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Improved Seed Planter.

The seeding machine here illustrated is designed to sow all kinds of seed, either broadcast, in drills, or in hills, and it will sow wheat and clover, or any other two kinds of seed at the same time; measuring the desired quantity to the acre with accuracy, and performing all of its functions by means of rotary motions without any of the rattle that results from reciprocating movements.

Fig. 1 of the engravings is a perspective view and Fig 2 is a vertical section.

The seed is placed in the hopper, *a*, that has holes through the middle of the bottom through which the seed falls upon the rotating cylinder, *b*. This cylinder is the axle of the wheels of the carriage; one wheel being secured rigidly to it, in order to give it the rotary motion. In the periphery of the cylinder, *b*, several round holes are bored to a sufficient depth to form seed cups, and the depth of these holes is made adjustable by screwing wood screws into the cylinder at their bottoms, the heads of these screws forming the bottoms of the cups, which may be varied in size by turning the screws a greater or less distance into the cylinder. These holes are made in a series of circles around the cylinder, the holes of a portion of the circles being of the right size for wheat, while those of the alternate circles between these are of the proper size for timothy, and thus the holes of the several circles are adapted in size to the various kinds of grain to be sown.

The bottom of the hopper, or rather a plate, *c*, interposed between the hopper and the cylinder, is provided with holes corresponding to those in the cylinder which are to be used at one time, and enough of these plates are furnished with each machine to suit all kinds of seed which the farmer may plant. The plate to be used in planting Indian corn has two square slots, one near each end, for planting two rows of corn at the same time, and these slots are bushed with india-rubber to prevent the corn from being caught between the edge of the hole in the roller and the edge of the plate and being broken.

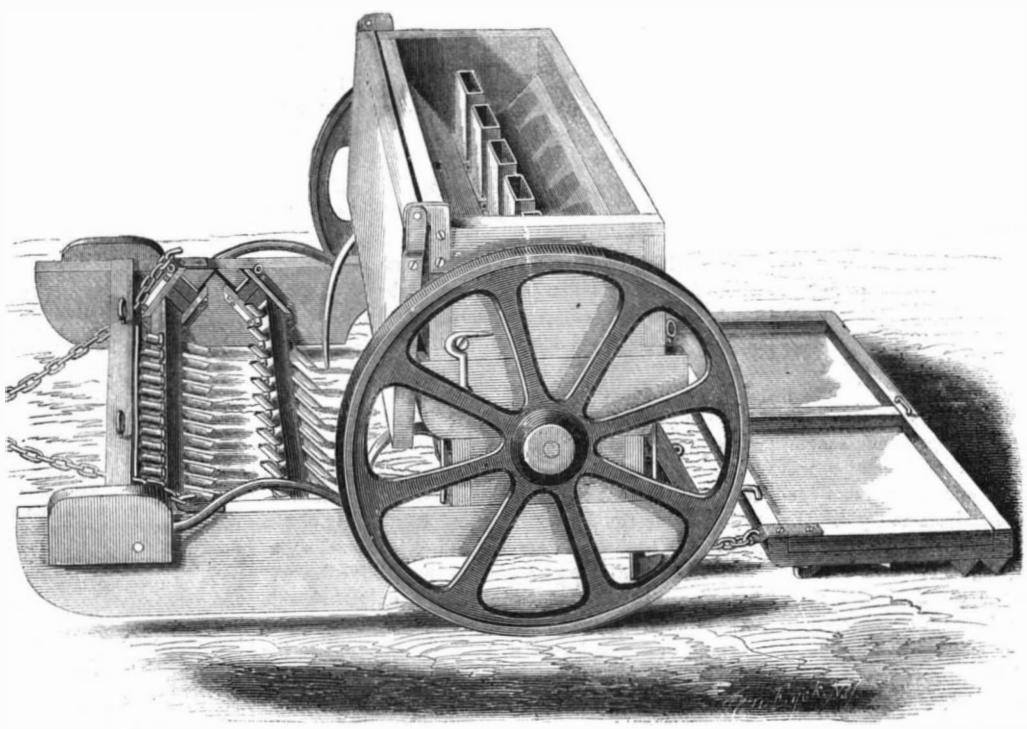
In sowing wheat and grass seed at the same time, the grass seed is placed in a series of hoppers, *d*, standing within the main hopper, while the wheat seed is placed in the main hopper; the holes in the plate and cylinder being of the proper size for the two kinds of seed, and being properly arranged to receive them. The ground is opened by two sets of colters inclined diagonally in opposite directions. One set of these colters is secured to the transverse beam, *e*, and the other to the beam, *f*, these beams being fitted to rise in the inclined slots, as shown. It will be seen that by this arrangement of the colters the ground is all thrown in one direction and then returned in the opposite direction; thus being pulverized in the most effectual manner.

The seed is covered by a drag or harrow the teeth of which are broad and arranged in positions similar to those of the colters; one row of the teeth being inclined so as to move the soil toward one side of the machine, and the next row being inclined to move the soil back to its place. When the harrow is not required it is turned up against the rear end of the machine and secured by a hook.

These several parts are connected together so as to perform the work by a single passage of the horses over the ground, thus avoiding the hardening of the sod by the repeated trampling of the team.

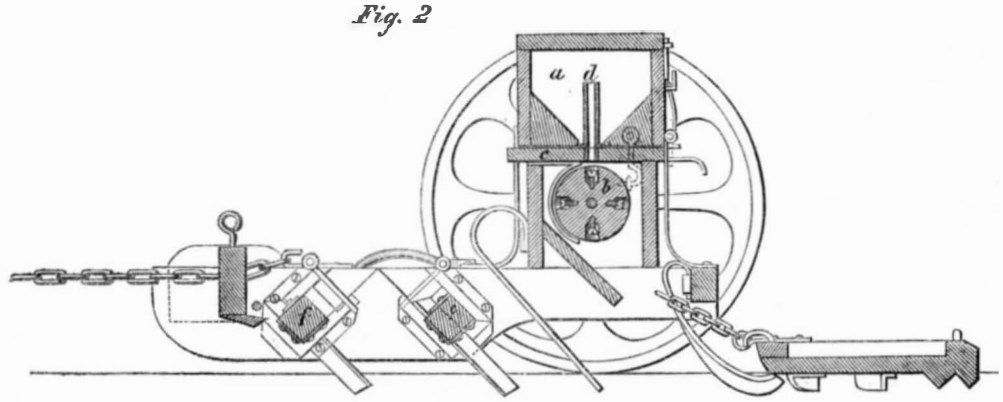
The patent for the sod-cutter, which is one of the novelties of this machine, was granted Aug. 19, 1862, through the Scientific American Patent Agency, and applications for patents for the seeding apparatus and the harrow are now pending. Further information in relation to the matter may be obtained by addressing the inventor, C. E. Steller, at Genesee Station, Wis.

Fig. 1.



STELLER'S COMBINED SOD CUTTER, SEEDING MACHINE AND HARROW.

Fig. 2



A LARGE rotary steam engine, the invention of M. Ballian, a Turk, is in operation at the Exhibition in London. This is the best sign for the resuscitation of Turkey, that has come to our notice. Let the Turks just devote themselves entirely to inventing, and they will soon be able to hold their own against the Russians, without being obliged to depend on either England or France for assistance.

How Bodies are Embalmed.

Embalming, which is coming much into practice of late, is thus performed:—The modern embalmer finds an artery into which he can place the nozzle of an injecting syringe. The artery in the upper part of the arm called the brachial, or the artery in the neck, the carotid, answers the purpose. Into this artery the embalming fluid, consisting of alum, or corrosive sublimate is injected, until it permeates every structure; the solution sometimes retains its fluidity, sometimes it is so constituted that while it is warm in the fluid, on cooling it sets and becomes more or less hard. After the injection the artery is closed, the opening through the skin is neatly sewn up, and the operation is complete. Great numbers of the officers of the army who have fallen in the engagements in Virginia have been embalmed in this manner by Dr. Holmes, of Brooklyn, and sent home to their relatives.

NOTES ON NAVAL AND MILITARY AFFAIRS.

THE BATTLE OF SHARPSBURG.

The greatest battle of the war took place on Wednesday, Sept. 17th. After the battle of South Mountain, described in our last, General Lee fell back a few miles toward the Potomac and took up a strong position with a small stream, called Antietam Creek, in his front. General McClellan slowly followed, and attacked him in his position. The great battle was witnessed by hundreds of spectators, among whom were a number of trained and able writers whose descriptions have been published. Though its innumerable incidents would fill many volumes, its general features were simple, and may be given in a few words. On the evening of Tuesday General Hooker, whose division formed the right wing of our army, was ordered to cross the creek, and be ready to attack in the morning. The enemy disputed Hooker's advance and a skirmish took place which served to reveal the fact to our commanders that the whole rebel army was massed in their front, and General Hooker remarked, "To-morrow we fight the battle that is to decide the fate of the Republic." At the break of day in the morning General Hooker opened the battle, and through the whole day until dark the two great armies, stretched in front of each other for a space of three miles, were hurling destructive missiles into each others ranks. General Hooker's division soon drove the enemy back across some corn fields and into the woods on our right. The enemy then charged out of these woods and drove our forces back again. Then Hartsuff's brigade charged and again drove the enemy from the field and into the woods. General Hooker now determined to drive the enemy from the woods, and two regiments had entered the woods and were engaged in fight when General Hooker was wounded in the foot and carried from the field. The command then devolved on General Sumner. Our forces were driven from the woods in confusion, and from the field in front, which they had won three times by deadly struggles. It was now one o'clock, and after all the long hours of bloody conflict, our right was in the same position which it had occupied in the morning. At this crisis Franklin came up with fresh troops, and General Smith, commanding one division of his corps, was ordered to retake the fields and woods. Says an eye-witness, "It was done in the handsomest style. His Maine and Vermont regiments and the rest went forward on the run, and cheering as they went, swept like an avalanche through the cornfields, fell upon the woods, cleared them in ten minutes, and held them. They were not again retaken." The attack of our left under Burnside was made in the afternoon. He crossed Antietam Creek by a bridge and moved slowly up the hill against Gen. Lee's right. The enemy were pressed back a short distance, and Burnside held his position with difficulty till nightfall. On the whole the advantage was decidedly with us.

THE TRUCE OF THURSDAY.

On Thursday large bodies of fresh troops arrived to reenforce McClellan, but he kindly allowed the rebels this day to bury their dead. The loss is estimated at about 10,000 on our side, and considerably more on that of the enemy.

GEN. LEE CROSSES THE POTOMAC.

During Thursday night Gen. Lee's army crossed the Potomac at several fords, taking with him all his trains, but leaving about 1,100 of his wounded on the field.

OUR FORCES ATTEMPT TO PURSUE.

On Saturday the 20th, our army having followed that of Gen. Lee to the banks of the Potomac, a regiment was sent across the stream to ascertain whether the enemy still remained in force upon the opposite bank. The reconnoissance developed the presence of the enemy in large masses, and the regiment returned; bringing with it four pieces of artillery, which it captured. The next morning, Sunday the 21st, General Barnes crossed with his own and a portion of Sykes's brigade, but the enemy appeared in overwhelming numbers, and he was obliged to withdraw.

EVACUATION OF HARPER'S FERRY.

On Friday afternoon, the 19th, Harper's Ferry was evacuated by the enemy; all the stores which they could not remove being destroyed. They also burned the railroad bridge over the Potomac.

THE BATTLE OF I-U-K-A.

Since our forces took possession of Corinth in the northern part of Mississippi, they have been under the command of General Grant, who has sent out detachments along the two railroads which meet at the town. On the railroad running to the southeast, at the distance of twenty-one miles from Corinth, is a little village called I-u-k-a, and here General Grant had caused some intrenchments to be thrown up by negroes, and had stationed some 2,500 troops under Colonel Murphy to hold the place. On the 12th of September, General Price with a large rebel army attacked Colonel Murphy, who after fighting some time fell back toward Corinth. On the 19th General Rosecrans marched down and attacked Price about two miles south of I-u-k-a, the battle commencing late in the afternoon and contiuuing till dark. During the night Price retreated, and at last accounts our cavalry were in pursuit.

IMPORTANT EVENTS IN TEXAS.

The New Orleans *Delta* of Sept. 9th, gives a minute account of the complete overthrow and dispersion of Sibley's brigade which was sent by the rebels of Texas to West New Mexico from the country. The *Delta* says: "We know that Sibley's brigade, after a temporary success at Valverde (near Fort Craig, about one hundred and fifty miles north of El Paso), passed Fort Craig and captured Santa Fe. Endeavoring to go on to Fort Union they were defeated and compelled to retreat. They evacuated Santa Fe, leaving their sick and wounded, and took the back road to El Paso. Two or three small skirmishes occurred, but after repassing Fort Craig we have had no certain intelligence concerning them.

In the last fight the Texans lost all—horses, arms, cannons, all their stores and even the sutlers' trains. Grant's celebrated train, captured by the Texans last summer, was recaptured in this fight. A great number were killed or wounded, and about one-half the whole force were taken prisoners. Sibley, with Cols. Steele and Green, escaped with one hundred and fifty men of Green's regiment. One or two hundred are supposed to have escaped in another direction and reached Mexico.

The escaping and exasperated Texans of Green's regiment assassinated Gen. Sibley and Col. Steele during the retreat, just before reaching El Paso. They alleged that the ruin of the brigade was attributable only to the drunkenness and inefficiency of the leaders. These facts were published in the San Antonio *Herald*. Green and his 150 men arrived in San Antonio on the 15th of June, having only their side arms and a few pack mules to carry provisions. This remnant of his regiment was about to be sent to the interior of the State to be filled up again.

In the vicinity of Fort Fillmore, Sibley was intercepted by troops from California. General Canby, with the new Mexican troops, was in pursuit and close at hand. He was thus caught between two fires, and retreat being impossible, a battle occurred, which resulted in Sibley's utter and complete defeat. The California troops were supposed to number about five thousand. Sibley's brigade originally numbered about two thousand seven hundred. Baylor's regiment was already in Arizona, and was joined to his brigade, so that his entire force was about three thousand five hundred men, as efficient and well armed as Texas could furnish. They were all mounted and well provided with artillery, among which were nine mountain howitzers. But the length of the journey, the want of supplies and medical stores, his losses by sickness, desertion, wounds and death, and capture of prisoners by the Government forces, had greatly reduced his numbers and produced a disheartening effect upon the remaineder.

Col. Riley, commanding Sibley's first regiment, resigned some time previous to the events above narrated and came back to Texas. Sibley was a native of Louisiana, and was formerly major in the United States regular cavalry. The Federal forces immediately after the fight took possession of El Paso. and Fort Bliss, which is near by, and sent a detachment to Camp Quitman, eighty miles east of El Paso. Thereupon the Texans evacuated Fort Davis, two hundred miles east of El Paso, and all the other forts in the extreme northwest of the State, Fort Clark, one hundred and twenty miles from San Antonio, now being the nearest fort to El Paso held by the Texans.

All able-bodied men between the ages of eighteen and thirty-five are ordered into camps of instruction. Sibley's brigade was the great effort of Texas, and contained the best fighting material in the whole State. Great things were expected of it; but it has failed as signally as it deserved. The fate of the leaders may be regarded as a precedent of what will happen to the great leaders of the rebellion when their deluded people come to their senses.

THE CAPTURE OF NATCHEZ.

Commodore Porter makes the following official report of his expedition up the Mississippi river and the capture of Natchez:—

ON BOARD UNITED STATES GUNBOAT ESSEX,
OFF NEW ORLEANS, September 9, 1862.

Hon. Gideon Welles, Secretary of the Navy:

Sir: I have the honor to report that on the 23d ult., having remained off the city of Baton Rouge two days after its evacuation by our troops, I proceeded up the river to reconnoiter, reported batteries in progress at Port Hudson, La., and also to coal my vessel at Bayou Sara, the only place I could obtain any at save New Orleans. Arriving there I found the town apparently deserted and the coal burning. Sending a boat's crew on shore they were fired at by guerrillas from the houses in heavy force; my men drove them out and burned the buildings in the lower part of the town, to prevent such being used to protect the enemy. These guerrillas had a few days previously fired at and wounded several of the crew of the United States gunboat *Sumter*.

On the 24th I was necessitated by want of fuel to send the towboat *Anglo-American*, which I had fitted out and armed, to New Orleans for coal, and I again dropped down the river and awaited her return off Port Hudson. I could discover no guns at this place, but earthworks were in progress, and whilst destroying these I had the misfortune to explode my heavy ten-inch gun. The *Anglo-American* not returning up to the evening of the 28th, I returned to Bayou Sara, where we were again fired at by the guerrillas, and from the buildings left, on which I ordered those remaining to be destroyed.

The *Anglo-American* joined me on the 25th and reported three batteries as having opened on her whilst passing Port Hudson. She received seventy-three shots in passing.

I had received information that the rebel gunboat *Webb* was at Natchez, to which city she had conveyed transports with supplies from Red river. I followed to that city, but found they had sought the protection of the Vicksburg guns. At Natchez a boat's crew from the *Essex* was sent ashore to procure some ice for my sick, when they were wantonly attacked by over 200 armed citizens, wounding the officer in command, and killing one and wounding five seamen. I immediately opened fire on the lower town, and set a considerable number of houses on fire from which they were attacking us. After bombarding the place for an hour the Mayor unconditionally surrendered the city. During this fire one of my nine-inch Dahlgren guns exploded.

I followed the rebel gunboat *Webb* to the batteries at Vicksburg, under the guns of which she, with two transports, lay. Heavy ordnance batteries, extending three miles further down the river than during the siege in July, prevented my nearer approach to these boats. Having exchanged some shots, and ascertained that the upper fleet was not in the vicinity of the town, being short of provisions, my battery weakened by the loss of two guns bursted, and also short of ammunition, I determined to steam down the river to New Orleans for supplies, and, if possible, ascertain the strength of the Port Hudson batteries. Leaving Vicksburg on the evening of the 5th instant, on the 7th, at a quarter past four A. M., we were off that place, and on coming within range the enemy opened on us a vigorous fire with siege guns. The *Essex* was struck heavily. As near as I could judge the enemy had in position from thirty-five to forty guns of 120 pounders, rifled, ten-inch smooth, nine-inch and eight-inch caliber, in three batteries commanding the river, to the extent of five miles. A sixty-eight-pound, and thirty-two-pound and also a ten-inch rifle ball lodged in the *Essex*, but without material damage. We were under fire an hour and three-quarters, during which time our guns were well and incessantly worked, and I have reason to believe the enemy suffered heavily, and the works were certainly in part destroyed. Mr. J. Harry Wyatt, fourth master and my secretary, had command of the batteries of the *Essex*, and his conduct throughout met my entire approbation. A land force will be necessary to complete the destruction of this fort, which, if allowed to be again restored, would seriously interrupt the free navigation of the Mississippi.

In the various encounters of the *Essex* since leaving St. Louis on the 6th of July she has been struck heavily one hundred and twenty-eight times by heavy shot—glancing shot left no record—three having broken her iron, and that from a rifled sixty-eight-pounder at the distance of a few feet, delivered by the ram *Arkansas*. Very respectfully your obedient servant,

W. D. PORTER, Commodore, U. S. N.

THE SURRENDER OF MUNFORDSVILLE.

The attack on Munfordsville, Ky., mentioned in our last, resulted in the surrender of our forces, which took place Wednesday morning, September 17th, the same day as the great battle of Sharpsburg. The rebels took about 4,000 prisoners, whom they are reported subsequently to have paroled, comprising the 60th, 67th and 89th Indiana, four hundred men of the 50th Indiana, two companies of each of the 17th and 74th Indiana, one company of the Louisville Provost Guard, 70 recruits for the 33d Kentucky, with the 4th Ohio battery of six guns and four other guns in position.

ALARM IN LOUISVILLE.

The surrender of our forces at Munfordsville left

the road to Louisville open to Bragg's army, and anxiety was created in that city. On the 22d it was announced that Bragg was advancing in force, and the city was thrown into the most intense excitement. General Nelson, in command of the Union forces, immediately adopted the most energetic measures for the defense of the place, and thus matters stood at the last accounts as we go to press.

IMPORTANT PROCLAMATION OF THE PRESIDENT.

On the 22d day of September, 1862, Abraham Lincoln, President of the United States, issued a proclamation declaring that on the first day of January, in the year of our Lord one thousannd eight hundred and sixty-three, all persons held as slaves within any state, or any designated part of a state, the people whereof shall then be in rebellion against the United States shall be then, thenceforward and forever, free, and the executive Government of the United States, including the military and naval authority thereof, will recognize and maintain the freedom of such persons, and will do no act or acts to repress such persons, or any of them, in any efforts they may make for their actual freedom.

REPORT OF THE COMMISSIONER OF PATENTS---AGRICULTURAL.

We have received from the Hon. D. P. Holloway, Commissioner of Patents, the portion of his report for 1861 which relates to agriculture. It is a volume of 656 pages, 20 of which are devoted to the report proper; the remainder being occupied by articles on various subjects pertaining to agriculture, written by persons who possess special intelligence in relation to the subjects on which they write. From Mr. Holloway's report we make the following extracts :—

DISTRIBUTION OF SEEDS.

A large proportion of the fund appropriated to this bureau has been expended in the purchase and distribution of seeds, cuttings, &c. From the 31st of December, 1860, to the same date in 1861, there were distributed 2,474,380 parcels of garden and flower seeds, embracing 154 varieties of the former and 230 of the latter. Most of these seeds were purchased by my predecessor, and if not as valuable as they might have been, the responsibility does not rest upon the present Commissioner. Several varieties of flower seeds were procured which have not been distributed, but destroyed, because of their objectionable qualities, some of them being noxious weeds, injurious to meadows and other grass lands.

About one thousand bushels of wheat, imported from different parts of Europe, have been distributed, the results from which, however, are not known.

Oats and barley of a superior quality have also been distributed.

The osier willow has been propagated most successfully, and forty-five thousand roots and cuttings will be distributed the present season. It is believed that its cultivation will prove profitable to the agriculturist, and largely beneficial to the country. Large quantities of this willow and its manufactures are imported into this country. It has been demonstrated beyond all controversy that it can be produced here as cheaply and in quality equal to any other country.

THE COMMERCIAL FACILITIES OF THE COUNTRY.

Its northern frontier is skirted by the great lakes; its southern, by the Gulf; its eastern, by the Atlantic ocean; and its western, by the Pacific. Beside these oceans, for foreign commerce, we have two grand systems of internal water communication running at right angles—one east and west, and the other north and south. The first, composed of the Hudson river, the Erie canal, and the great lakes, extending from our commercial metropolis half across the continent, to the heads of Lakes Superior and Michigan, affords fourteen thousand miles of navigation. The second is composed of the Mississippi and its tributaries, giving an aggregate of seventeen thousand miles. These two, interlocked as they are by the Ohio, Indiana, and Illinois canals, present a harmonious and unequaled system of internal navigation more than thirty thousand miles in extent.

The railroads now in operation which concentrate at Boston, New York, Philadelphia, Baltimore, Pittsburg, Cincinnati, St. Louis, Chicago, and other points, amount to 30,000 miles. There are in the country 40,000 miles of telegraphs, extending from city to city, and from sea to rea. These works are a portion of the grand instrumentalities of internal commerce in the United States. But the amount of this commerce baffles computation. Foreign commerce, far less in amount, is, from its nature, more easily calculated. We have correct tables of the total amount of our exports and imports from the organization of the Government. But how shall be estimated the amount of our internal commerce? The tabular statements of the last census are not yet made up, but Senator Simmons estimated the aggregate value of the annual results of the productive industry, on the basis of the census of 1840, at $2,000,000,000. H. C. Carey, in 1858, estimated it at $3,600,000,000. It may now be placed in round numbers at $4,000,000,000. Of this not one-tenth is exported. The remaining nine-tenths find home markets through the channels of internal commerce. The same is true of other countries. For example, the exports of France are less than one-eighth of the productive industry of the country. The volume of internal commerce is insufficiently indicated by the figures which express the annual value of the product of the nation's industry, inasmuch as the great mass of the products remaining at home become the subject of repeated sales and purchases. Even the commodities of foreign commerce are themselves the means of swelling internal commerce. How often is the wheat of Illinois bought and sold before it is exported, and how often are the silks and wines of France sold after they arrive at New York? So that it is within bounds to say that the internal commerce of the country is more than ten times as great and important as our foreign commerce. To those who hold, in the face of these considerations, that still foreign commerce is the most important interest, a sufficient answer is found in the words of an esteemed writer on political economy, who observes: "If wealth can come only from abroad, where does it come from abroad? From abroad also! so that in tracing it from abroad to abroad we should have to trace it beyond the confines of earth!" It is obvious that, so far as commerce is a source of great wealth, domestic has the advantage over foreign commerce, in that in the case of the former both parties to the bargain are at home, whereas in case of foreign commerce half, at least, of the benefit of the trade goes into the coffers of the foreign merchant.

THE REAL SOURCE OF BRITISH POWER.

Napoleon at St. Helena sadly said, "Great Britain conquered me not with her swords, but with her spindles; with her spindles she subsidized all Europe, and here I am."

The power of steam employed in Great Britain is estimated as equal to the united forces of 600,000,000 of men, and yet the total number of persons employed in the coal mines is but 120,000, two-thirds of whom raise coal for other purposes than for steam engines, so that 40,000 men mine coal enough to do the work of 600,000,000 men. The entire population of the island at the time of the foregoing estimate (1851) was 21,000,000, each one of whom, man, woman and child, were the power thus equally divided, would have thirty willing slaves to do his work. Slaves, too, born in full life; slaves that never tire, never fall sick, need no clothes, and eat only fire and water, costing only 40,000 men to raise food for 600,000,000.

To enable this fuel to do the work it is, however, required that man should play the part of engineer. The engineer must have his engine. But all the engines in Britain are made by 35,000 men. Adding now together the miners, 40,000, the engine builders, 35,000, we have less than 100,000 men as the total human force given to the development of a natural one equal to 600,000,000, the physical force of each being thus multiplied six thousand times. It is by means of this mighty power, aided by her carrying trade, and her absorption of all the earnings of all the agricultural nations who submit to her system of trade, that Great Britain has heaped up her vast wealth, now estimated at £6,000,000,000 sterling, or $30,000,000,000. It is by these means that she collects a revenue of $355,000,000. It is thus that she supports her monarchy, her aristocracy, her hierarchy, her army, her navy, her civil list, and pays the interest on her national debt of £800,000,000, or $4,000,000,000.

THE construction of a fire-alarm telegraph has been commenced at Montreal.

The Largest Barn in the Country.

The Shakers are famous for their great barns, and the largest one that they have is at Lebanon, in this State. It was recently erected at an expense of about $15,000, and is thus described :—

It is 196 feet long, 50 feet wide, five stories high; the walls of good flat, quarried stone, five feet thick at the foundation, carefully laid in lime mortar, cement pointed outside, and plastered inside; roofed with tarred paper, cement and gravel. It also has three wings, wooden buildings, which form four sheds about 100 feet long upon the east and west side of two cattle yards, on the south of the main building, with lofts for straw and grain connected with the barn.

The lower story of the barn is a manure cellar, and at the west end is level with the ground, so that carts can be driven in and out with ease. The next story is the cow stable, which is on a level with the yard, the cows standing with their heads toward the center, with a passage between supplied with water pipes and cocks. In this passage roots, cut feed or water can be given in iron feed boxes, which swing on a pivot into the passage. Behind the cows the floor drops a couple of inches, a space of three feet, and back of that rises again. The depression is to hold the manure. On the rise behind are iron rails, upon which cars run into the west end and over a space about 25 feet wide, and discharge their loads, the rails and a turn table being so contrived that the manure is well distributed with but little labor. The idea is entertained of making the whole cellar into a liquid manure vat, which could be distributed by its own gravity upon the lower part of the farm, or sent higher up by the water power that drives the mill not far distant. The cows are all fastened in their stalls at each milking, in summer, and all at one movement. They are driven in all together, and each one takes her place, where her name is printed overhead, and then by a pull of a cord all the movable stanchions are closed. They are opened by a reversed motion, and all the cows hurried out in a drove, so that they never make a deposit upon the floor. They are left a few minutes to do that in the yard, before sending them to the pasture.

There are six large chimney ventilators from the rear of the stalls to the roof. The floor above them supports the great hay mows, between which is the floor for feeding hay, which is sent down to the cows through box tubes, and these, when empty, also assist ventilation. There are openings from this floor into the straw lofts over the sheds, and also to the store rooms for roots and grain.

The next floor is the grand drive way for loads of hay, 16 feet wide and 196 feet long, with ample space at the west end to turn around. This floor opens upon a public road, and is but little above its level, so that loads really come in easily at the top of the barn. Over this floor is a fifth story, only the width of the floor, to give room for work, ventilation and light. Half of the many windows are glass and half slatted blinds. The hay is nearly all thrown down, not pitched up from the load. In case of need, the large space at the end could be filled, but it is thought that it will not be necessary, except with corn, which can be husked there and thrown down a spout into a large, airy granary over the western shed.

Strong Ironsides.

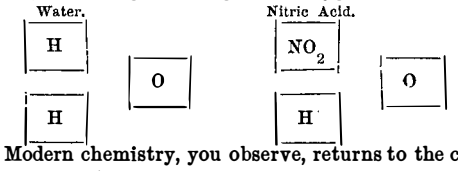
The New Orleans *Delta*, of the 9th ult., states that while Commodore Porter's iron-clad gun boat, the *Essex*, was coming down the river, a battery opened upon her at 80 yards distance, opposite Port Hudson, when a fierce contest ensued which lasted for an hour. The battery was silenced while the *Essex* was uninjured, and not a man on board was hurt. This seems to be astonishing, as 10-inch and other sized shot was fired at her and she was struck a number of times. Instead of any of the shot penetrating the armor, they merely made slight indentations in it and were broken to pieces. The *Essex* must be clothed with excellent plates to have resisted 10-inch shot fired at the short range of 80 yards.

THE editor of the *Illinois Farmer* states that potatoes struck with disease in the field, should be allowed to remain in the ground as long as possible. Those which are diseased rot away in the soil, those which are sound will remain fresh.

THE COLOR PRODUCTS OF COAL—MAUVE AND MAGENTA.

[Concluded from page 196.]

Benzol is readily attacked by fuming nitric acid; it dissolves in it, producing a liquid of a deep red color. On addition of water this liquid deposits a heavy yellow oil, collecting at the bottom of the cylinder, perfectly different from benzol, which floats on the surface of the water. The re-action will be intelligible to you, if I remind you that nitric acid when referred to our types, must be viewed as a water derivative; it is water in which, for one of the elementary hydrogen atoms, there has been substituted a compound atom, consisting of nitrogin and oxygen.



Modern chemistry, you observe, returns to the conception of former ages, which, in the name aquafortis, appears to have anticipated in a measure our present notions.

When nitric acid acts on benzole an interchange takes place between the elementary atom of the latter and the compound atom of the former, nitro-benzole, the heavy yellow liquid which we have produced, and water being formed :—

Benzole. Nitric Acid. Nitro-benzole. Water.

$$(C_6H_5)H+\left.\begin{matrix}NO_2\\H\end{matrix}\right\}O=(C_6H_5)\ (NO_2)+\left.\begin{matrix}H\\H\end{matrix}\right\}O$$

The transformation of benzole into nitro-benzole, discovered by Mitscherlich, is only a preparatory operation for the production of aniline. The method of converting nitro-benzole into aniline was discovered by Zinin. It consists in submitting nitro-benzole to the action of nascent hydrogen. Under the influence of this agent the compound atom NO_2, which in nitro-benzole is associated with phenyl, is decomposed; its oxygen is converted into water, the residue of nitrogen and phenyl assimilating the necessary quantity of hydrogen to form phenylated ammonia, or aniline,

Nitro-benzole. Hydrogen.

$$(C_6H_5)NOO+HH+HH+HH=$$

Aniline. Water.

$$\left.\begin{matrix}H\\H\end{matrix}\right\}O+\left.\begin{matrix}H\\H\end{matrix}\right\}O+\left.\begin{matrix}(C_6H_5)\\H\\H\end{matrix}\right\}N$$

The hydrogen necessary for this transformation may be furnished by numerous processes. The most convenient method for our purpose consists in submitting nitro-benzol to the action of metallic iron and acetic acid, a process first proposed by M. Béchamp. I mix the three bodies in a glass retort, and on application of a gentle heat you observe how immediately a most powerful re-action manifests itself. Let us hasten to connect the retort with a condenser; I have removed the gas burner from the retort; nevertheless the re-action continues, and a considerable quantity of water, covering an oily layer, has already accumulated in the receiver. The oily liquid is aniline. We recognize it at once by its peculiar deportment with a solution of chloride of lime. On pouring a single drop of our distillate into this beaker which contains a solution of chloride of lime, a splendid purple cloud is almost instantaneously diffused throughout the liquid. You perceive we are approaching our subject. The beautiful color which aniline strikes with a solution of chloride of lime has been long known. A solution of bleaching powder has always been used as a test for aniline; indeed, it was by this color re-action that the presence of our compound in coal-tar oil was first pointed out, a fact recorded in the name Kyanol (blue oil), originally given to aniline prepared from coal tar. Several other oxidizing agents, chromic acid for instance, were likewise known to produce colored compounds from aniline; but all the colors thus obtained were of a highly ephemeral character. Observe how the purple cloud which I produced by means of chloride of lime has rapidly changed to a dingy reddish precipitate. It was Mr. W. Perkin who had first the happy idea of investigating the circumstances under which this beautiful purple might be prepared in a form permanent and applicable for the purposes of the dyer. He succeeded in isolating this color by submitting, under appropriately selected circumstances, aniline to the action of bichromate of potassium and sulphuric acid.

Here then you have, step by step, the development of this new and important branch of chemical industry.

Through the kindness of my friend Mr. Perkin, I am enabled to exhibit to you magnificent specimens of his aniline purple, or mauve, in the dry state and in solution. This brown lump, with the remarkable coppery luster, is mauve in the solid state; its extraordinary tinctorial powers will be appreciated, if I tell you that this beautiful violet colored solution contains not more than $\frac{1}{10}$th of a grain of mauve in one gallon of alcohol; you will also understand the considerable commercial value of this substance. Weight for weight, I am told by Mr. Perkin, this coloring matter, when pure, is sold at the price of metallic platinum.

Very little is known regarding the chemical nature of mauve; its composition is not yet made out, and, as a matter of course, the process by which it is formed from aniline remains as yet perfectly unexplained.

Magenta is one of the fancy names given to the splendid crimson which is likewise generated from aniline by the action of oxidizing agents. This substance was first observed in purely scientific researches, and more especially in the action of tetrachloride of carbon upon aniline. To a French chemist, M. Verguin, the merit is due of having for the first time obtained this substance on a larger scale; he produced it by the action of tetrachloride of tin on aniline. Numerous other processes were subsequently suggested, among which treatment of aniline with chloride or nitrate of mercury with arsenic acid, and many other substances may be mentioned. Magenta, often called fuchsine, roseine, &c., soon became an article of large consumption. A great impetus to this new branch of industry was given in France by Messrs. Renard and Franc, who were the first to manufacture the new article on a commercial scale; in this country, very soon afterward, Messrs. Simpson, Maule and Nicholson engaged with great spirit in the manufacture of this splendid dye, the production of which has attained already colossal proportions. To Mr. E. C. Nicholson more especially belongs the credit of having developed this new industry to an unprecedented degree of perfection.

Before proceeding, however, let me show you the formation of Magenta by experiment. Among the many processes which I might adopt for this purpose I select the action of corrosive sublimate upon aniline, not because I consider this process superior to the others—it is, in fact, inferior to many—but because it is, perhaps, the best adapted for a lecture experiment. This white powder is chloride of mercury (corrosive sublimate); a small portion of this salt I mix in a test tube with perfectly colorless aniline. Let us stir the mixture with a glass rod until it is converted into a perfectly homogeneous liquid paste. This paste is still colorless, but on gently heating it by a gas burner it instantaneously assumes a splendid crimson of the greatest intensity, a single drop of the liquid being capable of deeply coloring a large beaker filled with alcohol.

In all the processes which convert aniline into coloring matters, a considerable number of secondary products are generated, which it is rather difficult to separate from the principal product of the reaction. These difficulties have been most perfectly overcome by Mr. Nicholson, who has succeeded in obtaining Magenta in a state of absolute purity. Chemists have thus been enabled to analyze this substance, and to lift, at all events, the corner of the veil which still covers the mysterious formation of the colored derivatives of aniline.

In the pure state, magenta is a fine crystalline, and, remarkably enough, perfectly colorless, or only slightly tinted body, which is represented by the formula—

$$C_{20}H_{21}N_3O=C_{20}H_{19}N_3,H_2O.$$

Rosaniline (this is the name by which chemists designate the colorless body) is a base, or ammonia derivative, which forms a series of splendid salts. With hydrochloric acid, for instance, it produces a beautifully crystalline salt of the formula—

$$C_{20}H_{19}N_3,HCl.$$

It is in the state of saline combination that rosaniline acts as a crimson dye. Into this shallow porcelain dish I have thrown a few crystals of rosaniline, which at a distance you scarcely perceive; I now pour upon these crystals a small quantity of acetic acid, when on gently heating the dish the crimson color instantaneously appears. But it is only in solution that even the salts of rosaniline are crimson colored; on slowly evaporating their solution, the red color entirely vanishes, and a splendid green crystalline substance remains, presenting in an extraordinary manner the beautiful metal luster which distinguishes the wings of the rose beetle. Together with all the products involved in the manufacture of aniline and aniline dyes, my friend Mr. Nicholson has placed before you the finest series of rosaniline salts which has ever been produced; and not content with this display, he was kind enough to send us a specimen of acetate of rosaniline, such as no mortal eye has ever seen before. The specimen may be litterally called the "crown of magenta." Crowns are always expensive articles, and the cost and trouble of getting them are often greater than their actual value. This remark applies in a measure to the crown of magenta. For the benefit of those who are fond of big figures—and who is not a little afflicted with this weakness?—I may state that the crown was grown in a vessel containing not less than 8,000*l.* worth of magenta, the crown itself being worth upward of 100*l.*

Having now explained the several stages of transition through which coal has to pass before it either becomes mauve or magenta, it may be of some interest to you to know the proportion which the finished dye bears to the coal from which it is derived. A set of specimens for which I am likewise indebted to Mr. Nicholson, is most instructive in this respect. Observe, it commences with a large mass of coal, weighing not less than 100 lbs.; the bottles which follow contain the coal-tar oil, naphtha, benzol, nitro-benzol and aniline, obtainable in succession from 100 lbs. of coal; remark how they gradually diminish in size, and how small, I might almost say insignificant, appears the bulk of magenta finally obtained. But compare the bulk of wool which this minute quantity will dye. It approximates to the bulk of coal with which we started. This comparison evinces, perhaps, sufficiently the extraordinary tinctorial power which this class of dye possesses, but a very simple experiment may possibly convey to you this idea even in a more impressive manner. The white paper which covers this large frame has been dusted over with a minute quantity of mauve; a second one is treated in a similar manner with magenta. The quantity of coloring matter is so small, that the paper has retained its original white color; but observe how it changes when I dash a beaker full of spirit against these squares; immediately the lovely purple of mauve is developed upon one of them, while the other one exhibits the dazzling crimson of magenta.

But let us now proceed to illustrate the mode of dyeing. For this purpose I introduce silk and wool, both unspun and woven, in succession, into solutions of mauve, of magenta, and, lastly, of a splendid new purple, lately discovered by Mr. Nicholson. Observe the extraordinary facility with which the coal tar colors are fixed both on wool and silk. These materials require no previous preparation, being dyed, in fact, simply by dipping, without the aid of any mordant. Silk and wool are animal substances; vegetal materials, such as cotton and linen, unless previously submitted to a special treatment, are scarcely affected by these dyes. This fact admits of being beautifully illustrated by dyeing linen fabrics on which ornaments have been embroidered in silk ribbon. The articles, when coming out of the bath, appear uniformly dyed; but by washing, first in pure water and then in dilute ammonia, the color rapidly vanishes from the linen ground, leaving the silk embroidery in brilliant colors. This extraordinary predilection of the aniline colors for animal substances is, moreover, strikingly illustrated by the condition of my hands, which by this time have acquired a thoroughly magentic appearance. Fortunately, the coal tar colors are unable to resist the the action of chloride of lime, and I have therefore only to immerse my hands for a moment into a solution of bleaching powder.

Already the color on my hand, you observe, has gone, but with the color, I am afraid, my time too. Let me endeavor to bring this lecture to a conclusion. I have fulfilled in a measure the promise which I

gave you at the commencement of this discourse. We have crossed together the extensive field which stretches between coal and color. I am impressed, deeply impressed, with the clumsiness of my performance as your guide, but I hope that the interest attached to the territory we have explored may, to some extent at all events, have indemnified you for the imperfection of my explanations, and that you leave the Royal Institution this evening with the kind of feeling every one of us has more than once experienced after traveling in similar company over a beautiful country—the guide is forgotten, but the impression of the scenery remains.

Having gone thus far, you may think that it is fully time for me to make my bow. But I venture, even at this late hour, to dwell for a moment on the moral of the story which I have told you, though you may feel disposed to consider this story rather a highly colored one.

The material which I had to condense, I might almost say to force, into the short space of an hour, has been overwhelming; and whilst explaining the formation of the various substances which I had to describe, while illustrating their properties by experiment, I have scarcely had time to glance at the history of our subject. This history is not without interest. You readily perceive that a branch of industry like the one I have endeavored to sketch could not possibly have risen like Minerva from the head of Jupiter—a sudden inspiration happily realized. The time, the toil, the thought of a host of inquirers were necessary to accomplish so remarkable an achievement. You cannot expect me at this late hour to examine minutely into this part of the subject, but I must not take leave of you without alluding to some facts which cannot fail to rivet the lively interest of the members of this institution. Let me tell you then that mauve and magenta are essentially Royal Institution colors; the foundation of this new industry was laid in Albermarle street. Benzol, which I have so repeatedly mentioned—benzol, which may be looked upon as the raw material, capable, under the influence of chemical agents, of assuming such wonderful shapes—benzol is the discovery of our great master, may I not add of our kind friend, Mr. Faraday. This volume, "The Philosophical Transactions for 1825," contains the description of his experiments. In 1825, thirty-seven years ago, the laboratory of the Royal Institution witnessed the birth of this remarkable body. Yesterday, under the auspices of Mr. Anderson, I invaded the same laboratory, a diligent search was made, and in my hand I hold the trophies of our expedition, the original specimens of benzol which Mr. Faraday prepared. In thus reminding you of one of the early labors of Mr. Faraday—which, owing to the number and vastness of his subsequent discoveries, appears almost to have escaped from his memory like a tradition of years gone by—I have opened a glorious page in the glorious history of the Royal Institution. Benzol has furnished us mauve and magenta, but it has done much more than this. Ever since chemistry became endowed with this wonderful body, benzol has been the carrier of many of the leading ideas in our science. In the hands of Mitscherlich, Zinin, Gerhardt and Laurent, in the hands of Charles Mansfield—never to be forgotten by his friends—and many others, benzol has been a powerful lever for the advancement of chemical science. Benzol and its derivatives form one of the most interesting chapters in organic chemistry, the progress of which is intimately allied with the history of this compound.

But what has the history of benzol to do with the moral of mauve and magenta? Well, ladies and gentlemen, ask Mr. Faraday; ask him what in 1825 was his object in examining benzol. I have perhaps no right to answer this question in Mr. Faraday's presence; but I venture to say that we owe his remarkable inquiry to the pure delight he felt in the elaboration of truth. It was in the same spirit that his successors continued the work. Patiently they elicited fact after fact; observation was recorded after observation; it was the labor of love performed for the sake of truth; ultimately, by the united efforts of so many ardent inquirers, exerted year after year in the same direction, the chemical history of benzol and its derivatives had been traced. The scientific foundation having thus been laid, the time of application had arrived, and by one bound as it were, these substances, hitherto exclusively the property of the philosopher, appear in the market place of life.

Need I say any more? The moral of mauve and magenta is transparent enough. I read it in your eyes—we understand each other. Whenever in future one of your chemical friends, full of enthusiasm, exhibits and explains to you his newly discovered compound, you will not cool his noble ardor by asking him that most terrible of all questions, "What is its use? Will your compound bleach or dye? Will it shave? May it be used as a substitute for leather?" Let him quietly go on with his work. The dye, the lather, the leather will make their appearance in due time. Let him, I repeat it, perform his task. Let him, indulge in the pursuit of truth—of truth pure and simple—of truth not for the sake of mauve, not for the sake of magenta—let him pursue truth for the sake of truth!

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meetings of the Polytechnic Association were resumed Thursday evening Sept. 11th. It is the practice of the Association to devote a half hour before the commencement of the regular discussion to a consideration of any miscellaneous matters that may be presented, and this half hour is generally occupied by inventors of new devices in presenting and explaining their inventions. The difficulty of explaining mechanism without the aid of engravings and the impossibility of obtaining engravings in time for our reports, compels us to omit this portion of the proceedings.

As there was, on the evening of the 11th, only one speaker on the appointed subject, the subject was continued to the evening of September 18th. Our report embraces the discussion of both evenings.

HIGHWAYS.

Mr. Fisher—read a long paper giving a history of highways from remote periods to the present day, and explaining in detail the difference between the systems of McAdam and Telford. McAdam put gravel below and broken stones upon the surface, while Telford reversed the process; putting broken stones below and gravel on the surface. Telford used stones in considerably larger fragments than those used by McAdam, and he placed them with their points upward so that they might hold the gravel.

Mr. Dibben—I think, Mr. President, there is no subject on which a little scientific information spread through the community would be of more value than the construction of highways. A large portion of the labor devoted to the construction and repair of roads might be more wisely directed. In New Jersey there are long pieces of sandy road which might be made perfectly hard and smooth by the application of a small quantity of clay and marl to the surface, and both the clay and marl are to be found in abundance in the immediate vicinity. In some places the road has been made hard by the droppings of marl from the carts as it was being carted from its beds to the fields for manure. Near Rondout, in this State, is a road a mile and a half in length, in which a smooth track is formed for each wheel by laying flat stones, the track between for the horse being formed of gravel. The difficulty of keeping the wheels on these flat stones prevented this road from being successful.

The Chairman (Mr. Vedder)—The managers of the plank road running from Albany to Chevry Valey tried several experiments which furnished a good deal of instruction in regard to this class of roads. They first planked the road with hemlock three inches thick, and as any of the hemlock plank wore out their places were supplied with beech plank two inches thick. Afterward the whole road was planked with oak three inches in thickness. It was found that the hemlock lasted 7 years, the beech 3 years, and the oak 4 years. Experience has shown that where there is travel enough to wear out a plank road it will prove profitable, but if it rots out it will not pay.

I have had quite extensive experience in road making, and I am satisfied that the matter of most importance is thorough draining. Some years since I had charge of the work of repairing a road in which there was a very soft bad place at the foot of a hill. I had the earth removed to the depth of some two feet and coarse stones thrown into the bottom of the trench, covering them with gravel. This spot has ever since been the best portion of the road. I would suggest the use of drain tile, laid in lines across the road. If even the frailest of drain tile were buried only 18 inches under the surface, I think there would be no danger of its being broken by heavy wheels.

Mr. Stevens—On the steep hills in Vermont experience has led to the same system of thorough draining recommended by the chairman. The track is excavated to the depth of three feet or more, loose stones are thrown into the bottom, and these are covered with gravel.

Mr. Dibben—Mr. Chairman, before we adjourn we must select a subject for the next evening.

Prof. Seely—Mr. Chairman, the use of petroleum for fuel is occupying a good deal of attention at the present time, and in connection with this I should like to see discussed here the employment of compressed air in furnaces. Perhaps the whole idea may be embraced in the phrase, "Fuel in the Arts," and I move that that be the subject for the next meeting.

This motion was carried, and the Association adjourned.

Photography on Mont Blanc.

We find in the *Moniteur* an interesting description of an ascent of Mont Blanc, effected on the 11th ult., by M. Bisson, an eminent photographer, who had already performed the feat last year, but was desirous of completing his collection of views. His progress as far as the Grands-Mulets was not marked by any particular incident; he took various views from different points, and then proceeded to the Passage des Echelles, where he and his party crossed the ravines, some 300 feet deep, crawling on horizontal ladders, one by one, on their hands and feet. Their further progress to the Dôme de Goutté was, however, impeded by an unforseen incident. A bridge of ice and snow, which had hitherto served as a passage to the Grand Plateau, had broken down, and they found a yawning abyss, from 45 to 155 feet in width, before them. No other passage seemed possible, and M. Bisson was on the point of giving up the adventure, when he was hailed by three of his men, who, unperceived, had sought a convenient place, and with their hatchets hewed out a path, by which they had succeeded in gaining the icy crest of the Mont Maudit. They soon descended the rocks on the other side, and threw ropes to their comrades, by which the luggage was hauled up. M. Bisson and the rest of the party followed the new but dangerous path, which brought them two hours sooner to the Grand Plateau. There new difficulties awaited them; they had to hew 800 steps, and ascend the side of the corridor, which, in some places, had an inclination of 50°. On reaching the end of the corridor, they were assailed by an icy-cold wind. On arriving at the summit, after some further labor, M. Bisson found to his regret that the silver of his plates was crystallized, the temperature having suddenly fallen 10° centigrade, although it was exactly noon. At 2 P. M. he descended from the summit, but visited it again on the 14th, and returned to Chamounix on the 15th without further accident.

Bridging the Susquehanna.

The Philadelphia, Wilmington and Baltimore Railroad Company are now constructing a pier in the Susquehanna river, preparatory to the construction of a railroad bridge over that stream. Piles have been driven where the water has a depth of forty feet; and by the use of machinery they have been cut off even with the bottom of the river. In constructing the pier an iron caisson, made of boiler iron, the size of the pier, has been constructed and each section will be sunk by filling it with blocks of granite until the stone work is above the water. A frame work at the bottom of the river, around the edge of the piles, will keep the caisson in its place. It is expected that this pier will be completed before the cold weather sets in.

New Gun Metal.—The Paris *Cosmos* says:—The cannon newly cast in Austria for the marine service, and from which so much is expected, are formed from a new alloy, called Aich metal from the name of the inventor. It is composed of copper, 600 parts; zinc, 382; iron, 18. Its tenacity is said to be excessive; it is easily forged and bored; when cold it may be bent considerably without breaking; its resistance is far greater than that of iron of the best quality.

Correspondence

Business at the Patent Office.

MESSRS. MUNN & Co :—I see by the papers that the Patent Office at Washington is being fitted up for a hospital. Is no business done now in that department? H. H. C.

Jefferson Co., N. Y., Sept. 15, 1862.

In reply to the above we would state that a portion of the Patent Office is fitted up for the reception of wounded soldiers, but the arrangements are such that the regular business of the department is not interfered with. Cots have been placed in the passage ways, between the cabinets, in two of the large model halls, and accommodations for nearly 800 patients are thus provided. The cots are however so arranged that access may be easily had to the glass cases containing the models, and the examination of inventions is not prevented. None of the examiners' rooms on the first floor are given up, nor are the regular operations of the bureau at all interrupted. Indeed so far as facilities for doing business are concerned, the Patent Office was never in a better condition. The amount of unfinished work now on hand is small, and in most of the classes the examiners are able to act promptly upon new applications.

In this connection we would remind our readers that now is the time, above all others, when the mind can be most advantageously applied to the discovery of new inventions. Just in proportion as the population is drawn off for service in the war, is the necessity for labor-saving inventions increased.—EDS.

Flint Glass.

MESSRS. EDITORS :—In your issue of September 20th, you notice an improvement in the manufacture of glass at Clichy, France, and other places by the substitution for red lead of the oxide of zinc with a small quantity of the oxide of nickel as a decolorizer and that this new combination is found to produce a new a cheap and purer glass, which is also capable of withstanding a higher degree of heat &c. This improvement has been patented in this country by Horace Trumbull, of New Jersey, as to the use of oxide of zinc and by Samuel Wetherill, of Penn., as to the use of oxide of nickel. In 1860, through your agency, a patent was taken in England in my name, combining both the American patents.

The successful adoption of the improvement in France ought to direct the attention of our glass manufacturers to the substitution of oxide zinc for red lead. The difference in the prices here being greater than in France or England the advantage will be correspondingly in their favor. R. H. MANNING.

New York, Sept. 23, 1862.

How to Treat Nervous Horses.

MESSRS. EDITORS :—I have read in the "Miscellaneous Summary" of your last number a bit of sound and excellent advice to horsemen, who should never, of course, "shy" themselves, whenever their horse is becoming nervous, nor notice it in their horses, and far less punish him.

Allow me, having had a great deal of experience in managing horses, to add another bit of advice to nervous horsemen. Whenever they notice their horse directing his ears to any point whatever or indicating the slightest disposition to become afraid, let them, instead of pulling the rein to bring the horse toward the object causing its nervousness, pull it on the other side. This will instantly divert the attention of the horse from the object which is exciting its suspicion, and in ninety-nine cases out of a hundred the horse will pay no more attention to the object from which he will fly away if forcibly driven to it by pulling the wrong rein. L. A. D.

Montreal, C. E., Sept. 22, 1862.

Sound Doctrine.

The following remarks we extract from a business letter received at this office a few days since. We recommend manufacturers everywhere to read what one of their craft says about placing good reading matter in the hands of his workmen :—

As to being a subscriber to your paper, I would say that for years I have had it every week, and in the two years past have obtained among my men in the shop some twenty names, and handed them to our newspaper agent, in order to secure our SCIENTIFIC AMERICAN at the lowest price. This I have done, not for the purpose of cheating you out of fifty cents each, but because I know that if my men can be induced to take such kind of papers, they are better men for me to have in the shop. One reading, thinking man, is worth more to me than two who live and die like the brute. If I have a man who reads your paper, I am sure to have a good man, and have never failed yet to find him of value to me by the fund of ideas he has in store, which helps him to good wages, and me in my business. So you see it is for my interest in a pecuniary point to have your valuable paper, and I hope I shall always have the means to take it, and eyes to read it, as the disposition is good I assure you.

Please accept my best thanks for the promptness and ability which has been manifested by you in obtaining my last two patents, as well as for all the businesss you have done for me heretofore.

W. B. B.

Waterbury, Conn., September 17, 1862.

WHERE AND HOW AUSTRIA MAKES HER MILITARY ENGINEERS.

MESSRS. EDITORS :—Fearing lest the second letter of Dr. Kennedy, on the subject of "Military Education," might not reach you through your exchanges, I hereby place a copy of it at your disposal. It will, if I mistake not, be found even more interesting than its predecessor. DWIGHT D. WILLARD.

Philadelphia, Sept. 22, 1862.

ZNAIM, MORAVIA, Aug. 14, 1862.

To their Excellencies Governor Curtin, of Pennsylvania, and Governor Olden, of New Jersey :

GENTLEMEN—It was with no slight satisfaction that I yesterday received, by order of Major-General Degenfeld, the Austrian Minister of War, a letter to General Petrosck, the Director of the Royal Imperial School of Engineers at this place. The reorganization of the military system of Austria in 1852, in the light of the experience of all other civilized nations, the bitter lessons taught her in the late Italian war, and the necessity of rigid economy in the administration of her public affairs, imposed as an effect of that war, all unite to give to her military schools more interest and value than attaches to those of any other great European Power. Under the military system of Austria the sons of soldiers are entitled to receive support and an elementary education at the expense of the government, and to preferment, based on merit, to the highest office in the army. From the elementary schools the best pupils pass at the age of twelve to the cadet schools, in which they remain four years, receiving a good education in mathematics as far as algebra and geometry, inclusive. The best of these pupils are, in turn, promoted to the School of Engineers, of Artillery, or of Cavalry and Infantry, in numbers and in proportion dependent on the wants of the service. When Austria wisely decided to separate her school of engineering and of artillery from that of cavalry and infantry, the fine old monastery of Kloster Bruck, in the environs of the ancient capital of Moravia, was vacant. Of the beauty of its situation, in the midst of luxuriant vineyards and commanding one of the loveliest of landscapes, I need say nothing to those who know what men of taste these old monks were. The spacious saloons, corridors and chambers of the monastery afforded ample accommodations to students; riding schools, stables and swimming school and parade ground were added, and the institution was opened here, distant about one hundred miles northwest of Vienna, most of which is traveled by diligence. This very remoteness of the town made it more pleasant, upon entering the building, to observe among the pictures upon the wall of the porter's room, the likeness of our own youthful Commander-in-Chief, McClellan. (The God of armies prosper him!) Not only are the dormitories and study, class and lecture rooms, commodious and well furnished, but the chemical laboratory is excellent, and the cabinets of architecture, of machines and of models are beautifully filled. The library, the nucleus of which was that of Maria Theresa, is increased as well by purchase as by the law which makes the libraries and military manuscripts of all deceased officers the property of the government. A student having entered the school remains four years, paying each year 660 florins, and receiving board, lodging, clothing and education. During the first year his studies are general on mathematical, natural and experimental science, German literature and history, and on design. During the second year descriptive and analytical geometry are completed, and military style in correspondence and reports, theory of projectiles, rules and exercises of the service, and topographical drawing are, among other studies, pursued. In the third year, mechanics, civil architecture, fortifications and ornamental drawing, and on the fourth and last, service of sappers and miners, military jurisprudence, tactics, permanent fortifications, construction of furnaces, boilers and machines, ornamental architecture, history of sieges. It was gratifying to observe that upon several of the above subjects the same text books were employed, which in translation are used in the Polytechnic College of Pennsylvania. For practice in the construction of gabions and earthworks, and pontoon and framed bridges the most ample provision is made. Proficiency in the art of design is especially insisted upon, and not only during the last term of his college life, but also for several years after he enters the service, the young officer is required to present annually an original working drawing of a fortification, machine or public work, tastefully executed and accompanied with descriptive text. These graduates constitute the engineer officers of the Austrian army, but in case the demands of the service require, the government does not hesitate to take engineers from civil life, and during the Italian war graduates of the Polytechnic School of Vienna—an institution not designed for military instruction, and not connected with the military system of the empire—were given commands in the engineer corps. Would it not be well for our own government to profit by the example, especially as many of our disasters on land may, unless I greatly err, be traced to a deficient engineer corps?

As General Petrosck, the Director, is regarded as one of the first engineers in Europe, I was anxious to learn the views of so experienced and earnest an officer on the question of the expediency of separating engineering and artillery schools from those of infantry and cavalry, and I found him decided and emphatic in the declaration that under no circumstances should they ever be united. He, and every other European officer of distinction with whom I conversed on the subject, agreed in condemning the plan of organization adopted for West Point as calculated to destroy the *esprit* of any army—a plan which might at one time have been approved, but which no European government would now for a moment continue. Moreover, while schools of infantry and cavalry may be located in rural districts, those of artillery and of engineers must be placed convenient to foundries, machine shops and arsenals. As soon as practicable, therefore, the school at Znaim would be removed to a large manufacturing city, where the students, brought into daily contact with practical men, would be taught to respect the artisan and his art, and learn the application with the theory of science. Was it not alike gratifying and suggestive thus to be told, in effect, that had Austria a Philadelphia she would make it the seat of her great school of military engineering?

With great respect, sirs, your obedient servant,

ALFRED L. KENNEDY.

President Polytechnic College of Pennsylvania.

THE Senecca Falls (N. Y.) *Courier* says that the Seneca Knitting Mills established in that village has recently contracted with the United States Government to furnish 700,000 pairs of stockings for the army, and daily turn out 8,000 pairs toward fulfilling the contract. About 300 persons are employed as operatives, and from 3,000 to 4,000 women and girls are furnished with work at their homes in the surrounding country and in distant places.

CAPTAIN COLES is employed by the British Admiralty at the rate of $15 per day to superintend the construction of his shields on war vessels. Besides this he receives $500 for each shield, and he is to receive $25,000 additional as a remuneration for the expenses incurred by him in bringing his invention into public use. We like to see governments displaying a liberal spirit toward inventors whose inventions have been of service to their country.

How to Make Native Wine.

As the time is close at hand for the manufacture of wine from our native grapes, the following directions for conducting the process, by John O. Mottier, an experienced wine maker of Cincinnati, are given through the *Horticulturist*, and they are stated to be useful and reliable :—

In order to make good wine it is necessary to have a good cellar, clean casks, press, &c. First of all, have your grapes well ripened; gather them in dry weather, and pick out carefully all the unripe berries, and all the dried and damaged ones; then mash or grind them with a mill, if you have a proper mill for the purpose. Be careful not to set your mill so close as to mash the seed, for they will give a bad taste to the wine. If you wish to have wine of a rose color, let the grapes remain in a large tub a few hours before pressing. The longer time you leave the grapes before pressing after they are mashed, the more color the wine will have.

For pressing the grapes, any press will answer, provided it is kept clean and sweet.

After you have collected the must in a clean tub from the press, have it transferred into the cask in the cellar. Fill the cask within ten inches of the bung; then place one end of a siphon, made for that purpose, in the bung, and fix it air tight; the other end must be placed in a bucket containing cold water. The gas then passes off from the cask without the air coming in contact with the wine, which would destroy that fine grape flavor which makes our Catawba so celebrated. When properly made, the must will undergo fermentation. Keep the end of the siphon that is in the water fully four inches deep, so as to exclude the air from the wine. When it has fermented, which will be in fifteen days, fill the cask with the same kind of wine and bung it loosely for one week; then make it tight. Nothing more is needed till it is clear, which, if all is right, will be January or February next. Then, if perfectly clear, rack it off into another clean cask, and bung it up tightly until wanted. If the wine remains in the cask till fall, about November, it will improve by racking it again. Be sure to have sweet, clean casks. Do not burn too much brimstone in the cask; I have seen much wine injured by excessive use of brimstone, generally by new beginners. For my part, I make little use of it.

You can make different qualities of wine with the same grape by separating the different runs of the same pressing. The first run is the finest, if you want to make use of it the first season; but it will not keep long without losing its fine qualities.

To make good sound wine that will improve by age, the plan is to mix all up together. The very last run will make it rough, but it will have better body and better flavor when two or three years old, and will improve for a number of years. The first run will not be good after two or three years.

I have fully tested the different ways of making and keeping wine these last twenty-five years.

Cultivation of Window Flowers.

The cultivation of flowers in windows is a source of pure domestic pleasure and rational improvement. The following extracts are from essays on the subject by Dr. Jack and Mr. W. Elder, read lately before the Pennsylvania Horticultural Society, at a meeting in Philadelphia, and published in the *Gardeners' Monthly*. Dr. Jack said the subject was one of interest to all who have a love for plants, and especially to those who have not the convenience for greater indulgence.

The conditions most desired, and the attainment of which has proved the most difficult, are the application of an even heat, and the maintenance of a constant moisture. In order to protect his window plants from an atmosphere too dry, he has pursued the plan of inclosing a space inside of the windows, projecting a case into the room and giving it the form of a bay window. The dimensions are, hight, 5 feet 8 inches; width, 3 feet 7 inches (this being the size of the window frame), and depth 2 feet 8 inches.

The accommodation of the plants is effected by a circular stage of 31 inches in diameter, revolving on a central stud. This form of stage permits a variety of arrangement, and allows access to all parts for the purpose of watering, &c. While this form of stage retains the moisture constantly rising from the soil equally as well as the ordinary Wardian case, it is better supplied with light, and affords an opportunity for a much more tasteful display of plants. It is, however, liable to great diminution of external air, by which means, in cold weather, the plants suffer for heat.

To secure a uniform and sufficient temperature, an opening is made on the top of the case for the entrance of warm air, and another in the bottom, for the exit of the cool, which falls in consequence of its greater specific gravity. By this means the plants are perfectly protected from contact with cold air. The current of warm air entering the top would, however, naturally dissipate the necessary moisture. To avoid this, a net work of loose cotton thread is placed over the opening, one end being immersed in water. Capillary attraction causes the whole to be moistened, and the air, in passing over it, becomes saturated with water.

The effect of this method is shown in the better appearance of the plants, a greater evenness of temperature, and the constant marked presence of humidity. All this is accomplished without complication, and requires but little attention. The process is almost self-regulating, much like that in the Aquarium, which renders the latter of such interest.

To secure the condition of heat, the plants should be exposed not too directly to the rays of the sun. If possible, the case should be so placed as to have the light of an adjoining window thrown in its rear.

Mr. Walter Elder, in his essay, traced the history of window gardening, and presented some thoughts on the moral and pleasing nature of the practice. It was the simplest branch of gardening, and the first to interest the mind with a love of flowering plants; it is the parent of exotic floriculture. Working people in large cities, who had not a foot of ground, made gardens upon the house tops, and now Paris and other European cities are noted for them.

The French excel in balcony gardens. Window gardening is perhaps more universal among the working classes in Scotland than in any other country. It is in every house. The pious, peaceful, and moral nature of the people attaches them to home, and creates in them a desire to beautify it.

The communication closed with an allusion to the soothing influence of the culture of flowers on the mind. There was never a more propitious time for the culture of window plants than now, when the number of flowers subject to such treatment is greatly increased.

European Harvests.

The Irish *Agricultural Review* says respecting the crops of England, Ireland and Scotland :—

On the whole, we think there is abundant evidence for arriving at the conclusion that the harvest of 1862 will be found an unusually short one in these countries. But, however unpleasant it may be to contemplate this, it is better that we should know it in time, in order that we may husband our food resources accordingly. We shall, no doubt, be largely dependent on foreign countries for the next year's supply; but it is gratifying to them that the supply is forthcoming, and that there are now no commercial bonds to shackle the importation of it. There need, therefore, be no apprehension of a famine. The scarcity will be not so much of corn, as of the means wherewith to purchase it. The great want with the laboring classes in Ireland, will be a want of employment to furnish these means; and if they will not get full employment, which we rather think is likely to be the case, it will prove that there are more people in the country than are actually wanted in it. We are going to add, that the sooner the surplus hands would seek a vent in emigration the better for themselves.

On this subject the English *Gardener's Chronicle* also states that of one hundred and eighty-eight reporters, one hundred and fifty assert that the wheat crop is below the average, while only thirty-seven call it an average crop, and the other one states that it is over an average one, the most unfavorable summary of reports for years. Taking it for granted that this report is reliable, England will be even more dependent upon the United States for bread stuffs during the next year than during the past, in which case our exports are not likely to experience any serious diminution, even though the Paris papers be correct in the assertion that the crop of France is the best for ten years, and that she will not have to import from other countries. Meanwhile the exports from New York to all the British ports continue heavy.

Soldier Health.

The Sanitary Commission have reported that the general rate of disablements by sickness in the army is one hundred and four persons out of one thousand; whereas, only thirteen out of a thousand should be sick at any one time in common life. A Massachusetts regiment, after being a year at the seat of war, has lost no more men from all causes than would have been the case under the ordinary circumstances of home life. A New York city regiment, after three months of camping, lost but one man out of eight hundre and he had heart disease before he left home. But it was a regiment whose average of intelligence and culture was perhaps the highest among the whole Federal force. Both these cases show that camp life is not necessarily fatal to health or life to a remarkable extent, and that the exercise of an intelligent care on the part of each individual soldier may almost banish disease from an army. And if the officers would coöperate with the men, would encourage them, and do all in their power to facilitate their efforts in this direction, the cost of the war and its duration would be most favorably modified. It is true that only one result is possible, even if Washington were laid in ashes, and the enemy were besieging New York and Boston—the annihilation of the "Confederacy;" still it is desirable to do this in the shortest time and at the least cost of life and treasure. To bring this about in the most enduring manner, while the Government is wisely waiting on events, until the proper moment arrives for the grand consummating act, let each soldier for himself, and each soldier's friend at home, and each patriotic officer among too many who are not so! do all that is possible to keep the army in the very highest state of health; because health is efficiency! Just as Lord Nelson's ship was leaving England, he discovered that the flannel shirts of the men were six inches shorter than they ought to have been, and refused to go until the proper kind were furnished. He was ridiculed and called an "old granny." The result was, that while the rest of the fleet was decimated, he did not lose a man! and "his ship, in efficiency, was as good as any two others!" Aside from the dictates of humanity, a soldier's health should be the highest consideration of any officer who hopes to accomplish great results.—*Hall's Journal of Health.*

Volunteers and Regulars.

An old army officer gives the reason why the regulars endure more fatigue than volunteers. When marching, if the regular even cuts his finger he falls into the rear and applies a bandage. The moment he halts for the night, after he eats his rations, his cheek is upon his knapsack and himself in the land of dreams. The volunteer does very differently. If he hurts himself he extemporises some inadequate sort of dressing and keeps along. When night comes the chances are ten to one that instead of taking repose at once he wearies himself still further by leap frog with his companions, or by playing "old sledge" for pints of whiskey. The regular carries with him nothing that he can help. Not an ounce more will he bear than regulation weight. The volunteer is too apt to leave nothing behind him that he can carry. Every daguerreotype even adds to the weight of a knapsack in a manner that none but those who carry them can adequately understand. In Mexico soldiers threw away money because it chafed their pockets.

FLAX.—Good flax has been raised by O. Irwin, near San Rafael, Marin County, Cal. Flax is found growing wild in all the valleys and on the hill-tops, and with proper cultivation it could undoubtedly be made one of the staple products of the State. There is now a favorable opening for the cultivation of this plant. The seed is always marketable, and commands a high price.

THE three new iron-clad river boats to be built at Pittsburgh are now on the stocks. Over seven hundred men are employed upon them, and many of these will work night and day until they are finished.

Improved Force Pump.

After all the study which has been devoted to the invention of force pumps, it is surprising to see one embracing so much novelty as the one here illustrated. Its operation will be understood by an examination of the section, Fig. 4, the other engravings representing the several parts in perspective.

A hollow shell, A, is cast in the form of a semi-cylinder with a permanent partition, *b*, dividing it into two compartments. This shell is to be wholly immersed in the water of the well, which enters the shell through two ports, *e e*, cut through its walls as clearly shown in Fig. 2; the water being forced out through the pipe, *d*. The water is alternately drawn into and forced out from each apartment of the shell, A, by means of the vibrating pistons, B B; the motion to these pistons being imparted through the medium of the cords, *f*, (see Fig. 3) and the lever above the ground, shown in Fig. 1. The pistons are made of the same width as the shell; their form is shown in perspective in Fig 2. A valve, *g*, with its curvature corresponding to that of the periphery of the shell, A, is fitted to work in a slot formed through the upper end of the partition, *b*. This valve has a port cut through the middle for the passage of the water into the eduction pipe, *d*.

When the pistons are moving in the direction indicated by the arrow in Fig. 4, the valve is in the position represented, and the water is being drawn into the right hand apartment of the shell and forced out from the other apartment. As the rising piston reaches the end of the stroke it comes in contact with the end of the valve and slides the valve along; opening the induction and closing the eduction port in its own apartment, and effecting the reverse operations in the other apartment. Thus by the oscillations of the pistons the water is alternately drawn into and forced out of each apartment.

A great deal of inventive effort has been exerted by the designers of this pump to simplify the process of its construction, in order to make it at a moderate cost, and in a durable manner. The shell is cast in a single piece with recesses for the shaft (in which the pistons oscillate) to rest in. The hooks for attaching the cords are imbedded in the sand of the mold, and thus cast with the wings. The cords too in practice will be replaced by small iron rods, and thus this pump will be very cheap, simple and durable.

An application for a patent for this invention has been made through the Scientific American Patent Agency. Further information in relation to it may be obtained by addressing H. C. Hunt, at Otumwa, Iowa.

Fig. 1.

HUNT AND DEVIN'S FORCE PUMP.

Fig. 2

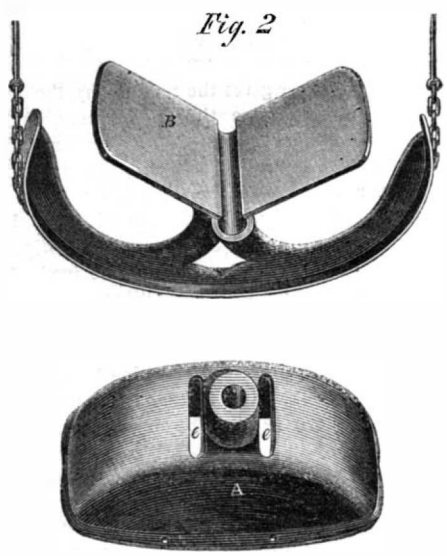


Fig. 3

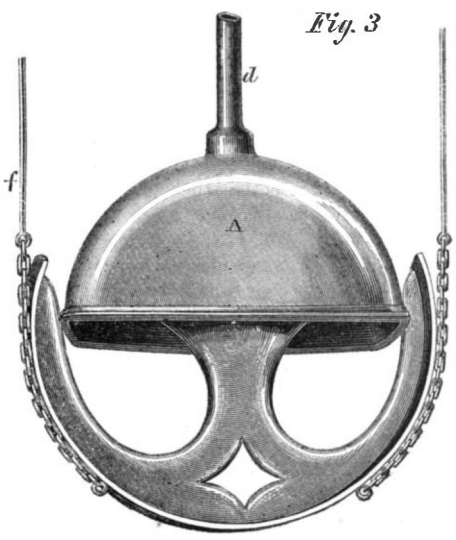
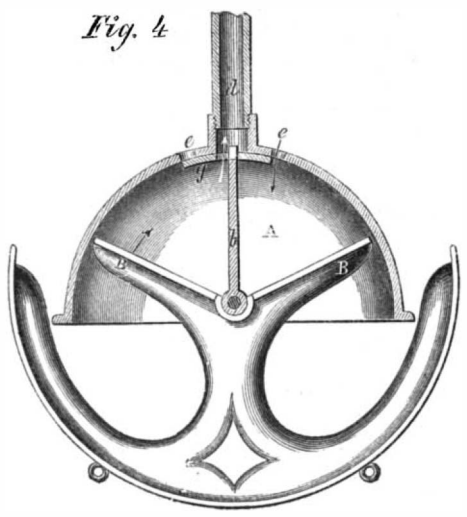


Fig. 4



Women Inventors.

A good many patents are granted to women in France, and occasionally one in England. On the 19th of August, provisional protection was granted to Eliza Jane Dagnall, of Point Pleasant, Wandsworth, in the County of Surrey, for the invention of "An improved tray or receptacle adapted for washhand stands for holding tooth brushes, tooth powder and nail brushes."

It is no uncommon thing for ladies to address the publishers of this paper concerning some new invention of theirs, and in the course of a year we take out a number of patents for the ingenious American ladies.

Another Monster Gun Cast.—Another of the heavy fifteen-inch guns for the new *Monitors* is shipped for proving. It weighs in its present state upward of thirty tuns, and will throw a ball weighing four hundred and seventy-five pounds. It differs considerably from the fifteen-inch Rodman guns, being some two feet shorter and apparently much heavier in the breech. The Fort Pitt Works have a contract for supplying several of these guns, and purpose turning them out at the rate of two or three a week.—*Pittsburgh Chronicle.*

An extensive agitation has been commenced in France for the purpose of securing greater freedom to commercial transactions. Among the special objects proposed are the repeal of usury laws, the abolition of imprisonment for debt, and the authorization of companies with limited liability on the part of the shareholders.

The shipment of iron ore, this year, from the Lake Superior region, will amount to 100,000 tuns.

PROVING A "MONITOR" 15-INCH GUN.

On Tuesday the 16th ult., the first 15-inch *Monitor* Dahlgren gun (described on page 393 of our last volume), finished at the Fort Pitt Works, Pittsburgh, was tested at the Navy Proving Ground, near Wall's Station, on the Pennsylvania railroad. An immense triangular frame of massive timbers was constructed for the purpose, and the gun was suspended by four strong iron rods, embracing the trunnions and breech. The testing charges are ten in number. Three of these are called "proof charges," consisting of 50 lbs. of Rodman's cake powder each, and a shell of 315 lbs., and seven service charges, consisting of 30 lbs. of powder each and a shell of 330 lbs. Great anxiety was manifested at the first discharge. The shell passed through a bank of earth at a short distance from the gun, then glanced upward and passed into a hill some distance beyond. At the second discharge one of the suspension rods broke and operations were concluded for the day. When the frame is repaired the other charges will be fired, and if the gun withstands these it will be accepted.

Petroleum Pitch.

The Philadelphia *Coal Oil Circular* says that in the first distillation of the crude oil, and in subsequent ones, where steam is not employed, it is not convenient to run the charges down to dryness, whereby the stills are more or less endangered; and when the distillation of the paraffine is not considered important, the charges are run down to a thick pitch, which, when cold, is an artificial asphaltum. This pitch is very useful for many purposes. It may enter beneficially into the composition of waterproof cements, varnishes and patent fuel. When evaporated down to a proper consistence, it is valuable for roofing. The roof is first coveted with sheathing paper, and then with the melted pitch, upon which gravel or sand is thrown immediately, and finally all that remains loose is brushed off. The pitch may also be converted into lampblack, by burning it away from the air, by which the carbon is converted into lampblack, instead of carbonic acid, which would be the result if the air was freely admitted to the combustion.

The sonorous qualities of mountains have recently been tested by a German savant, who has published the results of his observations in the *South German Musical Gazette.* He says the sounds are sometimes like the tinkling of a bell, sometimes like an organ; frequently they resemble the roll of a drum.

Le Credit Minier says that the work of tunneling Mount Cenis, by the power of compressed air is proceeding satisfactorily.

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NEW YORK, SATURDAY, OCTOBER 4, 1862.

AMERICAN INVENTIONS IN EUROPE AND THE "SCIENTIFIC AMERICAN."

We live in times which witness to the fulfillment of ancient prediction, which declares "many shall run to and fro and knowledge shall be increased." By means of discoveries in geographical science, improvements in navigation, shipbuilding, steamships and railways, nations that were once distant strangers to one another have become near neighbors. On one occasion the inventors, mechanics, artisans and manufacturers of all nations assemble in the capital of France to exhibit their productions in friendly emulation; on another occasion they meet in New York, and upon another, as is now the case, in the British metropolis. In ancient times the Greeks periodically held national industrial fairs, but these were confined to a very small number of states. On the other hand, the industrial exhibitions of the present day to which we allude, are world's fairs in every sense of the term. China, Hindostan, Egypt, Greece, America, and all the nations of Europe, have many representatives in the London Exhibition. Such displays of man's ingenuity, in practical forms, are of immense benefit, as they suggest innumerable improvements and incite competitors to further efforts to achieve still greater results.

A correspondent of the New York *Tribune* of the 20th ult., writing from London, states that there is congregated in the Exhibition building an array of agricultural implements, sufficient in number, apparently, for the cultivation of all England. They are shown in every variety of pattern and style, and yet although they are so numerous and varied "the result," he adds, "is likely to be that of stimulating invention, and that for the coming two or three years there will be a great number of applications for patents for improvements on what has been done, and for inventions on that which has not yet been accomplished, clearly traceable to suggested combinations and comparisons by this assemblage." He states, however, that our country possibly, has not much to learn from other nations in the manufacture of this class of machinery, it having occupied for several years the position of teacher.

Another influence, and one much greater, perhaps, than that of Industrial Exhibitions, for suggesting inventions and disseminating a knowledge of improvements, is pointed out by this correspondent as belonging to the newspaper press. On this head he says: "In the present Exhibition many medals obtained by European manufacturers are for machines of American invention, the right for which has been in some instances purchased and in some appropriated. The prize-medal thrashing machine in the French department is of acknowledged American origin; a handsomely-executed cornsheller from Tuscany, the best finished implement in that department indeed, and one of which the Italians seem quite proud, is an exact copy of a machine in use in our country years ago; and in the Prussian department is shown a Wood's reaper of later date, the exact counterpart of the one exhibited in the U. S. department. It must have been consoling to the proprietor of the invention to hear the Prussian manufacturer coolly pronounce it the best reaper in the world, congratulating himself on having had the sagacity to see that it was so when he first found the description in the SCIENTIFIC AMERICAN; but this is not the only class in which exhibitors have been surprised with unexpected assistance. Mr. Porter, of New York, who brought over an engine governor, found a copy of it exhibited free of cost to himself, and in full operation on a Prussian engine—the plan having been derived from the same fruitful source of ideas, the SCIENTIFIC AMERICAN. There are also American sewing machines in this Prussian department, and, in short, whatever is most excellent seems to have been appropriated by them."

This is impartial testimony by an eye witness to the extensive dissemination of American ideas by the SCIENTIFIC AMERICAN among peoples of different nations and languages. It also developes another important fact, namely, that nearly all Europe, as well as America, presents a field for the the adoption of American inventions, and when these are secured by patents in foreign countries, a knowledge of their merits may be conveyed through our columns to all those European manufacturers who would be likely to purchase rights.

The following remarks from the same correspondent afford evidence of the popularity of the American inventions in the Exhibition. He says:—"The American Court is lately becoming one of the most popular nooks in the building; it is crowded excessively most of the time, and the cow-milker, the clothes-drier and the paper-rag machine, threaten to rival the very jewelry cases in attraction. The clothes-drier is an ingenious Yankee notion. It is in constant operation, with an American flag representing the clothes to be dried. The "Cow-milker" is overwhelmed with orders, and the patent has been sold, it is said, for a very large sum. Our "trophy" has been removed from the nave, with the exception of the steam fire-engine, which, sporting two flags from the smoke pipe (the only United States flags in the nave), maintains its position of ensign bearer in the very center of the building, surrounded by statuary and jewelry trophies."

EDUCATION OF MECHANICS.

On another page will be found a sensible letter from a manufacturer stating that he always finds intelligent, educated mechanics more profitable to employ, even at higher wages, than those who are uneducated. We have never met any one who had much experience in employing large numbers of men who did not hold the same opinion, and, as a general rule, those manufacturers are most successful who are most careful to secure intelligent and skillful workmen.

It requires extensive observation to enable one even partially to appreciate the wonderful extent to which all the faculties are developed by mental cultivation. The nervous system grows more vigorous and active, the touch is more sensitive, and there is greater mobility in the hand.

We once knew a weaving room filled with girls above the average in character and intelligence, and there was one girl among them who had been highly educated. Though length of arms and strength of muscle are advantages in weaving, and though this girl was short and small, she always wove the greatest number of pieces of any in the room, and consequently drew the largest pay at the end of every month. We might fill many pages with similar cases which have come under our observation, but there is no occasion. It has long since been settled by the general observation of manufacturers, that intelligent workmen will do more and better work than ignorant ones.

But the excess in the amount of work performed is not the most important respect in which an intelligent workmen is superior to a stupid one. He is far more likely to be faithful to the interests of his employer, to save from waste and to turn to profit everything that comes to his hand. There is also the exalted satisfaction of being surrounded by thinking, active and inquiring minds, instead of by brutes.

Such are some of the advantages to the "Captains of Industry," which result from the employment of intelligent workmen; not in one article nor in any number of articles could these advantages be fully set forth. And if it is impossible to state the advantages to the employer, how vain must be the effort to describe those which result to the workman himself!

The increase of wages is the least and lowest of the rich rewards of mental culture. The whole being is enlarged and exalted; the scope of view is widened; the objects of interest are increased; the subjects of thought are multiplied; life is more filled with emotion; and the man is raised in the scale of creation.

HOW FIRE BRICKS ARE MANUFACTURED.

Could a substance not be obtained capable of withstanding a very high degree of temperature without fusion in furnaces, the smelting of iron and other metals, also the manufacture of glass, together with the practice of most of the modern arts, would be impossible. Happily there exists such a substance in the condition of a silicate of alumina, called fire clay, from which exceedingly fractious bricks and other kindred articles are manufactured. These bricks are employed for lining almost every kind of furnace, ovens and stoves. There are several localities in America where fire clay is obtained. It is abundant in many parts of the Ohio valley in connection with Alleghany coal seams and it exists in New Jersey and Staten Island. There is an extensive fire-brick manufactory in Brooklyn, one at Kreischerville, Staten Island, and another on the corner of Delancy and Goerck streets, this city, where we witnessed the operations of making fire bricks, a few days since. The fire clay after being raised from its natural bed is exposed for some time to the atmosphere before it undergoes the kneading and mixing operation to prepare it for molding. Portions of the clay are formed into rectangular cakes, then burned and afterward ground under the edges of a pair of large rotating stones constituting the well known Chilian mill. A certain quantity of this burned clay is afterward mixed with raw fire clay in a large circular trough of about twenty feet outside diameter In the center of this trough is a post from which a cross beam, like that of a horsepower, extends to the circumference of the circle, and to it is secured a narrow wheel like that of a wagon. The clay being laid several inches in depth in the trough and moistened, the wheel, which is adjusted to travel in larger and smaller circles, is moved treading round in the trough and cutting ruts, as it were, into the clay until it has been kneaded to the proper consistency. It is now lifted with spades from the trough and is ready to be carried up stairs to the molding room.

The molding operations are executed by hand and great care and experience appear to be requisite in performing the manipulations. The molds are of wood, and are of the size and form of the articles to be made. Thus there are quite a variety of sizes of fire brick ranging from 12 inches in length, $2\frac{5}{8}$ inches in width and $4\frac{1}{2}$ inches in thickness, to nine inches in length, $2\frac{1}{2}$ in width and $2\frac{1}{4}$ in thickness. The molders operate on benches and a mold is first sprinkled in the inside with dry fire clay reduced to the degree of fineness required in a Bogardus eccentric mill. Kneaded fire clay is then forced into the mold by hand until it is perfectly compacted, and the shape secured, when the molded brick is discharged on the bench by a gentle tap on the mold. The molded brick is now examined and if its edge or any part of it requires patching this is done with care and the surface is smoothed with a proper tool. The molded bricks are now carried to a floor where they are allowed to become about half dry, when they are submitted to severe mechanical pressure in hand brick presses. After this operation they are carefully dried in the atmosphere in summer weather, and in a suitable drying room during winter. These fire bricks are required to be perfectly dry before being placed in the kiln, for if any moisture is left in them they are liable to crack when being burned. They are placed carefully on edge in the kiln and arranged in rows and upon one another in such a manner that all will be subjected to an equal degree of heat. Conical kilns like those employed in potteries are used for burning such brick. One kiln in Kreischer & Co's. establishment in Goerck street can hold 18,000 common brick, another 24,000 and another kiln no less than 50,000. A much smaller number of articles such as oven tiles, and large stove linings can be burned at once in a kiln. When a batch of molded fire bricks is carefully arranged and is ready for burning in the kiln, the firing commences, and the temperature of the kiln is raised gradually until it becomes intense. Great care is necessary in conducting the burning operation, which continues for about five days. The kiln is then permitted to

cool slowly and when the bricks are taken out, they are found to have changed from a leaden gray to a cream color by the burning. A very small quantity of the oxide of iron in the clay produces this result. Not many years ago, most all the fire brick used in America were imported from England, but the number now imported is comparatively small, native-made bricks having almost entirely superseded them. About fifty millions are made annually from Jersey fire clay alone, and such is the value of this clay, that it is the base from which our American alum is made, and about two thousand tuns are furnished annually to the manufacturers of paper hangings for drab colors. The real value of fire clay as a material for making brick and other articles to resist intense heat in furnaces, depends upon the amount of silica contained in it. Lime and the oxide of iron frequently found in fire clay are injurious mixtures. Many of the fire-clay articles made in this manufactory are of large size and complex pattern, requiring great skill and patience, on the part of the operatives, in plastic modeling.

WHY BOILING MILK FOAMS.

When milk is boiled its volume is very much enlarged, while water merely bubbles without any increase in bulk; why is it that the two liquids under the same circumstances behave so differently?

When water is gradually heated to the boiling point the portion nearest the fire first reaches the temperature of 212°, and the first particle that is heated to this degree is immediately converted into steam. As in its new form its volume is about 1,700 fold greater than in the liquid state, while its weight remains the same, it floats upward through the water, being held in a nearly spherical shape by the nearly-equal pressure of the water against it upon all sides. When it reaches the surface it is lighter than air, and consequently floats away in the atmosphere, and being invisible, it is lost to our sight. The rapid formation of these little globes of steam, and their rising through the water produces that peculiar disturbance of the liquid which we call ebullition or boiling.

When milk is boiled the same little globes of steam are formed, but their surfaces are coated with an exceedingly thin film of the casein which is one of the constituents of milk, and which has sufficient tenacity to prevent the bubbles from breaking when they reach the surface, or from being separated from the liquid. They consequently accumulate as they successively rise to the surface, forming the white foam which so frequently flows over the edge of the vessel into the fire.

THE WAY TO MAKE AN OMELET.

It is surprising that a dish so easily prepared and so delicious as omelet has come into use to so small an extent in this country; there are extensive districts where it has never been heard of, and many housekeepers who meet with it in their travels never have it upon their own tables, because their cooks do not know how to prepare it.

Omelet is simply egg beaten and fried in butter. Break three fresh eggs into a bowl, add a little pinch of salt and a teaspoonful of water, and beat the eggs thoroughly. Then put a tablespoonful of good butter into a flat frying pan, and hold the pan over the fire with the handle a little elevated so as to incline the bottom at a small angle. As soon as the pan is warm pour in the eggs, and as the mass begins to cook run a case knife under it to keep it from burning to the pan. As soon as the surface is about dry fold one half of the omelet over the other, and it is ready to serve. It can be made in five minutes, and is an exceedingly delicate and delicious morsel.

THE IMPORTANCE OF SOUTH AMERICAN TRADE.

It is not a little surprising to find how completely ignored even by the great portion of our most intelligent men, is the Southern portion of this continent. South of Mexico all appears to be a *terra incognita*, which but few of our countrymen were inclined to explore. That England has long been impressed by its immense importance is shown by the lines of ocean steamers now in successful operation. She has found that the trade of some forty millions of people, inhabiting one of the richest portions of the globe is worth something, and has been, and is profiting largely by our indifference. British machinery and manufactures of all descriptions fill the markets of the South American Republic, and are paid for in the rich products of those countries, to wit, gold, hides, horns, tallow, coffee, cocoa, cotton, tobacco, indigo, metals, cochneal, dye woods, sarsaparilla, hemp, &c. The exchange of machinery and other articles of American manufacture could be made to amount to many millions yearly. Very many of the inventions so popular, and so extensively used in the United States, would be equally acceptable and important in South America if introduced there.

VALUABLE RECEIPTS.

French Varnished Leather.—This process consists of two operations: First, the preparation of the skin; and second, the varnishing of the leather thus dressed; in the preparation of the leather linseed oil, made to dry quick by means of metallic oxides and salts, is employed as the basis. For each 22 gallons of linseed oil, 22 pounds of white lead and 22 pounds of litharge are employed, and the oil boiled with these ingredients until it has attained the consistency of sirup. This preparation, mixed either with chalk or ochers, is applied to leather by means of appropriate tools, and well worked into the pores; three or four layers are applied in succession, taking care to dry each layer thoroughly before the application of the next coating. Four or five coatings of the dried linseed oil, without the admixture of the earthy substances, are then given, the addition of very fine ivory black and some oil of turpentine is usually made to the oil. These coatings are put on very thin and when carefully dried the leather is rubbed over with fine pumice stone powder to render the surface perfectly smooth and even for the reception of the varnish. The varnish is composed as follows:—10 pounds of oil prepared as above, half a pound of asphalt or Jewish bitumen, 5 pounds of copal varnish and 10 pounds of turpentine. The oil and asphalt are first boiled together, the copal varnish and turpentine added afterward, and the mixture well stirred. Instead of asphalt, Prussian blue or ivory black may be employed. This varnish must be kept in a warm place for two or three weeks before it is fit for use. The greatest possible care must be taken both before and during the application of the varnish to prevent the adherence of any dust to the leather. The leather when varnished must be put into drying stoves heated to about 200° or more, according to the nature of the leather and the varnish employed.

Glaze for Iron Vessels.—The iron vessels are cleansed perfectly in weak sulphuric acid, then washed well in soft cold water and dipped into a thin paste made with quartz melted with borax, feldspar and clay free from iron, reduced into an impalpable powder with sufficient water to make it into a thin paste. After the vessels are dipped in this paste, or the said paste laid on with a brush, they are powdered in the inside with a linen bag containing a very finely pulverized mixture of feldspar, carbonate of soda, borax and a little oxide of tin. They are then left to dry for some time in a clean place, then highly heated in an enameling furnace. This coating is very white, and resists the action of heat, acids and alkalies. The great defect in coating iron vessels for cooking or to be used and exposed to great changes of heat and cold, is the expansion and contraction of the metal which soon scales off the glazial covering.

Axle Grease.—First, 1 part of fine black lead, ground perfectly smooth, with 4 parts of lard. Some recipes add a little camphor. Second, Booth's axle grease (expired patent).—Dissolve half a pound of common soda in 1 gallon of water, add 3 pounds of tallow and 6 pounds of palm oil (or 10 pounds of palm oil only), heat them together from 200° to 210° Fah.; mix and keep the mixture constantly stirred till the composition is cooled down to 60 or 70°. A thinner composition is made with half a pound of soda, a gallon of water, a gallon of rape oil and a quarter of a pound of tallow or palm oil.

Useful Alloy.—An alloy used at the calico printworks of Mulhausen, France, consists of bismuth, 10.15 parts, tin, 57.23, lead, 31.15. It is used for printing patterns, which are first cut out of wood than transferred to the alloy by pressure. A good alloy for taps is made with copper, 2 parts, nickel, 1 tin, 1. These metals are first melted together and run into ingots, then cast in molds. The color of this alloy is like that of steel. It is very hard, takes a good polish, and is not acted upon by sulphureted hydrogen. It may also be used for bell metal as it emits a beautiful tone when struck.

MISCELLANEOUS SUMMARY.

Mountains of Silver.—The *Silver Age* of California, says:—From a pretty reliable source we learn that the Ophir Company are shipping weekly, from their works in Washoe County, the sum of not less than $60,000 in bullion, and some weeks it amounts to nearly $100,000 in value. At this rate the yield of the mine will probably reach the enormous sum of three millions of dollars this year. There are hundreds of mines, in our vicinity equally as good, which are undeveloped, but which only require the capital to make them yield similarly.

The Dunkers.—The section of Upper Maryland over which this fierce tide of war has recently rolled is densely populated, and in the immediate theater of these battles are the homes of very many peaceful Dunkers, a quiet order, whose fertile fields and large farm buildings tell of peaceful agriculture, and whose love of quiet and peace was thus fiercely invaded by the storm of shot and shell, and the dread spectacle of garments rolled in blood. They are non-combatants, and only small slaveholders.

The Way they do Things in France.—On the 20th of May 1837, a Commission, composed mostly of members of the Academy of Sciences, was appointed by the Minister of Finance to examine the various systems proposed to the French Government, for the bleaching out of manuscript. The sittings of the Commission continued for eight years, and their reports, deposited at the office of the Minister of Finance, form several volumes.

Appointments.—In thinking of some military appointments that have been made by the President, we are led to wonder who has his ear and heart that he should commission men to high station who are destitute of every quality, civil, military and moral, for their positions. Can it be that our cause can prosper under such leadership?

The flax crop in Ireland this year is said to be large and of superior quality. It is expected that more linen goods will be manufactured in Ireland next year, than have ever been made before. Owing to the high price of cotton goods, there will be a much greater demand for linen.

A return just issued states that in the year 1861 the county voters of England and Wales were 519,348 in number, and returned 160 members. The borough voters were only 467,563 in number, but they returned 338 members.

Anthracite coal is said to have gained such favor with the British Admiralty, as a substitute for bituminous, that instructions have been given for supplies to be furnished at New York to British men-of war arriving from the Bermudas.

The price of armor plates in England is $175 per tun. Each plate is submitted to a most rigid examination and test.

What has become of Winans's spindle-shaped steamer? We have been watching for its development with much interest.

A NATIONAL DISGRACE.

One of the most painful chapters in the military campaign, since the war began, has been enacted in the western department ever since the evacuation of Corinth. The national forces there seem to be without head or purpose, and while this disgraceful state of things has existed, the rebels have recruited their energies and have been allowed to overflank our army, and to over-run the hitherto loyal State of Kentucky. Its capital has been seized, and the lawful State Government is sent forth a hunted fugitive, "seeking rest and finding none." The richest portion of that State is laid waste, the rebel army is allowed to confront and threaten the commercial metropolis of the populous State of Ohio, and to retire unmolested to re-enforce another large army that had outrun and outwitted Buell; and now Louisville is in danger from these destructive hordes.

Such a state of things is in the highest degree dis-

graceful and humiliating, and takes heart out of those who freely give of their blood and treasure to uphold the Government. How long are these things to be? Echo answers, how long? Unless the war is conducted for the next three months on a different system, the contest may be regarded as well nigh hopeless.

ITEMS OF IMPORTANCE TO INVENTORS AND PATENTEES.

The following facts in regard to obtaining Letters Patent will be read with interest by many who have made what they suppose to be an invention, but are ignorant of what an invention (in a patentable sense) consists of. The patentee and assignee will also find some facts, under the appropriate headings, which will be likely to interest them :—

WHO IS ENTITLED TO A PATENT.

Any person, whether citizen or alien, may obtain a patent for any invention or improvement made by him, and not before known.

The assignee of any invention may have the patent issue to him directly, but this is held to apply only to assignees of entire interests; so that, although when the inventor assigns his entire interest to two or more, a patent will issue to them jointly; still if he yet retains a portion in himself, a joint patent will not be issued to him and them.

In case of the death of the inventor, the patent will issue to his legal representatives.

Joint inventors are entitled to a joint patent; but neither can claim one separately.

WHAT WILL PREVENT THE GRANTING OF A PATENT.

Even although the applicant has in good faith actually made an invention, a patent therefor will not be granted him if the whole or any part of what he claims as new had before been patented, or described in any printed publication, in this or any foreig country, or even if it had before been invented or discovered in this country, or if he has once abandoned his invention to the public; or if, with his consent and allowance, it has been for more than two years in public use or on sale.

The merefact of prior invention or discovery abroad will not prevent the issue of the patent, unless the invention had been there patented, or described in some printed publication.

Merely conceiving the idea of an improvement or machine in this country, is not such an "invention" or "discovery" as is above contemplated. The invention must have been reduced to a practical form, either by the construction of the machine itself, or of a model thereof, or at least by making a full drawing of it, or in some other manner equally descriptive of its exact character, so that a mechanic would be enabled, from the description given, to construct a model thereof, before it will prevent a subsequent inventor from obtaining a patent.

HOW IS THE INVENTOR TO KNOW THAT HIS INVENTION IS PATENTABLE?

A positive answer to this question is only to be had by presenting a formal application for a Patent to the Government, embracing a petition, specification, model, duplicate drawings, and the payment of the prescribed official fees. Aside from these steps, all that the inventor can do is to submit his plans to persons experienced in the business of obtaining patents, and ask their opinions and advice, or a special search may be made at the Patent Office by a competent person, to ascertain whether, among all the thousands of patents and models there stored, any invention can be found which is similar in character to that of the one under consideration.

MODE OF PROCEEDING TO OBTAIN A PATENT.

The application must be made by the actual inventor, if alive, even although the patent is to issue to the assignee, but where the inventor is dead, the application and oath may be made by the executor or administrator.

The law requires that the inventor shall, in all cases, furnish a model, which must not exceed twelve inches in any of its dimensions; it should be neatly made, of hard wood or metal, or both, varnished or painted; the name of the inventor should be engraved or painted upon it conspicuously. Where the invention consists of an improvement on some known machine, a full working model of the whole will not be necessary. It should be sufficiently perfect, however, to show, with clearness, the nature and operation of the invention.

Two sets of drawings, corresponding precisely with the model, and a clear and full written description of the invention—its mode of operation, the advantages claimed, &c.—must all accompany the model, with the amount of thefirst government fee, viz., $15.

THE IMPORTANCE OF THE SPECIFICATION.

Too much importance cannot be attached, by an applicant for a patent, to the manner in which the specification and drawings are prepared, as upon these will depend the legal value of the patent. Many inventors suppose that by taking the forms of specification, petition and oath prescribed by the Patent Office, they will have no trouble in getting an official decision upon their applications. This is an erroneous impression, and has led many applicants into great trouble and expense, much more than they would have incurred if they had employed, at the outset, a competent and experienced patent solicitor. While it is easy, comparatively, to prepare drawings for a patent, the specification should never be undertaken except by one who thoroughly understands the business.

STAMPING PATENTED ARTICLES.

It is customary, but not compulsory by law, that patentees should have their names stamped or engraved on the patented articles offered for sale; but the patentee is required by law to conspicuously stamp or engrave the precise date on which the patent was issued, upon each article.

EXTENSION.

Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1848 and 1849 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeking counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension; it must be done at the instance of the inventor, for whose sole benefit it is granted.

The petition for an extension must be filed in the Patent Office at least 90 days before the patent expires.

USING PATENTED DEVICES AFTER EXTENSION.

The benefit of an extended patent inures solely to the original inventor and patentee, or to his legal representatives. An assignee for the first term of the patent cannot exercise any right or interest under the extended patent. This question has been determined by a decision of the U. S. Supreme Court. Assignees, however, who were using patented machines at the time of the extension, still possess the right to use the same specific machines under the extended term of the patent, but this right does not cover the manufacture of new machines, or their sale to other persons.

Any information relative to securing Letters Patent, obtaining extensions, conducting interferences, infringements, &c., may be had by addressing the publishers of this paper. [See advertisement on another page.]

MUNIFICENT CONTRIBUTION FROM SAN FRANCISCO.

The citizens of San Franciso have contributed one hundred thousand dollars for the relief of the sick and wounded soldiers of the Federal army and navy. The money was forwarded on the 20th of September, and arrangements were made for its payment in New York immediately on the receipt of the telegram announcing the remittance.

Rev. Dr. Bellows, President of the Sanitary Commission, has sent the following reply :—

NEW YORK, September 22, 1862.

To S. H. F. Techenmacher, Chairman Central Relief Committee, San Franciso.

Your magnificent contribution will electrify the world! Thanks to God and to San Francisco for such unparalleled generosity. We shall make equitable distribution of your bounty. It will be stanching wounds and cooling fevered lips before this reaches you! On the strength of it, I telegraph our agents constantly to spare nothing on the battle fields of Maryland and Virginia, where we are disbursing hospital stores at the rate of five army wagon loads per day.

Your example will reanimate all our cities and towns. We shall lack nothing from New York, Boston, Philadelphia, Cincinnati, St. Louis, Chicago, when their already noble example is outstripped at a bound by the youngest great city in the nation—furthest from the seat of war and already nearest to the sick and wounded on her battle fields.

H. W. BELLOWS,
President of Sanitary Commission.

"DANDER UP."

It is reported that the President has at last got his "dander up," and that henceforth he will hurl the whole power of the nation against those deluded citizens who rebel against his authority. He declares that he only regrets he is not a military man, so that he might place himself at the head of the national forces and lead them, like an avalanche, against the rebellious hordes who have so impudently shaken their bloody banner in his face. Animated by such a purpose, and backed by a cabinet equally determined, there is hope at last that the national authority may speedily be restored. "Fear not Abram, for I am thy shield and thy exceeding great reward."

EXPLOSION OF AN ARSENAL.

A dreadful explosion occurred at the United States Arsenal, in the vicinity of Pittsburgh, on the 16th ult. There were about 150 young women and a few men employed in the arsenal, making fixed cartridges for the army, in what were called the laboratory buildings. It was here where the first of several explosions occurred, and the buildings were instantly shattered to atoms, and the bodies of many of the inmates carried up with the fragments of the structures. No less than eighty of the female operatives lost their lives by this calamity. The cause of the catastrophe is at present unknown.

Condition of the Great Eastern.

The mammoth ship still lies in Flushing Bay, near New York, where the damage sustained by running on a rock off Montauk Point, on her last trip to this port, is being repaired. We learn that the reports of experienced divers show that the ship's bottom was opened by the rock along a single line of her outer plate for a distance of several feet. The inner "skin" or hull of the ship was not touched, and remains as dry as on the day of launching, and the vessel could proceed on her voyage across the ocean to-day with more safety than can any vessel having but a single hull. Nevertheless, her officers and agent are pushing forward her repair by a very simple method, tried once before in Milford Haven with entire success, and which has the approbation of distinguished American engineers.

The mode is curious and interesting as it is simple. A large scow, with sides of proper hight, is preparing to be used as a cofferdam. It is made to fit the bottom of the vessel at the point of fracture, and its edges are paddled so as to close perfectly over any inequalities that may be found upon the hull. At the side of the scow (or cofferdam) are two shafts or manholes, which will pass up the side of the ship, reaching above the water's edge when it shall have been adjusted to its place. The scow when sufficiently sunken will be floated under the ship's hull, and fastened securely in position by chains hove taut. This done, pumps inserted in the manholes will free the scow of water, and admit the men and materials to repair the damages. It is believed there will be no difficulty in making the vessel just as perfect as before she touched the rock. A few days more will give us the result of the experiment—if that can be called such which has already been once successfully accomplished. In the meantime, advantage is being taken of the opportunity to thoroughly overhaul, paint and refurnish the *Great Eastern* from stem to stern.

THERE were only thirty inches of water in the channel of the Ohio on the 11th ult. The stream was still falling.

THE students of Princeton (N. J.) College, in view of the possible invasion of our borders by the rebels, are drilling nightly.

RECENT AMERICAN INVENTIONS.

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

Apparatus for Distilling Oils.—This invention consists in an improvement on the rectifier, which constitutes the subject matter of Letters Patent granted to the same inventor April 9, 1861, also in an improved purifier combined with such rectifier ; and further, in an improved arrangement of one or more such rectifiers and mode of supplying the oil to the rectifiers and the retort, by which several improvements, besides accomplishing all that is secured by the above described rectifier, provision is made, first, to supply the still continuously with oil freed from water or explosive vapors during the process of distillation ; second, to cause a continual stream of oil to run from separate condensing chambers after having been completely rectified and agitated in contact with chemicals, while distilling and condensing ; third, to distil oils at the lowest heat necessary to convert them into vapor, and so lessening the quantity of permanent gas produced in the distilling process ; fourth, to cause the vapor of the heavier oils on their way toward the condensing apparatus to melt the crude oils on their way to the still, and so to heat the latter oils to such an extent as to extract therefrom the lighter oils ; and fifth, to extract from crude petroleum or coal oil all of the products which are best suited for illuminating purposes and leave a more unctuous oil for lubricating or other purposes. Abraham Quinn, of New York city, is the inventor of this process.

London Exhibition—Chain Cables.

Excepting in the Navy Yard at Washington, we have been informed, no chain cables are manufactured for ships in America. All our cables are imported from England. As the safety of a vessel is so frequently dependent upon its cable, all information connected with the manufacture of cables is of great interest to our shipowners and seamen. The following on the chain cables at the great Exhibition is from *Mitchell's Steam Shipping Journal* :—

We will notice those of a new pattern exposed at the great Exhibition. As the medal for the strongest chain has been awarded by the jury to Sisco and Sinibaldi's patent plan, we shall describe it first. The links of this chain are oval in shape, made from hoop iron, galvanized and brazed. The hoop is wound on a reel by a machine, the invention of the patentees, till the thickness required is secured. It is then passed through a furnace of molten metal, and afterward rounded off for the completion of the latter operation of brazing. Between the links there is a stay as in the ordinary chains. The principle may be understood by taking a long slip of paper or tape and rolling it round the hand, lay upon lay, till the necessary thickness of a chain is gained, then placing a stay across the inner part of the oval thus formed, and a good idea is obtained of Sisco and Sinibaldi's rolled hoop link. The advantages of this make are the doing away with welding, and increased strength. In a common chain one bad link destroys the security on which a ship is held, and unless a chain is severely tested a flaw or imperfect weld may send a vessel and crew to destruction. Sisco and Sinibaldi overcome this defect in welding, which makes the iron brittle by making rolled hoops homogeneous. They coil the hoops cold, and the dipping the chain into molten metal, by heating every part equally, consolidates the layers into one mass and constitutes a really strong chain. In rolling hoop iron in this manner there is danger of fracture at the bend ; but where there are so many consecutive layers the fracture of one is of no serious consequence, for its weakness is counteracted by the liquid metal which enters and brazes it to the hoops on either side. The strength of this hoop chain must be comparatively great ; for every layer has a skin, and each link is made of sixteen layers, so that the chain is never likely to snap. If one skin is broken the other fifteen may be intact, and the breakage of one skin will give warning to the crew, whereas, by the existing chain there is no premonition and the snapping is sudden. In this respect the patented chain of Sisco and Sinibaldi partakes of the character of a rope whose strands give before it breaks. The links of a good iron cable will be elongated before it parts, but bad iron snaps without distending. Weight for weight this chain must be considerably stronger than the old manufacture, and if it can be sold cheaply, or at the same price as chains of corresponding dimensions, which is said to be the case, it ought to take largely, for a vessel need not have such heavy chain as is now demanded. The Admiralty strain for a 2-inch chain is 72 tuns. A chain this same size, made from rolled hoop iron was tested at her Majesty's yard at Woolwich. It was attached to a testing chain of 2½ inches in diameter, and on the hydraulic power being applied one of the links was lengthened ⅝ths of an inch, and the other ⅛th of an inch, when it reached a strain of 110 tuns, and the 2½-inch testing chain broke off in two places when the strain reached 114 tuns. The hoop-iron chain had some openings in one of the links, which had been imperfectly brazed, but it did not appear to have been made otherwise defective. One link of the same dimensions, 2 inches thick and 2 inches broad, was afterward placed in the testing frame, and when a strain of 70 tuns was applied it had lengthened $\frac{1}{12}$th of an inch ; with 80 tuns, ⅛th of an inch ; with 100 tuns, $\frac{5}{16}$ths of an inch ; with 110 tuns, ¼th of an inch ; with 115 tuns, $\frac{3}{16}$ths of an inch, and when it reached 120 tuns strain it was considered advisable not to continue the strain, as it was so great as to loosen the stone frame on which the machine rested, and liable to damage other parts of iron frame of the machine. The strain applied on this occasion was one tun more than had ever been previously applied, and the hoop chain was only slightly opened on one side. Here, then, is a safe-holding chain, and when galvanized, a clean one, and if all that is reported of its properties be true it ought to be extensively employed. It cannot be called new, for it has been patented a few years ; but the widow of Mr. Sisco, the original patentee, had not the means of bringing it into use. The Duke of Buccleugh, it is said, for a humane object has purchased the patent right, and those who wish to see the chain itself will find it in the Machinery Department, where the lady herself is the exhibitor, and is generally present to explain the mode of manufacture.

Vessels for Containing Milk.

A correspondent of the *Cincinnati Gazette* truly says :—There is no product of the farm that presents so much difference as butter. This arises chiefly from using vessels for holding the milk, and utensils in making the butter, which are soured. In my notice of the effects of having soured troughs in sugar making, I stated that acidity was fatal to good sugar making. It is not less so in butter making. Milk has a peculiar acid very easily formed, which entirely takes away that rich, sweet, fine flavor, belonging to good butter. A very little soured milk or cream on vessels rapidly generates enough acid to take it away. To avoid this, great care is requisite. Cleanliness only is not sufficient in having the vessels well washed, but they must be carefully washed in boiling hot water, and should be boiled in it also. But as the cream is very apt to stick, even in good washing, when the vessels are boiled in water, some pearlash or soda should be put in it, which destroys any acidity that may be about the vessels. They should then be well sunned. I have known some good butter makers who dispensed with the sunning when soda was used, but both are to be commended.

Professor Voelcker, of the Agricultural College, England, has paid much attention to the kind of pans for holding milk to obtain cream. His own conclusion is that the great point consists in having a shallow pan with a perfectly smooth surface. He states that good dairy women had found by experience that shallow pans throw up more cream than others, and keep the milk better. The more free the current of air through a dairy, the better ; but damp air is injurious to milk.

It has been found that a pan not exceeding two inches in depth is best for obtaining butter in summer, and in winter pans about four inches in depth appear to be the best.

The navy upon the Mississippi is now being reorganized, and a number of additions will be made to it. By the time the fall freshets rise the Mississippi fleet will be in readiness to go to the mouth of the river.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING SEPTEMBER 16, 1862.

Reported Officially for the Scientific American.

36,444.—Samuel Barnes, of Rochester, Mich., for Improved Millers' Stone Staff :

I claim the application of a back of iron or other equally firm and inflexible metal material or substance, to a surface of wood or other porous material capable of holding paint or other coloring matter for the purpose indicated, without warping, expanding or contracting, and also the application of the spirit level to such instrument, for the purpose indicated.

36,445.—Alexander Beckers, of Hoboken, N. J., for Improved Steering Apparatus :

I claim the conical grooved drum and endless rope or chain in combination with the sheaves, h and i, connected to the rudder head, as and for the purposes specified.

I also claim the screw, f, and recess in the wheel, c, to tighten the chain, e, in the manner specified.

36,446.—Edwin Bement, of Fostoria, Ohio, for Improvement in Plow Beams :

I claim the lateral braces, C C, attached to the clevis at any point, and to the hinder part or downward curve of the beam, or to the standard, by means of the lugs, B, or their equivalent, in combination with the slot, H, and clevis bolt, I, all the parts being constructed and operating substantially as and for the purpose set forth.

36,447.—Edwin Bement, of Fostoria, Ohio, for Improvement in Plow Points :

I claim the ribs, B C, both above and below the plow point proper, for the purpose of protecting the corners from wearing off or becoming rounded by use, and also to strengthen the point against a vertical strain and thus preserve it from being broken, as specified.

36,448.—Wm. Billinghurst and J. Requa, of Rochester, N. Y., for Improvement in Platoon Battery :

We claim, first, The combination of the barrels, B, operated as described, with the cartridges, g, and breech bar, E.

Second, The employment of the cartridge holder, or clamp, D, constructed substantially in the manner and for the purpose set forth.

Third, The employment or use of the rest or guide, W, constructed and operating substantially in the manner and for the purposes specified.

Fourth, The employment of the breech bar, E, in combination with the backing plate, P, when they are arranged and operated so as to automatically throw the hammer, U, back.

36,449.—William Boekel, of Philadelphia, Pa., for Improvement in the Application of Soft Metal Packing to Projectiles :

I claim, first, The described method of producing and attaching the soft metal expanding cup or packing band to the projectile.

Second, The described process of reducing the diameter of metallic expanding cups or bands to the exact dimensions required and embodying the same with the iron by the application of a draw plate or its equivalent, substantially in the manner and for the purpose specified.

36,450.—Job Brown, of Lawn Ridge, Ill., for Improvement in Device for Preventing Swine from Rooting :

I claim a spring pendant constructed and applied to the nose or snout of swine, substantially as and for the purpose herein set forth.

[This invention is designed as an improvement on the ordinary wire or ring which is inserted in the snouts of swine to prevent them from rooting.]

36,451.—C. W. Cahoon, of Portland, Maine, for Improvement in Lamps :

I claim a grooved clamp support for a vibratable chimney holder, substantially as set forth.

I also claim the combination of a grooved clamp support with a rimmed lamp head, substantially as set forth.

36,452.—M. L. Callender, of New York City, for Improvement in Vapor Burners :

I claim, first, Constructing the side wings, F, with open centers for the admission of air, as herein shown and described.

Second, The combination with the pipe, D, of the self-acting valve rod, d, as herein shown and described.

Third, The construction of the wings, E E, with the upper edges of their inner faces bent or ribbed, so as to form spaces or interstices for the admission of air to the flame, substantially as herein shown and described.

[This invention relates to burners for the vaporization and combustion of the vapors of the heavier volatile hydrocarbon liquids, such as naphtha or camphene, and its object is to provide for the vaporization of the liquid more effectually than heretofore, by heat, before the arrival of the vapors at the mouth of the burner, and for the more perfect combustion of the vapor ; also for regulating the supply of vapor to the burner, and its stoppage when the light is extinguished, and for the cleaning of the pipes or chambers.]

36,453.—Theodore Clough, of New York City, for Improvement in Preparing Petroleum for the Manufacture of Illuminating Gas :

I claim, as a new manufacture, the gas-making oil obtained by treating petroleum substantially as described.

36,454.—C. O. Crosby and Henry Kellogg, of New Haven, Conn., for Improved Manufacture of Tape Trimmings :

We claim, as a new article of manufacture the finished tape trimming folded and stitched by machinery and constituted substantially as herein described, that is to say, of a continuous length of tape in folds, presenting a succession of points and held as folded by a continuous line or several lines of stitches, making a continuous seam or seams along the length of the finished article.

36,455.—R. E. Deane, of New York City, for Improvement in Cooking Stoves :

I claim the combination with the hot plate of a crossbar, having a channel cast therewith on the under side thereof, so as to be interposed between the fire and the hot plate of which said bar forms a part, and provided with induction and eduction pipes, as specified, for the purpose of circulating and maintaining water within the hot plate, and heating the water while preserving the said plate from injury by the heat.

Also the form and arrangement of a channel or channels, as set forth, with a three-oven flange, or the equivalent thereof, substantially as described.

36,456.—G. F. Degelow, of Bethlehem, Pa., for a Process for Imitating the Grain of Wood, &c. :

I claim the above-described mode of imitating the peculiar porous appearance of the grain of various woods, on paper, leather, oil cloth, wood, metal or other suitable material, by first covering the materia

with a coat or coats of color, and then, preparatory to the usual process of graining and varnishing, imprinting on the colored surface numerous small indentations, resembling the pores of the wood to be imitated, by means of a suitable instrument provided with a number of sharp points and edges, all as above set forth.

36,457.—F. A. De Mey, of New York City, for Improvement in Mounting Field Ordnance :

I claim, first, The combination of a gun, front shield, revolving table and supporting carriage with a provision for the recoil of the gun when fired in any direction thereon, the whole being arranged to operate as artillery either in a state of rest or of motion without necessary attention, substantially as described.

Second, The employment in a carriage for ordnance, substantially of the character herein described, of the slides, C D, and of springs controlling the motion thereof, arranged to operate as herein set forth, and this I claim irrespective of the precise construction of the springs.

36,458.—S. F. Emerson, of Seville, Ohio, for Improved Clothes Wringing Machine :

I claim mounting the rollers directly upon the tip of the springs, E F, in the manner specified, in combination with the bar, A, and adjustable gripes, G G, the several parts being constructed and arranged substantially as and for the purpose described.

36,459.—Wm. F. Goulding, of Providence, R. I., and Frank Cheney, of Hartford, Conn., for Improvement in Drop Presses :

We claim, first, The combination of a strap, C, either flexible or otherwise (as distinguished from a belt), or its equivalent, in combination with a pair of friction pulleys, D D′, substantially as described, for the purposes specified.

Second, The combination of a friction drag, m l, with the strap, C, or its equivalent, substantially as described.

Third, The combination of the adjustable supporting stop, b, and the hammer, A, substantially as described.

Fourth, The combination and arrangement of the hammer, A, with both the adjustable stops, a and b, when the latter are combined with each other to arrest the furtherascent of the hammer and to sustain it at any given point, substantially as described.

36,460.—Royal Hance, of Piscatonia, Ill., for Improvement in Harvesters :

I claim, first, The fulcrum lever, F, fulcrum wheel, F′, fulcrum post, H, and lever, I, in combination with the draw bar, C, machine frame, C′, and platform frame, A, arranged and operating as and for the purpose specified.

Second, I claim the adjustable frame, N N′, the standards, O O′, and curved bar, O,″ when arranged as and for the purpose specified,

36,461.—L. T. Hazen, of Coventry, N. Y., for Improved Mode of Securing Crossbar and Shafts to Vehicles, &c.:

I claim, first, Incasing the ends of the crossbar and shafts in the socket thill iron, and securing the same with internal wedges in the manner as and for the purposes herein set forth.

Second, I claim the oil chamber, i, in the clip iron, F, in combination with the rolling socket, I, and the shaft or thill iron, A, the whole being constructed and operating substantially as herein specified.

36,462.—A. A. Hibberd, of Hermitage, N. Y., for Improvement in Machines for Setting and Upsetting Saws :

I claim the dies, D and E, and their arrangement substantially and for the purpose specified.

36,463.—Thomas Higgins, of Bow, England, for Improved Machine for Filling Dipping Clamps in the Manufacture of Matches, Tapers, &c. :

I claim the mechanical means above described for arranging splints, tapers and matches parallel to each other and discharging them into suitable dipping clamps.

[This invention relates to a novel arrangement of machinery, whereby the splints, tapers, or matches intended to receive on their ends a coating of composition that will ignite by the application of friction, may be arranged with facility in clamps, ready to undergo what is known as the dipping process, which is the process by which the phosphoric compound is applied to the tips of the splints, tapers, or matches.]

36,464.—D. A. Hopkins, of Brooklyn, N. Y., for Improvement in Tiges for Firearms :

I claim, first, Two or more openings connecting the rear end of the charge with the cone, whereby the charge is first fired upon opposite sides of the tige at the same instant, for the purpose stated.

Second, The passage, o, or its equivalent, and the combination thereof with lateral openings located and connecting therewith, substantially as shown and described, whereby flame may pass from a point or points at or near one end of the charge to a point or points at or near the other end thereof without igniting it at or near the center, for the purpose set forth.

Third, The powder chambers, n and r, located and arranged substantially as shown and described for the purpose specified.

36,465.—B. B. Hotchkiss, of Sharon, Conn., for Improvement in Percussion Fuse for Explosive Shells :

I claim the weakly-connected plunger, G, and a weight, H, so arranged as to stop the orifice in the back of the case, C, until the discharge of the cannon and so to open the orifice certainly at the instant of said discharge and no longer maintain any connection between the plunger and the weight, all substantially as and for the purpose herein set forth.

36,466.—F. W. Howe, of Providence, R. I., for Improvement in Breech-Loading Firearms:

I claim the projecting ferrule at the rear open end of the barrel, substantially as described, in combination with the movable breech, or the equivalent thereof, having a cavity in its face to fit over and enclose the said ferrule, substantially as and for the purpose specified.

I also claim, in combination with the movable breech, and the catch for securing it when closed, the sector or equivalent projection, on the cock or hammer, which prevents the hammer from being lifted from the nipple when the breech is not entirely closed, and which prevents the breech from being closed when the hammer is at half or full cock, substantially as and for the purpose described.

36,467.—Samuel Huson, of Jacksonville, N. Y., for Improvement in Grain and Straw Separators :

I claim attaching the upper ends of the vertical arms, E, of a grain and straw separator, to the rods, F, and their centers to the cranks, B, for the purpose of transmitting to the pickers, G, a horizontal elliptical movement, in the manner and for the purpose described.

36,468.—William Kingsley, of New York City, for Improvement in Igniting Explosive Shells :

I claim making fuse shells with a tube or passage from the rear end to the fuse in front, substantially as and for the purpose specified.

36,469.—J. K. Seedy, of Bloomington, Ill., for Improved Sugar Evaporator :

I claim, first, The water reservoir, 1, and sorghum reservoir, 2, constructed and arranged, substantially in the manner and for the purposes specified.

Second, The construction and arrangement of the scum-condensing pipes, 9, for collecting the scum at the edge of the boiling pans, 4 and 5, substantially as herein specified.

Third, The construction and arrangement of the scum-condensing shield pipes, C, for shielding pipes, 9, from the action of the fire, substantially as herein set forth.

Fourth, The construction and arrangement of the water or steam boilers, A, and the fire flues, 8, operating substantially as hereinbefore specified.

Fifth, The channeled steam pipe, 6, with or without the "pitch-offs," W, operating substantially as herein set forth.

Sixth, The combination and arrangement of reservoir, 1, pipe, J, and stopcock, P, operating as set forth, for cleaning the steam heater, 3, and boiling pans, 4 and 5, and pipe, 6.

Seventh, The combination of the still, 7, with the pipe, 6, when operating, substantially in the manner and for the purposes hereinbefore set forth.

36,470.—David Maydole, of Norwich, N. Y., for Improved Skate Fastening :

I claim, first, The hook, F, and plate, G, employed in the manner described, in combination with a T or hook-shaped sole fastening, operated by a lever, J or J′, substantially as set forth.

Second, The T-shaped bolt, I, sole plate, H, and lever, J′, in combination with the pins or screws, h h′, or their equivalents, and ridge, n, when arranged to operate in the manner and for the purpose set forth.

[This invention consists in having a hook at the back part of the heel plate of the skate, adapted to catch over a bar attached to the heel of the boot or shoe, to form a heel fastening, and in having a T-shaped bolt which protrudes through the sole plate of the skate, adapted to be turned in the slot of a plate attached to the sole of a boot or shoe, to form a toe fastening, the two devices combined forming a secure and reliable skate fastening.]

36,471.—Hugh McClinton, of Morrow County, Ohio, for Improved Apparatus for Evaporating and Defecating Sorghum Juice :

I claim the aforesaid apparatus for evaporating and defecating the juice of sorghum, consisting of said pans, strainers, faucets, pipes or tubes, and compartments, as combined in the manner aforesaid.

36,472.—Charles McIntire, of Easton, Pa., for Improvement in Culverts :

I claim, in the construction of culverts to be used in water and quick sands, the combination of the upper arch of brick or stone, with the lower arch of iron, when the latter is constructed with the flanges, B and C, the flange, B, being constructed to suspend the lower arch upon piles, stringers, or their equivalents, and the flange, C, as a base support for the upper arch of brick or stone, in the manner and for the purpose herein described.

36,473.—John McKenna (assignor to himself, A. and T. McKenna, of Pittsburgh, Pa., for Improvement in Faucets :

I claim a faucet having a division in the shank, forming separate and distinct ways, with their outlets below the shank, and enabling the fluid to pass through both into the same vessel, or one to act as a fluid way and the other as an air vent, as occasion may require it, as herein set forth.

I also claim combining with the two-way shanks, L, the chamber, E, with the cut-off at its bottom, arranged below the line of the shank, for the purpose as hereinbefore stated.

36,474.—S. G. Morrison, of Williamsport, Pa., for Improved Lining for Coal-Oil Casks :

I claim the application of soap, substantially as and for the purpose specified.

36,475.—John Neff, of Prattsburgh, N. Y., for Improvement in Machines for Making Horseshoes :

I claim the cam lever, M, with its cam, b, in combination with the notch, L, provided with an inclined bottom, a, arranged substantially as herein set forth.

I also claim the device for forming horseshoes, consisting of the block, A, provided with a curved guide, D, creaser, E, punch, G, openings, I K, inclined notch, L, and cam lever, M, the whole arranged, combined and operating substantially as and for the purposes herein specified.

36,476.—G. W. Parrott, of Lynn, Mass., for Improved Machine for Nailing on the Soles of Boots and Shoes :

I claim, first, The vibrating block, K, for cutting off the nail, when the block is hung on an eccentric, m3, by which it is raised to relieve the pressure on the shoe, whilst the shoe is being fed along under it, substantially in the manner set forth.

Second, I claim inclining the nail rod or strip, t, to the block or cutter, K, to cut the nail tapering and turning over the strip after each cut, to present the nail to be driven with its point down, substantially in the manner specified.

Third, I claim the clamps, r, and the parts connected therewith for feeding forward the strip, t, in combination with the mechanism for revolving the said strip, substantially as described.

Fourth, I claim the sliding block, F, pin, 12, and grooved cylinder, I, for revolving the strip, t, substantially as set forth.

Fifth, I claim the adjustable braces, k and u, for setting the nail rod at any required inclination to the block or cutter, K.

Sixth, I claim the mechanism substantially as described for feeding the shoe and turning it round to place the row of nails around the heel and toe.

Seventh, I claim adjusting the lever, g3, so that the dog, i3, on it shall strike the head of the dog, h3, or other stop, at part of the vibration of the lever, and thereby vary the feed, to make the spaces between the nails different along the sides of the shoe and around the heel and toe.

Eighth, I claim placing the cog wheel, y2, eccentric to the disk, T, so that it shall engage with the rack, w2 or x2, which may be on the upper side, substantially as specified.

Ninth, I claim the plate, g2, applied to the sole of the shoe, in the manner and for the purpose specified.

36,477.—J. N. Pease, of Harmony, N. Y., for Improvement in Horsepowers :

I claim the stationary wheel, A, in combination with the radial traveling frame, H, provided with the vertical shaft, I, which is connected by gearing with the wheel, A, so as to communicate by the traveling of frame, H, motion to the central shaft, D, by the rope or belt, K, substantially as and for the purpose set forth.

I further claim the double sunken gear, a a′, or equivalent teeth or cogs in the periphery of the wheel, A, in combination with the double pinion, C C′, on shaft, I, when said parts are arranged as shown, and used in connection with the traveling frame, H, and central shaft, D, as and for the purpose specified.

[The object of this invention is to obtain a horsepower of simple construction, which may be manufactured at a small expense, and still be strong and durable, and arranged in such a manner as to transmit the power of the animal to the machinery to be driven, with but little loss by friction.]

36,478.—C. H. Phelps, of New York City, for Improved Can or Tank for Coal Oil :

I claim, first, A sheet metal can or receptacle, provided with a faucet inserted in a screw plug, for the purpose specified.

Second, The constructing of the faucet with two screws, substantially as shown, when used in combination with the screw plug, as and for the purpose herein described.

[The object of this invention is to ob ain a can or receptacle for coal oil, which will effectually prevent all leakage or evaporation from the same, and admit of the oil being drawn from it as required for use, and also admit of being readily filled when necessary, and conveniently transported from place to place.]

36,479.—F. A. Pratt, of Hartford, Conn., for Improved Tool Rest for Turning Lathes :

I claim the combination with the feed carriage of a turning lathe of a vertically-movable tool clamp carrier, a vertical guide, so arranged as to confine the movements of all parts of the carrier in perpendicular lines, and an adjusting screw, independent of the tool clamp, for moving the carrier, substantially in the manner and for the purpose hereinbefore set forth.

I also claim the combination with the movable tool clamp carrier, its described vertical guide, and its independent adjusting screw, of the set screw, L, so arranged as to clamp the carrier in its guide, substantially as hereinbefore described, for the purpose set forth.

36,480.—H. W. Putnam, of Cleveland, Ohio, for Improved Clothes Wringer :

I claim casting around the body of the iron shaft, an alloy of metal, with collars substantially as described, this alloy covering being interposed between the iron shaft and the rubber covering, for the purpose of protecting the iron shaft from the corrosive action of the sulphur contained in the vulcanized rubber, as herein specified.

36,481.—Abraham Quinn, of New York City, for Improvement in Apparatus for Distilling Petroleum and Other Oils :

I claim, first, The still-neck, B, constructed with dams, y y, and having pipes, b and y′, and applied in combination with such dams, substantially as herein specified.

Second, The basins, P P′, placed within the chambers, C C′, of the rectifiers, and in combination with the pipes, Q Q′, substantially as herein specified.

Third, The perforated diaphragms, p p p′ p′ p2 p2, arranged within the rectifiers, substantially as and for the purpose herein described.

Fourth, The arrangement of several rectifiers, in combination with each other, with the still retort, and with the device or apparatus for feeding the crude oil, in such manner that the vapors of the heavier oils, on their way to the condensing apparatus, meet the crude oil on its way toward the still retort, and heat the latter oil to such an extent as to extract the vapor of the more volatile portions of it, before it arrives at the retort of the still, substantially as herein specified.

Fifth, The purifier, E, arranged in relation to the rectifiers, the feading apparatus, and the worm, E′, substantially as and for the purpose herein specified.

Sixth, The oil receiver, H, and chemical tank, I, and their pipes, S U, funnel, O, siphon, N, cocks, j k, and strainers, T T, the whole combined to operate substantially as herein specified.

36,482.—Barton Ricketson, of New Bedford, Mass., for Improvement in Rigging, and in the Spars of Ships and other Navigable Vessels :

I claim, first, The construction of the yards to fit around the mast, with a movable cheek piece, b, on one or both sides, substantially as and for the purpose herein specified.

Second, So applying the yards which fit around the mast, that they also slide up and down thereon, substantially as herein specified.

Third, Providing the yards with jackstays, constructed as herein specified.

Fourth, The attachment of the foot ropes to the yards, by means of rigid hangers, p p, so applied as to keep the said ropes outside of, and out of contact with the shrouds, substantially as herein specified.

Fifth, The traveling back and head stays, x y, applied and operating in combination with yards fitted over and around the mast, substantially as and for the purpose herein set forth.

Sixth, The combination of the revolving stays, 29 29, and outriggers, N N, applied to the mast, and in relation to the yards fitted around the mast, substantially as and for the purpose herein specified.

36,483.—Barton Ricketson, of New Bedford, Mass., for Improved Sails for Ships and other Navigable Vessels :

I claim, first, The attachment of top sails and courses to masts, by means of rods, Q Q, and metal slide-bows, P, or slides, T T, constructed and applied substantially as herein specified.

Second, The attachment of sails or portions of sails to each other, by means of slides, T T, secured to one, and fitted to slide up and down the leach of the other, substantially as and for the purpose herein specified.

Third, Fitting the lower and outer portions of a sail with a metal bar, X, constructed substantially as herein specified.

[The principal objects of this invention, and of the subject of the preceding claim, are to reduce the cost of the rig spars and sails of vessels, by a simple construction and arrangement of parts, to obtain increased speed by providing for the carrying of a greater area of sail without injuriously straining either the spars or the hull, and to facilitate the working of the sails, and thereby enable a vessel of a given tunnage to be worked by fewer hands. These inventions seem to have much merit, but they cannot be clearly explained without drawings.

36,484.—A. Robinson, of New York City, for Improvement in Fabrics for Roofing :

I claim a roofing fabric, made of woven strips of paper, or strips of paper and twine woven together, and cement, substantially as herein shown and described.

[The object of this invention is to obtain a cheap and durable fabric, to be applied to the roofs of buildings, to receive any suitable cement which may be used as water-proof covering. The invention is designed to supersede canvas and other fabrics which have been hitherto used for the purpose, as well as paper, which has also been used without any special preparation, but has not been found to be durable.]

36,485.—G. Sanford and J. E. Mallory, of New York City, for Improvement in Machinery for Breaking and Cleaning Flax and Hemp :

We claim the mode of operation, substantially as described, of one or more pairs of fluted rollers for breaking and cleaning flax, hemp and other like fiber-yielding plants, which mode of operation consists in giving to the pair or pairs of fluted rollers which gripe the flax or other plant, a reciprocating rotary motion alternately in opposite directions, the motion in one direction being greater than in the opposite direction, substantially as and for the purpose described.

36,486.—Thaddeus Selleck, of Greenwich, Conn., for Improvement in Traction for Locomotive Engines :

I claim the employment of granulated Franklinite metal, as a means for producing traction or adhesion of locomotive-engine wheels on the track, as set forth.

36,487.—James Stimpson, of Baldwinsville, Mass., for Improvement in Journals and Journal Boxes :

I claim the above described application of an oil or lubricator chamber, C, and an annulus or collar, F, or its equivalent, to a journal and its box or bearing surfaces, the same being arranged substantially in manner and so as to operate as set forth.

I also claim when the journal and its box or bearing surfaces are so made, forming a groove, c, to extend diagonally across each of the bearing surfaces, substantially in manner as described and represented, and for the purpose set forth.

I also claim the above-described arrangement of the auxiliary or filling chamber, o, with respect to the main and side chambers, F C, the same being productive of advantages, as above set forth.

36,488.—John Tagliabue, of New York City, for Improved Apparatus for Testing Coal Oil :

I claim, first, The employment of the holes, c c, in the water bath, C, in connection with the mark, d, for adjusting the hight of the oil in D, for the purpose set forth.

Second, The employment of the glass capillary wick tube, H, for the purpose above described.

Third, Supporting the wick tube, H, by means of a poor conductor, for the purpose of preventing the transmission of heat from the flame, M, to the oil in D, substantially as herein described.

36,489.—J. N. Walker, of Cincinnati, Ohio, for Improvement in Railroad Car Brakes :

I claim, first, The hanger, H, shaft, I, operating upon the universal joint, J, and wheel, K, combined with the endless screw, H, in manner and for the purpose herein described.

Second, The worm wheel, K, combined with its two flanges, L L, and the double set screw, M, in manner and for the purpose herein described.

Third, The combination of the lever, P, constructed with a hole and slot in its upper end, with the cord, R R, adjustable ball, Q, spring, S, and connecting lever, O, in the manner herein described.

Fourth, The construction and arrangement of the hanger, H, with its projecting arms embracing the screw, F, upon the axle and in vibration therewith, and with the foregoing claims, in manner and for the purpose herein described.

36,490.—Allen Walton, of Philadelphia, Pa., for Improved Bung for Oil Casks :

I claim in combination with the stave of a coal-oil cask, the screw tube, B, with its flange, b, the screw plug, D, and its head, d, and the intervening washer, m, the whole being constructed and applied to the stave as set forth for the purpose specified.

36,471.—W. M. Warren, of Watertown, Conn., for Improved Foot Press :

I claim the combination of a weighted pendulous foot lever, toggle joint and slide or die, as herein before set forth.

36,492.—W. H. Willard, of Cleveland, Ohio, for Improved Marine Propeller :

I claim, first, Making the hub in sections corresponding in number, to the number of buckets, each bucket and its section of hub being united and forming one piece, as herein described.

Second, So arranging the key seats in the respective sections of the hub, that these may be adjusted in sets of four, three or two, as and for the purpose herein set forth.

36,493.—L. J. Atwood (assignor to Holmes, Booth and Hayden), of Waterbury, Conn., for Improvement in Lamps :

I claim, first, Forming the lower end of the wick tube flaming or bell mouthed, in the manner and for the purpose specified.

Second, I claim the ratchet cap, wick tube and exterior shell of the burner, in combination with the projections, 6 6, near the middle of the wick tube, and the bell mouth, 5, at the lower end of said wick tube, whereby the parts are held together as set forth.

Third, I claim fastening the lower end of the spring, h, against the side of the wick tube without solder, in substantially the manner specified.

Fourth, I claim the ratchet cap, i, with the notch, 7, in combination with the wick tube, e, and spring, h, for holding the said spring from moving sidewise, substantially as set forth.

36,494.—Lewis Guild (Willard Everett and Company), of Dedham, Mass., for Improved Rollers for Washing Machines:

I claim, the coating, a, and collars, C, cast unto the shaft, A, whereby the journals are protected from rust, and the wooden roll, B, is secured to the shaft, substantially in the manner described.

36,495.—Nathaniel Jones, of Homer, N. Y., assignor to L. I. Mabie, A. J. Manley and R. H. Morris, of New York City, for Improvement in Shoe Lasts:

I claim the sectional shoe last, a b c, formed in the manner specified with the measurement at the line, 4, as short as the measurement at the line, 6, for the purposes and as specified.

36,496.—Elisha Mets (assignor to himself and P. M. Bromley), of Rochester, N. Y., for Improved Extension Table:

I claim, the short metallic slides, E E, resting in grooves, b b, on opposite sides of the extension bars, acting as stops striking one against the other in extending the table; and the device for joining and locking the edges of the leaves and sections, consisting of the rounded tongue and groove, h i, catch pin, G, and spring hook, C, the whole arranged together and operating substantially as and for the purposes herein set forth.

36,497.—H. M. Whitmarsh (assignor to himself, J. O. Nash and E. D. Nash), of Abington, Mass., for Improved Fastening for Gaiter Boots:

I claim the above-described improved boot fastening, consisting of a gore or tongue piece, B, which is drawn down to expose the opening, a b, and is drawn up again to close and secure said opening, and which piece, B, is held in place by the ends, i, and clamps, c, substantially as specified.

RE-ISSUE.

1,344.—Richardson, Barnum and Company (assignees of Henry Movers), of Salisbury, Conn., for Improvement in Mode of Heating Molds:

We claim, a hollow mold or chill when heated by the introduction of steam, hot air, blaze or flame, for the purpose of heating the same to the proper temperature, to give a more perfect and uniform chill to the treads of cast iron wheels, chilled tyre, or other iron castings whose surfaces require to be hardened.

Notes and Queries

I. B., of C. W.—A patent was granted to Thomas Blanchard, Oct. 21, 1856, for bending wood by end pressure. This improvement has been used to some extent in the States. You could not obtain a patent in Canada for such an improvement now unless your laws are different from what we suppose them to be. You must be the original inventor of the article for which you solicit a patent.

J. B. T., of Ill.—We do not think a patent could be obtained for substituting cast steel for wrought iron in the manufacture of an article. It is a mere change of use that does not involve invention.

L. P. K., of N. Y.—If you have a debtor who refuses or cannot pay your just claims against him, and if you can get a receiver appointed there is no doubt of his right to sell the debtor's property including his patent right if he has one. The transfer of the patent by the receiver to the purchaser would undoubtedly be a valid act.

T. M. C., of Mass.—At the time of the receipt of your communication we had come to the conclusion that our readers were about tired of the discussion.

E. W., of New Brunswick.—Several patents have been taken out for apparatus for making gas from resin, grease, &c., but we cannot tell which is the best. The works of J. & W. Slater at Slatersville, R. I., have been lighted for several years with resin gas, and the apparatus works with entire satisfaction, but we have heard of some others which caused a great deal of trouble. If you should insert a short advertisement in the SCIENTIFIC AMERICAN stating what you want and giving your full address, you would get numerous answers with testimonials, &c., which would enable you to make a proper selection.

J. G., of C. W.—Brass chains are manufactured by Wallace & Son, at Ansonia, Connecticut, to whom we refer you for particular information.

R. T., of Md.—The great objections to a rotary steam engine have been the unequal wear of the rubbing parts, and the difficulty of keeping the pistons steam tight. Such engines are desirable on account of their compactness and their power of communicating rotary motion to shafting without intermediate gearing, but out of a very large number which we have seen tried, we know not one that is now in successful operation.

H. W., of N. Y.—If a rupture is caused in any weak part of a boiler by the steam at any pressure, say 100 pounds, steam cannot be generated afterward by the surplus heat in the water of the boiler to exceed the original pressure.

A. G. F., of Mass.—We presume that the only method of preventing nitrate of soda from deliquescing is to protect it perfectly from the contact of moist air. We suspect that experience will show that the gunpowder made from this salt must be used soon after it is manufactured.

W. A. B., of Vt.—There is no doubt that were it not for the resistance of the air, a body thrown vertically upward would descend with the same velocity as its ascent.

C. C., of Mass.—The subject of weaving has received great attention in Great Britain as is evidenced by the fact that up to 1860 nearly three thousand patents have been granted in that country for improvements in this branch of the arts. The first reference to it on record you will find in the Exodus Chap. xxxv. Verse 35, which speaks of "Wisdom to work the work of a weaver." England probably owes its great preëminence in manufacturing to the fact that about 1686, 50,000 manufacturers took refuge in that country in consequence of acts of religious persecution committed in France by Louis XIV.

P. A., of N. Y.—The quantity of metal deposited by the galvanic battery is just in proportion to the quantity of the current, and the quality of the metal depends upon the relation of the quantity of the current to the strength of the solution.

J. R. C., of N. Y.—As a turbine wheel is constructed with issues for a certain quantity of water, the useful effect of such a wheel is not equal to that of an overshot, when the supply of water is not proportional to the size of the buckets. We have no records of experiments having been made to test the power of turbine wheels under varying quantities of water, but builders of such wheels with whom we have conversed, admit they are not so suitable as overshot wheels for varying streams or for varying work. It is claimed that they are superior on steady streams for constant work, such as grinding grain.

D. H., of R. I.—There is little difference in the friction of different metals rubbing upon one another, when their surfaces are supplied with an unguent. It is generally supposed that there is less friction between the rubbing surfaces of two different metals such as an iron shaft in a brass journal box, than there is between two similar metals, such as iron upon iron. Morin, the French author, however, asserts from his own experiments with frictional surfaces, that this is an erroneous notion. Granular and not fibrous bodies should be selected for frictional surfaces. Close-grained cast iron and fine cast steel are the best, perhaps.

C. S., of Pa.—There is no special work published on the manufacture of turpentine. The spirits of turpentine are obtained by distilling the crude fluid that exudes from the pine tree, with about one-fourth of its bulk of water. Resin is left behind in the still after distillation.

S. S. W., of N. H.—The Niagara suspension bridge, which connects the New York Central with the Great Western Railway in Canada, is not the one which was erected by the late Col. Ellett, but was designed and constructed by John A. Roebling, of Trenton, N. J The first locomotive passed over the river upon it in March, 1855, we believe, and it appears to be as sound and strong to-day as the first day it carried the iron horse above the deep waters of the river underneath.

S. J. K., of R. I.—The native copper of the Lake Superior region is different in its structure from the native copper of other regions, and from manufactured copper. It is not crystalline, but dense and ductile resembling in this respect native gold.

W. W., of N. Y.—Permanent photographs in their native colors may yet be taken, but thus far they have baffled the efforts of some of the most skillful and persevering scientific men. Niepce de St. Victor has taken pictures in their native colors but he has never been able to fix them. He is still engaged in efforts to take and fix such colors.

R. H., of Mass.—The toredo, or ship worm, is found in the northern seas of Europe as well as in the waters of the American coast. No cement or paint has yet been applied to iron ships that effectually prevents the adhesion of barnacles and sea weeds, the same as copper protects the hulls of wooden vessels.

H. G., of Conn.—The *Great Eastern* with a moderate cargo draws 24 feet of water.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, September 17, to Wednesday, September 24.

H. & S., of Mass., $20; R. C., of Mich., $20; W. B. B., of Conn., $40; H. G., of Mass., $20; H. B. M., of N. Y., $20; T. R. P., of N. Y., $20; B. T. B., of N. Y., $40; W. S., of N. Y., $80; L. A., of Cal., $40; R. R. G., of Ill., $20; L. & W., of N. Y., $15; J. B. R., of N. Y., $15; T. F. R., of N. Y., $40; J. F. G., of N. Y., $20; W. & H., of R. I., $20; P. C., of Ill., $15; J. L., of N. Y., $15; P. J. & Co., of Del., $10; F. B., of Conn., $15; J. G. W. & others, of N. Y., $275; H. H. C., of N. Y., $10; J. L. S., of Ind., $10; F. B. S., of N. J., $120; O. L., of N. Y., $40; E. B. R., of N. J., $15; J. D. W., of N. Y., $25; H. N., of N. Y., $10; G. R. S., of Mich., $25; J. J. H., of Ky., $25; D. R. W., of Iowa, $25; H. & A., of Ill., $25; J. M. S., of N. Y., $10; T. H. R., of N. J., $25; L. P. H., of Iowa, $25; J. B. S., of Ill., $15; C. T., of N. Y., $10; W. C. S., of N. Y., $15; L. D. G., of N. J., $43; W. H. W., of N. J., $40; C. W. C., of Mich., $25; W. B. E., of N. H., $35; A. L. F., of N. Y., $25; A. C., of Mass., $10; N. P., of N. Y., $25; J. M. M., of N. Y., $12; J. J., of N. Y., $28; E. S., of N. Y., $28.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and in form us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from September 17 to Wednesday, September 24, 1862:—

B. T. B., of N. Y.; J. D. W., of N. Y.; W. H. W., of N. J.; J. M. M., of N. Y.; H. & A., of Ill.; J. J. H., of Ky.; T. H. R., of N. J.; J. L., of Iowa; D. R. W., of Iowa; L. P. H., of Iowa; W. B. E., of N. H.; J. J., of N. Y.; A. C., of Mass.; C. W. C., of Mich.; O. L., of N. Y.; A. L. F., of N. Y.; G. R. S., of Mich.; N. P., of N. Y.; E. S., of N. Y.

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The inventor of the leg here illustrated has had his own person to experiment on, having lost a limb and being under the necessity of wearing an artificial one. The construction of the limb will be readily understood by an inspection of the engravings.

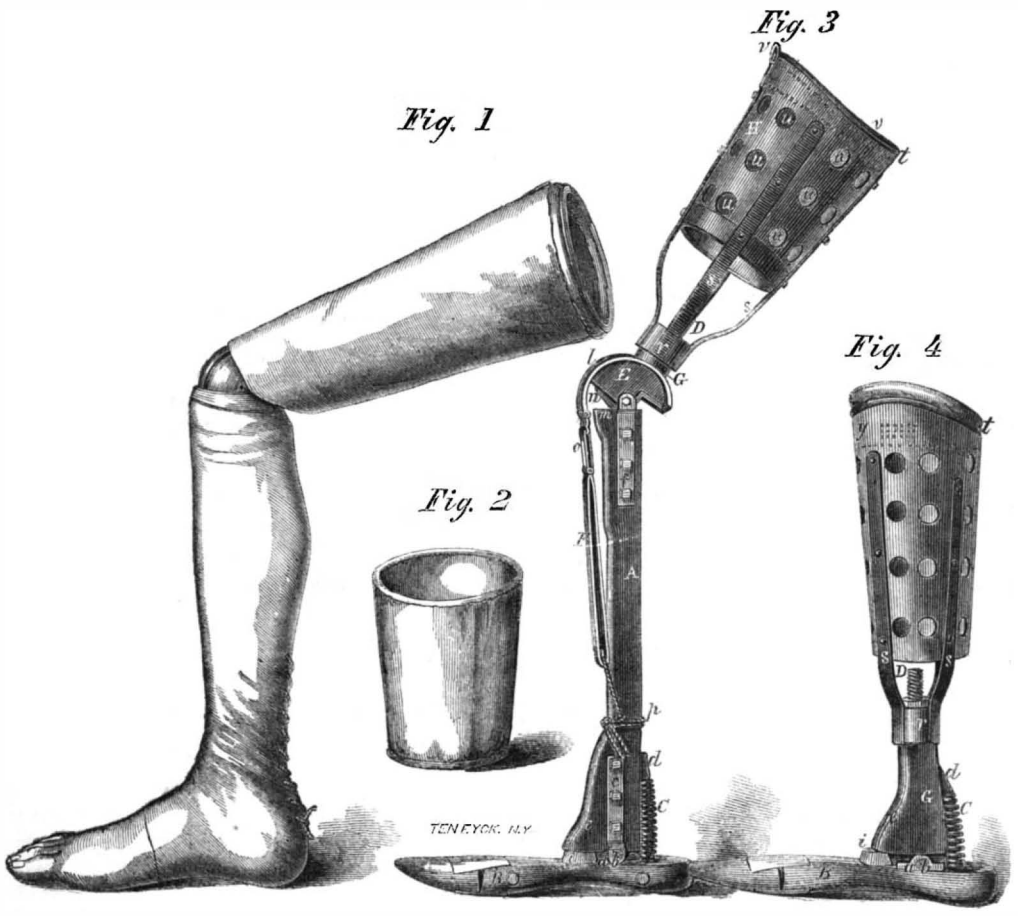
Fig. 1 represents the leg when finished, the leather covering being laced behind and under the foot; the calf of the leg being formed of hair or other suitable material, and the instep and heel being shaped with wood or cork. Fig. 2 represents the socket detached from its metallic case, H (see Fig. 3). This socket is molded directly over the stump or over a cast, and is made of thin felt lined and covered with leather.

Fig. 3 is an interior view of Fig. 1. The main support, A, representing the tibia of the human leg, is block, G, of wood is slipped over the spindle, D, and a metal cap, *r*, fits over the block and screws down upon it. From this cap, braces, *s*, are connected with the metallic socket, H. Two lock-nuts secure the parts when screwed down. The socket, H, can be screwed down more or less on the spindle, D, according to the length of the block, G, and thus the length of the leg may be accurately adjusted. The small holes, *t*, are for stitching the soft socket (see Fig. 2) into its case, H. The large holes, *u*, are for ventilation. The buckles, *v*, are for fastening the leg to the body. In Fig. 4 two straps are stitched to the socket, H, at the points, *f*, and meet in a buckle above the knee for supporting the leg.

In Fig. 4, which represents the construction of the leg for cases of amputation below the knee, the block, G, is extended in length and spreads out at the lower end to form the shoulder, *e*, for the same purpose as before described. The spindle, D, is pivoted at *b* directly to the plate, *a*, which is bolted as before to the foot-piece, B. In this case, as in the other, the final adjustment of the length of the leg will depend upon the length of the block, G, through which the spindle, D, passes.

The advantages claimed for this leg are: First, the main support is central rather than from the circumference. This peculiarity secures compactness, firmness and the best method of limiting the action of the knee and ankle by means of a shoulder and cushion. It also greatly facilitates the placing of the line of support exactly in its natural position. Second, the line of support is formed by means of apparatus not represented in thediagram, and which is believed never to have been used before. It is formed with half the weight of the body supported by the socket, which is so suspended that the stump is free to move in every lateral direction, and thus to assume the position due to it under the pressure. Third, there are two concentric sockets, the one of yielding material to be molded over the stump or a cast, and the other of sheet metal, serving as a light, firm and yet slightly elastic case for the soft socket. By this arrangement there can be secured, with absolute certainty, a perfect uniformity of pressure on all parts of the stump (the end of course always excepted), since all changes designed to equalize the pressure can be made between the two sockets by shaving or padding, as the case may be, the outside of the soft one. The two sockets are united merely by a row of stitches near the top, so that the soft one can be readily detached. Fourth, the socket is connected with the joints by means of a metallic cap and screw, which latter is one solid piece with the axle of the joints. This arrangement secures, with mathematical precision, the final adjustment of the length of the leg and position of the foot. It also facilitates the use of the firmest and most durable kind of joint, and one which is perfectly noiseless in its action. Another advantage of this arrangement is that it renders the leg easily dissectable. Fifth, the action both at the knee and the foot is limited by a shoulder and cushion. Thus all danger of excessive action is effectually obviated. Thus, too, the limb can be worn with a feeling of much greater security. The wearer feels equally secure against pitching forward, and against the opposite danger of having the leg give way under him. Sixth, by unlacing the covering (see Fig. 1) the cord which fastens the knee-spring can be reached (see Fig 3), and its tension varied to suit the comfort of the wearer. Seventh, in cases of amputation below the knee the necessity of an upper socket is superseded, and the leg is supported, as in the other class of cases, merely by a strap. If, however, owing to the shortness of the stump an upper socket is desirable, it can be applied as readily as in any other mode of constructing sockets.

The patents for this limb were granted June 24 and July 22, 1862. Further information in regard to it may be obtained of the inventor, Geo. B. Jewett, 50 Federal street, Salem, Mass.



JEWETT'S ARTIFICIAL LEG.

of wood, and to its lower end is hinged the foot-piece, B, to which a certain amount of motion is allowed as follows:—The foot-piece has attached to its upper side an iron plate, *a*, (not seen in the engraving) to which are hinged, at *b*, two metal straps, *c*, one on each side of A, fastened by bolts passing through A. A spring, C, is placed behind the piece, A, pressing against a stop, *d*, and the heel of the foot. As the weight is thrown upon the heel this spring is compressed, and as the step is completed a shoulder, *e*, on the front side of the piece, A, comes down upon an elastic pad, *i*, sunk partially into the foot-piece, and limits the vibration of the foot on its pivot. The thickness of this pad may be varied to suit the length of step or stride of the wearer.

To the upper end of the piece, A, are bolted two metal straps, *f*, one on each side, and to these is pivoted a metal spindle, D, that passes up through the blocks, E and G, and has cut upon its upper end a screw to receive the top of the metal cup, *r*. (This screw or spindle, D, may be seen in Fig. 4, but is concealed in Fig. 3 by the brace, S.) From the lower end of this metallic spindle projects a plate, *n*, which when the leg is straightened out comes in contact with, and rests on, a pad, *m*, attached to the top of the piece, A, which limits the motion of the joint forward. The outer side of the block, E, is circular, and has passing around it the metal band, *e*, to the front of which is fastened, by the leather strap, *o*, the spring, F, of elastic web or other suitable material. The lower end of this spring is simply tied at *p* to the piece A, so that its tension may be regulated.

The metallic case or socket, H, is connected with the spindle in the following manner:—A circular

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