraphernalia for prosecuting their labors, descended into the bell. To those on deck it seemed almost like descending into a tomb. The iron cap was adjusted to its place, and, for a few moments, silence reigned. Soon, however, the water at the side of the bell became violently agitated by a jet of ascending air. Mr. Taylor explained that they were now taking in ballast. Slowly and steadily the bell disappeared from sight, and continued its descent until, at seventy-five feet, the signal rope announced that the bottom had been reached. The descent was made in fifteen minutes. A more rapid descent is painful to the divers, who do not in that case have time to become accustomed to the pressure. An hour elapsed, during which period nothing was heard from the divers, except the occasional agitation of the water as it was disturbed by the escape of the foul air. Then the signal announced that the bell was about to rise. At the suggestion of Dr. Weisse, it was signaled to the divers that, when they were about thirty feet from the surface, they should allow the bell to rise rapidly. When this distance was reached, the motion began to increase so rapidly that it was with difficulty the men upon the deck could take in the tackle. Suddenly the monster reared its head, and shot up out of the water half its length, or more, preserving its equipoise admirably, and finally came to rest where, an hour and a-half previous, it had disappeared. The cap was raised, and the divers came forth—not dripping with perspiration like those who awaited them, but fresh and cool and without the slightest symptom of exhaustion.

The contents of their bags were some undoubted English shore ballast, copper and iron nails, and some gun flints bearing marks of use in the guns of the revolutionary period. They also reported having struck some of the timbers of the vessel.

This experiment satisfied all present of the value of the Submarine Explorer, and of its entire applicability to submarine blasting, sponge and pearl fisheries, etc. We were informed by Mr. Taylor that the Rothschilds, having heard of this machine some two years since, sent an agent to negotiate for its use in the Mediterranean sea, in the gathering of sponges, they being largely interested in that industry; but the Sultan would not permit its use, as it was thought its introduction would produce discontent among the divers, and the transaction remains still in abeyance.

At the place where these experiments are progressing, the tide runs seven knots per hour, and rises to the height of nine feet. The divers say the force of the tidal wave is distinctly felt at the bottom, but perhaps they regard as the tidal wave, currents arising from other causes. The bell has a lifting power of 6,000 lbs; it could therefore be used to great advantage in lifting blocks of stone after blasting, and dropping them where they would not interfere with navigation. Its application to removing the obstructions at Hell Gate seems feasible, and it is to be hoped that it may be tested with a view to its employment for that purpose.

WHAT CONSTITUTES A GREAT INVENTOR.

The faculty of invention is possessed by very few in an eminent degree, and orginators of great mechanical ideas are only rarely found recorded in the history of the world's progress. There are many who can seize upon and develop the ideas of others, who never were able to conceive an original idea for themselves, and such men are usually unable to distinguish the difference between an original conception and the appropriation of the conceptions of others.

It is said that Columbus, to illustrate how easy it was for men to follow in a path once marked out, or to do apparently simple operations when once some man of genius has shown the right way to do them, puzzled his hearers by a demand that they should attempt to stand an egg on end. After all tried and failed he, by a slight blow, cracked the shell, and in this simple manner solved the problem. The class of men to which we have alluded, taught to balance an egg, would conceive themselves equal to the discovery of new worlds. In their arrogance and insufferable self-conceit they assume equality with the mental giants to whose stature they can no more approach than could the frog in the fable, that burst itself in vain emulation of the ox. Lacking the modesty which usually accompanies real genius, they are always foremost in giving expression to their opinions, and inattentive to the claims of genuine merit.

These may be called the parasites of genius. Another class of men are those who, while recognizing and admiring inventive genius, are willing to admit that they do not themselves possess it, and to confine themselves within the sphere for which their peculiar gifts fit them. In Reade and Boucicault's celebrated story, "Foul Play," when Hazel is credited with great inventive genius, at the time he was puzzling his brains over the problem, "How to diffuse intelligence from a fixed island over a hundred leagues of water," notwithstanding he had done some very skillful planning and adroit execution, he disclaimed all pretension to the character of a great inventor. He said, "I do things that look like acts of invention, but they are acts of memory. I could show you plates and engravings of all the things I have seemed to invent. A man who studies books instead of skimming them, can cut a dash in a desert island until the fatal word goes forth—invent; and then you find him out. * * * Ah, if James Watt were only here, instead of John Hazel—James Watt from the Abbey, with a head as big as a pumpkin—he would not have gone groping about the island, writing on rocks and erecting signals. No; he would have had some grand and bold idea, worthy of the proposition."

A great inventor combines in one mind the imagination of the poet and the painter, and the logic of the mathematician, with perceptive faculties which enable him to trace from a cause its effect, with a rapidity and certainty that seems almost like intuition. He is ready for unforseen emergencies, and undaunted by unexpected obstacles. He never abandons an idea once conceived, until he has proved either its impossibility, or that it is of no practical value. He cannot abandon ideas; they will not leave him; they haunt him by night, and press upon his mind for solution by day; his only relief is "to work them out." This is one reason why so many inventors die poor. They are men of ideas, and ideas are expensive things. They demand apparatus and time and energy, and they are persistent in their demands. Such men are, after all, to be envied. They have resources which are not shared by the many. We know of one such—an old man, stooped and bowed with infirmity, but with a mind as placid as a summer sea. We verily believe that a pecuniary loss, which to most men would be a catastrophe, would be forgotten by him in an hour, or dismissed from his mind as unworthy of further thought. Such men are glorious examples of the triumphs of mind over physical infirmity. What a noble spectacle is a Humboldt, at upwards of threescore, working sixteen hours a day, his feeble age upheld by the sheer force of mental power; forgetful of physical discomforts, his mind soaring far above the petty cares of life, and reveling in the contemplation of Nature's mighty works.

JOSEPH BEAUMONT, of Canton, Mass., who built the first cotton mill in that State 68 years ago, is still alive, 90 years old, and of remarkably sound mind for fourscore years and ten.

THE ATLANTIC CABLE.

A correspondence has just been published by F. N. Gisborne, in relation to the origin of the Atlantic Cable, the conception of which, he states, was his, as well as a great part of the labor required before capitalists would even take the matter into consideration. We think the statement of Mr. Gisborne is very likely correct, but the credit due to Mr. Field is, that mainly through his perseverance the enterprise became a success.

It is announced that a submarine cable is to be laid next year, connecting the coast of France with this country. It is in the hands of Mr. Erlanger, the celebrated banker, and Mr. Reuter, who enjoys considerable notoriety for his sensation telegrams.

PLANCHETTE.

We have received a large number of readable communications, claiming to explain the mysteries of Planchette—fair examples of which have already appeared in our columns. The whole discussion, thus far, is chiefly speculative, always tending to religious and spiritualistic notions.

We fail to discover any substantial benefit to be gained from a continued discussion of this subject. We therefore drop it until some more reasonable explanation is put forth. We never did believe very much in the operations of ghosts and spirits, therefore it is hard for us to conclude that the little three-legged stool, provided with a pencil, and called "Planchette," has anything whatever to do with spirits. It is simply an amusing plaything.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING JULY 28, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

80,264.—NEEDLE FOR KNITTING MACHINES.—Ransom Allen, Salem, Mich.

I claim the movable shank, b, attached to the body of a knitting machine needle, and operated substantially as and for the purpose herein described.

80,265.—STEAM GENERATOR.—Jonathan Amory, West Roxbury, Mass.

I claim, 1st, The combination of the heating curve and its pipe or pipes for receiving air, with the fire box of the boiler, arranged and operating substantially as described.

2d, The combination of the heating curve and its pipe or pipes for receiving air, with an air chamber, K, arranged and operating substantially as described.

80,266.—SHUTTER AND WINDOW FASTENING.—Wm. L. Barnes, Irvington, N. Y. Antedated July 11, 1868.

I claim the bolt, F, constructed as described, and secured to the innerside of the sash, A, arranged in relation with the blind hasp, a, and staple the blind being held closed when the sash is raised, and locked by the bolt, F, passing through the staple above the hasp, a, when the sash is lowered, which movement also locks the sash, as herein shown and described.

80,267.—MANUFACTURE OF CARRIAGE SHAFT COUPLINGS.—Henry M. Beecher (assignor to H. D. Smith & Co.), Plantsville, Conn.

I claim the above described process or method of making the shaft connection blank, the same consisting in forming it with the head part, A, and the shank, B, and subsequently cutting it through on the lines, e e, and finally bending the portions, f f, around into right or nearly right angles with the shank part, B.

Also, the machine, substantially as described, for creasing or cutting the blank, and bending the portions, f f, of it around into or nearly into right angles with the shank, such machine being composed of the bed plate and standard, the two levers, the follower, and the two pairs of creasers or cutters, the whole being arranged for use in manner as specified.

80,268.—APPARATUS FOR CARBURETING GAS AND AIR.—Alonzo T. Boon and Albert D. Perry, Galesburg, Ill.

We claim the emery receptacle, F, when combined and arranged with float h, screw rod, H valve, m, pipe, N, and pipe, a, substantially in the manner and for the purpose as herein shown and described.

80,269.—TUCK CREASER FOR SEWING MACHINES.—Edward Bostock, Albany, N. Y.

I claim, 1st, A tuck creasing device constructed substantially as described, in combination with the plate, A, and gage plate, D, both constructed and arranged substantially as described, and the plate, D, serving to confine A to the bed plate, as set forth.

2d, A gage plate or guide for a sewing machine, when provided with an adjustable piece, I, having a slot, as and for the purpose set forth.

3d, The gage plate, H, slide, I, and creasing device combined, to admit of adjusting the apparatus in any desired position relatively to the needle and feeding device of different machines by means of a single screw.

4th, The tuck creaser and gage plate, for use with or without a sewing machine, when the whole is constructed as described.

80,270.—TUCK CREASER FOR SEWING MACHINES.—Edward Bostock, Albany, N. Y.

I claim, 1st, The combination with the tuck creasing devices, of a sliding wedge, eccentric, or a slide and fixed inclined plane, on the base plate, substantially as and for the purpose shown and described.

2d, In combination, the spring arm, and its creasing and pressure adjusting devices, and the fixed stand or yoke, E, substantially as and for the purpose set forth.

3d, The tuck creaser and its gage plate, constructed with their coinciding slots at an angle to the creasing arm and line of stitching, as described, so that, when affixed to a machine by means of the thumb screw and screw hole, and moved in a slanting direction for adjustment, the parallelism of the line of creasing with the line of feed may always be preserved.

4th, The devices herein described, the same constituting the tuck creaser, constructed as specified.

80,271.—CAR COUPLING.—C. T. Burchardt, New York city.

I claim, 1st, The car coupling composed of the hook, E, bearing piece, H, links, G, and the spring frame, B, when connected with the main spring, C, all substantially as herein described and for the purposes specified.

2d, The beveled or double inclined bearings, a2 a3, arranged relatively to the main spring, C, and spring frame, B, and its connections, as and for the purposes herein specified.

80,272.—HARVESTER.—H. K. Burnett, Poughkeepsie, N. Y.

I claim, 1st, The cams, D D rotated by the gearing, B C, in combination with the arm, U, roller, E, and jointed pitman, G, connecting the arm, U, to the cutter bar, h, substantially as set forth.

2d, The bar, K, at the end of the finger bar, H, and jointed at Q, to the shoe, R', and arm, X, as and for the purposes set forth.

3d, The shoe, R', jointed to the arm, X, in combination with the slotted brace, I, finger bar, H, and cutters, i, arranged and operating as and for the purposes set forth.

80,273.—BOOT SOLING MACHINE.—Thomas Cabourg, Paris, France.

I claim, 1st, The construction and use of the pulley, A, on which is wound the wire to be tapped, substantially as herein described.

2d, The construction of the tapping plate, substantially as described.

3d, The construction, disposition, and simultaneous action of the knives, substantially as described, and more fully shown in the drawings.

80,274.—FISHING SEINE.—John Collines, Ecorse, Mich. Antedated July 18, 1868.

I claim the application of the braces marked A A, as above, to a seine or net, substantially as and for the purposes herein described.

80,275.—COAL STOVE.—John Cooper, Dublin, assignor to himself and Bennett F. De Witt, Indianapolis, Ind.

I claim the addition, D, separated from the fire chamber by the partition, G, and subdivided into compartments, H J, by the partition, I, as set forth, and, in combination therewith, the induction pipe, E, eduction pipe, F, and chamber, L, arranged substantially as set forth.

80,276.—MACHINE FOR UNLOADING RAILROAD CARS.—John Doble, Chicago, Ill.

I claim, 1st, A swing frame of a car unloading machine, provided with head plates, B B, having convex surfaces presented to the sides of pulleys, C C, which are perforated and otherwise constructed substantially as described.

2d, Projections, h, adapted to serve as guards or fenders for pulleys applied to the swinging frame of an unloading machine, substantially as described.

3d, Perforated guards, h, perforated pulleys, C C, and convex surface bead plates, B B, applied to the swing frame of an unloading machine, substantially as described.

80,277.—HOP HOOK.—Elon Denio, Baldwinsville, and Elon C. Denio, New Hartford, N. Y.

We claim, 1st, The hop cultivator formed of the hoe or hook, combined with the knife, substantially as and for the purposes specified.

2d, The ferrule, with the raised projections or ears, and slot, or their equivalents, for securing the knife in place, in combination with the hoe or hook, of one or more tines, substantially as and for the purpose set forth.

80,278.—STOPS FOR FORE-AND-AFT SAILS.—Jacob Edson Boston, Mass.

I claim the arrangement and combination of the saddle, D, with the springs, H H, their rods, A, and the sliders, F F, connected with the ring, E.

Also, the arrangement and combination of the arched and annular links, G G b, and the arms, a' a', with the ring, E, and the sliders, F, and springs, H, applied to the rod or bar, A, extending between them and from abutments, B B, as set forth.

80,279.—FURNACE FOR TREATING ORES.—Samuel H. Folsom, Winchester, Mass.

I claim a series of two or more revolving tables placed within a furnace, A, and operating substantially as described, for the purpose herein set forth.

Also, the revolving cylinders, m n o, with their inclined guides, in combination with the flue, G, operating substantially as described, for the purpose set forth.

Also, a central deflector, O, applied to a table, C or D, for the purpose of more thoroughly distributing the flame over its surface, substantially as set forth.

Also, the inclined stationary stirrers, a' b', in combination with a revolving table, C or D, substantially as described.

Also, the scrapers, f', on the under surface of a table, C or D, in combination with a projecting edge or shelf, e', beneath the table, substantially as and for the purpose set forth.

80,280.—STOVE AND FURNACE GRATE.—Bartholomew Gommenginger and Chas. W. Trotter, Rochester, N. Y.

We claim, 1st, The grate, a, when constructed and operated in the manner and for the purpose specified

2d, In combination with the grate, a, the sliding ring, e, when constructed and operated in the manner and for the purpose specified.

80,281.—LAMP BURNER.—Richard Gorsline, Rochester, N. Y.

I claim the combination of the open frame, D, and transparent bottom plate, G, when arranged in connection with the removable cone, H, and fixed rim, C, the whole as herein set forth.

80,282.—LAMP CHIMNEY.—John Gracie, Pittsburg, and Robert H. Boyd, Hulton Station, Pa.

We claim, 1st, Providing a lamp chimney with an elliptic flange, substantially as herein described.

2d, In combination with the above, a lamp top provided with a flange, portions of which project inward for the purpose of catching, grasping, and holding the chimney in position, the contour of said flange corresponding to the form of the flange of the lamp chimney, substantially as herein described and for the purpose set forth.

80,283.—MACHINE FOR PRODUCING A RECIPROCATING MOTION IN KNITTING MACHINES, ETC.—Seotimus Haslam, Jr., New Britain, Conn., assignor to himself and John B. Talcott.

I claim, 1st, The combination with the shaft, b, of the sleeve, d, carrying the clutch and wheels, f f', and the collar, k, and collar, i, on the shaft, and clutch, m, or its equivalent, substantially as described.

2d, The gears, f f', arranged upon the sleeve, d, in combination with the clutch, e, plate, q, upon the shipper, p, and spring, s, or their mechanical equivalents, with the gears, 3 4 5 1, and chain, v, for the purpose substantially as described.

80,284.—CIGAR.—Frederick L. Hilbright, Newark, N. J., assignor to himself and Chas. E. Woodman, Boston, Mass.

I claim the combination and arrangement of the foraminous ferrule or cap with a cigar, the same being substantially as explained and represented.

80,285.—ADDRESS PRINTING MACHINE.—Henri Julien, Ottawa, Canada.

I claim, 1st, The combination with the vertically sliding press, A, of the rack, B, pinion, C, shaft, D, spring, p, and the mechanism for operating the shaft, D, substantially as and for the purpose described.

2d, The combination with the pawl, P, and connecting rod, E, of the mechanism for connecting them and disconnecting them with the parts to which they communicate motion, substantially as and for the purpose described.

80,286.—MACHINES FOR DRESSING STONES.—Francis L. King, Worcester, Mass.

I claim, 1st, The peculiar construction of the self-adjusting frame, with its shaft, gears, grooved racks, and set screw, B, when constructed and operating substantially as and for the purpose specified.

2d, The carriage, A, spindle, B, or its equivalent, apron, H, constructed and operating substantially as and for the purpose specified.

3d, The tucks, C C, disk, E, and curb, I, constructed and operating substantially as and for the purpose specified.

4th, Gears, F and L, shaft, K, constructed and operating substantially as and for the purpose specified.

5th, The peculiar relative position or adjustment of the carriage, A, and grinders, M, upon different centers, whereby the irregular or eccentric motion is produced, arranged and operating substantially as and for the purpose specified.

6th, the combination of the hopper, R, hollow shaft, N, the grinder box, M, with the carriage, A, with its various bearings, constructed and operating substantially as and for the purpose specified.

80,287.—MANUFACTURE OF CIGARS.—William C. Kneeland, Brooklyn, N. Y.

I claim as a new article of manufacture a cigar made with a cut-tobacco filler, substantially as described.

80,288.—FRUIT PICKER.—John A. Knight, Durham, Me.

I claim the fruit gatherer as described, combining the removable head, a, edge or teeth, c, handle or pole, a', jointed conductor, i, attached as described to the pole, and having the peculiarly formed chucks, p, as and for the purposes described.

80,289.—TABLES, BENCHES, ETC.—David S. Leavitt, Grand Rapids, Mich.

I claim the combination of the dovetail fastening, B, hinged legs, C, wedges or pins, and rods, when applied and used in the manner and for the purposes shown and described.

80,290.—CAR BRAKE.—Samuel M. Lee, New London, Iowa.

I claim, in combination with an independent piston, d, the arrangement of a forked bar, b, with the tender, and a single bar, c, with the car, for operating said bar, c, at either end, substantially as and for the purpose described.

80,291.—TEETH FOR GEAR WHEELS.—John Letskus, Allegheny City, Pa., assignor to himself and Richard Brown, Youngstown, Ohio.

I claim curved gear teeth for wheels and pinions, the upper and lower edges of which are arcs of curves of equal radius, having their centers in the same right line, constructed substantially as and for the purpose hereinbefore described.

80,292.—ROSE ENGINE LATHE.—Thomas Lippiatt, New York city. Antedated July 11, 1868.

I claim, 1st, The arrangement of the swinging frame, H, carrying a tracing pin, e, or an equivalent device, the vertically sliding die or pattern, J, mandrel, K, and engraving tool, d, operating substantially as herein specified.

2d, The arrangement of the revolving die or pattern, N, the swinging frame O, and tool box, F, operating substantially as herein described.

3d, The combination of the screw rod, S, and shaft, L, with the sleeve, M, and die, N, substantially as herein specified, for giving a lateral progressive movement to the said die, N.

4th, The arrangement of the revolving die or pattern, P, on the mandrel shaft, i, the swinging frame, H, and tool box, F, operating substantially as herein specified.

80,293.—TELEGRAPH INSTRUMENT.—George Little, Hudson City, N. J.

I claim, 1st, The combination of a pen with a reservoir.

2d, The combination of a pen, reservoir, and coil.

3d, The combination of a pen, reservoir, and coil, with paper properly actuated.

4th, The combination of a pen, reservoir, and properly moved paper.

5th, The combination of a pen, float, and reservoir, and all of these in combination with coil, and all of these also in combination with properly actuated paper.

6th, The combination of a pen and a reservoir, having an opening therein for the protrusion of the pen, with a regulating tube, and all of these in combination, first, with a float, second, with a coil, and third, with properly actuated paper.

7th, The combination of a pen with a reservoir of fluid and a permanent magnet properly located, and all of these in combination, first, with a float, and second, with a coil, and thirdly, with both a coil and float.

8th, The combination of a pen, a reservoir, and a coil, when the reservoir is vertical and provided with an opening at the bottom thereof, and the pen passes through the opening, and the coil surrounds the vertical reservoir, and these parts thus relatively arranged in combination with a regulating tube.

9th, The combination of a pen, a vertical reservoir, open at bottom, a coil surrounding the reservoir, and a permanent magnet, located above the reservoir, and all these parts thus relatively arranged, in combination with a permanent magnet, located below the reservoir and pen.

10th, The combination of the following parts, viz., a pen, a float, a reservoir of fluid, a regulating tube, a coil, a paper properly actuated, and these in combination with a permanent magnet, so located as to influence the pen, all these combinations, and the parts or elements making up the combinations, being substantially such as herein specified and set forth.

80,294.—STILL FOR HYDROCARBON.—Charles Lockhart and John Gracie, Pittsburg, Pa.

I claim, 1st, The chimney, D, combined with a series of fire chambers, z, and smoke chamber, m', constructed, arranged and operating substantially as herein described, and for the purpose set forth.

2d, Making the chimney, D, the axis of the wheel, 7, used for rotating the scrapers, in the manner substantially as herein described, and for the purpose set forth.

3d, The arrangement of the column, e, pipes, g and f3, openings, 10, and valve, z2, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

4th, Providing a still for hydrocarbons with a valve, which will act from an internal or external pressure, substantially as herein described and for the purpose set forth.

80,295.—BOLT.—Benjamin F. Lotridge, New York city.

I claim, in combination with the slotted case, B, the bolt, C, tongue piece, G, set screw, H, and spring, D, when the same shall be constructed and operated substantially as described for the purposes specified.

80,296.—FRUIT JAR.—W. W. Lyman, West Meriden, Conn.

I claim, 1st, The combination of flange cap, f, having incline or wedge elevations upon its outer edge, g, with a gasket seat, d, gasket, c, yoke, h, and ring, b, substantially as and for the purpose described.

2d, The combination of the flange cap, f, elevations, g, yoke and pin, h i, with the gasket and seat, e d, substantially as and for the purpose described.

80,297.—BUTTER DISH.—William W. Lyman (assignor to Meriden Britannia Company), West Meriden, Conn.

I claim the right and left hand screw actuating fulcrum, in combination with the cover, a'', and body, a, constructed and operating substantially as and for the purpose described.

80,298.—MACHINERY FOR MAKING PAPER BAGS.—George H. Mallary, New York city.

I claim, 1st, The clamp, formed of the bar, L, the shaft, K with its lags, t, when combined with the supporting bars, u, substantially as set forth.

2d, The clamp, formed of the sides, W and Y, and the jaw, 31, when combined with the folders, 6 6' and the cains, 5 5', substantially as described.

3d, The cross head, Z, the folding blade, 15, and the pasting roller, 13, when combined and arranged substantially as described.

4th, The levers, D and E, the crank, e c, the clamp formed of the bar, L, and the shaft, K, with its lags, t, and the clamp formed of the slides, W and Y, and the jaw, 31, all combined and operating substantially as described.

90,299.—MANUFACTURE OF ARTICLES OF SOFT RUBBER.—George W. Martin, (assignor to himself and J. W. Haskins) Boston, Mass.

I claim an elastic screw thread, substantially as described.

80,300.—CANE SEAT.—George W. Martin (assignor to himself and J. W. Haskins), Boston, Mass.

I claim a movable cane seat, having sunken bearings, g, as specified, and so constructed as to be reversible, and present each side to the front, substantially as and for the purpose described.

80,301.—PORTABLE ROOFS FOR HAY STACKS, ETC.—Thaddeus Munson, Canandaigua, N. Y.

I claim the combination with the sections, A A', connected by hooks, a a1 a2, of the bracing cleats, c c, at the top, and the cords, g g, at the bottom, passing loosely through the rings, d d, and attached to the bars, f f, and stakes, h, the whole arranged as described, and operating in the manner and for the purpose set forth.

80,302.—LAMP.—Person Noyes, Lowell, Mass. Antedated July 11, 1868.

I claim the use or application of a cap or stopple, a, to the top end of the wick tube of a lamp which has an outer jacket, sleeve, or other similar or analogous device, when said cap or stopple is constructed and arranged to operate substantially as and for the purpose set forth.

80,303.—CULINARY APPARATUS.—William W. S. Orbeton, Bradford, Mass.

I claim the improved brazier as connected with the main air supply openings, a a, etc., the auxiliary inducts, B B, etc., and the eauction openings, e e, arranged and combined together substantially in the manner and so as to operate as set forth.

Also, in combination therewith, the annular register supporting plate, C, as and for the purposes described.

Also, the combination of the main and auxiliary air inducts, a B, the discharge openings, c the fire pot cover, D, the annular register supporting plate, C, the latter having a dome or cover applied to it in the manner and for the purpose as explained.

Also, the combination of the hoop or band, F, with a brazier or cooking apparatus constructed in other respects substantially as set forth, the same being for the purposes explained.

80,304.—MACHINE FOR MAKING KNITTING MACHINE NEEDLE SHANKS.—Jesse S. Perkins, Lake Village, N. H.

I claim the combination of the friction jaws, d e, or the equivalent thereof, and the dies and cutters, f g n o p, arranged and provided with mechanism substantially as described, for operating them in the manner and for the purpose as specified.

80,305.—HANGING FOR GATES.—Peter Rasar and D. J. Mayes, Illopolis, Ill.

We claim the rollers, d d', plate, c, and yoke, k, of a self-closing gate, when arranged in relation to each other and the rest of the gate, substantially as and for the purpose specified.

80,306.—SMUT MILL.—Richard Redfield and James H. Redfield, Salem, Ind.

We claim, 1st, The arrangement of the horizontal fan, J', blast spout, B B6, branch spout, B1, partition, S', vibrating trough, C g, and horizontal spirally slotted case, E y, and horizontal beater, F J, substantially as and for the purpose described.

2d, The relative arrangement of the blast spout, B B1 B6 S', hopper, A, box, d d', vibrating roughened surfaced trough, C, openings, f i', spout, D, hopper, P, horizontal case, E y, horizontal beater, F J, passage, T, inclined spout, T1, vertical spout, T2, cap, H, and inclined receiver, H', substantially as described.

80,307.—MEASURING FAUCET.—Thaddeus S. Reeve, Chicago, Ill.

I claim a measuring faucet, consisting of screw, A, stop, B, gate, D, cylinder, E, piston, F, and gage, H, arranged substantially as described.

80,308.—HORSE POWER.—M. A. Richardson, Sherman, N. Y.

I claim, 1st, The friction brake, D, and nut, d, applied to the operating parts of a horse power, substantially as and for the purpose set forth.

2d, The combination and arrangement of the driving wheel, 1, with the friction device, D d, in such a manner as to be removable from the bed, either separately or together, by the removal of the nut, d, as explained.

80,309.—PEAT MACHINE.—Marvin S. Roberts, Racine, Wis. Antedated July 14, 1868.

I claim, 1st, The digging apparatus, D, consisting of box, E, plunger, F, and endless chain, G, with buckets, H H, combined and operating as described, and the whole secured to the boat, A, and provided with continuous automatic movement along the semi-circular curve, A', by means substantially as described, or other equivalent means.

2d, The mode of automatically regulating the semi circular to-and-fro movement of the digging apparatus, D, along the curve, A', by means of double wheel, m, lever, P', and stops, Q, substantially as herein set forth and specified.

3d, The perforated buckets, H, provided with the hinged bottom, F', and spring catch, c', in combination with the guides, h'', when arranged to operate as described.

4th, The segmental gear, A' and A'', arranged as described, in combination with the digging apparatus, and the mechanism for operating the same, substantially as herein described.

5th, The cutting flange, T, of the outer pulley, S, of the flange, F, to cut peat in the bed, and to thus facilitate the operation of the buckets, substantially as set forth.

6th, The grinder, Z, consisting of revolving toothed and furrowed plate, B', provided with spurs, D' D', and constructed as described, and of stationary furrowed concave, C', provided with toothed arms, o' o', and operating by means of set screws, p' p', the whole arranged and operating substantially as set forth, for the purpose of crushing, working up, and pulping peat, as described and specified.

7th, In combination with the grinder, Z, the partially revolving hoop, E', provided with bag, F'', constructed as described and secured to the great conveyer, G'.

8th, The boat, A, constructed as described, in combination with digging apparatus, D, and grinder, Z, to be used on watery peat bogs, substantially as herein described.

80,310.—THILL COUPLING.—Clark Robinson, Fox Lake, Wis.

I claim the socket, D D in combination with the pivot, K having a notch, M, the strap, A, and stop, E, substantially as set forth and shown.

80,311.—SAD IRON HOLDER.—G. H. Roth, Boston, Mass.

I claim the guard, as made with the lateral passages, e e, arranged in it, and with latches, D D, to embrace the parts, d d, of the handle, and cover the passages, e e.

Also, the combination and arrangement of the movable covers, G G, with the guard, made with the slots, e e, and provided with latches thereto, as set thereto.

80,312.—BED BOTTOM.—Isaac N. Sheets, West Jefferson, Ohio.

I claim the combination of the coiled springs, G, the tension rubber springs, N and the hinged levers 1, substantially as set forth.

80,313.—BOILER FLUE PLUG.—William M. Sinclair, Baltimore, Md.

I claim the flanged tubular plug, C, constructed with a longitudinal slot or slots, f, between the lugs, e, at its inner end, and a circumferential slot or slots, g, about in line with the end of the slots, f, for use in combination with the wedge or wedges, d, substantially as and for the purpose set forth.

80,314.—PLOW.—Daniel Smith, Cedar Falls, Iowa.

I claim, 1st, A mold board for plows, which is made entirely of glass, substantially as described.

2d, The combination of a glass mold board and a metal share, substantially as described.

3d, Securing a glass mold board to a plow frame, by means of clamps, a b, or their equivalents, substantially as described.

4th, The construction of the side clamps, a b, with curved overhanging lips, a' b', substantially as described.

80,315.—CULINARY APPARATUS.—Volney M. Thomas, Brandon, Vt.

I claim the arrangement and combination of the steam chamber, A, conducting pipe, D, and grate, G, when constructed and operating substantially as and for the purposes herein set forth.

80,316.—CLOTHES DRIER.—L. B. Waterman, Chicago, Ill.

I claim a detachable clothes drier consisting of the hinged bands, A, having the bars, B, pivoted thereto, and arranged to be secured to a stove pipe by means of the brace or pawl, b, and the ratchet, or its equivalent of rubber, as herein described.

80,317.—COFFEE MILL.—Edwin Watrous, Mystic River, Conn.

I claim, 1st, The grinding mill, in which the flange or attaching device is placed at an inclination to the axis of the mill, for the purposes and substantially as set forth.

2d, The hollow clamping washer, 7, in combination with the lug, 8, on the flange, h, for attaching the mill when the parts are slipped behind the screw heads, substantially as shown.

3d, The flanges, 1 2 and 3, constructed and applied, as shown, to the shell, b c, in combination with the hopper for attaching the latter, in the manner herein set forth.

80,318.—FOUNDATION FOR FENCES.—Thomas W. Welch and George B. Starbird, Mechanicsburg Pa.

We claim the part, A A, the parts, B B, the parts, C C, the octaganal or

round top, D D, the notched cross bar. E. the conical or pyramidal parts, F F F, etc., and the bolts and burs, H H, all combined and operating in the manner and for the purpose hercin set forth.

80,319.—PAD FOR HORSES' HOOFS.—Joseph L. Wetherell, Attleboro, Mass.

I claim my improved elastic heel cushion, as made with the two flanges, a a, arranged and combined with its body, and for use, substantially as specified.

80,320.—RAILWAY CHAIR.—William Wickersham, Boston, Mass.

I claim, 1st, In railway-rail chairs, the wedge, c, in combination with the spring, i, and the chair, operating substantially in the manner and for the the purpose set forth.

2d, The wedge, d, in combination with the wedge, e, and the chair, substantially in the manner and for the purpose set forth.

80,321.—METHOD OF SUPPORTING CHILLS IN CASTING.—William H. Wiley, Fredonia, N. Y.

I claim the pedestals, C C, constructed and manipulated with the flask and pattern, and supporting the cbill iron, D, substantially asand for the purpose set forth.

80,322.—OTTOMAN LOUNGE.—George H. C. Williams, Chicago, Ill.

I claim the ottoman lounge, consisting of the main body, A, extension section, A", hinged to the end board, J, and provided with foot piece, F', and head board, E, rod, I, hinges, 243, and receptacle, H, when combined, constructed, arranged, and operating as herein shown and described.

80,323.—CAR WHEEL.—William Wilmington, Toledo, Ohio.

I claim the within-described cast iron car wheel, the said wheel being produced by the use of two quantities of iron, and by substantially the process herein described.

80,324.—CANE AND TELESCOPE COMBINED.—George W. Wilson (assignor to John W. Little), Concord, N. H.

I claim a cane with the telescope and opera glass, either or both, combined and adjusted substantially as described.

80,325.—PENDANTS FOR SHEETS ON FORE-AND-AFT SAILS.—Nelson Woodbury (assignor to William Woodbury), Chelsea, Mass.

I claim the combination of a spring, a pendant, and an eye through which the pendant passes, or their equivalents, all substantially as and for the purpose specified.

80,326.—CAR OPENER.—F. S. Wyman, Chicago, Ill.

I claim the knife, C, rigidly attached to the adjustable plate, F, of a "circular can opener," and constructed to operate substantially as herein set forth.

80,327.—CENTERING LATHE.—Benjamin F. Bee, Harwich, Mass, assignor to the New York Tap and Die Company, New York city.

I claim the two slides, H I, provided respectively with the jaws, M L, in connection with the top plate, K, connected with the treadle, N, and the springs, d d', all arranged and applied to a centering lathe to operate in the manner substantially as and for the purpose set forth.

80,328.—INDICATOR FOR STEAM GENERATOR.—Robert Berryman, Philadelphia, Pa

I claim the arrangement of the vessel, A, spindle, C, guide, g, valve, d, adjustable float, F, whistle, B, lever, E weight, D safety valve, G, weighted lever, H, and whistle, I, as herein described, for the purpose specified.

80,329.—COFFEE ROASTER.—Friedrich Max Bode, Vienna, Austria, assignor to C. B. Mueller, Hanover, Prussia

I claim, 1st, Arranging the mouth of the shell, A, so that it projects through the jacket, B, as described, so that the contents of the shell may be easily inspected during operation, without requiring the removal of the apparatus from the stove.

2d, A revolving coffee roaster which turns on an inclined axis, substantially as herein shown and described.

3d, The cover, D, of the revolving spherical vessel, A, when so arranged that it serves at once as a cover and as a clutch for connecting the said vessel with its crank-handle, as specified.

4th, The construction and combination with each other of the spherical vessel, A, having the cylindrical neck, a, and the pin, b, of the jacket, B, with its flange, c, and the handle, C, cover, D, and handle, E, all made and operating substantially as herein shown and described.

80,330.—WINDOW SCRUBBER.—B. F. Burgess, Jr., Boston, Mass.

I claim a window wiper, constructed substantially as described, that is, by the combination of the supporting frame, B, and the rotating frame, C, arranged, substantially as shown, whereby the cloth is attached to the frame, and operated as and for the purposes described.

80,331.—TRACK CLEARER FOR RAILROADS.—John Callaghan (assignor to himself and Job Newton), St. Louis, Mo.

I claim the track clearer, constructed as described, consisting of the curved bifurcated beam, A, bearing upon its arms, a a', the scraper, G, with roller, J, and the brush, S, said beam extending upward in a forward direction, through the slotted plate, D, having the spring catch, I, and pivoted between the plates, H, secured to the under side of the track frame, B, all arranged and operating as described, for the purpose specified.

80,332.—LOCK FOR SECURING RAILROAD SWITCHES.—John V. Chamberlain, Cincinnati, assignor to himself, S. D. Patterson, and John V. Chamberlain, Delhi, Ohio.

I claim a switch-lock, composed of the bolt, D, slide, E, and the cam F, all arranged within a suitable case, A, attached to the switch-bar, B, substantially as herein shown and described.

80,333.—OIL CUP.—Sylvester Charnley, Portage City, Wis.

I claim the valve, D, having a triangular stem (as shown in fig. 3), the regulating screw E, valve, F, spring, g, and cage, B, when arranged in an oil-cup, substantially as described, for the purpose set forth.

80,334.—TABLE CUTLERY.—William Clayton, Bristol, Conn.

I claim securing the bolster of a knife or fork to the handle and shank of the same by means of a metal block, D, which is cast through a slot, b, and around the bolster and scales, or handle, substantially as herein shown and described.

80,335.—CHEESE VAT.—Paschal Colvin, Pecatonica, Ill.

I claim, 1st, The semi-circular cheese vat, composed of the shells, I and J, having shaft-bearings, t t, furnace, D, and spout, Q, substantially as shown and described, and for the purpose set forth.

2d, The cutting-frame B, composed of longitudinal and transverse cutters, a a a, and b b b, respectively, or their equivalent, and the shaft, A, and crank, B, in combination with a semi-circular cheese vat, substantially as shown and described, and for the purpose set forth.

3d, The stirring-frame, constructed, as described, of the curved paddles, N, attached to the arms, P, curved in opposite directions upon the shaft, A, the outer ends of one series of paddles being inclined in a reverse direction to the inclination given the ends of the other series, as herein described, for the purpose specified.

4th, The circulating pipe, i i i, substantially as shown and described, in combination with the semi-circular cheese vat and furnace, D, all substantially as shown and described, and for the purpose set forth.

5th, The shaft, r, bearing eccentric wheels, q q, in combination with a cheese vat, substantially as shown and described, and for the purpose set forth.

80,336.—CLOTHES WRINGER.—Philipp Cramer, Providence, R. I.

I claim, 1st, the combination of the frames, A D, rollers, B C E and F, and rods, c c with each other, all made and operating substantially as herein shown and described, for the purpose specified.

2d, The elastic scraper, j, to clear the surface of the roller, O, when arranged in combination with a wringer, made as set forth.

80,337.—LEVEL.—William P. Cutter, Chelsea, Mass.

I claim the level constructed as described, of the two flanged rings, B, inserted in the stock, A, from opposite sides, and each provided, near their inner ends, with cross-bars, C, whose points of intersection furnish bearings for the pivots of the weighted angular pendulum, D, as herein shown and described.

80,338.—SAWING MACHINE.—Henry A. Dauiels, Thomaston, Conn.

I claim hanging the shaft, C, by which the saw-frame, E, is oscillated in the slide, B, to which said saw-frame is pivoted, as herein described, for the purpose specified.

80,339.—DUMPING CAR.—Phylander Daniels, Jackson, Mich.

I claim a car dumping bed, provided with means for actuating it, substantially as and for the purpose described.

80,340.—APPARATUS FOR CLARIFYING SUGAR JUICE.—William Dill, Houma, La.

I claim, 1st, The combination with the curb, A, of the rotating strainer, G, when constructed, substantially as and for the purpose described.

2d, The combination with the strainer, G, of the vanes, K, substantially as and for the purpose described.

3d, The rotary strainer, G, constructed and arranged substantially as and for the purpose described.

4th, The combination of the strainer, F, with the curb, A, and rotary strainer, G, substantially as and for the purpose described.

80,341.—PAIL EAR.—George E. Eastman, Washington Mills, N. Y.

I claim a pail-ear, constructed substantially as and for the purposees herein shown and described.

80,342.—EVAPORATOR.—N. Evinger, Terre Haute, Ind.

I claim, 1st, the furnace, A, constructed in three parts, a1, a2, a3, and arranged substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the three pans or boilers, C, H, and I, constructed as described, with each other and with the parts a1, a2, a3, of the furnace, A, substantially as herein shown and described, and for the purpose set forth.

3d, The straining-device, constructed as described, of the sliding gate, G, carrying the semi-conical strainer, F, enclosed by the semi-tubular cover, F', all arranged in relation with the faucet, D, and side of the pan, C, as herein described, for the purpose specified.

4th, The combination of the frame or rack, J, with the parts a2 and a3 of the furnace, A, and with the pans, H I, substantially as herein shown and described, and for the purposes set forth.

5th. The hand-hook, K, constructed substantially as herein shown and described, when used in connection with the pans, H I, as and for the purpose set forth.

80,343.—CLASP FOR HOOP SKIRT.—Louis Fellheimer, New York city.

I claim, 1st, Fastening the steel, A, to the eyelit, C, bearing the tape, B, by passing the same through holes bored transversely through each side of the eyelet, and then crushing down the inner ends of said eyelit upon the steel, as herein shown and described.

2d, Boring holes transversely through the sides of the eyelet, C, for the passage of the steel, A, whereby said steel is secured to the eyelet inside the tape B, and for the purpose specified.

80,344.—DEVICE FOR HOLDING TOOLS AGAINST GRIND STONES.—Edwin Fernald, Turner, Me.

I claim the vertically adjustable jointed bar, H, bearing the wheel, j, in combination with the guide, G, and horizontally-traveling shoe, F, as herein described, for the purpose specified.

80,345.—SEWING MACHINE.—Stephen French, Orange, Mass.

I claim the arrangement of the cams, H, i, j, upon shaft, E; the pivoted lever, G, having wings, h; the shuttle-slide, f, spring, k, feed, I, having lug, l, and adjustable stop, m, all constructed to operate in the manner and for the purposes substantially as herein set forth and shown, for the purposes specified.

80,346.—SCAFFOLDING.—J. W. Glover, William B. Orner, and B. E. Orner, Martinsville, Ind.

We claim the employment of ratchet-shores, saddles, and levers, as a device or devices for raising the frames of houses, all substantially as shown and described.

80,347.—NUTMEG GRATER.—E. A. Goodes (assignor to himself, E. L. Miller, and W. H. Morford), Philadelphia, Pa.

I claim the grater, consisting of the grating-cylinder, B, provided with crank-handle, E, and plunger, a, having rod, c, and the plunger, C, G, with its handle, D, all constructed and arranged within the case, A, to operate as herein shown and described, for the purpose specified.

80,348.—MACHINE FOR BENDING SHEET METAL.—Joseph M. Grove and Henry Hedrick, Anderson, Ind.

We claim the combination, with the rollers of a bending-machine, of the cam, i, substantially as and for the purpose described.

80,349.—HAND PUNCH.—J. D. Higgins, Greenville, Conn.

I claim the detached tubular punch, G, in combination with the guide-box F, formed upon the jaw, D, the slotted spring, H, and operating-jaw, C, all arranged and operating as described, for the purpose specified.

80,350.—TANNERS' HOOK.—James Hoffman, Belvidere, N. J.

I claim, 1st, pivoting a lever-hook, C, to the shank of a tanners' hook, D, substantially as herein shown and described, and for the purpose set forth.

2d. The combination of the lever-hook, C, connecting rod, D, sliding ring, E, sliding rods, F, one or more sliding rings, G, and the coiled spring, H, with each other and with the hook, B, and handle, A, substantially as herein shown and described, and for the purpose set forth.

80,351.—BOLT CUTTER.—Henry Howe, Oneonta, N. Y.

I claim the combination of the slotted plate, B, cam, D, spring-catch, b, and projecting arm, c, all made and operating substantially as herein showu and described.

80,352.—PAPER CAP.—M. G. Imbach, and I. Weidenman, Hartford, Conn.

We claim, as a new article of manufactnre, a paper cap, having its crown formed by cutting from a rectangular sheet of paper a series of gores, or triangles, leaving them united at their bases, and having their vertices united at a common centre by means of the button, C, said crown being secured to the band, D, as herein described, for the purpose specified.

80,353.—OINTMENT FOR HORSES, CATTLE, ETC.—Richard Jonas, New York city.

I claim an ointment composed of the above mentioned ingredients, in about the proportions named and for the purposes set forth.

80,354.—MACHINE FOR FLATTENING AND BENDING CHAIN LINKS.—Peter Kendrick, Trenton, N. J.

I claim, 1st. The arrangement of the plungers, J J', rolls, M M', guides, K K' I', cross beads, H H', connecting rods, O O, shafts, C D, eccentrics, P F, crank, N, dies, Q S, and guide, R, with relation to the bed, A, substantially as herein shown and described, for the purposes specified.

2d, The combination of the grooved dies, Q S, arranged as described, with the bending mechanism, all substantially as set forth.

80,355.—NURSERY CUP.—J. F. Leslie and Edwin A. Tibbetts, Woburn, Mass.

We claim the nursery cup, when its cover, B, is provided with the stays, E, and ring, whereby it is adapted to be reversed to support said cup and form a heater, as herein shown and described.

80,356.—SUBSOIL ATTACHMENT FOR PLOWS.—J. C. Leonard and J. J. Gooar, Clinton, Mo.

We claim the subsoil plow, A, constructed substantially as described, in combination with the sod or other plow, C, all as set forth.

80,357.—BRANCH CEMENT PIPE.—Enoch Lockhart and Frank Roberts, Louisville, Ky., and Henry Knight, Brooklyn, N. Y.

We claim, 1st, The cores, D and C, the collars, G and J, the core pin, E, with the key, F, arranged substantially as described, for the purposes set forth.

2d, The key, F, in combination with the cores, C D, as herein described, for the purpose specified.

80,358.—MOLD FOR BUILDING-BLOCKS.—Thomas J. Lowry. Conneautville, Pa.

I claim the construction and arrangement of the improved mold for building blocks, operated as herein described.

80,359.—WATER WHEEL.—La Fayette Lyons, Bennington, Vt.

I claim a water wheel having a cylindrical or conical core, A, provided with the curved buckets, C, and arranged in a curb, D, provided with the supply and discharge passages, K G and H, substantially as and for the purpose described.

80,360.—CARRIAGE CLIP.—Thomas McCreary (assignor to himself, Geo. M. Sullivan, and John McCreary), Matteawan, N. Y.

I claim, 1st, A carriage clip in which the pivot, C, is swiveled in the shaft, and inserted from above, into the slotted ears of the clip, and fastened to the latter by means of a spring catch, E, or its equivalent.

2d, The strap, D, when rigidly secured to the pivot pin, C, of a carriage clip, for holding the spring catch, E, and for preventing the pin from turning, as set forth.

3d, A carriage thill coupling consisting of the clip, A, shaft, B, pin C, strap, D, and catch, E, all made and operating substantially as herein shown and described.

80,361.—SMUT MACHINE.—E. McLane, Young America, Ill.

I claim the passage, f, in the blast spout, H, provided with the valve, g, when arranged in relation with the spout, G, and fan, B, to operate substantially as and for the purpose set forth.

80,362.—CORN SHELLER.—Amzi C. Mills, Oaktown, Ind.

I claim an improved corn sheller formed by the combination of the curved slats or knives with the frame or conductor, A, substantially as herein shown and described and for the purpose set forth.

80,363.—MACHINE FOR DRESSING SLATE FRAMES.—Wm. F. Mosser, Allentown, Pa.

I claim, 1st, The sliding frames, Y, which carry the cutter shafts, M', and cutters, W, in combination with the revolving table, L, when constructed and operating substantially as herein shown and described and for the purpose set forth.

2d, The arms, S', operated by the cam, U', through the arm, V', to spread the cutter frames, Y, as herein described, for the purpose specified.

3d, Holding the cutters, up to their work by means of the bar, F', acting upon the strap, A', that drives them, arranged substantially as herein described and shown.

4th, The presser or holder, Q, constructed and operating substantially as herein shown and described, in combination with the revolving table, L, as and for the purpose set forth.

5th, The angular pivoted stop, I', in combination with the angular pusher, J', substantially as described, for the purpose specified.

6th, The pushers, E and J', operated as described, adapted to move the slats to the cutters, W and Q', respectively, substantially as herein shown and described.

80,364.—FENCE POST DRIVER.—Isaac J. Parker, Buffalo Grove, Iowa.

I claim, 1st, The hammer shaft, D, in combination with the sliding bar, F, and the windlass, I, the former being connected to the latter by a rope, H, passing over a pulley, a, and all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The fixed and adjustable rollers, J J', in combination with the hammer shaft, D, and the bar, F, substantially as and for the purpose specified.

80,365.—AUGER HANDLE.—H. D. Pennoyer, Athens, N. Y.

I claim the auger top constructed as described, of the parts, a b, secured together by the bolt, c, and provided respectively with the concentric spring pawls, h, and ratchet teeth, i, the upper part, a, having the loop, f, and the spring catch, B, and the lower part recessed to receive the shank of the auger, all arranged and operating as described, for the purpose specified.

80,366.—BOOTS AND SHOES.—William Smith, Whitehall, Bridesburg, Pa

I claim, 1st, The application to the soles of boots and shoes of strips, B, of wood, metal, or other suitable material, having beveled sides, and fitted in grooves in the sole, the grooves having dovetail sides, to correspond to the sides of the strips.

2d, Cutting transversely the inner surfaces of said strips, B, in order to render them yielding or flexible, substantially as shown and described.

80,367.—EXTENSION LADDER.—John A. Smith, Lacon, Ill.

I claim the extension ladder constructed as described, of the three sections, A B C, sliding in grooves, one within the other, and provided with the adjusting screws, E F, and the adjustable braces, G, composed of the rods, g1 g2 g3, all arranged as described, for the purpose specified.

80,368.—CEMENT FOR ROOFING, ETC.—Harrison S. Snow and Edgar J. Hunkins, Macon, Mo.

We claim a fire and water proof cement composed of the ingredients and in the manner and proportions substantially as herein described.

80,369.—DOOR LOCK.—John G. Spathlef, Sandusky, Ohio.

I claim the sliding plates, F F, when arranged on the inner side of the covering plate of a lock case, and when forced together by means of springs, e e, substantially as described, so as to close the key hole, as set forth.

80,370.—LIQUID MEASURE.—Ward Sprague, Sandy Creek, N. Y.

I claim the liquid measure constructed with the walls, a a, and fluid chamber, c, all constructed as and for the purpose described.

80,371.—RUFFLING ATTACHMENT FOR SEWING MACHINES.—A. Steward. Piano, Ill.

I claim in combination with the presser-foot and the ruffling attachment, the guide, A, having the lips, tongue, and friction points substantially as described.

80,372.—GRAIN REGISTER.—Barnett Taylor, Forestville, Minn.

1 claim, 1st, the hinged top, B, or its equivalent, in combination with a shaft D, pointer, a, ratchet wheel, Q, and sliding upright, M, and one or more pawls, all substantially as shown and described and for the purpose set forth.

2d, The hinged top, B, or its equivalent, in combination with the sliding upright, M, with one or more pawls or their equivalent, the screw shaft, D, and nut, E, all substantially as and for the purpose shown and described.

3d, The closed box having a hinged top, B, the vibrating of which actuates the interior registering machine of the said box, by means of a sliding upright, M, all substantially as shown and described and for the purpose of registering measures of grain by the weight of the same, all as set forth.

4th, The bell plate, L, clapper, Z, lever, Y, toothed wheel, C, and sliding upright and ratchet wheel, all substantially as shown and described, in combination with the yielding top, B, all as and for the purpose set forth.

5th, The graduated circle, U, and scale, b, substantially as shown and described, in combination with the pointers, a and c, screw shaft, D, and nut, E, all as and for the purpose set forth.

6th, Sliding upright, M, spring, J, and hinged top, B, of a closed box containing any registering mechanism, all substantially as shown and described and for the purpose set forth.

7th, The screw shaft, D, nut, E, pointer, c, scale, b, pointer, a, on the said shaft, and graduated circle, U, all constructed and operated substantially as shown and described and for the purpose set forth.

80,373.—BACK-BAND HOOK.—Charles Wack (assignor to himself Charles Miller and A. Steinbach) Evansville, Ind.

I claim, as a new article of manufacture, the back hand hook, constructed as described, of the plate, B, cast or formed with the hook, A, whose upper portion is bent in at e f, said plate being adapted for riveting to the strap, C, as herein shown and described for the purpose specified.

80,374.—HAT HOLDER.—Zera Waters, Bloomington, Ill.

I claim, 1st, A rod, B b, having any suitable lock-joint, substantially as described, in combination with the hat rest, A a, all as and for the purpose set forth.

2d, The lock mechanism, substantially as described, in combination with a rod, B b, and rest, A a, all as and for the purpose set forth.

80,375.—RIBBON ROLL CLIP.—Marcus Brown Westhead, Manchester, England.

I claim the flanged clip or slide substantially as herein set forth, for the purpose of putting up tape or ribbon rolls.

80,376.—GIB AND SELF-OILER.—Cyrus B. White, Port Richmond, N. Y.

I claim 1st. The partition plate, e, in the cup, C, for the purpose of separating the oil from the roll, D, and preventing the former being discharged from the cup under the reciprocating motion of the cross-head and gib.

2d. In combination with the above, the roller slide, f h, arranged in grooves g, in the sides of the compartment, d, substantially as described and set forth.

3d, The combination of the roller, D, wick, E, and the cup, C, divided into two compartments by the partition plate, e, substantially as and for the purpose specified.

80,377.—CARRIAGE.—Job Whitehead, Ames Station, Iowa.

I claim the combination of the springs, I, shafts, H, ratchets, L, pawls, M, pulleys, K, with the cross-piece, F, and framing, and with the pulleys, O, and axles, B, when constructed and arranged substantially as and for the purpose described.

80,378.—CRAYON HOLDER.—Rufus Wright, New York city, assignor to himself and I. B. Chadwick, New Haven, Conn.

I claim as a new article of manufacture a crayon holder having its split ends made angular, and provided with screw threads at opposite angles for the reception of the screw nuts, C, as herein shown and described.

80,379.—DOOR MAT.—William Young, Jr. (assignor to himself and Charles Lowell), Franklin, Mass.

I claim as an improved article of manufacture, a door mat, having two uncut wiping surfaces, composed of the rope, C, wound spirally around the longitudinal wooden bars, A, and rounded bars, D, secured to the top and bottom of said bars, A, all clamped together by the transverse rods and nuts as herein shown and described.

80,380.—CAR WHEEL.—Ansou Atwood, New York city.

I claim, 1st, The construction of the exterior part of the car wheel with the ordinary chilled rim, or the rim with a part of the plate attached, having the interior edge thereof with introcessions and projections formed by excentric curves, as and for the purpose before described.

2d, The exterior and interior parts of the wheel in combination, constructed and fitted to one another in either of the modes above specified forming the entire wheel, with the manner of putting the two parts together, and keeping them in place while in use, as and for the purpose before described.

80,381.—CLEANING COTTON WASTE.—Haydn M. Baker, Harlem, N. Y.

I claim the use of coal-tar benzole or coal-tar naphtha, or mixtures of same, and their equivalents, for removing oils from cotton waste, (or other fiber used for similar purposes) and also the separation and recovery of the oils and solvents by distillation.

80,382.—MACHINE FOR MAKING WOODEN TRAYS.—Henry Barber, Greenfield, Mass.

I claim 1st, The carriage, J, mounted upon the free rotating shaft, G, in combination with the guide-plates, H H', and guide pin, I, or the equivalents of these parts, to give the said carriage a combined rotary and rectilinear movement, substantially as and for the purpose described.

2d, In combination with the carriage, J, constructed and operated substantially as described, the concentric saws, C C, fixed upon a single vibrating head block, D, and placed, the one directly under the other, so that the bolt may move to the saws in a curved line, without causing the saws to cramp each other.

3d, In combination with the free shaft, G, guide plates, H H', and guide pin I, or their equivalents, the wheel, L, provided with the pins, e e, and the lever, M, and let off f, substantially as and for the purpose described.

80,383.—HORSE RAKE.—William H. Barton, Olney, Ill.

I claim, 1st In combination with the main sled or vehicle, A, and revolving rake, E, the supplemental hinged runners, D D, employed and operating in the manner and for the purpose set forth,

2d, The swinging frame, F f G, arranged and employed substantially as and for the purpose described.

3d, The combination with the supplemental runners, D, and rake, E, of the straps, I I, pulleys, H H, rock shaft, F, and treadle, f, substantially as and for the purpose specified.

4th, The presser bar, K, provided with the spring, L, and treadle, k', and arranged and employed, in combination with the rake, E, and swinging frame, G, substantially as and for the purpose set forth.

80,384.—DRIVING WHEEL FOR LOCOMOTIVES.—John Birkenhead, Canton, Mass.

I claim the arrangement and combination of traction spurs with the tread and the flange of the driving wheel of a locomotive engine, to be used on the rails of a railway, the whole being substantially as and for the purpose as specified.

80,385.—OPERATING SHUTTLE-BOX IN LOOM.—Jas. Brierly Worcester, assignor to himself and James Brierly, Millbury, Mass.

I claim, 1st, The combination of slides, O, controlled by pattern mechanism, with a carrier, as and for the purposes set forth.

2d, The combination of the lifters, slides, O O', and carrier, H, for operating the boxes, substantially as described.

3d The combination of a sliding spring-catch, L, pendant, R, and notched box rod, K, substantially as set forth.

4th The combination of the cast off lever, P, having a pendant, R, with the tripping arm, S, and its operative mechanism, substantially as described.

5th, The combination of the cast-off and raising apparatus, consisting of the lifters, slides, carrier, and their connections, as described, whereby I can change the boxes at will, on one or both ends of the loom substantially as set forth.

80,386.—DRILL HOLDER.—Charles Burleigh, Fitchburg, Mass.

I claim a drill holding chuck, constructed with a transverse plug crossing the socket hole for the drill butt, having a portion of the transverse plug, corresponding with the perimeter of the socket hole, removed and having a screw and nut, or equivalent means, for giving endwise movement to the plug, all substantially as and for the purpose set forth.

80,387.—DRILLING-MACHINE CARRIAGE.—Charles Burleigh, Fitchburg, Mass.

I claim the arrangement of one or of a series of horizontal drill machine bars or holders, substantially as described, so that any of the bars or holders and especially the lower one or the lower series may be elevated to allow the passage of the carriage to the breast when the track rails only are cleared from debris, and to allow passage of a car through the carriage and under the lower bar or bars up to the breast.

Also, a drill machine carriage, so constructed that a car may run up through the carriage, substantially as set forth.

80,388.—TRUCK.—Oscar F. Burton, Jersey City, N. J.

I claim, 1st The combination herein described for cramping the truck of the bar, K, levers, i, and vertical shafts, h the latter being arranged to freely turn in the truck frame, or opposite sides or ends thereof, and carrying lateral projections, forming axles or shafts to the wheels of the truck, substantially as shown and described.

2d, The combination, with adjacent or separate trucks, of an extension perch, formed of metallic tubes fitted together in a telescopic manner essentially as and for the purpose or purposes herein set forth.

80,389.—WHIP SOCKET.—Charles Christian, Sheboygan, Wis.

I claim a whip holder, constructed with the socket, B, in connection with the springs, D, substantially as and for the purpose described.

80,390.—DOOR HOLDER.—John K. Clark, Mount Pleasant, Iowa, assignor to himself, Charles B. Clark, and Henry R. Clark, Buffalo, N. Y.

I claim the pivoted arm, A, provided with roller, b, in combination with the india-rubber spring, d, and stop attachment, E, the whole constructed, arranged, and operating as shown and described.

80,391.—FERRY BRIDGE.—James A. Clark, New York city.

I claim the method of lowering the guard on the bridge, by means of the chain, f, that draws it and fastens the boat to the bridge, substantially as and for the purposes set forth.

80,392.—BLIND SLAT TENONING MACHINE.—Mil'n W. Clark, Worcester, Mass., assignor to R. Ball and Company.

I claim, 1st, The combination, with the cutter head, disks, and mechanism for imparting to them a rotary motion, of the cutter heads and their shafts, mounted eccentrically in said disks, together with mechanism for revolving the cutter heads in the manner described, so that the said cutter heads shall not only have a rotary movement upon their own axes, but shall also revolve around the axes of their supporting disks, as and for the purposes set forth.

2d, The combination with the disks, G', and shafts, G, imparting motion to the eccentric cutter heads, and running loosely in said disks, of the bearing support, 2, and annular disk-supports, F, substantially as and for the purposes set forth.

3d, The combination, with the disks, G', and cutter head shafts, of the adjustable quill bearings for supporting said shafts, substantially as and for the purposes set forth.

4th, The combination, with one of the annular disk supports, F, and gear, E', of clasp or guide piece, b, mounted loosely upon the hub of said gear, substantially as and for the purposes set forth.

5th, The combination with one of the gears, J, and the shipper or slide, of a hooked spring, constructed and operating in connection with the said gear and shipper in the manner set forth.

80,393.—RAILROAD CAR STOVE.—M. J. Clark, New Richmond, Ohio.

I claim, 1st, A railroad car stove, composed of upper and lower bases, J and C, connected by fenders, F and B, substantially as described.

2d, The cap, A, and fenders, B, combined and arranged as herein shown and described.

3d, The door and pan-lock, consisting of a bolt and screw-key, substantially as described.

4th, The fender door, I, and screw fastening, E, as specified.

80,394.—STUBBLE CUTTER.—Isaiah B. Conklin, Baltimore, Md.

I claim, 1st, Curved or inclined cutting swords, T, arranged and applied to the frame of a carriage, and adapted for cutting corn stubble, substantially as described.

80,395.—BEE-HIVE.—Samuel Cuplin, Iowa Falls, Iowa.

I claim, 1st, Providing the hive with an adjustable inclined bottom, C, when constructed as and for the purpose set forth.

2d, The dish or pan, d, furnished with the float, H, in combination with the

unnel-shaped device, f, when arranged in connection with a bee-hive, substantially as and for the purpose set forth.

3d, The employment of one or more sliding frames, j, constructed substantially as described

80,396.—STEAM HEATER.—John Davis, Wilkesbarre, Pa.

I claim the combination and arrangement of the pipes, B and D, embeded in the cast iron sides of the fire box, the pipes, C, forming the grate, the connecting pipes, B', and C', feed pipe, A, boiler, I, and communicating pipes, A', and E, all connected and operating substantially as described, for the purposes specified.

80,397.—WASH BOILER.—D. A. Danforth, (assignor to himself and Isaac Ayers) Elkhart, Ind.

I claim the inner boiler, B, having its bottom slotted, and provided with flange, E, arranged to fit within and operate in connection with the boiler, A, substantially as and for the purpose set forth.

90,398.—APPARATUS FOR COLLECTING AND SEPARATING MINERAL AND METALLIC SUBSTANCES.—William T. Duvall (assignor to the Duvall Patent Pump, Dredging, and Gold-washing Company), Georgetown, D. C.

I claim, 1st, The arrangement of the separating chambers, m, in such manner that the flow is caused to pass through the body of the mercury therein, and is spread or deflected by the perforated plate, r, essentially as shown and described.

2d The application of artificial currents of air or water for the purpose of raising or removing solid matter, in the manner, and by means substantially as herein set forth.

3d, A suction pipe of a pump, so applied as to be capable of vertical, oscillating, vibrating, or rotary motion, substantially as and for the purposes specified.

4th, The elongated foot piece of the suction pipe, substantially as represented in figs. 6 and 7, for operation as set forth.

5th, The wheel, B, constructed with one or more curved vanes, a, attached to the disk, e, when said vanes are made tapering from the periphery of the disk and vanishing or nearly so at its axis, as described.

6th, The projection of the vanes, a, in semi-circular or other form, beyond the periphery of the disk, substantially as and for the purpose specified.

80,399.—LOW WATER INDICATOR.—Theodore G. Eiswald, Providence, R. I,

I claim the arrangement of the horizontal pipe, B, vertical whistle and fusible plug tube, C, plug valve, E, chambered screw cap, G, and the valve, H, with its stem, I, and handle. K, as herein shown and described.

80,400.—LOW WATER INDICATOR.—Theodore G. Eiswald, Providence, R I.

I claim the arrangement of the horizontal pipes, A, vertical pipes, C, branch pipe, M, stopcock, m, cap, c, having fusible plugs, a a, valve, v, having the loose face plate, I, vertical stem, T, and hand wheel, W, substantially as shown and described.

80,401.—APPARATUS FOR SEALING FRUIT CANS.—T. M. Ferguson, Ramsborough, Ohio.

I claim the press blocks, D, thumb screws, E, and frame, A, when used for producing a vacuum in fruit cans, as and for the purpose described.

80,402. APPARATUS FOR ELECTRO PLATING.—William Gaies (assignor to himself and George W, Homan), New Haven, Conn.

I claim, as a new article of manufacture, the instrument, consisting of the zinc socket, with its sponge or brush, C, and connecting wire, D, with or without the holder, E, so as to operate in the manner substantially as specified.

80,403.—GOVERNOR.—J. E. Gillespie (assignor to himself and George S. Lincoln & Co.), Hartford, Conn.

I claim, 1st, The clutch, F, with its arm. F", in combination with the lever, G, and stand, D, substantially as specified for the purpose set forth.

2d, The shaft, I, and sliding portion of clutch, E, in combination with the arm of the clutch, F, and lever, G, substantially as set forth.

3d, Shaft, J, with its crank, 2, in combination with the fixed gear or toothed circle, C", disk, H, lever, G, and revolving fulcrum, F", substantially as specified, for the purpose set forth.

4th, The screw rack, R, and the worm pinion, u, in combination with the gear, S, and shield disk, H a, substantially as specified, for the purpose set forth.

80,404.—GAS MACHINE.—David M. Graham, Evansville, Ind.

I claim, 1st, The construction of the rarefier, I, with an air tight condenser, L, in combination with the air pipe, M, substantially in the manner and for the purpose herein described.

2d, The construction of the cylinder, A, with the concave rim, B, substantially as and for the purposes described.

3d, The rarefier, I, condenser, L, air pipes, M N N and T T, gas pipe, O, aerometer cylinder, E, with valve, a, and pulleys, U, U, cylinder, C, with movable cap, D, oil chamber cylinder, F, with opening, G, provided with flanges, and gasometer cylinder, K, all combined and operating in the one cylinder, A, substantially in the manner and for the purpose as described.

4th, The combination and arrangement of the heaters, Q R, substantially in the manner and for the purpose as herein described.

80,405.—GANG PLOW.—Smith Graham, Fennimore, Wis.

I claim the hinged framed beams, g, g', bar, i, lever, k, link, j, and metal strip, or bar, s, all combined and arranged substantially as and for the purpose described.

80,406.—DRILL HOLDER.—William Hall, Jr., North Adams, Mass.

I claim the drill holder, made substantially as described, not only with a longitudinal shank bore, and with a slot extending about the length of the bore, but with the faces of the slot parallel with the surfaces of the holder on which the heads and nuts of the bolts, c c, bear.

80,407.—HOSE COUPLING.—L. W. Hanson and Samuel Bush, Springfield, Mass.

We claim, 1st, The combination and arrangement of the two parts, A and B having pin, F, a notch, H, on one side, and cam lock, K, and notch, L, on the other, substantially as shown and described.

2d, In combination with the above, the rubber packing, C, arranged in and held by the groove, M, substantially as shown.

80,408.—SOAP CUP.—Joseph G. Harrison, New York city.

I claim a new article of manufacture consisting of the cast metal soap cup, A, constructed with a hollow curved side, B, a hook or hooks, D, and ribs, d, substantially as shown and described.

80,409.—WATER METER.—Abraham Heaton (assignor to himself and Bradbury & Goodsell), Bridgeport, Conn.

I claim the arrangement of the two pistons or series of pistons, each piston or series of pistons upon its independent rod, and operating in its respective cylinders and the said cylinders connected by passages in the manner described, and provided with inlet and outlet connections, so that the pistons operate in their respective cylinders, substantially in the manner herein set forth.

80,410.—SLATE FRAME.—Robert Heneage (assignor to Breed & Co.), Buffalo, N. Y.

I claim the rubber mats, D D, provided with catches, b b, and nipples, c c, in combination with the rounding corners, e e, of the slate frame, having the notches, a a, the whole arranged as described, and operating in the manner and for the purpose specified.

80,411.—RAILROAD CAR VENTILATOR.—M. T. Hitchcock, Springfield, Mass.

I claim, 1st, The T-shaped exhaust tube, having inclined ends, and valves, a b, attached thereto, for the purpose of adjusting the action of the ventilator to the direction of the motion of the car, and enclosed within the shell, C, which is rigidly attached to the car, in such a manner as to form an air passage between the exhaust tube and shell, the whole constructed, arranged and operating substantially as set forth,

2d, An exhausting ventilator, rigidly attached to the bottom of a railway car, and so arranged as to exhaust equally well, whether said car moves in one direction or the other, substantially as set forth, and to discharge the air from the ear directly beneath the same as specified.

80,412.—HAY SPREADER.—De Lancy Kennedy, New York city.

I claim, 1st, An adjustable journal box, B, in combination with the fork of a hay tedder, whereby the said fork may be set to operate nearer to or further from the ground, substantially as herein described.

2d, The buttons, D D, in combination with the extended and bent portions of the tines, C C, substantially as and for the purpose herein set forth.

80,413.—HYDROCARBON BURNER.—Samuel P. Legg, Springfield, Mass.

I claim, 1st, A fire box for burning liquid fuel in a steam boiler, having the bottom plate, A, elevated above the bottom of the boiler, for the purpose specified, and air flues, F F, closed by valves, and so arranged that the draft is entirely supplied through the air flues, in combination with the reservoir, K, and supply pipe, P, having a contracted nozzle, o', and so inserted in the fire box as to prevent heating the liquid fuel until it leaves the pipe, P, the whole arranged and operating substantially as described.

2d, The combination and arrangement of perforated conductor, I, perforated funnel, J, and the pipe, P, having a contracted opening, o', applied to the fire box of a steam boiler, substantially as described.

80,414.—OPENING AND CLOSING SHUTTERS.—Carl Lehnert (assignor to Joseph M. Weilhar t), Boston, Mass.

I claim, 1st, The combination of the cam surface and catch or projection, c, on the cam segment, I, with the spurs, b b, on the segment gear, H, for holding the blind or shutter open or closed, substantially as described and specified.

2d, The wedge, e, and adjusting devices, in combination with the segments H I, and cam surfaces thereon, substantially as described and specified.

80,415.—CARD RACK.—Mitchel Lepp, Albany, N. Y.

I claim the steadying slat, a, in combination with the holding slat, b, and the rack frame, c c' and e, constructed substantially as set forth, for the purpose herein described.

80,416.—COOKING STOVE.—J. W. Lowrey, Dayton, Ohio.

I claim the inner chamber, A, to be inserted into the stove as shown, together with its regulating valves and slide, M, N, and O, and adjustable end pieces, P and Q, substantially as and for the purposes herein specified and described.

80,417.—RAILROAD RAIL.—Robert M. Marchant, Wellington, New Zealand.

I claim, in the construction of railways, the arrangement of the rails, A, with a continuous substructure, B or H, either with or without the wooden foundation, D, or iron plates, I, the whole secured or bolted together, in the manner and for the purpose herein shown and described.

80,418. PUMP.—George Marshall, Brooklyn, N. Y.

I claim the combination of the water ways, F F', on one and the same side of the pump, suction pipe, C, valves, E G, and valve chambers, H J, with their lids or doors, L L', arranged substantially as described, loose clamping bars M M', and fixed inclines or wedges, I I', essentially as specified.

80,419.—CAR BRAKE.—S McCambridge, Philadelphia, Pa.

I claim, 1st, The combination of the shafts, G, M, and N, cog wheels, Q and Q', cams, R R, friction wheels, S S, belt, P, and pulleys, O and O', with the shaft, B, of the engine, and the wheel, V, and tightening strap, U, when the several parts are constructed, arranged, and operated in relation to each other substantially in the manner and for the purpose set forth.

2d, The combination and arrangement of the lever, W, connecting rod, n, tightening strap, U, and wheel, V, with the chain shaft, G, for holding the chain, F', tight, when the machine, H, is thrown out of gear with the engine, substantially in the manner described.

3d, The combination and arrangement of the spring seated slide, J, with the last truck, E, and chain, F, substantially as and for the purpose set forth.

80,420.—CAR BRAKE.—Samuel McCambridge and Edward G. Martin, Philadelphia, Pa.

We claim the arrangement of the continuous chain, C, and its described connecting rods, when the same is fastened at one end to the front car or truck, and operates, in combination with a fixed sheave or pulley, on the rear truck, through a rod or chain connecting directly with the actuating devices on the engine, all as and for the purpose set forth.

80,421.—PROPELLER.—Christian Gotthold Meinhardt, Altoona, assignor to himself and Benjamin F. Bell, Antistown, Pa.

I claim, 1st, The propellers, consisting of the ring, j, rim, F, valve, H, bars, i ii i2, on the piston rod, r, guide braces, g g1 g2, substantially as and for the purposes set forth.

2d, Reversing the steamboat, by means of overturning the valve, H, in the manner and substantially as described.

80,422.—ATTACHING BELLS TO THEIR YOKES.—George R. Meneely, West Troy, N. Y.

I claim securing the center bolt, which holds the clapper to the cap plate, which turns with the bell and supports it in various positions in the yoke by means of a toothed or indented washer attached to the center bolt, in combination with an adjustable clutch attached to the cap plate, substantially as herein set forth.

80,423.—SNOW GATE.—A. D. Murray, Henderson, Pa.

I claim, 1st, The friction rollers, H H', substantially as and for the purpose described.

2d, The combination and arrangement of the lever, K, bar, I, diagonal brace, D, with boles, m, and pin, n, substantially as and for the purpose set forth.

3d, The construction and arrangement of the battens, C' and E, substantially in the manner and for the purpose specified.

4th, The short stake, P, with notch, p, for holding the gate when closed.

80,424.—FASTENING FOR SHIRT COLLARS.—Charles E. Palmer, Newburyport, Mass.

I claim the pivoted button, B, in combination with the shank, a, fixed disk, A, thereon, and detachable head. C, all constructed and arranged as shown and described.

80,425.—VELOCIPEDE.—Harvey A. Reynolds, Brooklyn, N.Y.

I claim the lever, m, with the rods, n n', connected respectively, above and below the fulcrum, in combination with the wheels, d d, and axle, e, to which the other ends of the rods, n n', are connected on opposite sides of the king bolt, i, so as to steer the velocipede by the movement of one lever, as set forth.

80,426.—CAR COUPLING.—Levi Scott and Paul Trimmer, Burgettstown, Pa.

We claim the pivoted lever, F, latch, J, spring, M, and pivoted arm, K, in combination with the perpendicular rod, G, coupling key, D, and connecting rod, L, when arranged and operated as herein described, for the purpose set forth.

80,427.—SULKY PLOW.—Benjamin Slusser, Sidney, Ohio.

I claim, 1st, The combination of the lever, L, having the shoulder, n, with the crank, c, having the projection, m, and supporting the standard to which the plow is attached, when the several parts are connected and arranged so as to operate together, substantially in the manner and for the purpose specified.

2d, The combination of the crank, c, standards, g g, seat, g, rod, H, and hinged post, I, substantially as and for the purpose described.

3d, Supporting the plow upon two standards, E F, bent in the form and attached to the rear side of the plow, in the manner described.

80,428.—MORTISING CHISEL.—Josiah M. Smith, Warren, N. J. Antedated July 18, 1868.

I claim a tenoning chisel, constructed to operate in the manner as herein set forth.

80,429.—FIRE KINDLER.—Verlin G. Tansey (assignor to himself and James W. Simpson), Indianapolis, Ind.

I claim the burner, A, enlarged tube, e, filled with the packing, E, and furnished with the deflecting plate, i, and supplied with oil from the fountain, B, by the tube, g, substantially as shown, in combination with the air ducts, D M, through which air is supplied to the burner, when the draft opening is closed by the plate, C, all arranged and operating substantially as set forth.

80,430.—BUTTON BOOT.—E. P. Taylor, New Bedford, Mass.

I claim a button boot, in which the whole upper and leg front, a, and flap, f, are made in one piece, crimped to the proper form, substantially as shown and described.

80,431.—STEAM GENERATOR.—William R. Taylor and James F. Slot, Brooklyn, E. D., N. Y.

We claim making a vertical tubular steam boiler, substantially as described and with the tubes, water spaces, steam drum, and super-heater, arranged therein in relation to each other as set forth.

80,432.—SCISSORS AND SHEARS.—Augustus Thayer, Albany, N. Y.

I claim, 1st, The clipping notches, o o' o", or, c c, or their equivalents, placed forward or back of the pivot, p, or in the outer edges of the blades to one side, in combination with the blades, A A', and the said notches so placed as to give a sliding cut, as and for the purpose set forth and described.

2d, The holding notches, e e, in one or more sets, placed in the heels of the blades, as and for the purposes set forth and described.

80,433.—CONSTRUCTING BACK PADS TO HARNESS.—John Umbach, Kankakee, Ill.

I claim the use and application of the molding or cup in the filling and stitching the cushion or under part of the back pad to harness.

80,434.—REIN HOLDER.—J. W. Wadsworth, Durham, Conn.

I claim the construction and arrangement of the springs, B C, upon the bar A, and dash board, so as to be a part of the same, and operate in the manner set forth.

80,435.—WASHER.—John A. Way (assignor to The Darrow Manufacturing Company), Bristol, Conn.

I claim, as a new article of manufacture, an axle washer, made of raw hide substantially as described.

80,436.—THERMOSTAT.—Charles A. Wilson, Cincinnati, O.

I claim the adjusting and stop valve screw, H, located on the opposite side of the thermostat plates to the valve seat, E, as described, and for the purpose specified.

80,437.—SMOKE-STACK FOR LOCOMOTIVES.—Jearum Atkins, Washington, D. C.

I claim, 1st, the combination of the annular exhaust-nozzle, or its equivalent, and the annular smoke-passage substantially as herein described.

2d, The arrangement of the annular smoke-passage, and the annular deflecting-plate, P, substantially as set forth.

3d, In combination with the annular passage, G, and annual deflector, P, the central receptacle, H, substantially as and for the purposes set forth.

80,438.—METHOD OF REMOVING CARBON FROM GAS-RETORTS.—John A. Bassett and Oliver C. Smith, Salem, Mass.

We claim, 1st, The apparatus shown and set forth, having the various parts constructed and operating substantially as specified, and used for the purpose described.

2d, Combining an air-forcing apparatus, with a retort lid, having an opening for the purpose of admitting air to the interior of the retort.

3d, The combination of the pipe, H, and retort-lid, G, with the air-forcing apparatus, F, when used for the purpose specified.

4th, The combination of the flexible steam tube, E, with the main, C, and blower, F, for the purpose set forth.

80,439.—FARM GATE.—George W. Blackwell, Lebanon, Ind.

I claim the action of the gate in opening and shutting the wheels, B B, and supported between the upright posts, P P, on the wheels, C, and also on the latch, as shown in fig. 5, the catch being sustained by K, and forced into the catch on post by the spring, y.

80,440.—EGG-BEATER.—Lewis T. Blake, New Haven, Conn.

I claim the combination of the case or vessel, A A, with the beating blade, B, and the double crank, c d, when the whole is constructed, arranged, and fitted for use substantially as herein described and set forth.

80,441.—SHEET-METAL LINING FOR BATH-TUBS.—Charles Albert Blessing, Philadelphia, Pa.

I claim a bath-tub lining, made of sheets of hard metal, such as copper or zinc, consisting of the parts, B C C, when the same are constructed and arranged as described.

80,442.—HORSE HAY-FORK.—George W. Bowlsby, Monroe, Mich.

I claim, 1st, The projecting posts, l, secured at an angle to the tines, a a, at their pivot, c, in combination therewith, and with the toggle-lever, e, substantially as and for the purpose described.

2d, The combination and arrangement of the swinging tines, a, enlarged as described at c, bail, d, toggle, e, clevis, j, extended bolts, k, guards, m, supporting bar, h, and projecting posts, l, substantially as described for the purpose specified,

80,443.—MACHINE FOR CUTTING AND ASSORTING BROOM-CORN.—Miles D. Bradley, Ballston Spa, N. Y.

I claim, 1st, The perpendicular drum, A, the different-sized rollers, e1 e2 e3, etc., and belts, n1 n2 n3, etc., whether the said belts be flat or round, all constructed and operating together substantially as shown and described, and for the purpose set forth.

2d, The cutters, v v v v, shaft, E, pinion, J, and toothed rim, l, whether the said rim be toothed externally or internally, and drum, A, all constructed and operating together substantially as shown and described, and for the purpose set forth.

3d, The chutes, K K K, etc., in combination with the drum, A, rollers, e1 e2 e3, etc., and belts, n1 n2 n3, etc., all substantially as and for the purpose shown and described.

4th, The adjustable step-bearing, h, in combination with the drum, A, rollers, e1 e2 e3, etc., belts, n1 n2 n3, etc., all substantially as shown and described, and for the purpose set forth.

5th, The bevel-gearing r u, and pulley, G, substantially as shown and described, in combination with the drum, A, and its belts and rollers, all as and for the purpose set forth.

6th, Adjustable step-bearing, k, in combination with the shaft, E, cutter-wheel, D, drum, A, and its rollers and belts, all substantially as shown and described, and for the purpose set forth.

80,444.—PRINTING-PRESS.—William Braidwood, N. Y. city.

I claim, 1st, The levers, c, hung independent of the platen, operated as described, in combination with the rods, f g, crank pins, d, and roller-carriage, B, substantially as and for the purpose set forth.

2d, The slots, l, in the connection-rods, i, provided with bearings, m, springs, n, and adjusting screws, o, to operate in combination with the platen D, of a printing-press, in the manner and for the purpose described.

3d, The spring-arm, in combination with the bell crank lever, u v, and card drop, p', substantially as and for the purpose set forth.

80,445.—ELEVATOR.—Philipp Brand, Springfield, Ill.

I claim this combination of the jointed framework, B, platform, C, pipes, D, and steadying-arms, F, as herein set forth and for the purposes described.

80,446.—LAMP FOR DESTROYING INSECTS IN TREES.—F. Markham Briggs, Livonia, Mich.

I claim the construction of a lamp, A, provided with any suitable pan, O and arranged to be heated by means of wick-tubes, D, substantially operating as and for the purposes herein described.

80,447.—WATER-ELEVATOR.—G. H. Bristol, Romeo, Ill.

I claim the combination of the lever, L, its pawl, d, wheel, F, spool, E, shaft, D, bail, J, and the bucket and curb, when all are constructed, arranged, and used as specified.

80,448.—TYPE-MACHINE.—David Bruce, Brooklyn, N. Y.

I claim, 1st, In combination with the right-angled lever, E, the plug, D substantially as described, and for the purposes hereinbefore set forth.

2d, The sliding adjusting plate, H, and tapis, M, in combination with the right-angled lever, E, substantially as described, and for the purpose hereinbefore set forth.

3d, In combination with the said sliding adjusting-plate, the bifurcated cam, Q, substantially as hereinbefore described, and for the purposes set forth,

4th, The combination of the movable jaw, N, with the inclined gutter, B substantially as hereinbefore described, and for the purposes set forth,

5th, The combination of the compound spring, S, with the inclined gutter, B, for the purposes hereinbefore set forth, and made and operating substantially as described.

6th, The combination of the spring or trip-hammer, X, with the inclined gutter and right-angled lever, substantially as hereinbefore described.

80,449.—SPRING-PUNCH.—Martin V. Bryant, North Plains, Mich.

I claim the square lug, G, when used in connection with the frame, A, bifurcations, B B, punch, C, pin, D, spring, E, and die, F, substantially as and for the purpose specified.

80,450.—TRACK CLEARER FOR RAILROAD.—S. G. Cabell, Quincy, Ill., assignor to himself and Peter T. Abell, Atchison, Kas.

I claim the arrangement of the steam box, A, and the pipe, B, with the two way cocks, c, and rod, L, constructed substantially as, and for the purpose herein set forth.

80,451.—ASH-BIN.—Willard W. Chase, Springfield, assignor to himself and Solon W. Abbott, Sanapee, N. H.

I claim a mouth or receiving-aperture for ash-bins, and other purposes, as an article of manufacture, constructed and operating substantially as above set forth.

80,452.—TELEGRAPH INSTRUMENT.—Paul Antoine Marie Chauvassaignes and Jacques Paul Lambrigot, Paris, France.

We claim, 1st, The combination of the devices herein described for effecting the notation and automatic transmission of telegraphic messages, the same being constructed and arranged to operate in the manner and for the purposes set forth.

2d, An insulating-ink, composed of the ingredients herein named, taken in the proportions substantially as specified.

3d, A decomposable liquid, made of the ingredients herein-named, taken in the proportions substantially as specified.

80,453.—BRUSH-HOLDER.—Charles B. Clark, Buffalo, N. Y.

I claim connecting the thumb-nut, E, with the movable jaw, H, by means of the flange, G, and slot, K, together with the mortise, L, in the screw-shank F, for the purpose specified.

80,454.—BUCKLE.—John G. Clifton, Northfield, Ind.

I claim the arrangement of the loops of the frame of the buckle at one end, and at the center thereof, between the bars, b b, and d e, in combination with the tongues, i j, acting upon the opposite sides of the frame in the manner and for the purpose specified.

80,455.—FIREPLACE.—William B. Coates, Philadelphia, Pa.

I claim, 1st, The combination of the vibrating-rim, H, with its flange, K, and the bed-plate, J, with its flange, L, and apertures, M, the shaker, F, with its arm, G, and knob, as herein described, and for the purposes set forth.

2d, The construction of the body of the stove, when combined with the cylinder, E, shoulder, Y, and ribbed top, B, as herein described.

3d, In combination with the foregoing, the sifter, O, with funnel-shaped top, N, grate, P, spout, q, and receptacle, R, when constructed and operating as herein described, and for the purpose set forth.

80,456.—NUTMEG-GRATER.—J. L. Coles, and D. H. Coles, New York city.

We claim, 1st, A box, A, containing a revolving carrier, D, having a series of chambers, with spring-followers, which press the articles to be grated against the stationary grating-surface, E, which is combined with a receiver F, all as shown and described.

2d, The combination, with the cylindrical box, A, of a series of carriers, at angles to each other, so as to leave supplementary chambers, n, substantially as and for the purpose described.

80,457.—LUBRICATING DEVICE.—Frank Colligon, Buffalo, N. Y.

I claim the combination of the transparent indicator, E, with the lubricating cup, D, substantially as and for the purposes described.

80,458.—POTATOE-BUG CLEANER.—Joseph Corbeil, Lind, Wis.

I claim the machine for cleaning vines or vegetables of bugs or insects, consisting of a suitable frame mounted on wheels, and having the central receptacle, C, and the two side revolving fans or beaters, D, all constructed and arranged to operate substantially as described.

80,459.—AGEING AND PURIFYING SPIRITS.—James M. Crafts, Boston, Mass.

I claim the forcing of whiskey or a distilled liquor through air, or a gas charged with ozone or antozone, or the forcing of air or gas charged with ozone or antozone through whiskey or a distilled liquor, or the agitating together of whiskey or other distilled liquor, and air or gas charged with ozone or antozone.

Also, in connection therewith, the employment, as explained, of oak shavings, or other coloring equivalent or material, from which an extract is to be obtained.

Also, the treating of air by electricity, so as to ozonize such air, and subsequently passing such air in contact with or through whiskey, or an alchoholic liquor, the same being as and for the purpose or purposes substantially as specified.

Also, for the improvement of the liquor, confining it in a close vessel, and subjecting it while therein to the action of the heat; and

Also, the combination of the same, and the application of ozone or antozone to the liquor, by means substantially as specified.

80,460.—MANUFACTURE OF FILES AND RASPS.—Frederick C. Curie, Lancaster, Pa.

I claim, 1st, Converting files and rasps, either cast, or made from wrought or cast malleable iron, into steel, by the process substantially as herein described.

2d, The new article of manufacture, namely, files and rasps, made by the process substantially as herein described.

80,461.—STEAM SAFETY-VALVE.—Owen R. Davis, Lewiston, Pa.

I claim, 1st, The passage, i, communicating with the chamber, O, in combination with the piston-head. D, piston-rod, E, and valve, F, whereby to allow the steam to force said valve downward, and relieve the boiler of any undue pressure of steam that may accumulate in it, substantially as herein set forth.

2d, The arrangement of the piston-head, D, piston-rod, B, valve, F, and case or frame, G, whereby to prevent tampering with the valve when once arranged for the pressure required, substantially as herein set forth.

3d, The arrangement of the chamber, O, passage, i, valve-rod, q, valve, a, vent, k, and weight, C, substantially as set forth.

80,462.—CORSET.—Thomas B. DeForest, Birmingham, Conn.

I claim, 1st, A corset, formed from a felted material, substantially as herein described.

2d, In combination with a corset, constructed as above, the body-stay or band, A, substantially as set forth.

3d, The arrangement of the stays, B B, upon the surface of the corset, either inside or outside, without the formation of pockets in the body of the corset, substantially as set forth.

80,463.—ELECTRO-MAGNETIC ENGINE.—Alexander John B. De Morat, Philadelphia, Pa.

I claim the combining and arranging of a series of magnets, with magnets or armatures, revolving, or other motion, which are made to pass from a sphere of equilibrium into a sphere of attraction, thereby obtaining a motive power by the motion produced, resulting from the power of attraction, when one or more permanent or electro-magnets are placed angularly against curves or plain surfaces of any metal possessing magnetic properties, and in this motion at the same time to bring back the system into a neutral limit or sphere of equilibrium, and in that state to arrest and carry it beyond the limits of attraction (without the necessity of breaking circuit), then afterward released for a subsequent action, as herein set forth and described, or any other, substantially the same, which will produce these intended effects.

80,464.—METHOD OF FORMING LAMP TUBES.—T. B. Doolittle (assignor to Bridgeport Brass Company), Bridgeport, Conn.

I claim shaping or transforming the stock by means of wedging-mandrels forced longitudinally, in opposite directions, into the tube, to spread it laterally, and shape it, substantially as described.

80,465.—PACKING FOR CAR-AXLES AND BOXES.—Samuel R. Dummer, New York city.

I claim, 1st, The V-shaped lining, G, bearing against the grooved packing, C, and supporting the partly-yielding and non-yielding encircling line J K, substantially as herein represented and described.

2d, The combination of the grooved sectional packing, C D E, the V-shaped lining, G, the encircling chain, J, and its yielding connection, K, substantially as and for the purpose described.

80,466.—FRUIT FRAME.—S. F. Emerson, Seville, Ohio.

I claim, 1st, The covering or bag, F, and tube, I, in combination with the adjustable arms, E, substantially as and for the purpose set forth.

2d, The standard, A head, C, in combination with the arms, D E, dogs, G and cords, E, substantially as and for the purpose set forth.

80,467.—MACHINE FOR TURNING IRREGULAR FORMS.—Harrison Flint, and George P. Smith, Danbury, Conn.

We claim, 1st, The swinging arm, K, carrying the cutter and pattern guide, arranged relatively to the reciprocating carriage, B, carrying the spindles, C C', on which the pattern and the block to be turned are secured, as described.

2d, The link, w, and set-screw, x, for securing the pattern-guide, L, to the arm, K, and for adjustment purposes, when operating substantially as described, for the purpose specified.

80,468.—HOP-POLE CLEANER.—Henry Forncrook, Watertown, Wis.

I claim a hop-pole cleaner, rosser, and trimmer, constructed in the manner and for the purpose substantially as herein specified.

80,469.—ADJUSTABLE FILTER FOR FAUCET.—Henry G. Fuhrmann, Brooklyn, E. D., N. Y.

I claim a straining attachment to faucets, consisting of an elastic tube, A, and conical spout, B, containing a strainer, C, as a new article of manufacture.

80,470.—BRICK MACHINE.—R. M. Gano, and R. S. Miller, Pittsburg, Pa.

We claim the combination of the follower, D d, lever, I, connected to the rock shaft, n and the levers, u and L, connected by the rod, w, with the lever, H, and lugs, v, constructed and arranged to operate subsantially as and for the purpose set forth.

80,471.—LUBRICATING COMPOUND.—E. F. Gerdom, and C. W. Schindler, Albany, N.Y.

We claim a lubricating compound, made of the ingredients above specified, and mixed together in about the proportion and substantially in the manner set forth.

80,472.—FRUIT-JAR.—Thomas Gibson, Rochester, N. Y.

I claim the cover, C, with its groove, b, and the detachable clamps, B, in combination with the flange, a, and packing-ring, c, all acting conjointly, as herein shown, and for the purpose described.

80,473.—HANGING EAVES TROUGHS—H. M. Gilbert, and F. Elberson, Ada, Ohio.

We claim the combination of the fixed bracket, B, with the adjustable clamp, C, and brace, D, when arranged and operating substantially as described.

80,474.—VALVE.—Adam Good, Jr., and Simon Strouse, Titusville, Pa.

We claim the valve, D, provided with inclined or stoping recesses, i i, in combination with sleeve, E, seat, C, and chambers, A A', all arranged to operate substantially as described.

80,475.—BORING AND DRILLING-MACHINE.—John Goodin, Centralia, Ill.

I claim the arrangement of the corrugated cylinder, H, inclined toothed wheel, K, rack-bar, E, cog-wheel, O, and movable frame, F, with the standard, B, all constructed to operate as set forth.

80,476.—DAMPER.—William Hailes (assignor to J. F. Rathbone & Company), Albany, N. Y.

I claim an inclined guard, so applied to the orifices of a sliding draft apparatus, when located at or near the bottom of a fire-chamber of a stove, as to prevent the escape of ashes, etc., therefrom, substantially as described.

80,477.—HAND NAIL-DRIVER FOR BOOTS AND SHOES.—Edwin Hale, Boston, Mass.

I claim the arrangement of the tube, A, the feed-tube, B, and plunger, C E, and H, substantially as and for the purpose described.

80,478.—MACHINE FOR MAKING BOLTS AND SPIKES.—John S. Hall, Pittsburg, Pa.

I claim, 1st, The combination of the heading ram and its lever with the griping dies, gage, and with the cam, D, so that the ram shall have attained great momentum before it reaches the bar, bolt, or blank in the dies, and thus form the head, substantially as described.

2d, The unobstructed space under or below the dies and feeding point, so that when the griping ram recedes, after heading or upsetting of the end of a long bar or bolt, said bar or bolt may drop out of the dies, and thence be drawn out of the machine, substantially as described.

80,479.—HARVESTER.—James Harris, Janesville, Wis.

I claim, 1st, The arrangement of the shaft, c, operated by the hand lever, M, and having thereon the crank, d, with the rod, e, crank, f, shaft, g, and caster wheel, L, substantially as and for the purpose described.

2d, The combination and arrangement of the shaft, g, with the part, i, and brake, r p, either with or without the clutch, h, whereby the vertical vibration caused by the tortion of the rod is prevented, substantially as described.

3d, The combination and arrangement of the rod, g, part, i, and arm, l, the last two forming the caster arm of the grain wheel, L, when the part, i, is attached directly to the rod, g, and is made the fulcrum upon which the caster arm turns, as well as the moving lever, by means of which the cutter bar is raised or lowered, substantially as described.

4th, The combination and arrangement of the lever, M, shaft, c, cranks, d and h', rods, b and e, crank, f, shaft, g, clutch, n, part, i, and brake, r p, substantially as and for the purpose set forth.

80,480.—WATCH.—Andrew J. Harrison, Rock county, Wis., assignor to himself, W. W. Dexter, William M. Underhill, and Alonzo K. Cutts, and said Underhill assignor to Samuel C. Burnham, Jr. Antedated January 28, 1868.

I claim a band or hoop, cut open or divided at one side, so that it may be sprung open and applied around or partially around the works or mechanism of a watch, between the upper and lower plates, substantially as described, either with or without a covering of felt.

80,481.—MACHINE FOR CROZING AND HOWELING BARRELS. Edward Holmes and Britain Holmes, Buffalo, N. Y.

We claim the combination of the cutter head, H, supported to the swinging frame, I, with the rest, J, supported by the swinging frame, K, oscillating upon a common axis with the cutter frame, when said frames, K and I, are provided with a locking mechanism by which the cutter head may be held at a definite distance from the rest, and thereby made to follow the curvature of the cask, substantially in the manner and for the purpose set forth.

80,482.—MACHINE FOR LEVELING THE STAVES IN BARRELS. Edward Holmes and Britain Holmes, Buffalo, N. Y.

We claim the combination and arrangement of the head block, A, movable driver, B, and its operating screws, D D1 D2, spur wheels, E E1 E2, and driving pinion, F, or their equivalents, operating substantially as herein described.

80,483.—MACHINE FOR JOINTING STAVES.—Edward Holmes and Britain Holmes, Buffalo, N. Y.

We claim, 1st, The flexible hinged ribs k', in combination with the stationary ribs, k, constructed, arranged and operating for the purpose and substantially as described.

2d, The eyepers or feed arms, L, for the purpose substantially as set forth.

3d, The combination of the friction clutch, m, weighted lever, m, and pedal O, arranged and operating in the manner substantially as described.

4th, The combination of the horizontal rack, T, pinion or segment, S', upon the rock shaft, S, and arm, R, arranged and operating for the purpose and substantially as described.

80,484.—RANGE.—Elihu Hosford, Chicago, Ill.

I claim, 1st, The application of a current of cool air to the under side of the grate, in the manner and for the purpose substantially as herein described.

2d, The oven, H, formed by enlarging the air space and providing suitable doors, in combination with the cylinder, A, combustion chamber, C, columns D, and hot air chamber, E, substantially as herein specified.

80,485.—RUBBER HEAD FOR PENCIL.—Samuel D. Hovey, Brooklyn, N. Y.

I claim the pencil and pen head or tip, composed of the pencil mark eraser, o, and the pen mark eraser, e, combined, substantially as described.

80,486.—CAR COUPLING.—Henry R. Howe, Hartwick, N. Y.

I claim the combination of the buffer, A, spring bars, O and K, bent bar, P, chain, R, tongue, N, block, E, pin, T, spring, G, link, J, pin, J, set screw, S, and lever, L, when constructed and arranged substantially as described, as and for the purpose specified.

80,487.—ROTARY STEAM ENGINE.—Edwin W. Jackson, Brooklyn, N. Y.

I claim the combination of the steam chest, T, (Plate XVII), changeable steam ports (Plates XIII and XIV), main shaft plate, I, ng. A, the shifting pistons perforated completely through (Plate I B), they having projections or shafts on their ends, to which the four rollers C C, (Plate V), are attached, one on each end. Two end pieces, called governor's guides (Plates IX and X), which are placed one at each end of the pistons, thick bar, described as the bar of separation (Plate XV), x, placed between the upper and lower steam ports, and back plate, O (Plate XIII), to which the bar of separation is attached, substantially as and for the purpose set forth.

80,488.—WATER METER.—Gustav L. Jaeger, New York city.

I claim, 1st, The arrangement of mud cistern, b, and strainer, a, in the plug of the stop cock, D, substantially as and for the purpose described.

2d, the rods, I, and cranks, K, connecting diametrically opposite buckets of the wheel, B, which runs in the scroll, E, substantially as and for the purpose set forth.

80,489.—WAGON.—George W. Janvrin, Great Falls, N. H.

I claim, 1st, A wagon, so constructed and arranged as that the body of the same may be raised and lowered at option, by means of screws attached to and forming part of the wagon, when the said screws are acted upon by attachment to the carrying wheels, substantially as described.

2d, In combination with wagons, the wheel bevels, with their corresponding bevel wheels, when constructed and arranged substantially as shown and described.

3d, The device shown, of the shipper slides and their appended forks, in combination with the upper and lower bevel wheels, J and K, and the wheel bevels, in connection with the body of a wagon, when constructed substantially as described.

4th, The shipper bar clutches shown, when arranged in combination with the notched plates, the shipper slides, and the body of a wagon, substantially as above described.

5th, When in combination with wagons supported by more than two wheels the tip-cart arrangement of two or more cross bars, U Ux, and the pivoted bottom, when constructed substantially as described.

80,490.—HAT.—Henry Kellogg, New Haven, Conn. Antedated July 14, 1868.

I claim a hat formed from pulp, having incorporated within the material of the body or brim, during the formation thereof, a wire reed, or other stiffening frame or form, substantially as described.

70,491.—HEAD BLOCK FOR SAW MILL.—Dennis Lane, Montpelier, Vt.

I claim, 1st, The grooved block, P, and the yielding grooved block, P2, arranged in line in the same head-block, and successively acted upon by each of the ineline bars, N, arranged parallel in the reciprocating frame, G, whereby the head block is made to advance or recede, as desired, all constructed and operating substantially as described.

2d, The sleeve, E, forming an eccentric bushing in the post W, for the pinion wheel, E2, by which the pinion wheel, B2, is thrown in or out of gear with the bevel wheel, A2, for the purpose of advancing or retracting the carriage constructed and operating substantially as described.

80,492.—PORTABLE AND ADJUSTABLE STILL-WATER DAM.—S. Lewis (assignor to W. H. Cammeyer), Brooklyn, N. Y.

I claim, 1st, The construction and arrangement of a portable and adjustable dam, in sliding or telescopic sections, in the manner and for the purpose herein described.

2d, The combination of the self-anchors, 3, with the dam, in the manner and for the purposes herein described.

3d, The combination of the boats, supports, or floats, with the dam, as above described, and the arrangement of anchors to hold such boats in position, in the manner and for the purposes described.

4th, The combination and arrangement of windlasses, chains and boats with the dam, as above described, so that by the construction thereof a series of drills may be operated within and inclosed by the dam, in the manner and for the purposes herein described.

80,493.—CAR COUPLING.—J. A. Manning, Ashtabula, Ohio.

I claim the hooked tail, D, as constructed, arranged, and operated in combination with buffer head, B, and link, C, for the purpose and in the manner as described.

80,494.—LAMP BURNER.—Jas. Minifie, Baltimore, Md.

I claim, 1st, The combination and arrangement of the two corrugated cones C D, and tube, c, substantially as described.

2d, The corrugated cone, D, when provided with the above-described openings along the summits of the ridges formed by the corrugations, substantially as and for the purpose herein set forth.

80,495.—CARPET STRETCHER.—William Minster, Washington, D. C.

I claim, 1st, The hinged jaws, E E, pressed apart by means of a spring, and bound together by either a set screw or the headed bolt, F, and its nut, G, for the purpose of firmly holding the carpet, substantially as herein set forth.

2d, In a carpet stretcher, the jaws, E E, constructed as described, and hinged to the box, B, which slides upon the ratchet bar, A, and operating as and for the purposes specified.

80,496.—SCREEN FOR WASH STANDS.—Richard Nelson, Cincinnati, Ohio.

I claim the back or screen for wash stands and analogous articles of furniture, provided with one or more shelves, c, substantially as herein described.

80,497.—PROPELLING APPARATUS.—Ernst Offhaus, Newark, N. J.

I claim the annular cylinder, E1, connected to the water ways, A and B', and receiving the pistons, d d', in combination with the levers, s and t, switch, r, and stops, acting in the manner and for the purposes specified.

80,498.—TAG FASTENING.—N. M. Phillips, New York city. Antedated July 18, 1868.

I claim the within-described hook, A B C, bend or loop, D, guard, E, and shifting ring, H, combined and arranged for joint operation relatively to the tag, G, and to the goods, M, substantially in the manner and for the purpose herein set forth.

80,499.—REFLECTOR.—Louis Portner, Chicago, Ill.

I claim the reflector A, constructed substantially as and in the manner herein set forth and for the purpose specified.

80,500.—PARALLEL RULER.—D. J. Pratt, Albany, assignor to himself and Oliver Airey, Brockport, and Oliver Airey assignor to M. P. Cavart, Albany, N. Y.

I claim the construction of a parallel ruler by attaching to one of the limbs of a T-square ruler a gage plate for regulating the distance between the lines to be ruled, substantially in the manner set forth in the specification.

80,501.—WASHING MACHINE.—Phineas Prentiss, Chester, Mass.

I claim, in combination with the tub, with ribbed sides and dasher, with gearing, the adjustable socket, arranged so that the handle may be used with comparative depression or elevation, substantially as shown.

80,502.—CULTIVATOR.—Hiram Preston, Orfordville, Wis.

I claim, 1st, The adjustable V-shaped parts, C, in combination with the rocking shaft, B, when constructed and operated substantially as described and set forth.

2d, The lever, h, provided with the springs, i, and the arm, E, in conjunction with the parts, C, and ratchet, k, for the purpose of controlling the parts, C, substantially as described.

80,503.—CULTIVATOR TEETH.—William B. Ready, Sacramento, Cal.

I claim, 1st, The groove, c, in stock, a, as a seat for an adjustable point for a cultivator tooth.

2d, The movable tongue, d, pierced with holes or slots, i i i, forming an adjustable point of a cultivator tooth.

3d The combination of the grooved stock or support, a, with the adjustable tongue, d, for the purposes of a cultivator tooth, substantially as above described.

80,504.—DEEP-WELL TUBE.—A. Rhoades and J. Adams, Pontiac, Mich.

We claim the arrangement of the removable rod, D, having a female screw F, to connect to the screw upon the cleaner, E, at the lower portion of the slotted tube, B, all constructed to operate substantially as specified.

80,505.—RAILROAD-CAR HEATER.—John Rice, Bloomington, Ind.

I claim the heating apparatus, A B, constructed and arranged as described, that is, having the chamber, B', air tubes, D, in smoke tubes, F, chambers, C C E E G G, and registers and discharge pipes, as shown, the whole being attached to and combined with a railroad car, and operating substantially in the manner described, and for the purpose set forth.

80,506.—PROCESS FOR PURIFYING BUTTER.—L. S. Robbins, New York city.

I claim the within-described process for treating or purifying butter, substantially as herein described.

80,507.—CHURN.—A. A. Ross, Horicon, N. Y.

I claim the churn dasher, E, when constructed as described, of wire and a tin screw, F, and provided with a screw in its upper end, in combination with the dash wheel, C, constructed and operating substantially as and for the purpose herein set forth.

80,508.—KEROSENE-LAMP BOILER.—W. F. Rossman, Hudson, N. Y.

I claim, 1st, The combination and arrangement of reservoir or kettle, A, tube, a, boiler, C, and aperture, d, when employed in connection with a kerosene or fluid lamp, substantially as and for the purposes described.

2d, The combination and arrangement of burner, B, and chimney, e, with boiler, C, when the latter is connected with the reservoir or kettle, A, substantially in the manner and for the purposes set forth.

80,509.—STEAM CUT-OFF VALVE.—Robert Sanderson, Cleveland, Ohio.

I claim, 1st, The arrangement of the ports or openings, D, and notches, a, in the manner as and for the purpose set forth.

2d, The pivoted lever, I, and roller, H', as arranged in combination with the roller, H, and valve, D', in the manner set forth.

3d, The cam, G', as arranged in relation to the lever, I, as specified.

80,510.—BIT FOR BRIDLE.—Peter Schoonmaker, New Britain Conn.

I claim, as a new article of manufacture, a japanned bridle or harness bit, having its rings lined with metal, substantially as described for the purpose specified.

80,511.—MACHINE FOR PRESSING AND GROOVING SEAMS IN TIN WARE.—John Schumacher and Henry Upjohn, Ann Arbor, Mich.

We claim the gage, H, used in combination with the arm, C, as and for the purpose set forth.

80,512.—TILE MACHINE.—John Shellaberger, Shane's Crossing, Ohio.

I claim the relative arrangement of the shaft, B, sweeps, D D, pitman, F, lever, G, and plunger, H I, substantially as and for the purposes set forth.

80,513.—HORSE HAY FORK.—H. L. Sheperd, Osborn, O.

I claim, 1st, The combination of the side bar, A, connecting bar, F, point, C, and lever, E, when constructed and operating as and for the purposes herein set forth.

2d, The combination of the lever, E, with hook, b, and lever, G, with lug, c, when constructed and operating as and for the purposes herein set forth.

80,514.—HEAD BLOCK FOR SAW MILLS.—S. R. Smith (assignor to P. P. Lane and J. T. Bodley), Cincinnati, Ohio.

I claim, 1st, The ratchet wheel, G, containing both external and annular teeth, the pawls, M M', and reciprocating bar, I, all constructed and operating substantially as and for the purpose described.

2d, The combination of the wheel, Q, worm wheel, m, and toothed segment P, to operate the dog, R, as herein described, for the purpose specified.

3d, The plates, O, when constructed and operating in the manner substantially as described.

80,515.—BORING TOOL.—A. Steinbok, New York city.

I claim the adjustable frame, B, in combination with the auger, D, gimlets, E E, and case, A, provided with cutting edges, constructed and operating substantially as described.

80,516.—FEED-WATER HEATER.—Stephen Stucky, New Albany, Ind.

I claim the drum, A, with pipe, G, perforated as described, partitions, D F J I, forming chambers, C H E K, with the exterior pipes, as described, and with the boilers, L L, all constructed and arranged substantially as and for the purpose set forth.

80,517.—SUBMARINE EXPLORING.—H. S. Thayer, Boston, Mass.

I claim the boat, A, provided with an opening, B, through its hull, and over which opening is placed a darkened house, C, as and for the purpose specified.

80,518.—VENTILATING BOOTS AND SHOES.—Edwin Thomas, Philadelphia, Pa.

I claim, 1st, Ventilating boots and shoes by grooving the inner soles with grooves that are narrow at the top and wide below, so as to allow the air to pass along the grooves, as herein described and for the purposes set forth.

2d, The manufacture of leather for inner soles of boots and shoes with grooves of a dovetail shape, and a porous cover, for the purposes as specified.

80,519.—LAMP.—Wm. Totheroh, Reading, Pa.

I claim, 1st, The uprights, C C', deflectors, D D', ring, A, rings or bands, F and G, and the arms, H, when combined and arranged as shown and described.

2d, The uprights, C C', deflectors, D D', ring, A, base, B, filling tube, E, wick tube, b, and the outwardly curving wing or guide, c, when combined and arranged as shown.

80,520.—SEWING MACHINE FOR BUTTONHOLES.—Kasimir Vogel (assignor to E. W. Lothrop) Chelsea, Mass.

I claim, 1st, The irregular-toothed cam or former, E, whether having an intermittent, rotary, rocking, or reciprocating movement, substantially as and for the purposes described.

2d, The several parts of the described mechanism, when constructed, combined and operating substantially in the manner and for the purposes described.

80,521.—GANG PLOW.—Andrew Walker, Claremont, N. H.

I claim, 1st, A stationary frame, with adjustable plow beams underneath, pivoted to the main frame at the rear end, and suspended by the ratchet, E.

2d, In combination, the gear wheel, C, gear circle, D, lever, F, and spring catch, b, in combination with the ratchet, E, for the purpose of adjusting the depth of the furrow, and locking or suspending the plows at any given point, the whole arranged, constructed, and combined, and used in combination with and for the purpose set forth.

80,522.—SEED SOWER AND HARROW.—Andrew Walker, Claremont, N. H.

I claim, 1st, The ratchet lever, C, in combination with the harrow, G', the gear gage wheel, I, the lever, K, and circular ratchet, o, with the spring stop, a in lever, K.

2d, The valves, b b' attached to the seed box, B, and gage rod, c, in combination with the fluted roller, d, the whole combined, arranged, and used as and for the purpose set forth.

80,523.—GRAIN RAKE.—R. Warnock and Chas. Abbey, 2d, Ridgevill, Ohio.

We claim the rake, F, guards, H, arms, A', handles, C, and wheels, A, all constructed and combined to operate in the manner as and for the purpose set forth.

80,524.—STRAW CUTTER.—J. T. Watson and H. E. Robinson, Richmond, Ind.

We claim the combination of the box, B, the table, A, the knife, C, and the oscillating arm, D, and spring, E, substantially as arranged and described for the purpose set forth.

80,525.—STOVE FOR RAILROAD CAR.—F. H. Whitman, Harrison, Me.

I claim, 1st, The plate, e, suspended on plates, b b', so as automatically to close the funnel aperture, substantially as herein set forth.

2d, The self-closing grate or draft, substantially as and for the purposes herein set forth.

80,526.—APPARATUS FOR CLEANING SEWERS.—C. Williams, New York city.

I claim, 1st, The toggle arms, i i, braces, j j, and head, D, carrying the sheave g, combined and operating to hold the pulley, substantially as and for the purpose described.

2d, The guide piece, m, on the dog, D, to facilitate the introduction of the rope to the sheave, g, substantially as set forth.

3d, The folding scraper, c, fig. 5, constructed and arranged for clearing pipe sewers, substantially as shown and described.

4th, The automatically folding leaves, e c, arranged in the bucket, C, constructed as shown and for the purpose set forth.

5th, The adjustable bail, e, in combination with the fixed bail, f, of the bucket, C, substantially as and for the purpose specified.

6th, The bucket, C, made with perforated sides, as and for the purposes set forth.

7th, The detachable guide frames, E, arranged upon the man holes of a sewer, in combination with the draft rope, Bx, substantially as and for the purposes described.

80,527.—CIGAR HOLDER.—Martin V. B. Young, New York city.

I claim, 1st, The wedge-shaped piercing tube, G, applied to a cigar holder, substantially as and for the purpose set forth.

2d, The combination, with the piercing tube, G, and tube, A, of the pointed stud or pin, F, substantially as set forth.

80,528.—SETTEE.—T. J. Close, Philadelphia, Pa.

I claim, 1st, A frame of a settee with dovetail mortises and round or oval bosses, substantially in the manner and for the purpose specified.

2d, The combination of the slats, B, having holes or countersinks, with the bosses, c, as described, on the frame, A, and wedge-shaped keys, substantially in the manner and for the purposes set forth.

REISSUES.

66,773.—PAINT.—Dated July 16, 1867; reissue 3,051.—D. R. Averill, Newburg, Ohio.

I claim a paint, composed of the ingredients herein named, and prepared and compounded substantially in the manner specified.

Also, a liquid paint, when prepared and mixed for use, in any color, in its manufacture, and put up in packages for sale, and which may be preserved in such condition, substantially as and for the purpose described.

63,486.—SAW.—Dated April 2, 1867; reissue 3,052.—Henry Disston (assignee of Charles Disston), Philadelphia, Pa.

I claim, 1st, A detachable saw tooth in which is combined a circular base adapted to a circular recess in the blade with a projection at the rear adapted to a shoulder on the blade, all as set forth for the purpose specified.

2d The lips, i, on the edge of the projection, d, of a saw tooth, or on the edge of a recess in the blade, in combination with a groove and recesses, m, in the projection or in the blade, substantially as specified.

71,311.—FOOT FOR TUBS, BUCKETS, ETC.—Dated Nov. 26, 1867; reissue 3,053.—J. W. Kendall, Philadelphia, Pa.

I claim a movable adjustable foot for tubs, buckets, barrels, etc., substantially for the purpose shown.

36,673.—STUMP EXTRACTOR.—Dated Oct. 14, 1862; reissue 3,054.—S. M. Longley and E. J. Genet, New York, and S. B. Smith and A. C. Getty, Hudson, N. Y., assignees, by mesne assignments, of S. W. Ruggles, Fitchburg, Mass.

We claim, in the afore-described differential windlass, the combined use of power-multiplying toothed wheels, wrapping-connected differential drums or pulleys, and a sheave block or blocks, substantially in the manner and for the respective purposes herein set forth.

15,882.—HARVESTER.—Dated Oct. 14, 1856; reissue 3,055.—J. G. Perry, Kingston, R. I., assignee by mesne assignments of C. W. Glover, Roxbury, Conn.

I claim, 1st, So constructing and operating the vibrating sickle-driving mechanism of a harvesting machine that such mechanism shall work through the driving wheel of the machine.

2d, The combination of the cogs, e, on the driving wheel, the pinion f, upright shaft, C, and wheel, g, with the pinion, h', of the shaft, D, arranged substantially as and for the purpose specified.

3d, The combination, with the driving wheel, of the guide box, B, bar, F, rod, H, and lever, I, in such manner that the angle of presentation of the cutters carried by the finger bar, E, may be adjusted, substantially as set forth.

37,535.—WATER ELEVATOR.—Dated Jan. 27, 1863; reissue 3,056.—Division A.—W. B. Wadsworth, Cleveland, Ohio.

I claim, 1st, The toothed wheel, open and adapted to the chain, substantially as shown and described.

2d, The said wheel, in combination with the chain c b b f f d d, substantially as shown and described.

3d, The tilter, g y, in combination with the flat chain, c b b f f d d, substantially as shown and described.

4th, The arrangement of the curved tilter, g y, and stops, h h, substantially as shown and described.

37,535.—WATER ELEVATOR.—Dated Jan. 27, 1863; reissue 3,057.—Division B.—W. B. Wadsworth, Cleveland, Ohio.

I claim the chain, composed of links, as shown at c b b f f d d, the bent cross bar, c, running through to the outside of the hooks of the last link to b b, and then angling as shown at f f, to hooks d d, inside of bends, b b, substantially as shown and described.

14,622.—CULINARY BOILER.—Dated April 8, 1856; reissue 3,058. Edward Whiteley, Boston, Mass.

I claim the trap, G, and cap, I, or its equivalent, as arranged and applied to the vessel, B, whereby the latter may be employed either as a boiler or steamer as set forth.

Also, in combination with the vessel, B, the interior vessel, H, perforated to admit the steam, when placed within the outer receptacle, B, and entirely surrounded or inclosed thereby, substantially as and for the purpose set forth.

70,768.—HORSE POWER.—Dated Nov. 12, 1867; reissue 3,059. W. H. Wiley, Fredonia, N. Y.

I claim, 1st, The gear table, D, rigidly connected to the draft levers, F, by the interposed spindles, E, or their equivalent, so as to form a gear frame for carrying the pinions and sour wheels, G H, about the internal stationary cog rim, C, and also a support for the draft levers upon the stationary central spindle, C', substantially as described.

2d, The pinion spindles, E, when secured to the table, D, at varying distances from the center thereof, so that different sizes of pinions to gear with cog rim C, and spur wheels to gear with pinion, I, may be used, as and for the purpose set forth.

DESIGNS.

3,130.—VISE.—Quimby S. Backus, Winchendon, Mass.

3,131.—IVORY TABLET.—Wm. C. Comstock, Essex, Conn.

3,132.—KNITTED FABRIC.—Thomas Dolan, Philadelphia, Pa.

3,133.—SHIRT COLLAR.—R. S. Jennings, New York city.

3,134.—SHIRT CUFF.—R. S. Jennings, New York city.

3,135.—TOY.—R. S. Jennings, New York city.

3,136.—TWINE HOLDER.—E. M. Judd and R. L. Smith, Walcottville, Conn., assignors to Twiner, Seymour & Judds.

3,137.—STOVE.—W. N. Moore, Neenah, Wis.

3,138.—CLOCK CASE.—Nicholas Muller, New York city.

3,139.—TRADE MARK.—J. M. Mumford, South Reading, Mass., assignor to himself and Auguste F. Mason.

3,140.—DRAWER PULL.—John E. Parker, Meriden, Conn.

3,141.—BOTTLE.—M. B. Powell and C. W. Stutenroth, Naperville, Ill.

3,142.—EMBOSSED PAPER, ETC.—E. F. Price and E. A. Murphy, New Haven, Conn.

EXTENSION NOTICES.

Barton H. Jenks, of Bridesburg, Pa., having petitioned for the extension of a patent granted to him, the 24th day of October, 1854, for an improvement in looms, for seven years from the expiration of said patent, which takes place on the 24th day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of October next.

Stephen E. Booth, of Orange, Conn., administrator of the estate of Sheldon S. Hartshorn, deceased, having petitioned for the extension of a patent granted to the said Sheldon S. Hartshorn the 7th day of November, 1854, and reissued the 26th day of May, 1868, for an improvement in buckles, for seven years from the expiration of said patent, which takes place on the 7th day of November, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 26th day of October next.

John C. Schooley, of Cincinnati, Ohio having petitioned for the extension of a patent granted to him the 14th day of March, 1855, for an improvement in process of curing meats, for seven years from the expiration of said patent, which takes place on the 14th day of March, 1869, it is ordered that the said petition be heard at the Patent Office on Monday the 28th day of December next.

Barnet L. Solomon, of New York city, executor of the estate of Myer Phineas, deceased, having petitioned for the extension of a patent granted to the said Myer Phineas the 24th day of October, 1854, for an improvement in pen holders, for seven years from the expiration of said patent, which takes place on the 24th day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of October next.

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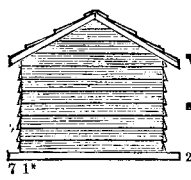

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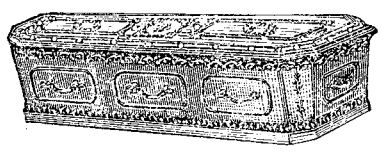

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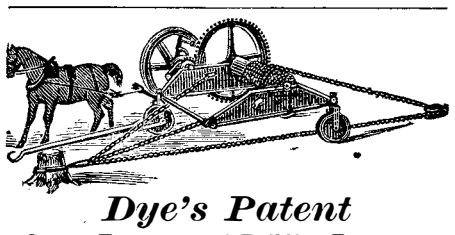

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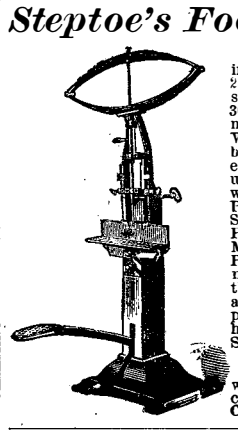

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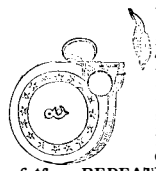

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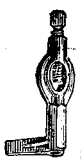

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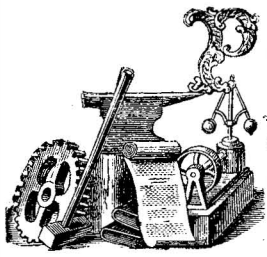

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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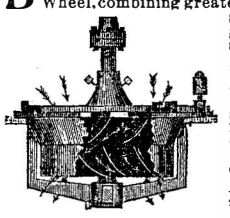

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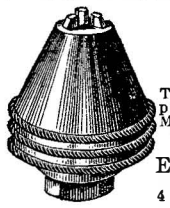

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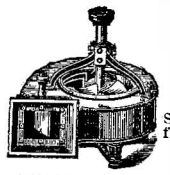

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