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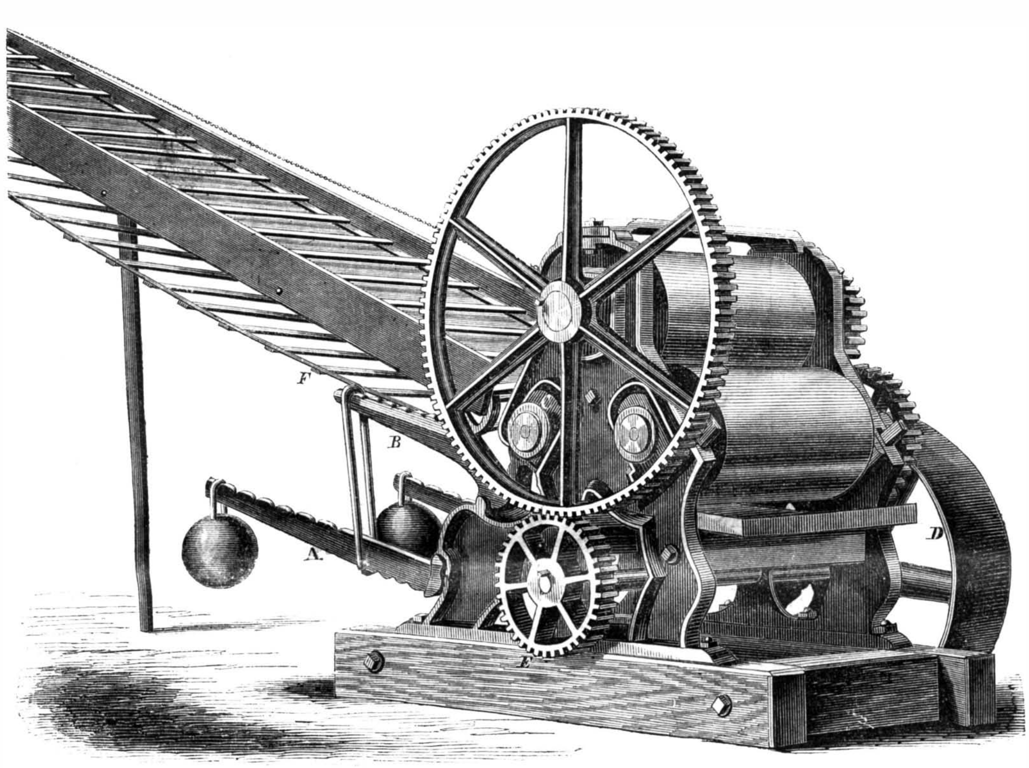
Adjustable Cane Mill.

The growing importance of the sorghum interest has brought out many useful improvements in the manufacture of the staple which have proved of great utility.

The mill illustrated herewith is intended to accomplish the crushing of the cane in a very thorough manner. By a system of levers, A and B, the roll, C, is forced up against the top roll, in close contact with it. In this way large and small canes are thoroughly and equally squeezed, so that no juice remains in them. It is easy to see that, by the compound levers, the strain can be perfectly regulated, as the weights can be shifted to produce any pressure required. The power is applied to the pulley, D, and transmitted to the upper roll through the pinion, E. The endless apron, F, carries the cane to be crushed. This mill is in great demand at the West and has given general satisfaction. Patented on the 10th of Dec., 1863, by Luther E. Porter, and assigned to E. W. Skinner & Co., of Madison, Wis., from whom further information can be obtained.



ADJUSTABLE SUGAR-CANE MILL.

Reinforcing Superannuated Cannon.

The London *Artizan* says:—"Captain Palliser's improved system of strengthening the obsolete cast-iron guns, and rendering them available for the public service by the insertion of a wrought-iron tube, was on the 17th ult., tested at Woolwich with much success. One of the old 68-pounders, weighing formerly 95 cwt. 1 qr., cast at Lowmoor in 1859, and after considerable service condemned and branded with the broad arrow in testimony of its unfitness for further use, was fired twice at the proof-butt in Woolwich Arsenal, with a charge of 16 lbs. of powder and shot weighing 110 lbs. each. The gun has been bored up to 13 inches, and strengthened with a coiled tube reducing the bore to 7 inches. The present weight of the gun is 104 cwt. The tube made in the royal gun factories is of charcoal iron, and appeared to be perfect. After firing two rounds, the screw nut at the muzzle was turned round, and the tube thereby turned out a short distance to see that it was not jammed in the gun, by which all the parts were ascertained to be correct. The gun was afterwards sent up to the royal gun factories in order that the tube might be taken out, the breech-plug unscrewed from the tube, and the vent-bush inserted, and which, according to a suggestion of Capt. Palliser, will be screwed in from the interior of the gun. To prove the amount of resistance which it is expected the improvement will give to the old ordnance, the gun is ordered to be fired 1,000 times consecutively. The rifling is to consist of three grooves, and spiral for part of the bore. The spiral will be uniform, the final pitch of the rifling being a turn in 16½ feet. After completing the 1,000 rounds the gun will be despatched to Portsmouth for experiments on board the gunnery-ship *Excellent*, to test its power.

What is an Engineer?

From the London Engineer.

One eminent man tells us that an engineer, in the true sense of the term, must have the integral and differential *calculi* at his finger's ends; that he must be able to treat every portion of his work in the most abstract manner, and to soar into mathematical sublimities on the smallest question. He should be able, "by geometric scale, to take the size of pots of ale; resolve by sin and tangents straight, if bread and butter wanted weight; and wisely tell what hour o' th' day the clock does strike by algebra." This is the German, and more especially the French, notion of an engineer. Shoals of engineers like this quit every year, in a perfected state, the German Polytechnics. The greater expense of the French *Ecole Polytechnique* and other schools act as a brake on production of this kind, but those who do leave these schools have been described by one of themselves as *capables de tout faire, et prets a rien.*

A second man, equally eminent and famous, tells us that an engineer is not an engineer without *ingenium*—he must be naturally gifted in the highest degree with the faculty of invention. A man must be born in the constructive purple; he must be an engineer by right of birth—by right divine. This is, to some extent, the American idea of an engineer; of that strange country where they make presidents of rail-splitters, cabinet ministers of cobblers, and generals of tanners and lawyers; where, as in California, a man can change his profession as often as he can divorce himself from his wife. This system has resulted in many new and original productions, but as often in tarnation smashes.

A numerous class then tell us that a real engineer must be able to handle the file, the chipping hammer, the turning tool, and the drawing pen, with equal ease and facility. He must be able at once to take the tool out of any man's hands in the shop and show him how it should be handled. This is more especially the English idea of an engineer. It has produced much sound and good work as long as the experts have confined themselves to a more or less beaten track. The several tracks have been formed—like English railway lines—at much expense of blundering and waste, but as far as they go, they are sound. The way is good of its kind, but its kind is not perfect.

Then comes the world's opinion of what constitutes an engineer. In London, the *sine qua non* is a fine office in Great George street, or thereabouts, provided with an ante-room holding a more or less number of clients. The work can be done by younger men, hired at so much a month; and commercial success sets the stamp on the metal, whether it be gold or pinchbeck. In most parts of the provinces, a large manufactory is required, either inherited or not, as the case may be. After acquiring "a considerable degree of eminence" in commissions on heavy contracts, the insignia of M. Inst. C. E. follow as a matter of course. In all the world, however, success makes engineers as well as statesmen or generals. What is then an engineer? He is neither a pedant, however profound, nor a visionary empiric, however ingenious, nor an ignorant mechanic, however dexterous. Engineering consists in the adaptation of the forces of nature to the wants of human society—the word adaptation being used in the wide senses of directing, preparing, and producing. These forces of nature are recondite and complicated, and, although that inquiring animal, man, has been face to face with unchanging nature for thousands of years, he has not been able to wheedle all her secrets from her. Science, however, such as it is, is the human practice of generations and generations; it is the knowledge—power latent in the life-span of a single individual multiplied many thousands of times. The self-satisfied empiric, or the ignorant operative, who rejects that accumulated labor called science, shows a narrow-minded ignorance which is only equalled by the learned man who fancies that everything can be done by mathematical calculation. Much more could be done by theory if theories were complete, but science, in its present state, is only imperfect, and requires to be bound together for every-day use by every-day practice. And the imperfection of man's individual powers will never allow what is termed practice to be dispensed with, while an ounce of mother-wit will always be worth more than a tun of school-wit. We may thus define an engineer as a man more or less gifted with the constructive and philosophical faculties, furnished with a sound education in the modern sciences, and one who has passed as much time in the workshop as in the lecture-room.

F. CRACE CALVERT ON PRESERVING MEAT.

Dr. F. Crace Calvert, F.R.S., F.C.S., is delivering a course of lectures before the Society of Arts, England, on Chemistry applied to the Arts. He is very learned and able, but has one fault as a lecturer, that of rambling away from his subject whenever he encounters a side question that interests him. He recently delivered a lecture on Flesh, from which we take copious extracts:—

PRESERVING MEAT BY COLD.

A low temperature is most favorable to the preservation of flesh and other animal substances, and under that condition it will not enter into putrefaction, the best proof of which is that elephants in a perfect state of preservation have been found in Siberia buried in ice, where they have doubtless existed for many thousands of years. It is also well known that the inhabitants of polar regions preserve their meat fresh by burying it in snow, and I mentioned an instance in one of my previous lectures, viz., the preservation and bleaching of sturgeons' bladders on the banks of the Volga.

PRESERVING MEAT AND VEGETABLES BY DRYING.

A high state of desiccation or dryness also contributes powerfully to the prevention of decay. Thus in Buenos Ayres and Monte Video meat is cut into thin slices, covered with maize flour, dried in the sun and it is consumed largely, under the name of tasago or charke, by the inhabitants of the interior, and also by the black population in Brazil and the West Indies. Further, dried meat reduced to powder is used by travelers in Tartary and adjacent countries, and I may add that, of late years, meat biscuits have been extensively consumed by the emigrants having to travel from the United States to California and the West Coast generally. It is stated that six ounces per diem of this meat biscuit will maintain a man in good health throughout the journey. A remarkable instance of the preservation of animal matter by extreme desiccation is related by Dr. Wefer, who states that in 1787, during a journey in Peru, he found on the borders of the sea many hundreds of corpses slightly buried in the sand, which, though they had evidently remained there for two or three centuries, were perfectly dry and free from putrefaction. Although it is not within the scope of these lectures to describe the preservation of vegetable matters, still I cannot refrain from mentioning the interesting method adopted by MM. Masson and Gannal, by which, as you are doubtless aware, vegetables are preserved in the most perfect manner. Their process is most simple, as it consists in submitting the vegetables for a few minutes to the action of high pressure steam (70 lbs. to the square inch), then drying them by air heated to 100 degrees, when, after compression by hydraulic pressure, they are made into tablets for sale, and when required for use it is only necessary to place the tablets for five hours in cold water, when the vegetable substances swell out to their former size and appearance, and are ready for cooking.

BY EXCLUDING THE AIR.

As the presence of oxygen or air is an essential condition of putrefaction, the consequence is that many methods have been invented to exclude that agent, or rather, as I shall show at the end of this lecture, the sporules or germs of cryptogamic plants or animals, which are the true ferments or microscopic source of fermentation and putrefaction. Permit me to describe concisely some of the methods proposed; and I believe that one of the best processes for excluding air was that invented by Appert in 1804. It consists in introducing the meat or other animal substance, with some water, into vessels which are nearly closed; these are then placed in a large boiler with salt (which raises the boiling point of the liquor), and the contents of the vessels are kept boiling for about an hour, so as to exclude all air, and destroy, by the high temperature, all the sporules or germs of putrefaction they may contain, when they are hermetically closed. M. Chevalier Appert has improved this process in placing the prepared vessels in a closed boiler, by which means he raises the temperature (by pressure) to 234 degrees, effecting thus the same purpose more rapidly and economically. To give you an idea of the extent of this trade, I may state that M. Chevalier Appert prepered over 500,000 lbs. of meat for the French army in the Crimea. I am aware that many modifications have been applied to this process, but I shall only mention that of Mr. G. McAll, who adds to the previous principle of preservation a small quantity of sulphate of soda, well known to be a powerful antiseptic. The beautiful specimens now on the table, which have been kindly lent to me by Messrs. Fortnum and Mason, and by Mr. McAll, will satisfy you of the applicability of the above-named methods for the preservation of meat and other animal substances. But before concluding this part of my lecture, I must add that the preservation of animal and vegetable substances by the exclusion of air and cryptogamic sporules is also effected by other methods than those above described; for instance, they are embedded in oil, or in glycerine, as suggested by Mr. G. Wilson, or in saccharine sirups. I should not forget to men tion that several plans have been proposed for protecting animal matter by covering their external surfaces with coatings impermeable to air. Two of the most recent are the following:—M. Pelletier has proposed to cover the animal matter with a layer of gum, then immerse it in acetate of alumina, and, lastly, in a solution of gelatine, allowing the whole to dry on the surface of the animal matter. The characteristic of this method is the use of acetate of alumina, which is not only a powerful antiseptic, but also forms an insoluble compound with gelatine, thus protecting the animal matter from external injury. M. Pagliari has lately introduced a method which is stated to give very good results. It consists in boiling benzoin resin in a solution of alum, immersing the animal matter in the solution, and driving off the excess of moisture by a current of hot air, which leaves the above antiseptics on the animal matter.

BY SMOKE AND CARBOLIC ACID.

It is scarcely necessary to mention the old method of using smoke arising from the combustion of various kinds of wood, except to state that in this case it is the creosote and pyroligneous acids which are the preservative agents. The preservation of animal matter by a very similar action is effected by the use of carbolic acid, a product obtained from coal tar. It is mnch to be regretted that this substance, which is the most powerful antiseptic known, cannot be made available for the preservation of food, but there can be no doubt that, for the preservation of organic substances intended for use in arts and manufactures, no cheaper or more effective material can be found. For example, I have ascertained that one part of carbolic acid added to five thousand parts of a strong solution of glue will keep it perfectly sweet for at least two years, and probably for an indefinite period. Also, if hides or skins are immersed for twenty-four hours in a solution of one part of carbolic acid to fifty of water, and then dried in the air, they will remain quite sweet. In fact hides and bones so prepared have been safely imported from Monte Video. From these facts, and many others with which I am acquainted, I firmly believe that this substance is destined within a few years to be largely used as an antiseptic and disinfectant.

BY SALT AND HEAT.

I need hardly speak of the power of chloride of sodium, or common salt, in preserving animal matters, and it is highly probable that the interesting process described to you on the 13th of April, by Mr. J. Morgan, for the employment of salt, is likely to render great service in preserving animal food from putrefaction. But with regard to the feasibility of its use in Monte Video and Buenos Ayres, I cannot offer an opinion, as it depends upon so many local circumstances which it is impossible to appreciate here. Messrs. Jones and Trevethick displayed at the last exhibition some meat, fowls, and game preserved by the following process, which received the approbation of the jurors. Meat is placed in a tin canister, which is then hermetically closed, with the exception of two small apertures in the lid. It is then plunged into a vessel containing water, and after the air has been exhausted through one aperture by means of an air pump, sulphurous acid gas is admitted through the second aperture, and the alternate action of exhausting the air and replenishing the sulphurous acid gas is kept up until the whole of the air has been removed. The sulphurous acid gas, in its turn, is exhausted, and nitrogen admitted. The two apertures are then soldered up, and the operation is completed.

Heat and Force.

Whenever friction is overcome, heat is produced; and the amount of heat so produced is the exact measure of the force expended in overcoming the friction. Professor Tyndall says, while speaking upon the subject of "Heat Considered as a Mode of Motion:"—"We usually put oil upon the surface of a hone; we grease the saw, and are careful to lubricate the axles of our railway-carriages. What are we really doing in these cases? Let us get general notions first; we shall come to particulars afterwards. It is the object of the railway engineer to urge his train boldly from one place to another. He wishes to apply the force of his steam or his furnace, which gives tension to the steam to this particular purpose. It is not his interest to allow any portion of that force to be converted into another form of force which would not further the attainment of his object. He does not want his axles heated, and thence he avoids as much as possible expending his power in heating them. In fact he has obtained his force from heat, and it is not his object to reconvert the force thus obtained into its primitive form. For by every degree of temperature generated by the friction of his axle, a definite amount would be withdrawn from the urging force of his engine. There is no force lost absolutely. Could we gather up all the heat generated by the friction, and could we apply it mechanically, we should by it be able to impart to the train the precise amount of speed which it lost by the friction. Thus every one of those railway porters whom you see moving about with his can of yel low grease, and opening the little boxes which surround the carriage axles, is, without knowing it, illustrating a principle which forms the very solder of Nature. In so doing he is unconsciously affirming both the convertibility and the indestructibility of force. He is practically asserting that mechanical energy may be converted into heat, and that when so converted it cannot still exist as mechanical energy, but that for every degree of heat developed, a strict and proportional equivalent of locomotive force of the engine disappears. A station is approached say at the rate of thirty or forty miles an hour; the brake is applied, and smoke and sparks issue from the wheel on which it presses. The train is brought to rest: how? Simply by converting the entire moving force which it possessed at the moment the brake was applied, into heat."

A New Hydro-carbon in the Coal-tar Series.

M. A. Bechamp recently announced to the French Academy of Sciences the discovery of a new hydrocarbon in the mixture that makes up coal tar. In rectifying with care the products which boil between 130° and 150° cent. (266° and 302° Fah.) M. Bechamp observed that the thermometer remained a long time stationary in the neighborhood of 140° (cent.), a temperature midway between the boiling points of xylole and cumole. Keeping this temperature constant, he separated from 30 measures of brown tar, one measure of a liquid hydro-carbon. A new rectification allowed the whole of this to pass between 139° and 140°. This constancy of the boiling point forbids the supposition that it is a mixture of xylole and cumole. By further purification with concentrated sulphuric acid and sodium the author finally succeeded in producing in the neighborhood of 900 cubic centimetres of a product boiling from the commencement to the end at a temperature between 139° and 140° (282° and 284° Fah.)—*Le Genie Industriel.*

It is said, that if the largest pip in an apple be sown, the fruit will be similar to that of the parent tree without grafting; and that the cabbage seed gathered from the middle flower stem produces plants which will be fit for use a fortnight earlier than those from the seed of the lateral flower stems. Cucumber seeds may be sown early in June and July in the open ground.

CREDIT.—The article upon the 303d page of this volume entitled, "The products of industry and the wealth of the United States," should have been credited to the *Railroad Record.—Railway Times.*

[The article upon the 311th page of the *Railway Times* entitled "Chucking Work in Lathes," should have been credited to the SCIENTIFIC AMERICAN.—EDS.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute on Thursday evening Sept. 22, 1864, the President, D. S. Tillman, Esq., in the chair. After some miscellaneous business the President announced the regular subject of the evening,

PRESERVING FRUITS.

Mr. Hogg, being called on by the President to give some of the results of his large experience, said that the thing which he had labored to accomplish was the preservation of fruit in its natural state with its fresh flavor unimpaired, but he had not succeeded, and he did not believe that it would ever be done. Apples and pears we may have fresh by selecting varieties that will ripen at different periods, the latest kinds lasting till the earliest of the succeeding year begin to ripen. But the more perishable fruits, like strawberries and cherries, can be kept throughout the year only by methods which, to a great extent, destroy their flavor.

The plan that seemed most promising of success was that of placing the fruit in chambers at a low temperature, and excluding it from the air. Some fifteen or twenty years ago a patent was obtained for this plan, and the right for this city and vicinity was sold for $6,000. The purchasers prepared a large establishment on the Hights in Brooklyn. A circular cellar was excavated, and over it an ice house was erected. The fruit was placed in the cellar, and the temperature was kept just above the freezing point. The first season a cargo of pineapples was placed in the cellar, but they were so warm that the ice was melted and the fruit rotted. The next season the pineapples were cooled, and then they kept. I visited the place that season. There were beefsteaks in the cellar that had been there several weeks, and they were just as fresh and sweet as when they were first cut. That season the scheme was a commercial success. The pineapples kept till they were very scarce in the market, when they were sold at high prices. Lemons were also kept in the same way. But those who bought the fruit found that it was worthless. The flavor was all gone. The pineapples looked all right, but they did not taste like pineapples. After that the plan was abandoned.

I have tried the plan of placing fruit in jars and exhausting the air as perfectly as it could be done with a very good air-pump, and then placing it in a low temperature. But in this case also the flavor departed, and the fruit became tough.

I once prepared a solution which on drying would form a thin air-tight film, and into this I dipped some cherries and plums, and then laid them away in a cold chamber. The film was elastic, and when I went to look at the fruit I found that each cherry and plum resembled a toy balloon. Fermentation had taken place, and the gases generated had extended the film so as to multiply its volume several fold.

A low temperature and the exclusion of the atmosphere will not preserve fruit, for a slow fermentation will go on in consequence of the oxygen contained in the fruit. This fermentation takes place even while the fruit is on the tree. If currants become what we call over ripe, they do not rot, for currents will dry on the bushes without decaying, but a fermentation takes place which converts the sugar into acid, and the berries become so sour that they will almost take the skin off the mouth. Grapes are frequently soured in the same way from having their roots surrounded with stagnant water. I have observed this frequently in my own graperies.

Mr. Stetson inquired at what temperature the cellar spoken of was kept.

Mr. Hogg answered, at about 36 degrees—never above 38, and never below 35. It is absolutely necessary that the temperature should be very uniform. If the fruit freezes it is ruined.

Professor Reed remarked, "When I was a boy it was very common to see young men who had been on a three-years whaling voyage; they nearly all had more or less of the scurvy, and it was the general practice for them to keep raw potatoes in their pockets which they nibbled as they walked about. Finally it was discovered that by putting potatoes into molasses they might be kept through a whaling voyage, and now the scurvy is unknown. I have seen potatoes brought back from a two years cruise which were perfectly sound."

Dr. Rowell exhibited a self-sealing jar which he said he bought in this city fourteen years ago, and had used it every year since. "It was made in England. It is of earthen ware lined with glass. The cover is also lined with glass and ground to fit the mouth, being held in place by an iron clasp which screws under the inclined lugs under the rim. Ever since I have had this I have tried every new jar that I have seen, and I have never yet found one that I liked as well as this."

Mr. Hogg remarked that in putting fruit into cans it is better not to put in any sugar. Sugar promotes fermentation and hastens decay.

In drying fruits they should always be dried in the shade. If you take up a dried apple that has been dried in the shade it will feel like a fine Turkey sponge, while that which is dried in the sun will be brittle as a piece of bark. My brother writes me that the fine Japanese teas are all dried on mats under sheds, and hence their superior flavor.

Mr. Stetson asked which have the better flavor dried peaches or canned?

Mr. Hogg replied, "Oh dried, decidedly."

Dr. Rowell stated that some time ago he bought a bunch of dried peaches in market which in color and flavor were precisely as good as peaches freshly gathered from the tree. They were pared and quartered, and the quarters were strung on threads so as not to touch each other.

Mr. Hogg remarked that this is quite a common method for preparing a very nice article. The strings are festooned on pegs under the ceiling of the kitchen.

Mr. Stetson stated that a man in the room who is largely engaged in preparing canned fruit for market, says that the cans should not be sealed while they are hot. After being filled with fruit they should be set into a vessel of cold water which should be heated to the boiling point, and be kept gently boiling for twenty or twenty-five minutes, and then set off to cool. As the liquid cools it will of course shrink, and the can is to be filled with liquid which has also been recently boiled, and then it is to be immediately sealed.

Mr. Watson exhibited a can of fruit which he had brought down in his pocket. It was a magnesia jar holding about four liquid ounces, and was closed by a cork, first soaked in boiling water and sealed with a cement made of rosin four parts and tallow one part. He said that it was impossible to expell all the air, and unnecessary. He would warrant the peaches in this jar to keep two years, even at ordinary temperatures.

Dr. Rowell observed that in the self-sealing cans in which an india-rubber gasket is employed, the india-rubber will impart an unpleasant flavor to the fruit.

Dr. Parmelee said that when india-rubber is used for such a purpose great care should be taken in preparing the article. The rubber should be taken from the insides of the bottles which are free from the kreosote and carbon of the smoke employed by the natives in drying the bottles. Then no more sulphur should be used than is necessary to vulcanize it. That is very little—not more than 1½ ounces to the pound.

Mr. Bartlett would like to ask Mr. Hogg if the experiment had been tried of placing jars in air-tight cans before putting into the cold chambers? As the flavor and aroma of fruit consists of essential oils and ethers which are very volatile, it was not strange that it should go away if allowed a free opportunity to escape.

Mr. Hogg did not know that this had been tried.

Dr. Parmelee described an experiment made by himself and another gentleman to test the point whether a thin coating of india-rubber would preserve fruit from decay. The gentleman came to him and requested him to make a very pure preparation of india-rubber to cover some apples with. He selected some of the pure gum and dissolved it in sulphuric ether, and the apples were dipped in this solution. As the ether is very volatile the solution soon dried, leaving a thin coating of india-rubber on the fruit. In regard to the result, the other gentleman thought that the apples decayed sooner than they would without any coating, but the speaker thought they decayed just about as soon.

The President announced that on next Thursday evening the room would be occupied for an exhibition of fruits and flowers by the Horticultural Society of the American Institute, so there would be no meeting of the Polytechnic Association next week.

The subject of glove making was selected for the next meeting, and the Association adjourned.

An English Atmospheric Hammer.

An atmospheric hammer and stamp is now being shown in operation in Birmingham, under the supervision of the patentee, Mr. Grimshaw, at 19½ Ryland street North, in that town. The way it works is as follows:—"An air-pump is worked by a band from a shaft, and forces air into a reservoir, which is so constructed as to form the framework of the machine. The reservoir, in its turn, communicates with a cylinder, in which a piston works with so little friction that it can be moved up and down by hand. This piston is, in fact, the hammer, inasmuch as at the end of it is fitted a head, which may be varied in form to suit any kind of work. The shaft, on which is fixed the pulley-wheel to which the pump crank is geared, has another wheel fitted upon it, which performs a very important operation. By means of a screw or lever (either will do), the last-named wheel can be so moved to or from the center of the revolving plate, which is attached to the 'cut-off' valve, that the speed of the hammer can be varied entirely at the discretion of the operator. This wheel and plate work at right angles to one another, and when not in contact the hammer does not work. The reservoir is capable of bearing great pressure, and will store up, so to speak, a large amount of power, until it is wanted for a series of smashing blows. A valve attached to this reservoir prevents it bursting, and appears to be a valuable assistant means of regulating and variating the action of the hammer; and if it is true, as we have been enassured, that these atmospheric hammers and stamps can be worked with much less power than steam stamps, costing less in the first instance, and cannot, from the simplicity of their construction, cost nearly so much to keep in repair, there appears every probability of their coming into general use. The inventor is a practical mechanic, but the patent-right has been sold."—*London Engineer.*

The Color of Trout.

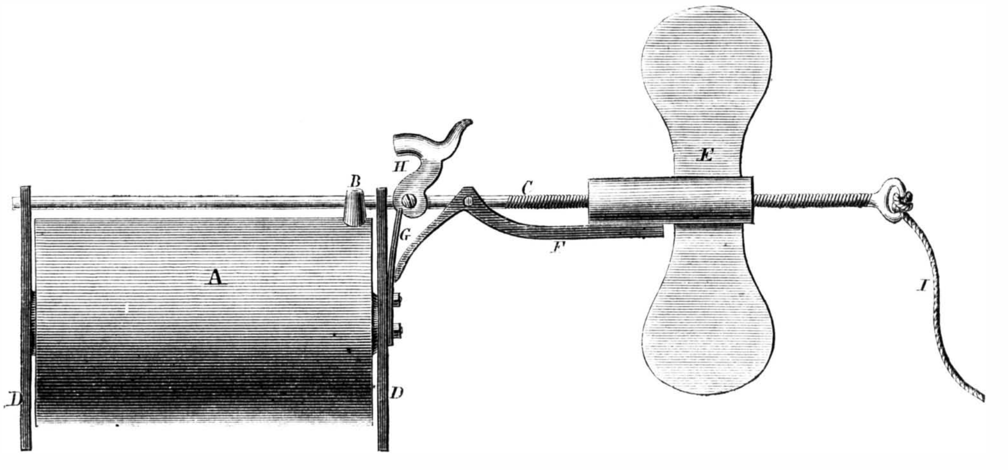
Mr. St. John adverts to the wonderful capability which trout possess of adapting their color to the color of the water in which they are placed. "Put a living black burn trout," he says, "into a white basin of water, and it becomes, within half an hour, of a light color. Keep the fish living in a white jar for some days and it becomes absolutely white, but put it into a dark-colored or black vessel, and, although on first being placed there the white-colored fish shows most conspicuously on the black ground, in a quarter of an hour it becomes as dark-colored as the bottom of the jar, and consequently difficult to be seen."

We can entirely confirm the truth of this statement, and a striking illustration is to be found in two lochs in the northwest of Sutherlandshire, separated only by a low ridge of land. In the one—which is full of dark moss water—the trout are nearly black; in the other, where the bed of the loch is limestone, and the water so clear that you can see the bottom where it is 40 or 50 feet deep—they are almost as silvery in color as sea trout. Loch Brora, too—another lock in the same country—affords a further corroboration of the truth of Mr. St. John's observations. That loch is divided into three sheets of water, united by narrows, where the lake assumes the appearance of a river. In the upper part, where the bottom is sand and fine gravel, the trout are clear in color, with bright vermillion spots; in the central division, where the bottom is not so clean, and the water darker, they are also dark in color, and their spots are not so bright; while in the lowest division of the lake, where the bottom is very muddy, the trout are quite black and ugly, though of a larger size.—*Fraser's Magazine.*

A SMALL balloon made of gold-beater's skin, two feet in diameter, was lately sent up from London, and after a twelve hours' voyage landed in Bavaria, about 500 miles distant.

NEW REBEL TORPEDO.

Torpedoes have come to be recognised as very formidable machines in offensive warfare, and the damage they have inflicted on our navy, during the war, has been very great. These machines are being continually experimented with, and are much more reliable than they were formerly. We illustrate herewith one of the latest inventions of the rebels in this line, and append the letter of an obliging correspondent in the army who has furnished us with the sketch. The sketch is indistinctly drawn as regards the details of the lock; it would not work as now shown. The principle of the thing is, however, correcfly delineated, and any common musket lock will answer the purpose as well as another. As the propeller revolves by the action of the current, it draws away from the lever, which liberates the trigger and explodes the cap on the nipple. It is a very crude affair and poorly arranged as to its details. It is expected to swing up against the side of a vessel (two torpedoes being connected together by a line) and heading down stream the screw is intended to turn with the current as before explained. We subjoin the report of our correspondent :—



"Having formerly been a reader of your paper and knowing that you are always interested in new inventions and of undoubted loyalty, I take pleasure in sending you the accompahying sketch of a torpedo lately invented in Richmond, hoping you will publish it, as I believe it is calculated to do a vast amount of damage. This description will enable you to understand it:—A is the shell containing the powder, with the tube, B ; fastened into it is a rod of seven-eighths iron (round, with a thread cut on it). D is a flat bar of iron (there is one on each side) one inch by one-fourth, fastened to the rod, C, far enough apart to allow the torpedo, A, to just pass in between them, to which it is soldered or brazed. E is the propeller, which has a thread cut inside the hub. F is a lever, and G is a spring fastened near one end by rivets; the other end works in a slot in the hammer, H. I is a cord by which two torpedoes are intended to be fastened together. To operate them it is intended to have them buoyed so that they will float four or five feet below the surface; they will be stretched apart the length of the cord, and placed in the water at ebb tide above the vessel that it is intended to destroy. They are then to be floated down until the cord comes foul of the ship's cable or the ship herself, when the two torpedoes will swing around under the ship's side. The propeller then begins to operate; as soon as the hub has passed the end of the lever, F, the hammer falls upon the cap on the tube, and the explosion occurs. JUDSON KNIGHT.

City Point, Va., Sept. 21, 1864.

AGE OF THE HUMAN RACE.

That portion of the past eternity of which we have any knowledge is naturally divided into three parts, the historic, the archæologic, and the geologic. The historic is that portion the events of which are recorded by printing and writing; it extends back between 700 and 800 years before the Christian era. Archaeology reveals to us the existence and condition of our race in times preceding the historic period, as shown by dwellings, implements and other remains. Finally, the wonderful record of the rocks carries back our knowledge of the globe into the night of time for millions of years before the existence of such a being as man.

At the present time the world of science is absorbed in investigations along the earliest boundary of the archæologic period, where it fades away into the domains of geology. Until within a few years it was supposed that the crude stone implements which are the oldest legacies from our ancestors, and which reveal to modern intelligence the state of the human race in its infancy, were not found in any formations older than those which the geologists call recent, which have been formed since the earth was inhabited by the existing species of animals. But within a few years stone implements, manifestly of human construction, and even bones of men, have been found associated with the remains of animals belonging to an earlier age, and which have long since perished from the face of the earth. Since the first of these discoveries was announced their progress has been rapid, and the last number of *Silliman's Journal* has an account of seven which have been published within a few months. We give one of these accounts taken from the proceedings of the Royal Society:—

"Professor Owen minutely details the circumstances under which these discoveries were made; and states that the contemporaneity of the human remains with those of the extinct and other animals with which they are associated, together with the flint and bone implements, is shown by the evidences of the plastic condition of the calcified mud of the breccia at the time of interment, by the chemical constitution of the human bones, corresponding with that of the other animal remains, and by the similarity of their position and relations in the surrounding breccia. Among the principal remains of the men of the flint period described are the following: 1. The hinder portion of the cranium, with several other parts of the same skeleton, which were so situated in their matrix as to indicate that the body had been interred in a crouching posture, and that, after decomposition and dissolution of the soft parts, the skeleton had yielded to the superincumbent weight; 2. An almost entire calvarium, which is described and compared with different types of the human skull, which Professor Owen shows to be superior in form and capacity to the Australian type, and more closely to correspond with the Celtic type, though proportionally shorter than the modern Celtic and the form exhibited by the Celtic cranium from Engis, Switzerland; 3. Jaws and teeth of individuals of different ages.

"After noticing other smaller portions of human crania, the lower jaw and teeth of an adult, the upper and lower jaws of immature individuals are described, the characters of certain deciduous teeth being referred to. The proportions of the molars are not those of the Australian, but of other races, and especially those of ancient and modern Europeans. As in most primitive or early races in which mastication was little helped by arts of cookery, or by various and refined kinds of food, the crowns of the molars, especially of *m* 1, are worn down, beyond the enamel, flat and smooth to the stumps, exposing there a central tract of osteodentine without any signs of decay.

"The paper was illustrated by a view and plans of the cavern, and by figures of the principal human remains, and of two implements of bone on which the Viscomte de Lastic had discovered, on removal of the breccia, outline figures of the head of a reindeer and the head of a horse in profile."

Archæological inquiry has shown that mankind first employed implements made of stone, the use of copper was next discovered, and finally the art of working iron. The archæological period is therefore divided into three ages, the Age of Stone, the Age of Bronze, and the Age of Iron.

The progress of the race was not equally rapid in all parts of the earth, but while in some countries the best tools that the people had were rudely chipped from stone, in others they knew the use of copper, and in others they had learned the art of working iron. Even now, while large portions of mankind are enjoying all the knowledge and comforts of the highest civilization, there are others which are sunk in the brutish ignorance, and exposed to the sufferings, which belong to the Age of Stone.

The aborigines whom our ancestors found on this continent had not advanced beyond the Age of Stone, though the old workings in the copper mines of Lake Superior show that they had been preceded by a race belonging to the Age of Bronze. Among the numerous relics left by the savages of the Stone Age in Europe, are large pebbles which were evidently employed in making the arrows and other stone implements. The only marks of human workmanship that they bear are two depressions pecked in opposite sides to facilitate the hold of the thumb and finger as they were grasped in the hand.

We have before us a pamphlet by Franklin Peale containing an illustration and description of a pebble found by him in this country, and having similar depressions pecked in its opposite sides. Mr. Peale says that he has several of these in his cabinet, and that quite a number have been sent from this country to Europe. The slight change in the appearance of these implements from ordinary pebbles has caused them to be neglected, but now that attention is called to them they will doubtless be picked up in large numbers. The evidence furnished by these implements that man, in the same state of development, resorts in all lands and times to the same means for gratifying his wants, causes them to be regarded with peculiar interest.

How an Oil Well is Bored.

A correspondent of the Boston *Traveller*, writing from the oil regions of Pennsylvania, gives the following description of the manner in which oil is found:—

"In selecting a spot for a well, the artesian driller raises a derrick about 110 feet in hight, bringing up a steam engine of about six horse power, and then, after driving down an iron pipe about six inches in diameter through the earth and gravel some fifty feet or so, to the first strata of rock, introduces a drill of about two and a half inches in diameter attached to a temper-screw, and thence to the 'walking beam' and engine, with which he bores now at the rate of eight or ten feet per day into the solid slate and soap stone, say one hundred feet; he then comes to the first strata of sandstone, which may be ten or twelve feet in thickness; and boring through this comes again to a slate and soap-stone of a blueish cast, and working on, say for twenty-five feet or so, he reaches the second strata of sand-stone, out of which there comes rushing up, when the right vein is struck, inflammable gas, salt water and petroleum. The bore of the well is enlarged by a 'rimmer;' and then an iron tube in sections of about fourteen feet and closely screwed together, is inserted by sections and run down to the veins of oil; a flax-seed bag which expands when wet is fixed between the tubing and the walls of the well in order to prevent the surface water from descending; a 'plunger' or valved piston is introduced into the tube, and the sucker-rod being attached to the 'walking-beam,' the conduit pipes and tank, which may hold sixty barrels, being in readiness, the engine moves and the precious treasure gushes forth. This is what is called pumping a well. In the 'flowing wells,'—that is such as send the oil out spontaneously—the drill must go down into the third strata of sand-stone; but this, in some instances, is very deep. In a well on Watson's Flat the drill has reached the depth of one hundred feet and yet the third bed of sand-stone is not reached."

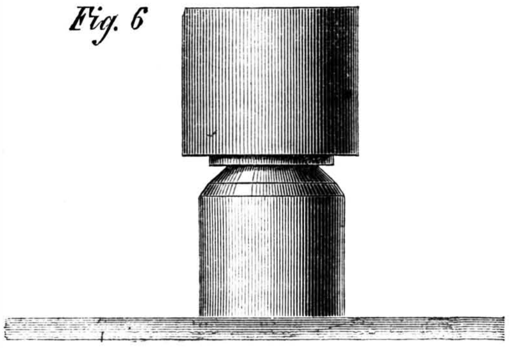
DIE ENGRAVING, SINKING AND MULTIPLYING.

BY J. NEWTON, OF THE ROYAL MINT.

[Concluded from page 213.]

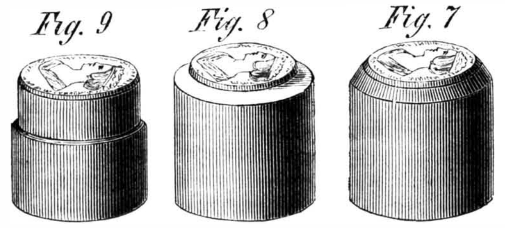
The pressman now steps into his hole, and is surrounded by perhaps a hundred topped die blocks. He affixes now the puncheon in the press, and attendants await his signals to raise the fly-arms, and release them as before described. One by one the blocks are placed so as to receive the impact of the puncheon until the whole have received a partial impression, and present the appearance sketched in Fig. 5. Occasionally, faulty steel is discovered at this stage, and then the defective blocks showing perhaps, fissures down their sides, are at once cast away to the scrap-heap. Those which exhibit no such symptoms of weakness are returned for another annealing, and will not be again put under the press until the following day. Of course at the mint dies are continually being manufactured, and each suc-

Fig. 6



ceeding die sees fresh crops advancing step by step towards completion. We will imagine, therefore, that a moment after the departure of the batch just referred to, to the annealing ovens, another detachment, which were on the day before partly struck, is returned to the die press-room. Then the puncheon, removed and placed successively on the half-struck dies, has administered to it in succession the heavy blows of the press, care being taken first to put in the engraving properly, and thus to prevent the marring of the transfer. At this point the puncheon and embryo die are correctly exhibited by Fig. 6. When separated, the latter assumes the appearance shown in Fig. 7. Possibly, a third annealing and a third

Fig. 9 Fig. 8 Fig. 7

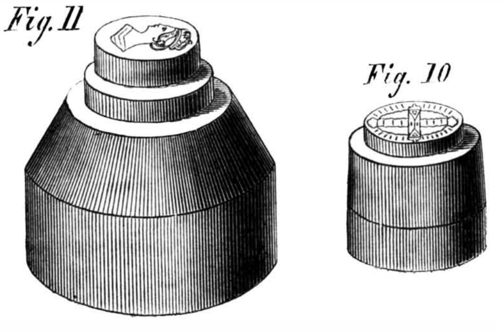


striking may be required; but this, of course, depends on the stubborness or the plasticity of the steel, and with regard to medal multiplying that demands infinitely more labor. Fig. 8 will convey a clear idea of the florin die when its impression is fully developed.

We may now be considered to have reproduced, as it were, 100 matrices by sheer mechanical and unartistic agencies, for the partially-formed dies are really fac-similies of the engraver's handy-work, and it will be understood that thousands and tens of thousands of dies may be and are pressed into existence at the mint in the same way. The power indeed of multiplying copies in this manner is unlimited, for if the puncheon fails either by cracking or sinking, there is the matrix to refer to for the creation of another, while if the matrix itself should break down one of the impressed dies may be used as a substitute for that, and thus, therefore, if the matrix and the puncheon be once successfully completed, whether for coins or medals, a power of reproduction exists in both which obviates all risk of requiring the engraver's aid to renew them. The wholly-struck twin dies are once more annealed and transferred to the turning-room and the lathes. Each one is put into a peculiarly-formed chuck fitted with adjusting screws, and so fastened as that the impression is made to run truly. Then all superfluous metal is cut away by sharp tools used by expert workmen, and are thus brought to gauged diameters. They then present the form indicated by Fig. 9. Afterwards comes the hardening, polishing, and tempering processes as previously explained, and the whole batch is now ready for the coining press room, there to be used in the multiplication of coins.

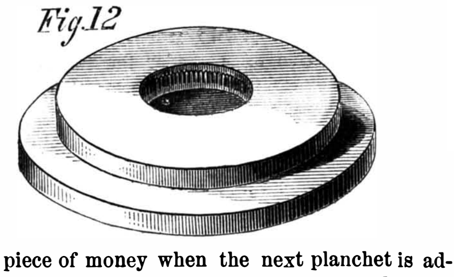
The diagrams given have not been drawn to an exact scale, as they are not intended to serve as working drawings but simply as illustrations to make more clear our letter-press description. They are purposely reduced far below the full size of the dies they represent for the purpose of economizing space. Figs. 10 and 11 exhibit the obverse and reverse florin dies as

Fig. 11 Fig. 10



they appear when mounted and prepared for the coining press. It will be observed that they differ as respects their form, one having a long, and the other a short "neck." The reason for this difference is that when placed in the press the obverse die will have a steel collar (see Fig. 12) fitting over it for the purpose of milling the edges of the planchets of silver at the moment that the impressions on their surfaces are given. This collar, after forming a mold for that purpose, is forcibly depressed by the action of the machinery, and must have room to slide down the neck of the die, and thus to release the impris-

Fig. 12



oned piece of money when the next planchet is advanced by the feeding apparatus to be stamped. The collar is made to rise again by means of a spring, and in fact it is alternately raised and depressed at the rate of sixty times per minute so long as the press is in motion.

The feeding apparatus in advancing displaces the finished coins and leaves planchets in their places. The short-necked reverse die simply enters the collars from above, and the force with which it does so gives the images, superscriptions to each piece of silver, and expands it into the milled collar or edge mold. Having done this it rebounds upwards to the distance of an inch and is free for another descent upon the next planchet. It may be said that there are eight stamping presses at the mint, and that their united daily production is 200,000 coins, whether of gold, silver or bronze.

Cream Cheese.

An inquiry in the *London Field* for a receipt for making cream cheese was replied to as follows by three correspondents:—

"We put a quart of cream into a clean jug, with half a teaspoonful of salt stirred in, and let it stand a day or two till thickish. Then we fold an ordinary grass cloth about six or eight times and sprinkle it with salt, then lay it in a sieve about eight inches in diameter. The sides of the cloth should come up well over the sides. Then pour in the cream and sprinkle a little salt on it. Change the cloth as often as it becomes moist, and as the cheese dries press it with the cloth and sieve. In about a week or nine days it will be prime and fit to eat. The air alone suffices to turn the cream into cheese.

"Take about a half pint of cream, tie it up in a piece of thin muslin and suspend it in a cool place. After five or six days take it out of the muslin and put it between two plates, with a small weight on the upper one. This will make it a good shape for the table, and also help to ripen the cheese, which will be fit to use in about eight days from the commencement of the making.

"Take a quart of cream, either fresh or sour, mix about a saltspoonful of salt, and the same quantity of sugar. Put it in a cloth with a net outside, hang it up, and change the cloth every other day; in ten days it will be fit for use."

"Humbug" Toads.

A correspondent of the London *Mining Journal* thus disposes of the hermetically sealed toad business. He says:—"Your Derbyshire correspondent in last week's journal, refers to the alleged discovery of a live toad in a solid block of Cannel at the Ravenhead Colliery, St. Helen's. This to me is like all other fabulous reports. I would first ask if the man is one of those who get an extra shilling by such tricks; for it looks much like a trick, when he says his attention was called to the fine appearance of the piece of coal. He then broke it, and found it hollow, and then takes it with him to the surface, and finds a toad in it. It is not unusual to find stones hollow. Then what could have induced him to carry it to the surface. I have myself twice had this attempted to be practiced on me. Hollow stones are very convenient to play this trick with. I have seen frogs put in a hole not half the size of a frog's body. I was in Wales a few months since, where some men were sinking a shaft, half in solid rock and half in old quartz. There were four Scotch gentlemen with me; the men blasted a hole, and in a few moments one of the men came up with a living frog, and said the hole had thrown it out. The Scotch gentlemen were so delighted with the discovery that orders were given for something to be got to convey it to Scotland, and the man was about to get a reward, when I interfered, and asked them if half the shaft was not in old rubbage. I had seen it, and they were compelled to acknowledge it, as Mr. Mackenzie, the engineer, was one of the party, and would have gone down and proved it. The smoke of the powder soon caused the frogs near to get out of the water, and this one jumped up on the rock. Miners now-a-days are quite up to all these maneuvres to get a ready shilling. I thought to have heard no more of frogs or toads in stones after what Mr. Hunt openly stated as to himself and all the committee at the Exhibition being misled when they allowed the frog to be put in the lump of coals there as being found in a lump of coal in a mine. Mr. Hunt stated at a public meeting that they were duped, and he much regretted ever consenting to it being put there. It is only narrow-minded men who allow rogues to dupe them in such a way."

Correction.

In the 3d paragraph, first line, of Mr. Coombs's letter on the power required to start a train, the word "from" is erroneously printed "to." It should read, "if the power were applied *from* any point," etc.

In the fifth paragraph, next the last line, the word "power" is printed "purpose." It should read, "the propelling *power* will be just equal," etc.

In the 6th paragraph, second line, the word "former" is erroneously printed "frame."

In the 7th paragraph, third line from the bottom, the word "truck" is erroneously printed "track."

In the 8th paragraph, last line in the column, the word "as" is erroneously printed "on."

LONG ISLAND PINE APPLES.—At the recent exhibition of fruits and flowers by the Horticultural Society of the American Institute, there were three pine apples, growing in pots, from the hot-house of Edwin Hoyt, Esq., of Astoria, Long Island. One was very green, the other two were yellow and nearly ripe. All were large and thriving.

COAL AND COKE.—Professor Seely usually burns anthracite coal in his chemical furnace, but when he reduces silver from the chloride he finds it necessary to use coke, in order to obtain a heat sufficiently intense for the purpose.

MR. HENRY T. CARTER's improved valve motion, illustrated on page 104, present volume of the SCIENTIFIC AMERICAN, was patented April 12th, 1864.

Correspondence

Silvering and Gilding on Wood.

MESSRS. EDITORS:—The process of silvering and gilding on wood consists, first, in giving the wood or molding a thin coating of glue size (bonet glue), combined with a little English washed whiting (gilders), which is free of sand. The object is to fill up the pores of the wood, and render it non-absorbant to some extent. Then a composition of white glue and whiting of thicker consistancy, resembling white house-paint is applied, coat after coat, as it dries. From five to seven coats are used; parts to be burnished require a thickness of at least the 16th of an inch of this composition. The surface is then smoothed down with pumice and water, and finished with fine sand paper when dry. It is very important to know if the whitening composition is of the right strength. Apply the nail of the finger as a test; if the composition can be scratched, it is right, if the nail makes no impression, more water and whiting should be added; for if too strong and hard it will not burnish well and the composition will in time crack and peel off. If too weak it will blister when gilding it, the water used will soak through it too easily to the wood, neither will it burnish but chip off.

Second, From five to seven coats of a composition styled burnish gold size, are now applied. This composition consists of best London pipe clay, free of sand, ground in water with best black lead, red chalk and a little grease, and combined when to be used with weak glue size. This mixture is smoothed down with fine emery paper and sometimes washed with cotton cloth and water. In America the gold size composition is used very weak in glue, while in Great Britain it is used very strong. Equally good work is made by both modes.

Third, The work is now coated with a very weak solution of glue, so weak that when quite cold the liquid will not more then set into a jelly. Parts to be burnished get two extra coats, and are not rubbed down with emery paper. The surface is now ready to receive the silver or gold leaf. Pure water, or better, new rum, is used to wet the work, and while wet the silver or gold leaf is cut into suitable pieces, and applied with a brush styled a gilder's tip. After the work is covered with gold or silver, and dry, a very weak glue size is used over the metal leaf, except on the burnished parts; such parts are burnished in about two hours after gilt. The dead work is rubbed down (styled matt silvering on gilding), with a little cotton wool, and then small pieces of silver or gold leaf as may be are applied with new rum to all little omissions. When dry it is again rubbed down with cotton, if the work should now prove perfectly covered with leaf, say silver, it is then coated with gold lacquor, receiving from three to four coats, and is known as German molding or gilding. Gold leaf is not lacquored. To give a minute description of the process would require many pages. Dr. Ure writes three or four pages on gilding and gives a Paris receipt "much extolled," adding "I never read more perfect nonsense; it is not to be even styled old-fashioned, for that would have some virtue and interest." No practical man except a knave would have given the doctor such a description. His article on electro silvering and gilding will command respect. THOMAS TAYLOR.

Roxbury, Mass.

Freak of Electricity.

MESSRS. EDITORS:—I have a two story wooden building, or rather two buildings joined together, forming one, twenty feet wide by fifty long, standing in a north and south direction. In the south end of the lower story I have a room thirty feet long, and the width of the building, in which I have a steam engine, two wood-turning lathes, several saws, and other machinery. The engine is a small portable one, having the engine and machinery mounted on the boiler, and the fire-arch inside the boiler. It stands about six feet from the south end of the room. The lathes are placed one on each side of the room, and the saws and other machinery along the middle. The joint between the two buildings crosses this room, and the floor in one part is about six inches higher than in the other. Twenty feet from my shop stands a wooden building, of equal size, upon which there is a lightning-rod, attached to a chimney at the ridge and passing down to and into the ground on the side of the building next my shop, and about opposite to the center of the machine room I have described. Yesterday afternoon, while I was engaged at the lathe farthest from the lightning-rod, and my son was at work on the lathe nearest to it, we were startled by a report like that of a 6-pounder gun discharged in the room. We were both raised several inches from the floor by the shock, and I distinctly saw jets of flame issuing through a loose portion of the floor, where the two buildings join in my machine room. Along that seam, shavings were set on fire in two places. The floor between the engine and the south end of the room was torn up clear across the building.

Now the question I wish to determine, and upon which I desire your opinion is, where did the lightning make its entrance into the room? The appearances out of doors were it came down the rod and the next building, went down into the ground, and spreading thence came to the surface in two places, about three-fourths of the distance from the rod to my shop, and then ran along the surface of the ground, tearing up a trench about three inches deep, and passing under the shop in two places. One place of entrance was exactly opposite the place where the floor was torn up, and the other opposite the place where I saw the flames, like exploding gas, come gushing through the floor. I have also found some slight marks about my smoke-pipe, as if it might have descended by that route; but is that probable, inasmuch as the boiler and machinery was not injured or disturbed in the slightest manner? Whence also came the gushing flames I saw? Will inflammable gas generate under old buildings during hot dry weather? The weather has been very hot and dry for the last two months, and there is very little circulation of air under the shop. And why did we not experience some shock or injury from the electric fluid, as it was said by the neighbors to have been a very unusually heavy charge, and exploded under our feet, on both sides and all around us? Will dry fine chips and saw-dust from hard wood act as an insulator? For the floor was covered to some slight depth with such material.

MASON HEARSEY.

Ionia, Mich., Sept. 10, 1864.

[The flames observed were doubtless portions of the electricity. Shavings of very dry resinous wood might act as non-conductors, but this is not needed to explain the escape of our correspondent and his son from injury. The electricity of a lightning flash is very apt to scatter when it strikes a building.—EDS.

The Tumbling of Projectiles.

MESSRS. EDITORS:—The criticism of the London *Mechanics' Magazine* on the 600-pound gun, which appears in your paper of September 17th, I deem anything but fair.

A 13·3-inch rifled gun withstood 70-pound charges, burning it all up. The editor says:—'So far it is a very good gun, but no further." I would have said very good gunpowder and a powerful gun, provided it was used with a proportional weighty projectile. The editor condemns a new gun and an inventor upon a few trials, but, Sir, the bone and sinew of the question is not even mooted. Sabots, shell, strength of gunpowder, quantity of same, formation of rifling, number of grooves, depth of same, twist of same and perfection of sights; all these have a most intimate relation to each other. The question of rifled ordnance, with all its bearings, is yet but little generally understood. The chiefs of our bureaus, commanders of our arsenals and navy-yards, and ordnance officers, well understand the necessity of continual experiment in rifled-gun practice. The mere change of quality of powder may destroy the flight of a projectile. The slightest change of weight of sabot, or any change in its formation, may destroy or improve the flight. But I will give you practical examples. The shells principally in the service are the Parrott, Hotchkiss and Schankle. These shells respectively have their proper sphere, and have done good service during this war, yet a scientific ordnance officer can make either of them tumble handsomely at will. A very little increase of strength of charge, either by an increase of quantity or quality, will make the Hotchkiss and Schankle tumble, while a weak charge will make a Parrott projectile tumble also.

The Schankle 30-pound shell, fired from a 30-pound Rodman, with 3¼ pounds of powder, ordinary strength, will have an excellent flight and smooth sound; increase the strength of charge by quality, and every shell will tumble. The sabot is made of papier mache, which, compared to metal, is soft. The extra strength of charge drives the sabot across the grooves like so much soft clay; the projectile, therefore, will not rotate. The Hotchkiss shell is broken up by high charges from a very different cause. Lately this shell has been improved by the introduction of three grooves to admit the flame from gun charge to the time fuze, so as to light the fuze without fulminates, which weakens the lead band. Yet with moderate strength of powder this shell has an excellent trajectory, good sound, and accurate flight, and has one excellent property above all other projectiles, viz., it can be used in any gun with equal advantage. The Parrott projectile is in very deed made for the Parrott gun, is remarkably well adapted for high charges and long ranges, but this again is in part the result of the sabot, which is either of soft iron or of bronze metal or brass, and strongly made, and requires great resistance; that is, a heavy projectile or a greater twist in the gun—it may be both. With a high charge good flight may be obtained, and immense range, with high elevations, provided the gun is strong enough. The Parrott gun is strong enough, but the Parrott projectile some times tumbles from other causes, principally from neglect to open up the brass sabot at the rear with a chisel, so as to give the expanding gases a chance to get between the sabot and iron base of projectile. It will be seen that to criticise either a gun or projectile by a few trials, in the manner described, is no test of the quality of the gun; it is much more likely that the shell or sabot requires modification than that anything is wrong with the gun. THOMAS TAYLOR.

Sweet Potatos in Place of Hyacinths.

MESSRS. EDITORS:—A curious as well as simple and interesting experiment may be performed in the following manner:—Take a sweet potato, place it in the mouth of a transparent jar so that it fits loosely, and keep it in its place by putting pins it it. Fill the jar with water, and set it where the sun can shine on it, or in a place where the temperature is quite even. Almost any place in the house will do, as in a window where it gets the light. The progress will at first be slow; replenish the jar with water as the potato absorbs it, keeping the water up to the middle of the potato, and soon roots will appear from the part in the water. From this point its growth is quite rapid, the roots striking downward; finally it begins to sprout from the top, green leaves appear, and it continues to grow like a climbing vine, attaining a yard in length, and making a fine plant. I have started several in this manner, and now have one doing well. CASSINI.

Marine Paints.

The need of some good composition or paint with which to protect the bottoms of iron vessels from fouling, has always been felt since the launching of the first ship of iron. It is impossible to cover the bottoms with copper, owing to the galvanic action which ensues, by which the iron is rapidly decomposed. Many attempts have been made to produce a composition that should furnish full protection, and our navy department has expended many thousand dollars in trials of various preparations. Two of the most highly recommended paints have lately been tried, and we subjoin the official reports. It will be seen that there is still room for improvement, still an opening for some ingenious person to realize a large fortune by the discovery of the proper protecting composition:--

U. S. STEAMER "FORT DONELSON,"
Beaufort, N. C., Aug. 22, 1864.

SIR:—I have to report in reply to your inquiry in relation to "Davis's Preparation," that the grass formed on her bottom, lasted two weeks, in the Dry

Dock Basin in Boston; it disappeared, however, as soon as we got to sea, but in its place "barnacles" formed, and in one month from the time of leaving port they were three-quarters of an inch in diameter. I scrubbed them off as well as possible in my tarry of four days (11th to 15th of August), but I find that those undisturbed have acquired the size of one and a quarter inches, appearing to thrive on "the mixture," since last visiting this port. Also in removing by "broom" the collection, "the mixture" came off too, leaving the bare iron; this I have applied boiled linseed oil to, and its forming a gum and filling the pores of the iron will, I know, be better than Davis's costly preparation. THOS. PICKERING,

A. V. Lieut. Commanding.

Hon. Gideon Welles, Sec'y of the Navy.

U. S. STEAMER "FORT DONELSON,"
Gosport Navy Yard, Sept. 3, 1864.

SIR:—I have to add, in addition to report of 22d ult., my arrival here, under orders of Admiral Lee, to clear my (very foul) ship's bottom. On surveying her "in dock" I find that a glass tumbler placed on her, anywhere below water line, would enclose at least five large barnacles (a sample I have preserved in spirits). In my opinion "Davis's Preparation" is a total failure on a vessel, not visiting fresh water once in three weeks, as did the *Circassian* to New Orleans. THOS. PICKERING,

A. V. Lieut. Commanding.

Hon. Gideon Welles, Sec'y of the Navy.

U. S. STEAMER "TRISTRAM SHANDY,"
Navy Yard, Norfolk, Va., Sept. 22, 1864.

SIR:—In obedience to an order from Acting Rear Admiral S. P. Lee, I respectfully submit the following report in regard to the use of Emory Marine Paint:—This vessel was docked in Boston about six weeks since, and received two coats of the above-named paint. Before she had been in the water two weeks I noticed that the bottom commenced to foul; she has been in the water now about six weeks, and as far as can now be seen is very foul; large quantities of barnacles, muscles, and grass have accumulated on the bottom. As soon as she is docked I will forward a more minute report in regard to said paint. In my opinion it is unfit for the purpose for which it is intended. EDWARD F. DARENS,

Ast. Vol. Lieut.

Hon. Gideon Welles, Sec'y of the Navy.

Photography without a Nitrate of Silver Bath.

We copy the following account of experiments from a recent number of our esteemed cotemporary, the *British Journal of Photography*. Nothing will be hailed with more delight among photographers than a good method operation, by which the troubles and inconveniences of the nitrate of silver bath can be avoided.

We are inclined to believe that Messrs. Sayce and Bolton have made an important step in the right direction. It is proper for us to state that we have hastily tried the method described below, but we did not obtain such good results as are there indicated. Our pictures exhibited good details, but we were troubled by a veil of fog upon them. We should be glad to have our photographic readers send us the result of their experience. The following is the new method:—

"Without entering into the preliminary investigations which led to this discovery, the secret of the whole consists in converting simply bromised collodion into what we will for convenience designate 'collodio-bromide of silver,' by the addition of the combining equivalent of nitrate of silver to the previously bromised collodion.

"To reduce this to practice we prepared bromised collodion as follows:—

Alcohol	½ ounce.
Bromide of cadmium and ammonium	3 grains.
Pyroxyline	2 grains.
Ether	½ ounce.

(Well filtered.)

"We then took an ounce phial, placed therein four grains pulverized nitrate of silver, which we dissolved in two drops of distilled water; then covered the bottle with a perfectly non-actinic coating of brown paper, and in a yellow light added the ounce of bromised collodion. The mixture at once produced milkiness, which does not disappear; we then shook the bottle and coated a clean glass—previously tipped at the edges with benzine and India-rubber solution—with the collodion, without even allowing it to settle, and allowed the film to settle in the ordinary manner: then placed the plate, face upwards, in a dish of water, and when the greasy appearance vanished, rinsed under the tap for a few seconds; then poured under the film the ordinary 15-grain solution of tannin, worked it well into the film for about one minute, drained, wiped the back with blotting paper, and dried rapidly in a kitchen oven.

"This plate was exposed the following day for thirty seconds, using a Ross's four inches and a half focus single lens, smallest diaphragm, say three-sixteenths of an inch. Result: details in full, and sufficiently dense to print, the negative perfectly clean, free from pineholes, comets, spots—in fact, everything was absent that has ever tended to harrass and perplex our photographic existence.

"Another plate, similarly prepared, the same evening, and exposed about half a minute after the first for fifteen seconds, was only slightly under-exposed. The development was as follows:—We placed the plate, film upward, in a dish of water; when equally moistened we poured over it the following solution:—

Water	1 ounce.
Carbonate of ammonia	3 grains.

to which had been added a few drops of the alcoholic solution of pyrogallic acid, viz., ninety-six grains of the former to one ounce of the latter.

"Development commenced at once; but owing to the extremely blue transparency and thinness of the film, one or two minutes passed before the details were distinctly visible, when a piece of white paper was placed underneath. At this stage the plate was thoroughly washed; afterward—in order to neutralize the alkali—rinsed with a little very dilute acetic acid; and then intensified in the ordinary manner, using the following solutions for that purpose:—

No. 1 SOLUTION.

Pyrogallic acid	1½ grain.
Citric acid	1 grain.
Distilled water	1 ounce.

No. 2 SOLUTION.

Nitrate of silver	30 grains.
Distilled water	1 ounce.

(To two drachms No. 1 add two or three drops of No, 2.)

"The negative rapidly acquired density. When sufficiently dense it was washed and fixed with a saturated solution of hyposulphite of soda, then washed thoroughly and dried. It yielded a good print. A wet collodion plate under the same circumstances would have required about ten seconds. Twenty seconds would probably have sufficed in our case.

"Several modifications of the above process have occurred to us, the experiments connected with which we are now following up. We purpose making the film more opalescent, and have hopes of accelerating the exposure so as to equal in rapidity that of bromised or wet collodion.

"As far as we can judge from our short experience, the process is singularly free from the risks that have hitherto beset dry-plate photography, and the easy manipulation equals, at least, that of the wet process. One dozen stereoscopic plates may be prepared by one person in half an hour—exclusive of cleaning the glasses.

"We are not in a position to say whether the collodion deteriorates by prolonged keeping. We know that hitherto we have found no loss in sensitiveness; but, of course, it must be kept in the dark. A bottle is a wooden case, such as those sold by druggists, is very suitable for the purpose. It had better be painted over with black varnish, and covered with yellow or brown paper.

"Having regard to the chemical equivalents in the formation of bromide of silver, the weight of the bromide salts and of the nitrate of silver may be extended at discretion, as also of the pyroxyline, but it will be found desirable not to have the collodion too thick.

"Excess of bromide produces insensitiveness.

"No doubt many experimenters will at once give the subject their attention, and aid us by the publication of their observations. We hope to have further improvements to communicate next week, or very shortly. "B. J. SAYCE,

"W. B. BOLTON.

"Liverpool, Sept. 3d, 1864."

Interesting Trial of Heavy Ordnance.

Some interesting details in reference to the comparative uses of smooth-bore and rifled guns for certain uses have been lately developed by a trial at Washington. The telegraphic report of the proceedings says:—

"The guns used in the practice were 200-pounder Parrotts and the 15-inch Rodman. The guns were fired at elevations ranging from eight to fifteen degrees, and the remarkable scientific fact was developed that at the extreme elevation of fifteen degrees the range and time of flight of the smooth-bore and the rifled gun were nearly the same. The practice was as follows;—The rifle gun fifteen degrees of elevation; time of flight, sixteen and one-fifth seconds; range, four thousand five hundred yards. The fifteen-inch gun, same elevation; time of flight, sixteen and two-fifths seconds; range, forty-two hundred and fifty yards. At point blank range the fifteen-inch guns strike the water near the fort with a ricochet rebounding from the water fifteen or twenty times. The dangerous field is nearly two miles, and when the great weight of the projectiles from the fifteen-inch gun is recollected, it would be seen that a fleet of vessels exposed to this dangerous field would have both their sides penetrated by this missile, as it leaped along the water with its irresistible momentum, making a succession of flat trajectories, which would not go over, at their greatest hight, the bulwarks of any ordinary vessel. The ricochet shot from a smooth-bore gun has this advantage over one from a rifled gun, that the former continues on in a straight course, while the flight of the latter is erratic, and sinks, when fired on the water, after the first or second leap. Not only do the smooth-bore guns possess superior advantages from the ricochet when fired over the water, but they are also able to do superior execution with grape and canister against an assaulting party on shore, each discharge being like the explosion of a mine. The impression of all the officers and experts witnessing the practice of to-day was unexpectedly in favor of the smooth-bore gun."

As usual in these reports the charge is entirely ignored, so that we are left in doubt as to a very important point. The service charge of the 15-inch gun is 35 pounds, of the 200-pound rifle, one-tenth the weight of the shot, No. 7 powder.

THE TUMBLE IN PRICES.

When we published our list of prices of the leading staples in this market for August 24th, gold was worth 250 in our paper currency, it is now worth 200, and nearly all articles have, of course, declined in about the same proportion. The following table exhibits the most important changes which have taken place in the last month.

	Price Aug. 24.	Price Sept. 27.
Coal (Anth.) ℘ 2,000 ℔	$12 50	$ 10 00
Coffee (Java) ℘ ℔	58	45
Copper (Am. Ingot) ℘ ℔	53	47
Cotton (middling) ℘ ℔	1 90	1 20
Flour (State) ℘ bbl	9 40	8 30
Wheat ℘ bush	$2 25@ 2 86	$1 80@2 50
Hay ℘ 100 ℔	1 30	1 30
Hemp (Am. drs'd) ℘ tun	320 00 @360 00	No change.
Hides (city slaughter) ℘ ℔	15½@ 16¾	11½@ 12
India rubber ℘ ℔	$1 40 @ 1 60	1 20
Lead (Am.) ℘ 100 ℔	$16 50 @ 16 75	$14 00 @14 50
Nails ℘ 100 ℔	10 00	9 50 @10 00
Petroleum (crude) ℘ gal	55	39
Beef (mess) ℘ ℔	$13 00 @ 15 00	10 00 @13 00
Saltpeter ℘ ℔	25 @ 28	24 @ 30
Steel (Am. cast) ℘ ℔	20 @ 30	20 @ 24
Sugar (brown) ℘ ℔	19 @ 28	15 @ 22
Wool (American Saxony fleece) ℘ ℔	$1 00 @ 1 10	95 @ 1 05
Zinc ℘ ℔	23	20

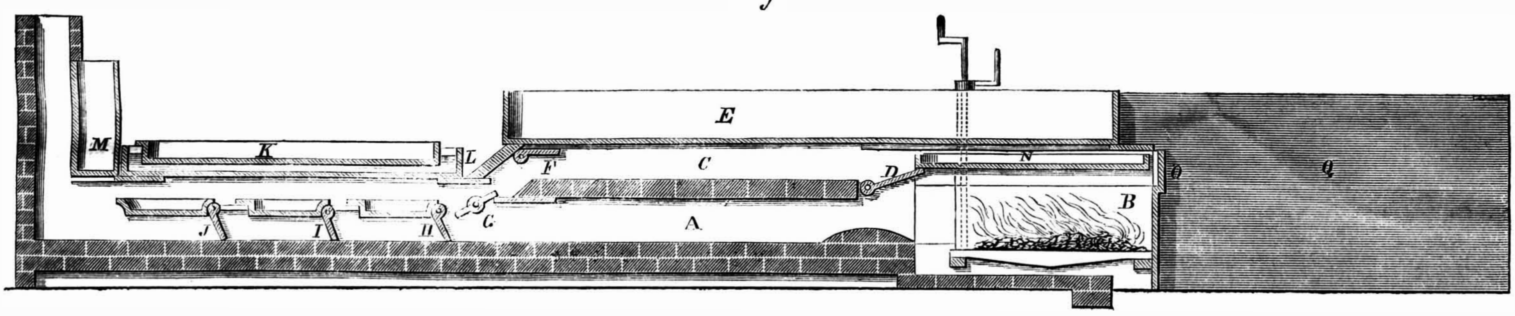
If Secretary Fessenden will continue the policy of contracting our paper currency we will have gold still lower, and the prices of all things in reach of a still larger number of the people.

ACCORDING to a report to the Italian Government the coral fisheries, which are a great resource for the poorer classes, employ 460 boats, manned by about 4,000 men. The fishing implements, pay of the men, board of the crew, etc., absorb annually about 6,000,000 francs, distributed among more than 6,000 persons of different professions. About 160 tuns of coral are annually introduced into the kingdom of Italy. The articles made of it and exported are to the value of from 12,000,000 to 16,000,000 francs yearly, principally sent to Asia, the interior of Africa and America.

Improved Sorghum Evaporator.

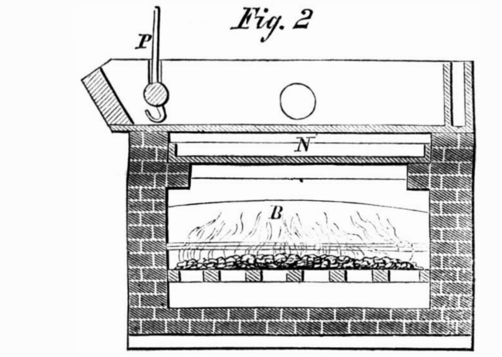
It is well known that great difficulty is experienced in the manufacture of sorghum sugar by the ordinary evaporators, in keeping the fire at an even temperature in relation to the different stages of the process and the times of them. In the evaporator shown herewith this difficulty is overcome by a very complete system of dampers arranged in relation to the flues leading to them, so that the heat may be thrown upon, or directed from, any one of the pans at pleasure. It will be seen that the main flue, A, leads from the furnace, B, and that directly above said flue is another one, C. When the damper, D, is turned down therefrom, the main flue will be closed, and the heat will attack the pan, E, where the boiling-off is first commenced. The heat can be retained under this pan, if desired, by turning the damper, F, up, as shown, and the double damper, G, as shown, while the lower dampers, H, I and J, are closed, also as shown. In this way the heat is driven along the upper flue under both pans. The dampers just alluded

Fig. 1



BOND'S SYSTEM FOR SORGHUM EVAPORATORS.

Fig. 2



to are set at different distances from the chimney, so that any portion of the pans can be exposed to or cut off from heat. They are operated by handles from the outside as usual, but instead of solid rods being provided for the dampers they are fastened to tubes through which a current of cold air flows and keeps them cool. The finishing pan, K, is set in a water bath, L, which is an excellent arrangement, for through its adoption the sirup can never be burned, no matter how intense the heat or rapid the ebullition. The water for this bath is derived from a tank, M, next the chimney, the heat from which warms it. There is an air passage, N, in which is a door, under the forward pan, by which the contents of the same can be quickly cooled off, should it be necessary, while the other pan is boiling. The air is prevented from destroying the draft by turning the damper so as to close the communication with the chimney. The pan, E, is made with a metal bottom and three metallic sides; the fourth being of wood, set flaring. This wooden side sets off the flue, and has a vertical adjustable flange, P, (see Fig. 2), which carries a number of hooks. On these hooks, bags, containing bone-black, are set so that the juice can be easily freed from impurities, and after this is done it is let down into the finishing pan to be further worked. A preliminary heating may be given the juice in a side furnace, Q, which is warmed by an oblique flue from the main fire, and it should be somewhat higher than the main pans so that the juice will flow from it. A peculiarly-shaped skimmer is used in connection with the evaporator, which is in form similar to a coal-scoop with holes in the bottom, it is made of wood and floats on the juice ; it can be used to advantage with any kind of evaporator.

This invention was patented through the Scientific American Patent Agency on the 12th of July, 1864, by Caleb Bond, of Richmond, Ind.; for further information address him at that place.

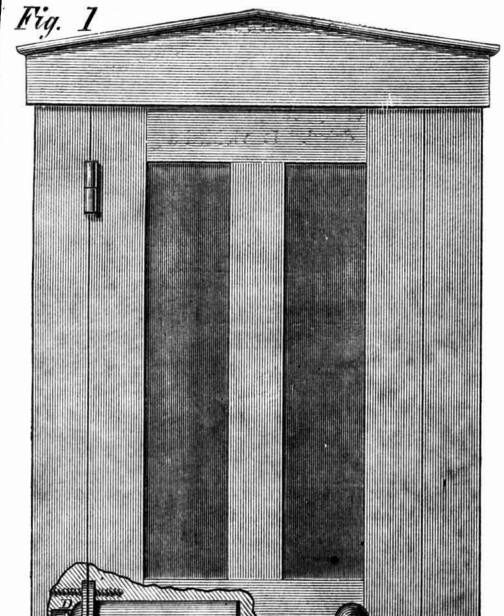
NATIVE CHICORY.

Mr. Charles F. Voght, of Blue Island, Ill., has been engaged in the cultivation of chicory for the past year, and has raised a crop of about ten tuns. From a comparison of the quality with that of the best imported we can say that the native chicory is superior, and in this opinion others, familiar with the foreign article, concur. Mr. Voght anticipates a great extension of his business, and in the ensuing year will raise one hundred tuns. Chicory, as is well known, is largely used abroad in the adulteration of coffee. It is imported to this country for the same purpose, and its culture here will result in a new branch of industry and revenue to the country.

WORCESTER'S AND JONES'S DOOR SPRING.

These engravings represent an improved door spring, which can be easily and quickly attached to any old or new door, gate, or shutter, and is so constructed as to be entirely out of sight, a great advantage in fine rooms or offices, where anything like machinery is objectionable.

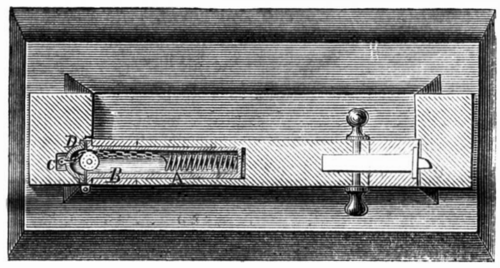
Fig. 1



The construction of this device is as follows:—In Fig. 2 a section is shown wherein the spiral spring, A, is fastened to the case, B, at one end, and is at the loose end connected to a small pin, C, in a concave plate, D, fitted in the door jamb. At the outer extremity of the case, B, there is a small roller fixed, over which the chain connected to the spring passes. These are the details, and the operation of them is so obvious as to require no explanation from us. The advantage of the pin in the concave plate is that it allows the spring to be unhooked at any time, if necessary, so as to permit the door to remain open, as, for instance, in summer time, when free circulation is needed. This spring does not slam the door, as its greatest force is exerted when the former is wide open. It can also be quickly inserted in place, and will last a long time with care.

It was patented through the Scientific American Patent Agency, on Aug. 30th, 1864, by W. H. Worcester and E. F. Jones, of Farmington, N. H. Further information can be had by addressing them as above.

Fig. 2



The Mackerel Fishery.

Mr. Carter, in his *Summer Cruise on the New England Coast*, gives the following facts concerning the mackerel fishery:—

"When a mackerel vessel reaches a place where the fish are supposed to be plentiful, the master furls all his sails except the mainsail, brings his vessel's bow to the wind, ranges his crew at intervals along one of her sides, and, without a mackerel in sight, attempts to raise a school by throwing over bait. The baiter stands amidships, with a bait-box outside the rail, and with a tin cup nailed to a long handle he scatters the bait on the water. If the mackerel appear, the men throw out short lines, to the hooks of which a glittering pewter jig is affixed. The fish, if they bite at all, generally bite rapidly, and are hauled in as fast as the most active man can throw out and draw in a line. As they pull them on board, the fisherman, with a jerk, throws them into a barrel standing beside him. So ravenously do they bite, that sometimes a barrelful is caught in fifteen minutes by a single man. Some active young men will haul in and jerk off a fish and throw out the line for another with a single motion, and repeat the act in so rapid succession that their arms seem continually on the swing. 'To be high-line,' that is, to catch the greatest number of fish, says Sabine, 'is an object of earnest desire among the ambitious; and the muscular ease, the precision, and adroitness of movement which such men exhibit in the strife are admirable. While the school remains alongside and will take the hook, the excitement of the men, and the rushing noise of the fish in their beautiful and manifold evolutions in the water, arrest the attention of the most careless observer.'"

Messrs. Potts & Klett, Camden, N. J., wish to obtain an apparatus for making fresh water from salt.

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NEW YORK, SATURDAY, OCTOBER 8, 1864.

Contents:

(Illustrations are indicated by an asterisk.)

THE THEORY OF EXPANSION.

Queen Elizabeth, once seeing Sir Edward Ratcliffe walking in the palace garden, put her head out of the window and propounded to him the query,

"What does a man think of when he thinks of nothing?"

Sir Edward was an applicant for some grants that had been promised-but delayed, and after a minute's hesitation he replied,—

"He thinks of a woman's promises."

If the same question was asked of our engineers the answer might be,—"He thinks of the theory of expansion." There is no such theory, or at all events, there is none that is founded on observed facts. Steam in expanding exerts a constantly diminishing pressure, doubtless in accordance with some fixed law, like all of the operations of nature, but what this law is nobody knows.

There is a notion floating in the minds of many men and expressed in many books, that the pressure exerted by steam in expanding follows the law of permanent gases developed by Morriotte, that the pressure is in inverse proportion to the volume, so that with double the volume there is half the pressure.

Dumas ascertained that if water is evaporated under the atmospheric pressure the volume of the steam will be 1,669 times greater than the volume of the water from which it was formed. It was then assumed that if water was evaporated under greater pressure its density would follow the law of permanent gases, and a formula was given for calculating the density at all other pressures. This formula being reduced furnished the simple rule to add 458 to the temperature, divide by the pressure, and multiply by $37\frac{1}{3}$ to get the volume. In accordance with this rule authors of works on the steam engine laboriously computed long tables of the density of steam at different pressures, and these were copied and re-copied by successive book-makers, thus passing into literature as a part of the science of steam. Joule, Thompson, Rankine, and others, on directing their attention to the subject, were led to doubt whether steam and other condensable vapors do follow in expanding the law of permanent gases, and Prof. Rankine published a new formula, founded on theoretical considerations, for computing the density of steam at different pressures. In 1859 William Fairbairn invented a very ingenious apparatus for measuring the volume of steam when formed at different pressures. That apparatus was illustrated on page 380, Vol. I., new series of the SCIENTIFIC AMERICAN. The very first approximate results of Fairbairn's experiments showed a wide departure from the Marriotte law. In his paper, published on the page above cited, he gives the following table of the density of steam at various temperatures as computed from the old formula and as determined by his own observations. The density is stated in the number of times which the volume of steam is greater than the volume of the water from which it was formed:—

Temperature.	Volume of Steam By Formula.	Volume of Steam By Experiment.
244°	1,005	896
245°	969	890
257°	790	651
262°	740	640
268°	680	633
270°	660	604
283°	540	490

These experiments of Fairbairn overthrew the old notions in regard to the density of steam when formed at different pressures, and they determined the real facts in regard to this branch of the subject, but they by no means settled the question of expansion. Steam formed at a temperature of 283° has a volume 490° greater than the water from which it was formed, while steam at 244° has a relative volume of 896, but whether steam at 283° with a relative volume of 490, if allowed to expand to a volume of 896 will have a temperature of 244°, with the corresponding pressure, remains an unsolved problem.

SLOVENLY WORKMANSHIP.

The steamer *Plymouth Rock*, which formerly sailed on Lake Erie (she is now dismantled) had a small blowing engine of the ordinary construction. When this engine was to be started at first it would not turn the centers. The exhaust pipe led to the main condenser, as usual; in all respects the engine was an ordinary high-pressure one. At the time the delay occurred the boat was ready to go out on a trial trip, and the guests were on board and anxious for the trip; but not an inch would the stubborn engine move. In this dilemma the steam-chest bonnet was taken off and the valve examined, but nothing was found amiss. Some thoughtful person then suggested that a block of wood had been left in the cylinder; inspection failed to detect any such block. A consultation of mechanical doctors was held, but all to no purpose; for, as the engineer wisely remarked, "if the valve was right she must go," but she didn't. At last the blockhead, who made the joint on the exhaust pipe at the condenser, became conscience-stricken. He confessed that he was not certain whether he had cut the hole out in the center of the joint or not; in mechanical parlance he had made a "blind joint." This proved to be the fact, and when the impediment was removed the engine worked well enough.

A similar case, involving more disastrous results, was where a glass water-gage was put up with the same neglect. The rubber washer in the bottom coupling was not cut out. The water in the boilers foamed and filled the tube, which being once filled remained so, and the water-tenders being thus deceived lost their water, and burned the crowns of the furnaces.

We cite these cases in no pedantic spirit, but merely to show what results neglect or careless workmanship may produce. Another instance occurs to us, wherein a man put a check valve on a feed-pipe the wrong end to, so that at the first stroke of the plunger the pipes were all bursted. A mischievous practice of putting globe valves up so that the steam pressure comes on the under side of the valve may be daily noticed among fitters. It is argued that the valve works easier. It unquestionably does, but it also wears faster, and the perpetual steam leak, which occurs, soon necessitates renewal; besides all these objections it is a slovenly and senseless way of doing work.

There is no place where good judgment is more required than about a steam engine. A twist of the wrist too far may cost men their lives, and the inability to tie a knot properly has sacrificed life in many instances. Some men were once in a cylinder of one of our Sound steamers, screwing up the follower bolts on the piston; the throttle-valve leaked, incommoded them, and the officious captain, thinking he understood the management of the valve, in trying to shut it turned it the wrong way and scalded the men to death. Be watchful, be vigilant! It is the eye that is quick to see danger and the brain that is swift to avert it that is wanted in erecting or handling steam or other machinery.

ILL-REGULATED MACHINERY

A wheezy locomotive, exhausting unequally, is a most distressing sound to an engineer. A long line of shafting, thumping, bumping, and pounding, is a standing reproach to the directors of any works. A pulley which runs like an eccentric, is shameful evidence of want of care on the part of the man who bored it. An engine with the packing slatting to and fro in the piston betrays a careless engineer. Slack bearings that should be tight are a nuisance. Leaky stuffing-boxes that drip water, allow steam to blow out, or air to filter through them, are a disgrace. Boilers that leak at every seam, and are full of scale, are not only expensive but dangerous; and so on through the long category of neglect, oversight, or reckless use of machinery of all kinds.

It should be remembered that the individual faults in the special machines alluded to above cost money. If a man had a hole in his pocket and lost a cent therefrom daily, at the end of the year he would look solemn and berate himself soundly for his carelessness; but the same man, if a manufacturer, would stand complacently by and see money going out of his safety valve by leaking steam, or in some of the other ways heretofore mentioned.

It is not right, in a commercial point of view, to say nothing of mechanical morality. When a manufacturer hires a workman he has a right to demand that he shall put forth his best skill in his service. For the sake of his reputation the workman should exert his abilities, and the result would soon be seen in the lessened cost of repair. Besides the economy in fuel gained by a properly working steam engine over one badly regulated there is a further advantage in the amount of work performed, which should not be lost sight of.

PECULIARITIES OF THE PADDLE-WHEEL.

Much ingenuity has been expended in the endeavor to cause the paddles of the wheel to enter and leave the water vertically. Had this been found beneficial, the complexity and liability to derangement might have been submitted to, but the reverse is the result of various trials. If the vertical paddle had been considered and acted on as the essential and natural form for propulsion, the inventor of the simple radial arm paddle would have merited undying fame. By the combined motions of the vessel forward, and the paddle downward, the entrance to the water is nearly edgewise, at any material angle, whereas the entrance and exit of the vertical paddle "backs water," by the forward motion of the vessel.

The superiority of the radial paddle is still further seen, admitting an oblique action (not edgewise), by the fact that such oblique action would not *per se* be injurious, or only slightly and incidentally so, by increased slip, which item (slip) is waived for the present. Then, the wheel arm being vertical, with a given movement of the crank and expenditure of steam the vessel is moved a certain distance; with the wheel arm horizontal, if immersed to the axis, there would be no movement of the crank or vessel, and no steam used. Now between the vertical and horizontal positions, the required force or quantity of steam, to move the crank an equal distance, would be determined by the angle of obliquity, and the progress of the vessel would be increased as the quantity of steam used, under the said equal movement of the crank, being in action and effect similar to increased pitch of the screw propeller.

The assumed loss by oblique action is one of several oversights, in orthodox mechanics, and is estimated to be generally about 15 per cent, which would give an angle of 9° as the mean point of impact on the water. The usual mode of ascertaining the slip is free from error, and may average 12 per cent, which would be increased with the angle, in the ratios of the square root of the required force. While it is contended, and made prominent by orthodox authority, that the loss to the paddle wheel, by oblique action, is say 15 per cent, the details of the properties of the screw prepellers are given without any reference to obliquity, which cannot be generally less than 30°, entailing a loss, by the same rule of 50 per cent. Consistency requires that this large deducive loss be acknowledged, although experience shows an advantage of 10 to 15 per cent over the paddle wheel, in economy of steam.

The cause of the superior efficiency of the screw propeller may be found in the partially dead water against which it acts, yet avoiding the drawing back of the vessel, owing to the continued advance, beyond the immediate influence of the backward ejected water. T. W. B.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Amalgamator.—This invention consists in the employment of a cylindrical case provided with dies and having a rotary oblique muller placed within it and provided with shoes, all being constructed and arranged in such a manner that all particles of the quartz or rock will be brought in contact with the quicksilver, and the metal contained in the quartz or pulp thoroughly amalgamated and without cutting up or grinding the quicksilver, so that the latter will be liable to float off with the scum on the water, as is now the case to a great extent and which involves a considerable loss in quicksilver. H. L. Hopkins, of San Francisco, Cal., is the inventor.

Anti-friction Pulley Block.—The object of this invention is to obviate or remove a large portion of the friction attending the use of pulley blocks as at present constructed, and, at the same time, reduce the dimensions of a block of a given power very materially, while the smallest sheave of the same will admit of the rope bending or conforming to it perfectly without the liability of rupturing its outer fibers. John J. Doyle, of Brooklyn (E. D.), N. Y., is the inventor.

Journal Box.—This invention consists, first, in constructing the box in two separate parts and so as to admit of being fitted together and secured by two bolts which do not pass through the interior of the box, whereby the box, when the two parts are secured together, is rendered oil-tight, the waste of oil in the ordinary journal boxes, caused by the leakage of the same through the bolt holes, being entirely obviated. The invention consists, second, in an improved packing to prevent the escape of oil from the box around the axle, and also to prevent the admission of dust into the box, said packing consisting of a metal plate provided with a bushing of soft metal to fit upon the axle; the plate is fitted loosely in grooves at the rear of the box, and arranged in such a manner as to admit of the box, under the wear of the journal, to settle freely, while the packing will remain fitted snugly on the axle without being subjected to any undue pressure or wear. The invention consists, thirdly, in a self-operating lubricating valve placed in an oil chamber within or at the upper part of the box and so constructed and arranged as to admit oil in suitable quantities down upon the journal, whereby the latter will always be supplied with pure oil and much wear of the journal avoided. E. S. Dickinson and W. D. Nelson, corner of Second avenue and 42d street, New York, are the inventors.

Row-lock.—This invention consists in the employment of a grooved guide bracket in combination with a flange attached to or cast solid with the row-lock, in such a manner that in rowing the full strain of the oar is sustained by the bracket, which is firmly screwed down to the gunwale of the boat, and that portion of the gunwale to which the rowlock is fastened is strengthened by said bracket, whereas, by the ordinary rowlock its strength is diminished; and, furthermore, the rowlock is so constructed that it has no possible chance to break. The invention consists, also, in combining with the rowlock a spring of any desirable form and construction, in such a manner that by the action of each spring the rowlock is kept parallel with the keel and prevented from turning edgewise, and consequently it is always in the proper condition to ship the oar. Capt. J. W. Norcross, of Boston, Mass., is the inventor, and he has made an assignment to Messrs. Wilcox & Hall, Middletown, Conn.

Rigging for Sails.—This invention consists of the metallic grooved ribs placed longitudinally up the mast on its after or hinder part to extend as far up as as it is desirable to hoist the sail. These ribs are grooved on the outside and inside. In the outside groove is to be placed a movable carriage or slide, to which is attached the boom or gaff which works on universal joints; in the inside groove are placed a series of small sliding carriages which will be attached at intervals to the sail so as to hold it close to the mast. Similar ribs with the inside grooves only, will also be placed on the upper side of the boom and on the under side of the gaff to admit a series of small carriages to which the lower and the upper edges of the sail are secured, in such a manner that in hoisting and lowering the sail the slides run freely in the grooves and do not get jammed or entangled like the ordinary hoops; and, furthermore the sail by this arrangement is held at all times at the after center of the mast and, as a consequence receives the direct force of the wind; whereas the hoop allows the sail to swing to the leeward side of the mast, thus putting a large portion of said mast between the wind and the sail when the vessel is beating to windward. The bending and unbending of the sail is also greatly facilitated by this improvement. The improvement consists, further, in a cap applied to the small carriages, for the purpose of preventing the fastening by which the same are attached to the sail, from chafing. Capt. J. W. Norcross, of Boston, Mass., is the inventor.

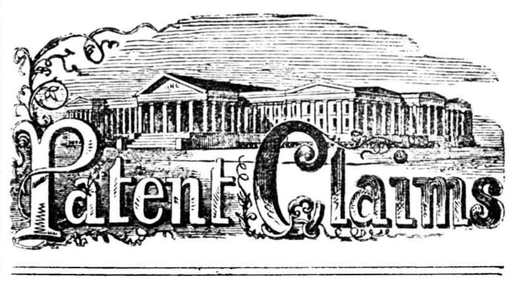
Knitting Machine.—This invention relates to certain improvements in that class of machines which are known as "Dalton's Knitting Machines," and in which a cylinder of stationary needles is used with the barbs on the outside. Within this cylinder rotates a shaft in unison with a circular table revolving around the cylinder of needles, so that the respective gears carried within the cylinder of needles by the shaft and outside by the circular table, travel around the said cylinder of needles and deposit the yarn in the barbs of the needles, close the said barbs, cast off the previous loop, and thus knit the fabric by any of the well known character of stitches. This present improvement consists in casting the needle cylinder solid with the bed or stand of the machine so as to save a large amount of stock and labor requisite with the present arrangement in fitting and securing the cylinder to the bed; also in running the revolving circular table between the flange of the cylinder and the needle plates and thereby dispensing with the old stationary bed, with the hub of the cylinder and with the nut required to hold the same in its place; further, in the use of an adjustable collar in combination with the revolving table and needle cylinder in such a manner that any wear in the working surfaces of the cylinder or table can be compensated for at any moment, and the gears are enabled to retain their relative distance from the needles; finally, in making the needle plates adjustable in a vertical direction so that the same can be readily arranged to bear uniformly upon the inner edge of the revolving table, and any wear occurring in the bearing surfaces can be compensated for with little trouble or loss of time. Joseph Dalton, Brooklyn (E.D.), N. Y., is the inventor.

Profits of Blockade Running.

The Liverpool *Courier* publishes some statistics in reference to the profits of blockade running. A single trip, it shows by a copy of bona fide account, costs $80,265. Of this amount five thousand dollars went to the captain for one month's service, three thousand dollars for pilotage out and in, and other sums equally large to officers, engineers, and others, all of whom, in view of the risk incurred, were paid the most liberal wages, even the coal heavers receiving two hundred dollars a month. Against this heavy expenditure the following is given on the credit side of the earnings:—

800 bales of cotton for Government....	$40,000
800 bales of cotton for owners	40,000
Return freights for Government..........	40,000
Return freights for owners..............	40,000
Passengers..............................	12.000
Total..............	$172,000

Thus, in case of a successful trip, the operators make a monthly profit of $91,735. It is to be remembered, however, that very often the vessels engaged in this business are captured at the first venture, entailing a heavy loss. Several foreign houses have been almost, if not entirely, ruined by their mishaps in this business.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 27, 1864.

Reported Officially for the Scientific American.

☞ 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.

44,377.—Breech-loading Fire-arm.—John S. Adams, Taunton, Mass.:

I claim, first, The mode of attaching the trigger guard to the movable chamber, by means of tongues and grooves, or their equivalent, thereby securing strength to open and close the chamber at the same time, allowing the guard to slide, to open the breech, and eject the empty cartridge case, in the manner specified.

Second, I claim operating the device for withdrawing or ejecting the metallic cartridge case, from breech-loading fire-arms by a sliding-longitudinal movement of the trigger-guard.

Third, I claim the movable cartridge chamber, B, the hinged breech-block C, the sliding trigger guard, E, the spiral spring, k, and the ejecting device, I, all in combination and operating in the manner herein described for the purposes set forth.

44,378.—Automatic Dancer.—James E. Atwood, Trenton, N. J., and Cassius P. Stimets, New York City:

We claim, first, The arrangement and combination of the movable coiled spring, E, with the base, C, and spring-board, D.

Second, The finger-piece, F, attached to or formed on the rear end of the spring-board and extending through or beyond the back of the pillar, B, substantially as and for the purpose herein set forth.

44,379.—Railroad Car Seat.—A. S. Babbit, Keeseville, N. Y.:

I claim the application to car seats or other fixed articles of furniture to be used in a moveable conveyance, of flanged blocks, c, provided with shanks, b, that pass up through plates, a, which are suspended from springs secured to the top ends of the shanks, b, and made to support the car seat, or other article, substantially as described, so that said blocks can be readily secured to some fixed portion of the movable conveyance and their shanks with the springs will form yielding guides to keep the seat or other article in place and render it comfortable for the person using the same.

[The object of this invention is to support by springs car seats or other fixed articles of furniture to be used in a movable conveyance, such as berths or benches in vessels, said springs being connected to the legs of the seat or to the frame of the fixed article of furniture, so that they stretch when the seat or other article of furniture is occupied, and that the stems or cores round which the springs are wound form guides for the legs or frame and prevent the seat or other article of furniture changing its place spontaneously.]

44,380.—Submarine Vessel and Life Boat.—John Bachman, Hoboken, N. J.:

I claim, first, The wings, B B2, and plates, B′, constructed, arranged, and operating in the manner described and employed in connection with the vessel, A A′, as and for the purposes set forth.

Second, I claim the combination of the block, E4, shaft, E3, and handle, E6, constructed and arranged as described and employed for operating the propellers, E, in the manner set forth.

Third, I claim the hinges, B4 e, formed in one piece and adapted to prevent the entrance of water, substantially as herein described

44,381.—Ink-stand, Pen-cleaner, etc.—Frederick Bailey, New York City:

I claim the combination of the ink-stand, A, with the cup, C, which serves both as a receptacle for the cleansing substance and as a pen-rack, substantially as set forth.

44,382.—Nails for Leather Work.—Stephen W. Baldwin Baldwinsville. N. Y.:

I claim a nail having the form of construction adapting it for use, substantially as described.

44,383.—Dining-room Stove.—John Bamber, Rochester, N. Y. Ante-dated Sept. 19, 1864:

I claim, first, The combination and arrangement of the flues, b and d, and the plates, f and g, of the elevated oven, when they conduct the heat from the underside around four other sides thereof, as and for the purposes set forth.

Second, The construction of the sliding grate, G, with tapering hollow bars, as shown and for the purpose set forth.

Third, The rotary raker suspended below and clear of the grate bars when constructed so as to have an endwise motion as well as around its axis, substantially as shown.

44,384.—Carpet-fastening.—Wm. Barnard, Deerfield, Mass. Ante-dated Sept. 10, 1864:

I claim a carpet-fastening composed of the rings, C, rods, D, and hooks, E, all arranged and applied substantially in the manner as and for the purpose herein set forth.

[This invention relates to a new and improved fastening for securing carpets to floors. The object of the invention is to obtain a fastening of the class specified which will admit of the carpet being readily taken up and put down, and properly stretched when put down.]

44,385.—Bilge Water Gage.—Job R. Barry, Philadelphia, Pa.:

I claim the syphon bilge water gage, E F, constructed and operating substantially as herein described.

[This invention consists in the combination of an inverted syphon filled with mercury or other suitable liquid with a tube leading to a chamber or cup in the hold of a vessel and connecting either with the short or with the long leg of said syphon in such a manner that the mercury in the long leg is caused to rise or fall either by the pressure or by the suction of a column of water in the tube leading from the syphon to the chamber or cup, said pressure or suction being increased or diminished by the rising and falling of the water in the hold of the vessel.]

44,386.—Water Elevator.—Ezra P. Barton, Windsor N. Y.:

I claim the combination of the loose box, D, its ratchet wheel, C the disk and ratchet wheel on the shaft, A, with the crank arm or lever, E, attached to the box, D, and armed with a brake and a pawl at its short end, substantially as described.

[This invention consists in combining a friction break with the lifting apparatus of a water elevator, so that the crank arm will operate either one or the other.]

44,387.—Machine for cleaning Flax.—Charles Beach, Penn Yan, N. Y.:
I claim forming the hollow case or bed with toothed ribs, D, having intermediate spaces, g, the same being used in combination with the toothed drum, C, substantially in the manner and for the purpose herein set forth.
I also claim in combination with the ribs, D, and drum, C, arranged as above described, the dust passages, E, bounded on the inside by the perforated partitions, d, arranged and operating substantially as and for the purpose herein specified.
I also claim the combined arrangement of the ribs, D, passages, E, drum, C, fan chamber, G, and fans, H, as herein described.

44,388.—Boot and Shoe.—Lyman R. Blake, Quincy, Mass.:
I claim as a new article of manufacture a boot or shoe having a construction, substantially as described.

44,389.—Twine Cutter.—S. E. Blake, Worcester, Mass.:
I claim the combination of the knife or cutter, B, and spring, C, when arranged and applied to the plate or socket, A, as shown to form a new and improved twin cutter, as set forth.
[This invention relates to a new and improved implement or device for cutting twine, designed for the use of retail merchants and others, where business requires the tying up with twine of articles in small packages.]

44,390.—Carriage for raising and transporting Ordnance.—Caleb Bates, Kingston, Mass.:
I claim the combination and arrangement of the four truss frames, A B C D, the frame, L, and the axle bar or beam, E, together and with the windlass and its operative mechanism, substantially as hereinbefore described.
I also claim the arrangement of the furcated brace, S, with the truss frames, A B C D, the axle beam or bar, E, and the king bolt, G.
I do not claim the combination of two windlass barrels and one chain having its end attached to the two barrels respectively, but what I do claim is my improvement hereon, the same consisting in connecting the helical grooves of the two barrels by running one into the other, by means of a grooved frustrum arranged between and combined with the two grooved barrels and so that the chain may coil from the larger to and upon the smaller of the two barrels, in manner and for the purpose or so as to operate as specified.
I also claim my improved arrangement of the detaching springs with respect to the pawls and brake head.

44,391.—Step-ladder.—Jesse Booker, Dayton, Ohio:
I claim as a new article of manufacture the arrangement of stiles, A A′, cleats, B B′, battons, D, and pins, E, as described and represented.

44,392.—(Suspended.)

44,393.—Lamp-burner.—Clarissa Britain, St. Joseph, Mich.:
I claim, first, The elongated galley or socket, I, in combination with the elongated neck, I′, of the glass chimney and the air valve, E, or its equivalent, substantially as and for the purpose described.
Second, I claim supporting the cone, H, out of contact with the body of the burner, A, upon projections, g, in the manner and for the purpose described.

44,394.—Slide Valve.—Andrew Buchanan, New York City:
I claim, first, The employment for relieving the face and seat of the slide valve of friction of one or more gibs, E, and slides, D, applied and operating substantially as herein specified.
Second, The lubrication of such gibs and slides by means of a passage, c, and slot, e, in the slide communicating with a grease cup, G, outside of the valve chest, substantially as and for the purpose herein specified.
Third, Making the face or faces of the gib or gibs of rounded or arched form longitudinally, substantially as and for the purpose herein set forth.

44,395.—Shear and Stake-holder.—E. H. Camp, Jackson, Mich.:
I claim the employment of a ball shank-holder, operating in the manner and for the purpose herein shown and described.
I also claim the combination of the ball shank-holder with the plates, A C, substantially in the manner herein shown and described.

44,396.—Rocking Chair.—Robert Chauncey, Syracuse, N. Y.:
I claim the flexible arm, D, applied to a rocking chair and in combination with the wheel, E, (arranged as above described) capable of giving motion to the chair by pressure upon the flexible arm.

44,397.—Clamp for Bridges.—Newton Chapin, Chicago. Ill. Ante-dated June 28, 1864:
I claim the combination of the hollow clamp heads, B B, provided with the partitions, E E, and block, F, with the adjustable rod connecting the same, arranged and operating substantially as and for the purposes set forth.

44,398.—Keys or Packing Clocks for Bridges.—Newton Chapin, Chicago, Ill. Ante-dated June 28, 1864:
I claim constructing an iron key for bridges in the form of a hollow shell and providing the same with one or more partitions, b b, substantially as and for the purposes described.

44,399.—Hospital Bedstead.—John D. Cochran, Milford, N. H.:
I claim in combination with the stationary side rails, B, the hinged rails, G, levers, H, inclined ways, I, ropes, K, and shaft, L, substantially in the manner and for the purposes described.
I also claim the combination of the levers, O, ropes, N, shaft, P, and pitman, Q, with the hinged parts, D and C, substantially in the manner and for the purposes described.

44,400.—Fruit Basket.—Charles Crozat Converse, Dubuque, Iowa:
I claim, first, The box constructed substantially as above described by supporting its bottom upon its own sides, as above set forth.
Second, The method thus described of securing the bottom of the box in its proper place by inserting the angular corners of the same or the spurs formed on the edge of a round or otherwise shaped bottom into slats or perforations made in the sides of the box to receive them, the upper portion of said slats or perforations, at the same time securing the additional purpose of ventilation and any other device, substantially the same and producing analagous results.
[This invention consists in making a strong fruit or berry basket out of very frail material, by sustaining its bottom which is sexagonal or many-sided, by means of perforations cut in the sides of the basket, which receive the angles of the bottom.]

44,401.—Sugar Evaporator.—James S. Corbin, New Richmond, Ohio:
I claim the combination of the fire-box furnace and damper, as described.
I also claim a horizontal damper operated by a lever attached to an upright, substantially as and for the purpose herein set forth.

44,402.—Machine for Dyeing Flannel and other Cloths.—Daniel M. Cummings & Allen Hays. Enfield, N. H.:
We claim, first, The combination of a series of parallel stretching rollers, a a a a, with one or more central fans in a cloth-drying machine, when said rollers are arranged and combined substantially in the manner and for the purpose herein represented and described.
Second, The use of annular slides, y y, or their equivalents when interposed between and combined with one or more revolving fans and a series of stretching rollers, a a a a, in a cloth-drying machine, to control the current of air from such fans, substantially in the manner and for the purpose herein set forth.
Third, The combination of a toothed ring, p, or its equivalent with the pinions, O O, and set screws, S S, to secure the simultaneous movement of the set screws, substantially in the manner and for the purpose herein set forth.
Fourth, The combination in a machine for drying cloth, of a bisected journal box, c c′, with either journal of a revolving shaft, E, upon said journal box is supported and adjusted and its two sections are held together and confined by means of cavities in the heads of opposite set screws embracing and confining the ends of pivots or lugs, so formed upon the bi-sected journal box as that each pivot shall be divided by the partition of said box, substantially in the manner and for the purpose herein set forth.

44,403.—Circular Knitting Machine.—Joseph Dalton, Brooklyn, N. Y.:
I claim, first, Casting the needle cylinder of a knitting machine solid with the bed or stand.
Second, Running the revolving table, D, between the flange of the cylinder, B, and the needle plates, F, substantially as and for the purpose specified.
Third, The adjustable sectional collar, E, applied in combination with the revolving table, D, and cylinder, B, in the manner and for the purpose substantially as herein shown and described.
Fourth, Making the needle plates vertically adjustable, for the purpose set forth.

44,404.—Implement for dividing Clods in the Field.—Joshua N. Davis, Martinsville, Ohio:
I claim the arrangement of frame, A, adjustable vibrating head, C, and rotary head, G, the whole being armed with cimeter formed knives, B, arranged and operating as set forth.

44,405.—Manufacture of Starch.—Bernard Descamp, Buffalo, N. Y.:
I claim the above described process of separating starch from cereal and other materials, by subjecting the same to the action of steam in closed vessels, substantially as set forth.

44,406.—Seeding Machine.—Samuel D. Deyo, Strawberry, Iowa:
I claim the fitting of the journals of the shaft, H, of the seed-distributing wheels, I I, in slides, G, placed in the outer sides of the seed boxes, in combination with the wheels, J, on the inner sides of the traction wheels, B B, and the screws, e, in the bottoms, a, of the nipper parts, d, of the seed boxes, all arranged substantially as and for the purpose herein set forth.
[This invention relates to a new and improved seeding machine designed for planting seed either in drills or hills and in chuck rows.]

44,407.—Journal Box.—E. S. Dickinson & Wm. D. Nelson, New York City. Ante-dated Sept. 18, 1864:
I claim, first, The employment or use in a journal box for car axles, of an oil chamber provided with a valve, I, so constructed and arranged that said valve will under the motion of the car, oscillate or roll so as to intermittingly open and close the oil passage, and gradually supply the journal with oil and keep it in a properly lubricated state.
Second, The combination of the two parts, A B, projecting ears or flanges, a f, screws, C′, and shoulders, c and e, when the said parts are constructed and arranged as herein described and operated in the manner and for the purposes specified.
Third, The packing plate, C, fitted in the rear of the journal box and provided with the collar or bushing, D, substantially as and for the purpose herein set forth.

44,408.—Cider Mill.—Perry Dickson, Erie, Pa.:
I claim the combination of the cylinder having teeth made by punching holes from the inside, in combination with the spiral or oblique scraper for removing the pomace that passes through the perforations, substantially as described and represented.
[This invention relates to an improvement on what is generally known as the "grater mill," for grinding apples for the manufacture of cider, said mill being also applicable to the grinding of other vegetables or roots.]

44,409.—Pulley Block.—John J. Doyle, Brooklyn, N. Y.:
I claim the employment or use in a pulley block of one or more eccentric sheaves in connection with the ordinary concentric sheaves one or more arranged to operate in the manner substantially as and for the purpose herein set forth.

44,410.—Churn.—James J. Edwards, Columbus, Wis.:
I claim in combination with the perpendicular parallel dasher blades, the levers, E E, stop cock, K, and tube, I′, when constructed in the manner as and for the purpose herein described.

44,411.—Saw-set.—A. R. Fenner, Cold Brook, N. Y.:
I claim the eccentric, g, arranged in combination with the jaws, C D, handle, A B, and regulating screw, b, substantially in the manner and for the purpose shown and described.
[The object of this invention is to arrange the set so that it will adapt itself to the variations in the thickness of a saw blade, and this object is obtained by an eccentric arranged in combination with the jaws of the set, and the screw which regulates the amount of set to be given to each tooth in such a manner that at such places where the blade is thick its rear edge will be elevated less above the point of the regulating screw than at those places where the blade is thin, and consequently the amount of set given to the teeth will be in proportion to the thickness of the blade at each point.]

44,412.—Dumping Apparatus.—Frank Ficht, Isle Royal Mine, Mich.:
I claim the combination of the recesses, b b, with the rails, A A′ A2, or their equivalents, substantially as herein shown and described.
I also claim the employment of the wheels, G, in combination with the above-named parts, substantially as herein shown and described.
I also claim the employment of the skip or car, B, in combination with the above-named parts, substantially as herein shown and described
[This invention pertains to the class of devices that are employed for elevating ores, minerals, earthy matters, and other substances from mines, wells, excavations, [and subterranean places of all kinds.]

44,413.—Hay Presses.—Matthew Fletcher, Louisville, Ky.:
I claim the combination of a toggle press, with a revolving table, sustaining a series of packing boxes, arranged and operating substantially in the manner and for the purpose set forth.

44,414.—Pipes or Smoking Apparatus.—Edward S. Franks, Boston, Mass.:
I claim a pipe having its stem and bowl arranged and applied in manner and so as to be adjustable relatively to one another, as specified.
I also claim the combination of the adjustable bowl and stationary stem, or the equivalent thereof, with the vessel, B, and its mouth pipe, arranged substantially and so as to operate as specified.

44,415.—Mode of Separating Fibers of Hemp, Flax, etc. —Jim B. Fuller and James P. Upham, Claremont, N. H.:
We claim effecting the separation of the pipes of hemp, flax and other similar substances, by subjecting them, while in a wet or moist condition, to the picking or beating action of an ordinary cotton picker, lapper or willow, or ordinary shoddy picker, or any machine or machines of similar nature, substantially as and for the purpose specified.

44,416.—Bodkins for passing enlarged shanks of Buttons through Cloth.—P. W. Gengembre, Boston, Mass.:
I claim the implement or piercers made with the springs or clasps, h h, and eye or eyes, f, or the equivalent thereof, the same being substantially as and for the purpose specified.

44,417.—Forming and Double-seaming Stove Boilers.—Benona S. Gleason, Kalamazoo, Mich.:
I claim hinging the semi-circular section, a, to the sides of the central section, b, in combination with the screw, e, and movable section, c, and key, f, as and for the purposes set forth.

44,418.—Building Brick Walls for Houses.—Levi Goodrich, San Jose, Cal.:
I claim the employment or use in hollow brick walls, of angular, diagonal, lattice or herring-bone bridging; or in other words bracing and tying with wood, iron, stone or other material laid in the mortar joints while the walls are in course of erection, substantially as and for the purpose herein set forth.
I further claim the internal brick piers or buttresses, e, when used in connection with hollow walls and ties or braces, substantially as and for the purpose specified.

44,419.—Parlor Cooking Stove.—John Goss, Lewiston, Maine:
I claim the arrangement of the fireplace ash-chamber, oven and flues, as described, in combination with the passage, L, and its closing valve or gate, M, applied directly to the bottom of the ash-chamber and top of the oven, substantially as and for the objects or purposes as hereinbefore specified.

44,420.—Shoe Shave.—Israel Hayes, Farmington, N. H.:
I claim the knife, B, fitted to the part, b, of the stock, as shown, and connected with an adjustable guard plate, C, all arranged and applied, substantially as and for the purpose herein set forth.
I also claim the rounding of the under surface of the knife, B, and the plate, d, substantially as and for the purpose set forth.
I further claim constructing the stock, A, of three parts, a b f, curved substantially in the manner as and for the purpose specified.

44,421.—Apparatus for Separating and Collecting Gas from Petroleum.—Isaac H. Hobbs, Philadelphia, Pa.:
I claim the employment of a lift and force pump, C, between the exhaust or vacuum vessel, A, and the receiver, B the whole being constructed, arranged and combined to operate together, in the manner described, for the purposes specified.

44,422.—Amalgamator.—H. L. Hopkins, San Francisco, Cal.:
I claim the muller, B, formed of an oblique section of a cylinder, or in other words formed of an ellipse, placed obliquely on a shaft, C, with its periphery composed of a portion of a cylinder, which is concentric with said shaft, C, in combination with the cylindrical case, A, all arranged substantially as and for the purpose set forth.
I further claim the plate or dies, b, with the spaces, c, between them, in the cylindrical case, A, and the shoes, d, on the muller, B, when said parts are applied to or used in combination with the case and muller, for the purpose specified.

44,423.—Screw for Music Stools.—Lorenzo Horn, Wolfboro, N. H.:
I claim retaining the seat of a music stool in its proper place after the screw has been run up out of the thread in the nut, substantially in the manner and for the purpose herein described and set forth.

44,424.—Cook Stove.—Wm. Hosmer, Auburn, N. Y.:
I claim, first, The plates, C C′, fitted within the fire chamber, and arranged substantially as shown, for the purpose specified.
Second, The employment or use of a series of dampers, D, placed within the flue, B, and arranged substantially as and for the purpose set forth.
Third, The combination of the dampers, D, in the flue, B, with the plates, C C′, in the fire chamber, as and for the purpose specified.

44,425.—Flexible Tube or Hose.—David R. Hoxsie and Thomas L. Reed, Providence, R. I.:
I claim the use of animal intestines as an impervious covering for tubing or hose, as described.

44,426.—Defensive Armor.—Chas. H. Hudson, Roxbury, Mass. Patented in England May 27, 1862:
First, I claim the method herein described of re-enforcing or backing heavy metallic ships' armor at pleasure, by introducing water into chambers between the outward armor-plating and the inner wall of the hull, to prepare the vessel for action, and discharging the water from said chambers when the vessel is not to be exposed to danger from projectiles, substantially as and for the purposes herein described.
I also claim the aforesaid method of re-enforcing or backing heavy metallic armor, when applied to forts and batteries, substantially as and for the purposes herein described.

44,427.—Fumigator for Smoking Bees, etc.—George Hughes, Bloomington, Ill.:
I claim, first, The fumigator, A, provided with the perforated plate, a, constructed and operating substantially as shown.
Second, I claim the cap, B, provided with the perforated mouthpiece, C, substantially as and for the purpose set forth.
Third, I claim the wooden mouthpiece, C, of a fumigator, having the orifice, b, constructed in the form shown and described, for the purpose set forth.

44,428.—Weather Strips for Doors.—H. C. Hunt, Amboy, Ill.:
I claim the plate, c′, when used in connection with the packing, g, for the purpose specified
[This invention relates to a new and improved weather strip for doors, designed to prevent rain from being driven by the wind underneath the door, and also to prevent the wind itself from passing underneath the door.]

44,429.—Cutting and Pressing Tobacco.—W. W. Huse, Brooklyn, N. Y.:
I claim mounting the nut of the feeding and pressing screw in a bale, which can be changed from a vertical to a horizontal position, substantially as described, in combination with the cutters and with the frame, so constructed as by the change of position of the bale which carries the nut of the screw, and moving the bed of the cutting trough, as set forth, the said machine can be used for pressing or cutting tobacco, as set forth.

44,430.—Parlor Stove.—Sumner Hyde, Williamsburg, Mass.:
I claim, first, The inner cylinder, C, composed of a series of vertical sections, a, provided with radial plates, c, at their outer sides, to form partitions and divide the space between the two cases into compartments, d e, which communicate with the interior of the stove by perforations, f f′, the compartments, e, communicating with the ash pit, D, and all arranged substantially as and for the purpose specified.
Second, The register at the bottom of the stove composed of the two plates, E F, provided with perforations substantially as described when used in combination with the two cases, B C, with the vertical partition plate, c, between them, substantially as and for the purpose set forth.
[This invention relates to a new and improved stove for burning fine fuel, such as shavings, sawdust, fine coal or coal dust. The invention consists in the employment or use of an outer and an inner case, between which there are vertical partitions, the inner case being perforated, and all so arranged that the air is admitted into the body of the fuel to insure its perfect combustion, and, at the same time, heat allowed to be radiated from the outer cylinder. The invention further consists in using in connection with the two cases aforesaid, a register grate, arranged in such a manner as not only to control the amount of air required to feed the fire from below, but also to serve as a raking device to free the fuel from ashes.]

44,431.—Hulling Clover and other Seeds.—Wm. Jones and Abraham Miller, Hagerstown, Md. Ante-dated Sept. 21, 1864:
We claim, first, The series of rakes, D, bars, E, provided with teeth, e, projecting above and below, in combination with the crank shafts, F, and notched bars, D, substantially in the manner and for the purposes set forth.
Second, We claim the above-described separator in combination with the thresher, huller and cleaner, substantially as specified.

44,432.—Water Meters.—Henry J. King, Worcester, Mass.:
I claim the shaft, B, provided with the screw flanges, C, in combination with the endless screws, E, worm wheel, F, and indicating mechanism, substantially as and for the purposes described.
I also claim the arrangement of the shaft, B, with the pipe, A, having its inlet and outlet passages, as set forth, in combination with the chamber, G, of the main gear wheel, F, substantially in the manner and for the purpose specified.

44,433.—Corn Sheller and Separator.—Elijah Knapp, Jamestown, N. Y.:
I claim the weights, D, in combination with the threshing cylinder, B, to operate substantially as and for the purpose herein set forth.
I also claim the fan blower, G, in combination with the spout, E, shelling cylinder, B, and weights, D, all arranged substantially as and for the purpose specified.
[This invention consists in the employment and use of a shelling cylinder, weights, a chute and fan-blower, constructed and arranged in such a manner that the corn may be shelled from the cob rapidly and thoroughly, and the corn separated from the cobs, and all light foreign substances, such as dust, chaff, etc., separated from the corn

44,434.—Car Axles.—B. J. LaMothe, New York City:
I claim a series of tubes introduced within or over each other, to form an axle or shaft, substantially as specified.
I also claim a separate sleeve, l, shrunk upon the axle, and forming a journal that can be removed when worn out, as specified.

44,435.—Distilling Turpentine from Wood.—George R. H. Leffler, Baltimore, Md.:
I claim distilling turpentine directly from wood saturated or thoroughly moistened with steam or water, substantially as set forth.

44,436.—Salve for the Eyes.—Joseph Loewenherz, Hoboken, N. J.:
I claim a salve for the eyes, composed of the within-described ingredients mixed together, substantially in the manner and about in the proportion set forth.

[This invention consists in a composition of a number of materials, some of which are already used in treating diseases of the eyes, but which when used in combination produce really wonderful effect in moving the Egyptian silkness of the eyes and all sorts of inflammation; also, in removing spots formed in the eyes by previous faulty treatment, and in strengthening weak eyes.]

44,437.—Means for Oiling Knitting Machine Burrs.—John Maxwell, Amsterdam, N. Y.:
I claim, first, The application of a movable cover, g, to a knitting burr, having a tubular oil-supplying axis, about which the burr revolves, substantially as described.
Second, The combination of a cap, g, tube, c, and tubular spindle or axis, B, with a knitting burr, substantially as described.
Third, The combination of shoulder, a, and tubular axis, B, with a knitting burr having a cap applied to it for closing said axis, substantially as described.

44,438.—Camera Stand.—Thos. H. McBride and David Baldwin, East Birmingham, Pa.:
We claim the use of the two independent supporting levers, g and f, in combination with the adjustable platform, b, the whole being arranged substantially as described, for the purpose set forth.

44,439.—Fire Plugs.—John McClelland, Washington, D. C.:
I claim, first, The combination and arrangement of the inclosing casing with the sides and top of a hydrant, whereby the nozzle or nozzles of the hydrant shall be covered and protected when the hydrant is not in use, substantially in the manner herein set forth.
Second, I also claim providing each discharging aperture of a fire-plug, with an independent check-valve, substantially in the manner and for the purpose herein set forth.
I also claim the face-plate, D, forming one side of the distributing chamber, S, arranged and combined with the said distributing chamber, substantially in the manner and for the purpose herein set forth.
Fourth, I also claim the combination of the curved ways or guides, O O, with the edges of the check-valves, L L, when the said ways or guides, O O, are provided with flanges, which are received in grooves formed in the upper edge of the valves, L, substantially in the manner and for the purpose herein set forth.
Fifth, I also claim the arrangement and combination of the handles, P, with the valve cranks, N, and the sides of the distributing chamber, S, of my improved hydrant, substantially in the manner and for the purpose herein set forth.

44,440.—Stovepipe Connection.—George Rodney Moore, Lyons, Iowa:
I claim the reversible connection of B and C, with A, substantially in the manner and for the purposes herein set forth.

44,441.—Kerosene Burners.—George Neilson, Boston, Mass.:
I claim extending the conical deflector, J, from the tops of the wick-tube down to the base of the shell, and attaching it thereto, substantially as and for the purpose described.

44,442.—Plow.—David Nelson, Port Washington, Ohio:
I claim a plowshare cast with a socket, for the purpose of receiving and securing a steel point, in the manner and for the purpose herein see forth.

44,443.—File for Dressing Metal.—Wm. T. Nicholson, Providence, R. I.:
I claim a file whose ranges of teeth are separated by bands, which vary from each other in width by a fixed and regular ratio of increase or decrease, as herein set forth and described.

44,444.—Machine for Pulverizing and Levigating Substances.—O. E. Noble, Penn Yann, N. Y. Ante-dated Sept. 16, 1864:
I claim, first, The wheels, B and C, and slotted rod, D, when arranged as specified and used for the purpose set forth.
Second, I claim the receptacle, E, mortar, H, pestle, I, cylinder, K, and concave, M, when made as specified, and used for the purpose set forth.

44,445.—Attachment of Sails.—Joseph W. Norcross, Boston, Mass.:
I claim, first, The ground ribs, B B', applied to the mast, and also to the loom and gaff, if desired, and arranged to receive the bearings, C C, in the manner and for the purpose substantially as described.
Second, The caps, c, applied to the small carriages, D, substantially in the manner and for the purpose specified.

44,446.—Row Lock.—Joseph W. Norcross, Boston, Mass.:
I claim, first, The application of the segmental flange, C, and grooved bracket, D, in combination with a row lock, B, of any desirable construction, substantially as and for the purpose set forth.
Second, The spring, c, applied in combination with the row lock, B, in the manner and for the purpose, substantially as shown and described.

44,447.—Retort Stands.—J. D. O'Donnell, Washington, D. C. Antedated Sept. 16, 1864:
I claim making the rings and sliding clamps separate, the rings having ends of shanks, bent to form hook, the slides, C, having the extra orifice, G, which with set screw, F, forms a clamp, combining thus with orifice, H, a slide, of old style, as connected with ring of old stand, and a clamp; the first moving up and down the rod, B, and securing by set screw, E, the slides, C, at any point, the latter admitting the hook on end of shank, I, to ring, D, and forming by means of set screw, F, the ring and slide combined, gaining all the advantage before claimed and operating as before described.

44,448.—Friction Clutch.—L. H. Olmsted, Newark, N. J.:
I claim, first, The combination of the pulley, A, and friction block, D, of a friction clutch, for the purpose set forth.
Second, The combination of the friction block, D, lever, F, and wedge, E, of a friction clutch, for the purpose set forth.

44,449.—Heating Stoves.—P. P. Parkhurst, Milford, Mass.:
I claim the series of tubes, D, communicating with the fire chamber, A, and drum or hot-air chamber, E, in connection with the pipes, H H F, and dampers, G G', all arranged substantially as herein set forth.

[The object of this invention is to obtain a stove which will radiate the heat into the compartment in which it is placed, by withholding the products of combustion within a chamber, above the fire-pot, so that they cannot pass directly into the flue, and having said chamber communicate with the fire-pot, by means of a series of tubes, which form in the aggregate a large radiating surface. The stove is also provided with a pipe, arranged in a novel way, to afford the necessary draught.]

44,450.—Ore Crushers.—A. F. W. Partz, Wurtsborough, N. Y.:
I claim giving to the movable block, E, a combined crushing and grinding motion, by means of the eccentric shaft, C, upon which it is suspended, and the rear rocking support, F, substantially as described.
The horizontally-adjustable block, H, in combination with the movable block, E, when supported by the rocking rear support, F, substantially as described.

[This invention consists in combining with the movable block an eccentric and a supporting link, in such a manner that by the action of said eccentric a crushing and grinding motion is imparted to the block, and by this double or eccentric motion of the block the operation of crushing quartz or other substances is considerably facilitated. The eccentric motion of the movable block at the point of exit of the ore will remain uniform according to the position given to the adjustable block, and the escape of coarse lumps is prevented. On being discharged from the crushing blocks the ore or substance to be crushed passes through between smooth crushing rollers, which reduces the same to the required degree of fineness.]

44,451.—Mariner's Compass.—Joseph S. Pende, New York City. Ante-dated Sept. 19, 1864:
I claim suspending the needle in the manner described within a spherically formed case of iron hung as set forth, said case having an opening at top sufficiently large to display the compass card, and to permit the earth's action upon the needle, all as set forth.

44,452.—Harvester.—Worden P. Penn, Belleville. Ill.:
I claim, first, The combination of lever, E, frame, A, clutch, b' c, and laterally sliding wheel, D, with the wheels, g g2 and h, arranged and operating substantially as described, or their equivalents.
Second, In a single wheel adjustable frame machine I claim the use of adjustable lever, E, with the clutch wheels, C D, and means applied to said lever for establishing it in the desired position.

44,453.—Mode of breasting Heels.—W. H. Pitkin, Providence, R. I.:
I claim, first, The vertically sliding gate, D, with knife, E, and guard, F, constructed and operating in the manner and for the purpose substantially as herein shown and described.
Second, The longitudinally sliding adjustable jack, G, in combination with the vertically sliding reciprocating knife, E, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use, for breasting heels of boots and shoes, of a vertically sliding frame or gate carrying a knife and a guard, and connected to a treadle in such a manner that by depressing the treadle the knife is caused to descend, and the operation of breasting a heel is effected with comparatively little bodily exertion, and by the guard the knife is prevented from cutting any deeper than desirable, and from injuring the sole.]

44,454.—Brake for Horse-power.—Absalom Pursel, New Village, N. J.:
I claim so combining the brake-lever, H, and the cord, I, connected to the breeching, that when the horse falls back the brake is applied and when the horse goes ahead the brake is taken off.

[The object of this invention is to connect a brake-lever with the horse in such a manner that when the main shaft of the power is suddenly relieved from all opposing strain or resistance, as soon as the horse falls back the brake is applied.]

44,455.—Railroad Chair.—Amos Rank, Salem, Ohio:
I claim, first, A two part railroad rail chair, which is constructed with double supporting cheeks, d d, interlocking base portions, g g' g', and a laterally holding bolt, b, passing through the neck of the rail, substantially as described.
Second, The combination of the tongues, g g' g', cheeks, d d, flat bolt, b, and key pin, h, with the slotted end rails, A A, substantially as described.

44,456.—Composition for forming Black-boards, Slates, etc.—W. A. Reason, Chicago, Ill.:
I claim, first, The employment of a combination of light and heavy grits in the manufacture of liquid slate, substantially as and for the purposes specified.
Second, I claim the combination of gum shellac, resin, alcohol, and alkali, with the grits and lamp-black, as and for the purposes specified and described.

44,457.—Soap.—Lawrence Reid, New York City, and John Rogers, Brooklyn, N. Y.:
We claim the incorporating of gelatin or glue, as made previous to drying, in a fresh state, or a solution from the dry articles in sufficient quantity, as from five to fifteen per cent of glue, and a proportion of caustic soda ley from 3 to 9 per cent, of the specific gravity of 25 Baume's hydrometer, the whole forming a uniform mass possessing the treble attraction of gelatin caustic soda and ordinary soap for dirt, and thus increasing quantity and improving quality, all done in the manner set forth in this specification.

44,458.—Machine for breaking and dressing Flax.—Luther Rundell, Pike, N. Y.:
I claim the wings, D D, of the wheel, provided with the thick edges, b, and the thin edges, b', in combination with the breaking and dressing bede, 1 2, made elastic and adjustable by the springs, E, substantially as and for the purpose herein set forth.

44,459.—Embossing and Seal Press.—George B. Sargent, Boston, Mass.:
I claim so constructing and arranging the platen that it may be readily inserted in an envelope, substantially as and for the purpose described.

44,460.—Hydrometers.—Joseph Saxton, Washington, D. C.:
I claim the hydrometer composed of a floating bulb, and an attached chain of graduated links to determine and indicate the specific gravities of liquids or the percentage of alcohol they may contain, substantially in the manner set forth.

44,461.—Rose Engine for ornamenting Glass, etc.—Anton Schwitter, New York City:
I claim, first, The use of a rotating tool in combination with an ordinary rose engine, arranged and operating substantially as and for the purpose set forth.
Second, The adjustable head, d, and swivel head, g, in combination with the extension spindle, I, carrying the tool, H, all constructed and operating substantially as and for the purpose described.
Third, The slotted plate, J, carrying the bearing for the tool spindle, I, and arranged in combination with the slotted table, A, in the manner and for the purpose substantially as set forth.
Fourth, The swinging shaft, K, arranged in combination with the adjustable tool spindle, I, in the manner and for the purpose substantially as herein set forth.

[This invention consists in the employment or use on a rose engine of a rotating tool, made of a composition of emory with liquid silex, or of any other suitable material, and applied in combination with the spindle and mechanism of an ordinary rose engine in such a manner that by the action of said tool lines can be produced on the surface of articles made of glass or other similar material, with the same facility as on articles made of metal.]

44,462.—Seed-sower.—Jasper Scovill, Hamburgh, N. Y.:
I claim, first, The perpendicular rotating fingers, O, in combination with the worm shaft, M, and worm wheels, N, deflecting boards, P and Q, when constructed and operating in the manner and for the purposes described.
Second, The arrangement and combination of the spreading boards, P and Q, with the seed-box of a seeding machine, so as to catch the seed as it drops out of the seed-box and spread it for sowing "broadcast," substantially as and for the purposes set forth.
Third, The removable planting box, S, having tubes, s, and double and reverse acting slides, T and T', so constructed and arranged that it may be attached to the frame of the seeding machine, so that the machine may be used for planting in hills, substantially as set forth.
Fourth, Making the pendant plow-frame, C, hinged or jointed in the middle for the purposes set forth, when used in a seeding machine constructed in the manner described.

44,463.—Water Elevator.—Abram H. Seaman, Coxsackie, N. Y.:
I claim the hook, G, attached to the bucket, D, in connection with the rods, H H', in the box or curb, A, and the shaft or windlass, B, all arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved means employed for tilting the bucket, in order that its contents may be discharged. The object of the invention is to obtain a well curb or well windlass which will be exceedingly simple in construction, not liable to become deranged by use, and which may be constructed by any one of ordinary ingenuity.]

44,464.—Street Pavement.—N. Mendal Shafer, New York City:
I claim, first, The use for paving streets, etc., of diamond-shaped blocks, A, provided with steady pins, b, holes, c, and semi-bottom flanges, B, in the manner and for the purpose substantially as herein described.
Second, The combined depressions and impressions, d e, in the sides and partitions of the blocks to prevent the surfaces of the same from wearing smooth, as described.

[This invention consists in the employment or use for paving streets, etc., of diamond-shaped skeleton blocks, cast or otherwise manufactured with steady pins or lugs on one and with corresponding holes in the opposite side, and with semi-bottom flanges projecting over the edge on two sides of each block in such a manner that in placing the blocks together the steady pins of one catch into the holes of the adjoining one, and at the same time the projecting part of the bottom flange of each block catches under and supports that part of the adjoining block which is not supported by its own bottom flange, and by these means a solid and durable pavement is produced.]

44,465.—Mechanism for starting Sewing Machines.—Albert M. Smith, Brooklyn, N. Y.:
I claim, first, So constructing and attaching to the shaft on which the balance or other wheels are placed for operating the machine, a movable arm in which a bail is fitted loosely in a conical recess, being kept by its own gravity in contact with the rim of the wheel, so that by moving the arm forward it becomes wedged between them sufficiently to move the wheel with it, and start the machine in the right direction, substantially as described, or in any manner equivalent thereto.
Second, I claim, in connection with the above, the arrangement for moving and operating the arm from the top of the table.
Third, I claim the latch or thumb-piece whereby the ball is raised and held from its contact with the rim of the wheel so that it can be moved back when desired.

44,466.—Steam Engine Governor.—H. D. Snow, Rochester, N. Y.:
I claim the employment of steam pressure in marine governors, as a means for counter-balancing the centrifugal force of the revolving balls.

44,467.—Ventilating Boots and Shoes.—Amos Stocker, Watertown, N. Y.:
I claim, first, A boot or shoe, in combination with a bellows acted upon by the foot, for the purpose of changing or causing fresh air to pass through the inside of a boot or shoe, as set forth.
Second, I claim the air tube passing through the insole with the air holes at the toe, as described.

44,468.—Apparatus for stretching Hat Bodies.—Wm. H. Stevens, Danbury, Conn.:
I claim operating the blocks or stretchers, C C, through the medium of the straps or cords, D D, arranged with the pulleys, E E, and used in combination with the lever, F, pitman, G, and crank pulley, H, or their equivalents, for the purpose specified.

[This invention relates to a new and improved machine for stretching hat bodies into a proper form after they have passed through the felting operation. The invention consists in the employment or use of two blocks or stretchers suspended on curved arms, and operated by means of a lever and straps passing over rollers, the straps being attached to the lever ends of the blocks or stretchers, and the latter constructed of a peculiar form, whereby the desired work may be accomplished in an expeditious and thorough manner.]

44,469.—Clothes Dryer.—T. A. Summers, Rochester, N. Y. Ante dated Sept. 16, 1864:
I claim the arrangement of the pivoted receiving socket, D, constructed as and for the purposes specified, with the bar, B, axial bolt or rod, E, and the bucket, A.

44,470.—Horse Hay Fork.—Eugene B. Turner, Attica, Ohio:
I claim, first, The use of a pivoted lever, d, having a shoulder formed on it at f, in combination with the fork handle, B, constructed with a sliding pin, g, and a hinged fork, substantially as described.
Second, Connecting the fork to its handle, B, by means of a loop, a2, hook, k, and notches formed in the handle, substantially as described.
Third, The combination of the slotted handle, B, pivoted latch lever, d, slide, g, connections, h h and k, and the hinged fork, substantially as described.

44,471.—Mill-stone Dress.—David W. Thompson, Somerset, Pa.:
I claim, first, Cutting in mill-stones for grinding annular grooves, whether in the runner, in the bed stone, or in both, substantially as and for the purposes described.
Second, The combination of the annular groove with the leading furrows of any dress, when the one intersects the other, substantially as and for the purpose set forth.

44,472.—Corn Planter.—John Thomson and John Ramsey, Aledo, Ill.:
We claim the employment or use of a wire or cord, O, provided with knots at a suitable distance apart and applied to the machine, substantially as shown, in connection with anchors, S, all arranged substantially as and for the purpose set forth.

[This invention relates to a new and useful means for actuating the seed-dropping mechanism, whereby the necessity for furrowing the field previously to dropping the seed, in order that the same may be planted in check rows, is obviated, the employment of an attendant to drop the seed dispensed with, and the seed covered and the earth rolled or pressed over it in a perfect manner.]

44,473.—Sad-iron Heater.—John N. Titsworth, Aurora, Ill.:
I claim, as a new article of manufacture, a sad-iron heater composed of the casing, A, and hinged covers, c c D d, etc., with the outer edge of each cover projecting sufficiently beyond the case, A, to allow it to be raised by the point of the iron, substantially in the manner herein set forth.

44,474.—Button for Doors.—Henry Underwood, Tolland, Conn.:
I claim a button, B, attached at one end to a plate, a, by a pivot, b, and in an inclined position and provided with a beveled edge, c, at its outer end, in connection with stops or projections, d d', on the plates, a and a', all arranged to operate substantially in the manner as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in buttons, such as are applied to doors for the purpose of keeping them in a closed state.]

44,475.—Lock.—Henry Underwood, Tolland, Conn.:
I claim the cam, C, provided with the eccentric slot, c, and otherwise constructed as described, in connection with the pin, d, on the bolt, B, all arranged to operate substantially as and for the purpose set forth.
I further claim in combination with the cam, C, the tumbler, D, one or more provided with the stud, e, and the ward, h, and the notched slot, f, in the cam to receive the stud, all arranged substantially as and for the purpose specified.

[The object of this invention is to obtain a lock of simple construction without the employment or use of a spring, thereby avoiding a part which is extremely liable to get deranged or out of working order, either on account of breakage, due to an improper tempering or to oxydation, the latter contingency being sure to occur if the lock is at all exposed to moisture or dampness.]

44,476.—Door Latch.—Henry Underwood, Tolland, Conn.,

I claim the crank-shaped knob arbor, C, provided with the plate, e, in combination with the slide bolt, A, arranged substantially as and for the purpose herein set forth.

I further claim constructing the knob arbor, C, of two parts, c c', one part, c, being of cylindrical form at its inner end, d, and having the plate, e, projecting from it, and the other part, c', having a tube, g, at its inner end provided with a slot, h, to receive the inner end, d, and plate, e, of the part, C, all arranged to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved door latch of that class which have sliding bolts, and it consists in applying the knob arbor to the bolt, and also in constructing the knob arbor in such a manner that the use of a spring is avoided, and the bolt made to operate equally as well as if a spring were employed.]

44,477.—Mowing Machine.—William Van Anden, Poughkeepsie, N. Y.:

I claim, first, The short inclined journal, E, united at its upper end directly to the axle, B, and affixed at its lower end by a hanger, G, to the frame, A, in the manner and for the purpose described.

Second, The arrangement of the stationary axle, B, short inclined journal, E, and vibrating cutter bar frame or shoe, F, constructed and operating in the manner and for the purpose described.

Third, The combination of the link, N, lever cam, I J, and cam, H, with the vibrating cutter bar frame or shoe, F, substantially in the manner and for the purpose described.

Fourth, The combination of the lever, L, link, N, lever cam, I J, cam, H, vibrating cutter bar frame or shoe, F, and journal, E, substantially in the manner and for the purpose described.

Fifth, The arrangement of the cam, H, and the horizontally swinging cam lever, I J, with the vibrating frame or shoe, F, and the journal, E, substantially in the manner and for the purpose described.

Sixth, I also claim the combination of the inclined plane, P, when attached to the pole of a mowing machine, with the hand lever, L, and vibrating lever, J, for the two-fold purpose of lifting the front of the mower frame and at the same time tipping the outer end of the cutter bar, as herein-before set forth.

44,478.—Sheep Rack.—Albert L. Webb, East Troy, Wis.:

I claim the cross legs, A A, feed racks, E E, guard, D, roofs, R and X, trough, T, and scraper, Y, the several being constructed, arranged, and operated, substantially as and for the purpose specified.

44,479.—Horse Power.—Seth Wheeler and Edgar Jerome, Albany, N. Y.:

We claim constructing horse powers with one or more movable panels or doors, substantially as described and for the purpose speeified.

44,480.—Churn.—George L. Witsil, Philadelphia, Pa.:

I claim the upright or standard, B, the slotted lever, C, its vibrating collar or sleeve, H, in combination with the rod, F, its spiral projection, e, and plunger, G, the whole being constructed and arranged for joint action, as and for the purpose herein set forth.

44,481.—Refining Hydro-carbon Oils.—William Archer (assignor to himself and William P. Downer), New York City:

I claim the arrangement of machinery by which a thin sheet of film of hydro-carbon oil is, by centrifugal action, continuously made to flow over and to become thoroughly permeated and cleansed by a volume of sulphuric acid, or other purifying element, in manner as described.

44,482.—Umbrella.—Elizur E. Clark (assignor to Franklin N. Clarke), New Haven, Conn.:

I claim the combination of a skirt with an umbrella, in the manner and for the purpose substantially as described.

44,483.—Achromatic Lenses.—Julia A. W. Fitz (administratrix of the estate of Henry Fitz, deceased), New York City. Ante-dated Sept. 20, 1864:

I claim the method of correcting spherical and achromatic aberations and curvatures of field in cameras for taking photographic views, and for the various optical instruments, substantially as specified.

44,484.—Car Coupling.—William H. Forker, Meadville, Pa., assignor by mesne-assignments to Henry Baldwin. Jr., Philadelphia, Pa. Ante-dated Sept. 18, 1864:

I claim the combination of the arm, C, and spring, D, hinged drop pin, D', and projection, e, constructed and arranged as described, and operating in connection with the draw-head, A, and link or shackle, B, in the manner and for the purposes specified.

[This invention relates to an improved car coupling, of that class which are commonly termed self-coupling, and it consists in the employment or use of a drop pin connected by a joint to an arm pivoted at the upper part of the draw-head, and having a spring bearing against the under side of its back part; all being arranged in such a manner that an ordinary link or shackle in the draw-head of one car may, on entering the draw-head of an adjoining car, engage itself with the drop pin, and form a connection between the two cars, while the parts being few and combined and arranged in a simple way, ensure durability, and prevent the liability of the coupling getting out of perfect working order.]

44,485.—Oil Can.—G. C. Overhiser (assignor to himself and George W. Gregory), Binghamton, N. Y.:

I claim, first, The sliding collar, as described, with or without the spout, in combination with the tube of the can.

Second, The rod, D, acted upon by a spring in combination with the sliding collar, for the purpose herein described.

Third, The combination of the lever, the wire, with the washer and the spring for cleansing the vent.

Fourth, The lever, C, and loop, b, in combination with the rod, D, and sliding collar, for controlling the discharge of the oil, as described.

Fifth, The sliding collar and spout in combination with the rod, D, spring, E, lever, C, and can, as and for the purpose described.

44,486.—Fly Trap.—George T. Savary, Reading, Mass., assignor to Ben. B. Savary, Boston, Mass.:

I claim, first, The trough, A, provided with the brush, C, and trundles, D, substantially as and for the purpose described.

Second, Dividing the trough, A, into separate compartments by means of the perforated partitions, b, substantially as and for the purpose described.

44,487.—Hose Connection.—Peter Schemmals (assignor to Uriah P. Harris), Chicago, Ill.:

I claim, first, The band, E, made in two or more sections provided with a screw thread on its outer surface and hinged, substantially as specified.

Second, The combination of the sectional conical band, E, and the funnel-shaped barrel, B, the two forming a clamp.

Third, The bands, B and E, in combination with the hose, C, and the inner band or projection, D, all being constructed and operating substantially as set forth and specified.

44,488.—Paging Machine.—Samuel W. Soule and C. Latham Sholes (assignors to said C. L. Sholes), Milwaukee, Wis. Ante-dated March 27, 1864:

We claim, first, The introduction of the figures, 00, 02, 04, 06, 08—01, 03, 05, 07, 09, in the columns, d d, as represented for the purpose of forming a new combination, as set forth.

Second, The combination of the long and short columns of figures with the spools, e e, and ratchet wheel, c, for operating the belt, as set forth.

44,489.—Machine for Polishing the Heels of Boots.—James M. Thompson & George P. French, Stoneham, Mass., and Seth D. Tripp, Lynn, Mass., assignors to said Seth D. Tripp:

We claim. first, Heating the polishing wheel of heel-polishing machines by friction, substantially as described.

Second, The independent guard plate, F, in combination with the polishing wheel, B, substantially as described.

[This invention consists in an ingenious arrangement of devices for polishing the heels of boots and shoes automatically.]

44,490.—Sewing Machine.—Charles H. Wilcox (assignor to James Wilcox), New York City:

I claim, first, The method herein described of preventing in sewing machines of otherwise ordinary construction and operation the loop of the needle thread from being twisted out of the path of the looper by combining with its reciprocating needle and revolving looper, a needle race constructed and arranged substantially as described so as to operate in the manner herein before set forth.

Second, The combination with an insulated cloth plate section containing a needle hole of the needle race under an arrangement to operate in conjunction with the needle and looper, substantially in the manner and for the purposes set forth.

44,491.—Sewing Machine.—Charles H. Wilcox (assignor to James Wilcox), New York City:

In sewing machines having a feed known as the four motion feed I claim the making of the hole through which the needle works in a separate piece of metal secured to the cloth plate, the feed surface operating on all four sides of such needle hole, as hereinbefore described.

44,492.—Bullet for Fire-arms.—Mary G. Williams and John Owen (administrators of E. D. Williams, deceased), New York City:

I claim, first, The combination substantially as herein described of the body, A, of the bullet having a central cavity and system of grooves, substantially as herein specified and a central taper pin, B, to operate substantially as herein set forth.

Second, The central taper pin, B, having its head constructed with a system of grooves, substantially as herein specified.

Third, The combination of the hollow and grooved body, A, the grooved headed flanged or ribbed taper pin, B, and the disk, C, having a central opening larger than the neck or shank of the pin, to operate substantially as herein specified.

[This invention consists in a novel construction of a bullet whereby it is caused on its discharge from the gun to be broken into several pieces, and to act at close quarters or at short range as a charge of buck-shot, but which has the advantages over buck shot that it can be used in a rifle without fouling the bore or grooves, and that it can be more easily made into a cartridge and can be projected with greater force.]

44,493.—Winding and Setting Watches.—Charles E. Jacot (assignor to Saltzman Jacot & Co.), Chaux-du-Fond, Switzerland:

I claim the miter gears, h and r, and shank, t, applied as specified in combination with the wheels, l and n, acting upon the wheel, e, to wind the spring as set forth.

And in combination with the foregoing I claim the swinging plate, k, and gear, m, to operate in the hands when desired, as set forth.

44,494.—Knitting Machine.—John, James and William Thornton, and said William Thornton, executor of Albert Thornton, deceased, Nottingham, England, assignors to Martin Laudenberger, Philadelphia, Pa. Patented in England Aug. 8, 1863:

We claim the arranging apparatus for producing looped fabrics as above described, that is to say with two sets of hook or looping instruments facing each other and combined with other parts as above described, so that in working the courses the fabric already made is transferred continually to and fro from one set of hooks to the other, the hooks or instruments which for the time are clear of the fabric being also passed through the loops in the corresponding hooks or instruments of the other set, and in returning drawing back loops of thread through them, the course being completed by the hooks having the old loops throwing them off.

44,495.—Preserving Human Bodies, etc.—John Morgan, North Dublin, Ireland:

I claim, first, The embalming or preserving of human bodies, and the preserving, pickling, curing, medicating and flavoring of animal bodies, generally by forcing or injecting, preservative or antiseptic fluids through the natural channels of the circulation of the blood as herein before described, clearing the blood out of the capillaries and small vessels and causing preservative fluids by the process above mentioned to saturate the tissues of the body by filbration and otherwise.

Second, The application and use of the hereinbefore mentioned peculiar preservative fluids, in the manner and for the purposes specified.

44,496.—Machine for making Folded Tags.—Thos. B De Forest, Birmingham, Conn.:

I claim, first, An arranged and automatic machine for making folded tags, in which the material from which the tag is to be cut, folded and punched, is supplied by an intermittent feed to a suitable table or sustaining surface, where it has performed upon it all the operations requisite to produce a folded tag.

Second, I claim, in combination with a mechanism for folding over the end of the strip of material, a mechanism for feeding the material to the proper position to be folded.

Third, I claim a folding mechanism, in combination with an eye-forming or punching mechanism.

Fourth, I claim the employment, in combination with a folding mechanism, of a cutting-off knife or its equivalent.

Fifth, I claim the combination of a folding mechanism, a feeding mechanism and a cutting-off device.

Sixth, I claim the combination of an eyeleting mechanism with a folding mechanism.

Seventh, I claim the combination of a folding mechanism, an eye-punching mechanism and an eyeleting mechanism.

RE-ISSUES.

1,771.—Composition for making Printers' Inking Rollers.—Lewis Francis and Cyrus H. Loutrel (assignees of said Lewis Francis), New York City. Patented March 8, 1864:

I claim combining an alkali or alkalies or alkaline earths, or any of their compounds, with glue and glycerine, to form a composition for the manufacture of printers' inking rollers.

1,772.—Composition for making Printers' Inking Rollers.—Lewis Francis and Cyrus H. Loutrel (assignees of said Lewis Francis), New York City. Patented March 8, 1864:

I claim combining sugar or any other saccharine matter with glue and glycerine, to form a composition for the manufacture of printers' inking rollers.

1,773.—Piano Forte.—Herman Lindernan, New York City. Patented August 7, 1860:

I claim, first, The arrangement and construction of a curved or arched structure as a substitute for the long and cross blocks now in use, in the manner and for the purpose, substantially as described.

Second, I claim an arched or curved structure as a substitute for the long and ross blocks, as well as the outside casing, made of a number of veneers or boards glued together, in the manner and for the purpose substantially as set forth and specified.

1,774.—Stoves.—Samuel B. Sexton, Baltimore, Md. Patented April 19, 1859. Re-issued Dec. 3, 1861; again re-issued Feb. 16, 1864:

I claim, first, A stove for warming or heating purposes, constructed with a fuel magazine, supported free from the grate, and a combustible chamber, having a fire bed or base-burning surface of a greater diameter than the fuel magazine, so arranged and constructed that the fuel may be spread out laterally and from a conical pile, and burn in their layers, and so that the inflamed gases may rise or circulate in a free space as they are evolved from the entire outer surface of the burning conical pile of coals, substantially as and for the purposes set forth.

Second, In combination with the subject matter of the first claim, constructing the combustion chamber, A, with projecting window frames, substantially as and for the purpose described.

Third, A stove for warming purposes, embracing the features of construction mentioned in my first claim, and the additional feature of the gas or products of combustion, circulating apartment above and around the upper portion of the magazine, substantially as and for the purposes set forth.

Fourth, A stove for warming purposes, wherein the spreading of the coals in a lateral direction from the lower end of the magazine is wholly unobstructed all around, and, at the same time, the combustion chamber proper is formed by the outer wall of the stove, and the products of combustion circulate underneath, around, over and in contact with the magazine, whatever may be the form and relative proportions of the parts, substantially as and for the purposes described.

Fifth, The combination of a fuel-supply magazine, H, which has its lower end free from the fire-bed, G, with unobstructed space below it, where the fuel may spread out laterally and burn in a conical pile and in thin layers, with a stove which has illumination doors or windows in its wall, A, so constructed and arranged that the fire may be kindled through the apertures or door frames, substantially as set forth.

Sixth, The combination of the free space, F, illumination space or wall, A, and gas-circulating space, p, and the upper part of the circumference of the magazine, H, in a magazine stove, substantially as and for the purpose described.

1,775.—Harvesters.—James A. Saxton (assignee by mesne assignment of Hosea Willard and Robert Ross). Patented Nov. 3, 1857:

I claim, first, The combination of the grain platform, G, or its equivalent, with a hinged coupling arm, E', and a rear connection, which allows of an up motion of the platform, independently of the main frame, substantially as described.

Second, Supporting the rear delivery side of the platform, G, or its equivalent, by a yielding connection from the main frame, in combination with supporting the front delivery side, by a leading wheel, g'', or its equivalent, substantially as described.

Third, The combination of the grain platform, raker's seat, G, and arm, G'', or its equivalent, with the inner side of the main frame, substantially as set forth.

Fourth, Connecting the front of a grain platform of a two-wheel harvesting machine to a finger beam, which is in turn hinged by a free hinge to a hinged coupling arm, whereby the platform is free to conform to the irregularities of the ground, substantially as set forth and described.

Fifth, The combination of the independent-supporting and driving wheels, B B', with ratchets, b b', levers, C C' gears, D D', and d' d'', substantially as and for the purposes set forth.

Sixth, The combination of convex pulleys, J', with concave ratchet wheel, b', substantially as set forth.

1,776.—Harvester.—James A. Saxton, Canton, Ohio, assignee by mesne assignments of Hosea Willard and Robt. Ross. Patented Nov. 3, 1857:

I claim, first, The combination of a knuckle or the equivalent thereof, with the joint which connects the finger beam and coupling arm for raising the hinged finger beam of a mowing machine off of the ground to pass obstructions.

Second, The combination of a lever with a hinged finger beam and coupling arm, as herein described, in such a manner, that while the finger beam or either end is free to conform to the inequalities of the ground while in operation, the finger beam can be raised or elevated to pass over obstructions, as set forth, by simply raising the coupling arm, substantially as described.

Third, The combination with the joint which connects the finger beam and coupling arm of a knuckle and adjusting screw or bolt or their equivalents, for regulating the upward deflection of the heel end of the finger beam.

1,777.—Harvester.—James A. Saxton, Canton, Ohio, assignee by mesne assignments of Hosea Willard and Robt. Ross. Patented Nov. 3, 1859:

I claim, first, the combination with the finger beam which supports the cutter or cutters of a single-draft coupling arm, one end of which is hinged or jointed to a bracket or hanger connected to the front outer corner of the main frame while the other end extends out by or under the inner front corner of the main frame, and is here hinged or jointed to the heel of the finger beam or to the shoe which supports the same, substantially as and for the purpose herein described.

Second, Hinging the coupling which carries forward the finger beam, as aforesaid, to a bracket or hanger connected or fastened to the front outer corner of the main frame, in combination with giving to said coupling arm a bracing support at a point near the inner side of the main frame, substantially as and for the purpose herein described.

1,778.—Harvester.—James A. Saxton, Canton, Ohio, assignee by mesne assignments of Hosea Willard and Robt. Ross. Patented Nov. 3, 1857:

I claim, first, The combination with the heel of the finger beam or the shoe which supports it, of a yielding finger bar, hinged extension piece, or coupling arm, and a friction support, substantially as and for the purpose herein described.

Second, The combination of a metallic loop, with the shoe which supports the heel of the finger bar or beam, and the finger-bar extension piece or coupling, whereby the use of a hinged brace is obviated while the heel of the finger bar or beam is allowed to yield up and down to conform to the inequalities of the ground, and at the same time is kept from being twisted back when the machine is in operation, or forward when the machine is backed, substantially as and for the purposes herein described.

Third, The arrangement of said finger bar extension piece or yielding connection, in such a manner as respects the main frame that one of its ends will be connected to the front outer corner of the main frame, while the other end projects out by the inner front corner of the main frame, there to connect with the shoe which supports the heel of the finger bar or beam in combination with a friction support, for the purposes as stated, substantially as and for the purposes described.

1,779.—Harvester.—James A. Saxton, Canton, Ohio, assignee by mesne assignments of Hosea Willard and Robt. Ross. Patented Nov. 3, 1857:

I claim the arrangement of the draft or tongue, the main driving and bearing wheels and the two supporters to the finger-bar extension piece, substantially as described, whereby the line of draft through the tongue will be on a line between the two supporters and also on a line between the outer wheel and inner or sliding loop support to render the machine more evenly balanced and the various parts less liable to give way.

1,780.—Harvester.—James A. Saxton (assignee by mesne-assignments of Hosea Williard and Robert Ross), Canton, Ohio. Patented Nov. 3, 1857:

I claim, first, The combination of a leading wheel with the inner shoe hinged to a coupling arm, substantially as and for the purposes herein described.

Second, The combination with said shoe and leading wheel of an adjustable arm for the purposes set forth, substantially as and for the purposes herein described.

Third, The combination and relative arrangement of wheel, g'', arm, g', finger beam, F', shoe, F, and curved coupling arm or finger bar extension piece, E', substantially as described.

1,781.—Harvester. James A. Saxton (assignee by mesne-assignments of Hosea Williard and Robert Ross), Canton, Ohio. Patented Noy. 3, 1857;

I claim the combination with the finger beam or bar and the main frame of a two wheel machine of an adjustable hinged coupling arm, substantially as and for the purposes set forth.

1,782.—Furnace or Heat Generator and Radiator.—Gardner Chilson, Boston, Mass. Dated Sept. 25, 1854:

I claim, in combination with one or more tapering tubes, substantially as described, made to communicate in the fire-chamber, essentially as specified, a conical or tapering radiator closed at top and arranged directly over the fire, and made to open near its base in the said tapering tube or tubes, and to operate with respect to them and the fire-pot or chamber and the surrounding air or medium to be warmed or heated, substantially as specified.

I also claim arranging the feed or fire-place door within the trunk or mouth piece to the fire-pot or place, and so as to operate as specified.

And in combination with the mouth piece and the door arranged in it as specified, I claim the passage in the mouth piece and its plate, c, for the thin sheet or stratum of air to pass under the door (while it is wholly closed) and said plate, c, and be heated by contact with the plate before it (the said air) reaches the fuel.

And in combination with the inclined door of the fire-place the plate, c, and the air passage directly under it, I claim the ledge or flange, a', arranged as described, the same being not only for the purpose of regulating the admission of air into the passage, but of keeping it from passing under the door and over the plate, c, while the ledge is below the level of the top surface of the plate.

I also claim the arrangement of the register hole (viz, in line of or oxially with respect to the shaft of the grate) in combination with the arrangement of the outer end of said shaft; viz., entirely within the throat of the ash-pit, or in rear of the registry plate or opening, as specified, the said arrangement not only enabling me to dispose the grate shaft entirely within the ash-pit mouth (the end of said shaft, when projecting from the front face of the furnace, being, generally speaking, more or less in the way, besides presenting an appearance often disagreeable to the eye), but to make the registry opening answer the purpose not only of admitting air to the fire when required, but of enabling a person to place a key or crank upon the shaft for the purpose of turning or moving the grate when necessary, and this without danger of ashes escaping out of the ash-pit, provided its door be closed.

I also claim the combination of a fire-pot, a dome surmounting it, and a series of flues leading from the base or lower part of the dome, the whole being substantially as herein-before described.

I also claim the combinatibn ef a fire-pot, a dome surmounting it, a series of flues (leading from the base or lower part of the dome), and a series of conical or partially conical bases or semi-cones, serving not only to facilitate the entrance of smoke and heat into the conical radiators or flues, but the absorption of heat and its radiation towards the floor, and its reflection into the tapering radiators, the whole being substantially as specified.

I also claim the combination of a fire-pot, a dome surmounting it, or placed over it a series of flues (leading from the base or lower part of the dome) and a hollow ring or annular radiator, placed on and opening out of the said flues, the whole being substantially as herein-before explained.

DESIGN.

1,991.—Double Lamp Stove.—William B. Tatro, Hartford, Conn.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of al the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications an i rawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex.Commissioners of Patents:

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ab lity, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patent able, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live n remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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 Re-issue....................$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

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO's Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents ar suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore. who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes & Queries

A. T. D., of Maine.—A very much greater pressure can be obtained from carbonic acid gas than from steam, but the difficulty of using it in the way you proposed results from the fact that it can be liquified only under great pressure. In order to evaporate it, it is only necessary to reduce the pressure, when it takes the gaseous form at all temperatures. B. Pike, of this city, makes chemical apparatus to order, and there is a manufactory in Boston. An Avery engine is a Barker mill steam engine with sword-shaped arms You can procure a vessel capable of bearing a pressure of 1,700 pounds per inch at any large iron works.

C. W. H., of Md.—We do not understand how you get the proportion, *m : n : : c : d*. The sides of plane triangles are to each other as the *sines* of their opposite angles, but not as the angles. However, we think we can find more popular matter for this paper than the discussion of abstract questions in mathematics.

C. H. C., of Md.—We are unable to understand your explanation of the action of Giffard's injector. You will find our own on page 260, Vol. III. (new series) of the SCIENTIFIC AMERICAN, with some further remarks on page 4, Vol. IV. We have no doubt of the correctness of that explanation.

G. L. G., of Conn.—The gases usually employed for producing the lime light are oxygen and hydrogen, though common illuminating gas answers very well in place of hydrogen. Oxygen is obtained by heating chlorate of potasa and peroxide of manganese together in a glass or copper retort.

V. B., of ——Your article on coffee-tea is interesting, but not being accompanied by any name we are obliged to reject it.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Sept. 21, 1864, to Wednesday, Sept. 28, 1864:—

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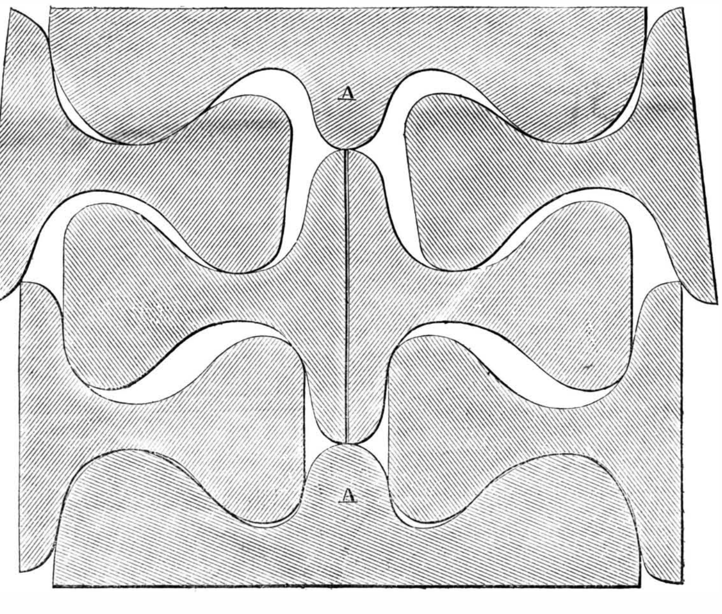

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How to make good Cider.

To make good cider the following general but important rules should be attended to. They demand a little more trouble than the ordinary mode of collecting and mashing apples of all sorts, rotten and sound, sweet and sour, dirty and clean, withered and wormy, from the trees and the ground, and many more of the filthy and slovenly processes usually employed, but in return they produce you a wholesome, high-flavored and palatable beverage, that always commands an adequate price, and gives health and pleasure, instead of a solution of villainous compounds in a poisonous and acid wash, that no man in his right senses should drink :—

1st. Always choose perfectly ripe and sound fruit. 2d. Pick the apples from the tree by hand. Apples that have been on the ground any length of time contract an earthy flavor, which will always be found in the cider. 3d. After sweating, and before being ground, wipe them dry, and if any are found bruised or rotten put them in a heap by themselves, from which to make an imperfect cider for vinegar. 4th. As fast as the apples are ground the pomace should be placed in a previously-prepared open vat, of suitable size, and with a false bottom, strainer, or clean straw about it. Let the pomace remain about one day, then draw off, return the first, and continue to do so until it runs clear. Let the juice percolate or filter for one or more days. The cider thus extracted will compare closely with any clear, rich sirup, and which is only deserving the name of temperance cider, and may be drank, or used for any purpose, as a choice and superior article. In this way about one-half of the cider will separate; the remainder may then be expressed for the use of the press. 5th. To press out the juice, use a clean strainer cloth inside the curb, with some clean straw intermixed in thin layers, with the pomace, and apply the power moderately. 6th. As the cider runs from the vat or press, place it in a clean, sweet cask or open tub, which should be closely watched, and as soon as the little bubbles commence to rise at the bunghole or top, it should be racked off by a spigot or faucet, placed about two inches from the bottom, so that the lees or sediment may be left quietly behind. 7th. The vinous fermentation will begin sooner or later, depending chiefly upon the temperature of the apartment where the cider is kept; in most cases during the first three or four days. If the fermentation begins early and proceeds rapidly, the liquor must be racked or drawn off and put into fresh casks, in one or two days; but if this does not take place at an early period, but proceeds slowly, three or four days may elapse before it is racked. In general, it is necessary to rack the liquor at least twice. If, notwithstanding, the fermentation proceeds briskly, the racking must be repeated, otherwise the vinous fermentation, by proceeding too far, may terminate in acetous fermentation, when vinegar will be the result. In racking off the liquor, it is necessary to keep it free from sediment, and the scum or yeast produced by the fermentation. When the fermentation is completely at an end fill up the cask with cider in all respects like that contained in it, and bung it up tight, previous to which a tumbler of sweet oil may be poured into the bunghole, which will exclude the oxygen and prevent the oxydation of the surface of the cider. Cider produced as here directed, and without foreign mixtures, is a pleasant, cooling, and wholesome beverage. While, on the contrary, we may say, the acids and dirty drugs, added to liquor already impure, retard fermentation, thus adding poison to poison, producing colic, and not unfrequently incurable obstructions.—*Cultivator*.

Increased Explosiveness of Mining Powder.

Mr. Nobel announces that by damping mining powder with nitro-glycerine its explosive power is trebled, and the noise of the explosion much less than when ordinary powder is used.—*Chemical News.*

[Glycerine belongs to that class of organic substances in which one or more equivalents of hydrogen may be replaced by an equal number of equivalents of nitrous acid. It is this substitution which changes cotton into gun cotton. The change carries into the compound a quantity of oxygen which on the application of heat enters into combination with the other elements so rapidly that the action is explosive. Nitroglycerine if set on fire at ordinary temperatures burns rapidly without explosion, but if gradually heated to the burning point it explodes with violence. The composition of glycerine is $C_6\ H_8\ O_6$, and by the action of nitric acid 2 atoms of $N\ O_4$ are substituted for 2 atoms of H, forming nitroglycerine, with the composition $C_6\ H_6,\ 2\ N\ O_4,\ O_6$.—EDS.

BROWN BRONZE DIP FOR COATING HAT HOOKS, ETC.—A brown bronze dip for coating hat and coat hooks is thus described in a recently issued handbook. We have never tried it, and know nothing of its value:—Iron scales, 1 pound; arsenic, 1 ounce; muriatic acid, 1 pound; zinc, solid, 10 ounces; the zinc should be kept in only when the bath is used. The castings must be perfectly clean from sand and grease.

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