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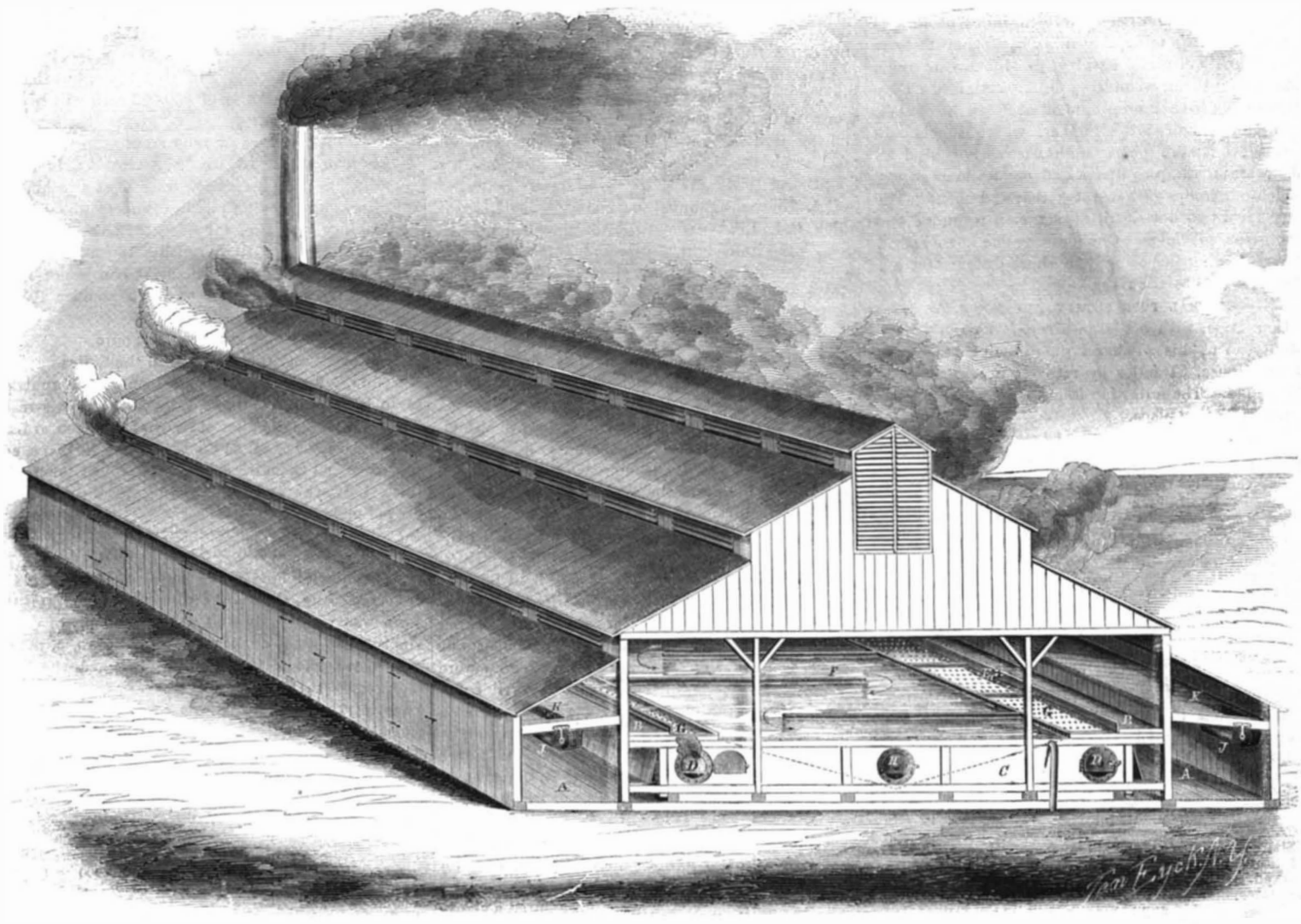

## CHAPIN'S APPARATUS FOR MAKING SALT.

### Improved Salt Evaporator.

The accompanying engraving represents a building and apparatus for making salt, invented by Nathan Chapin, of East Saginaw, Michigan. He says that he has tested the plan by a smaller apparatus (25 feet by 50) which he erected a year ago, and this cut is made from the drawings furnished by the builder who has the work in progress of erecting an establishment of the full size—70 feet by 124, and 35 feet high.

The principal portion of the building is occupied by a vat, C, 108 feet long, 45 feet wide and 3 feet deep. This vat is traversed throughout its length by two tubular furnaces, D D, and is filled with the saltwater to be evaporated. Floating in the water in the vat, C, is a second vat a little narrower, the sides of which converge to an angle in the middle as indicated by the dotted lines, and which is traversed by a tubular furnace, H.

The water is drawn into the vat, C, at the faucets, E, nearly over the hottest parts of the furnaces, D, and in this vat is subjected to sufficient evaporation to cause the deposit of the less soluble impurities, as the oxide of iron, the carbonate of iron and the carbonate and sulphate of lime. As the supply of the feed water is continued during this reduction of the mass by evaporation, a current is maintained backward, and when the brine reaches the rear end of the vat it flows upward through an orifice provided for the purpose into the upper vat where the evaporation is completed. The upper vat has partitions, F, extending a part of the way across it alternately from either side, so as to form a zigzag channel, through which the brine slowly flows to the forward end, depositing its salt by the way upon the inclined bottom of the vat.

The water having deposited its salt, still retains those impurities which are more soluble than the chloride of sodium, such as chloride of magnesium, chloride of potassium, &c., and is known as bitters or bitter waters. This is drawn off as often as is necessary at the front of the vat, and the salt is raked out upon the perforated platforms, G G, where the water drips from it into the vat below; the impurities which still adhere to it being washed off by the vapors which are condensed upon it.

It is then thrown into bins under the side walk, A. That portion intended to be ground for table use is more thoroughly dried by being spread upon the platforms, K K, after which it is ground by the cylinders, J J, which run against concaves sufficiently close to pulverize the salt, and then this portion also falls through the walk, A, into the bins below.

It will be perceived that in the engraving the fire room in front is omitted, in order to show the parts more clearly.

The apparatus represented in the above engraving will soon be thoroughly tried, and we are promised the results for the benefit of our readers.

The patent for this invention was granted March 18, 1862, and further information in relation to it may be obtained by addressing the inventor, Nathan Chapin, at East Saginaw, Mich.

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BRITISH COTTON MANUFACTURES.—In 1856 the estimated value of cotton manufactures in England was some $275,000,000. Of this $190,000,000 was exported; and only about $85,000,000 consumed in England. Over two-thirds of the whole amount had to seek a market in other countries. The domestic exports from Great Britain for the years 1858, '59 and 60, averaged over $638,000,000.

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COLT'S Armory, at Hartford, Conn., received an order on the 25th ult., for 30,000 pistols for the Government.

## NOTES ON MILITARY AND NAVAL AFFAIRS.

### GENERAL M'CLELLAN'S ARMY.

At about 1 o'clock in the morning of Aug. 1st., a night attack was made on McClellan's camp from across the James River by 3 batteries of 6 guns each, 6, 10 and 12 pounders, killing 5 of our men and wounding 2. A few shells filled with petroleum were also thrown with the intention of setting fire to our shipping, but the range was faulty and the vessels were not injured. The attack had been anticipated on our side, and in a few minutes the fire was returned from our siege guns with 20 and 32-pounder shells, and the rebel batteries were soon silenced.

### THE JAMES RIVER CROSSED.

In the afternoon of the 1st., 600 troops were sent across the river to destroy the houses and woods under the shelter of which the rebel batteries had been planted. The service was successfully performed. The South shore has since remained in the occupation of our forces. On Sunday Aug. 3d, they made a reconnoissance to within fourteen miles of Petersburg. At Cox's mills, five miles back, they met the Thirteenth Virginia cavalry in line. Our men charged on them, when they broke and ran. They drove them to their encampment at Sycamore church, two and a half miles further, where they again formed, but were put to flight, leaving behind all their tents, camp equipage and commissary stores, which our troops gathered together and burnt. The rebels had two horses killed, six men wounded and two taken prisoners. Our loss was one horse killed. After scouring the country a short distance further they returned to the river.

### GENERAL POPE SLOWLY ADVANCING.

Gen. Pope, with his large army, is now in Orange county, Va., his advanced guard being at Orange Court House, 81 miles by railroad northwest from Richmond. The following is his account of the advance upon that place.

HEADQUARTERS OF THE ARMY OF VIRGINIA,
August 3, 1862.

Major General HALLECK,

The reconnoitering column under General Crawford, crossed the Rapidan and pushed forward to Orange Court House yesterday, and took possession of the town, which was occupied by two regiments of the enemy's cavalry, under General Robertson.

Eleven of the enemy were killed, and fifty-two taken prisoners. Among the latter are one major, two captains, and two lieutenants. Our loss was two killed and three wounded. The enemy retired in such haste as to leave their wounded in our hands.

The railroad and telegraph line between Orange Court House and Gordonsville were destroyed.

JOHN POPE, Major General.

### THREE HUNDRED THOUSAND MILITIA CALLED OUT.

In addition to the 300,000 volunteers recently called for by the President, a draft of 300,000 militia is to be made for nine months' service. The following is the order for this draft :—

WAR DEPARTMENT,
Washington, August 4, 1862.

*Ordered First.*—That a draft of three hundred thousand militia be immediately called into the service of the United States, to serve for nine months, unless sooner discharged. The Secretary of War will assign the quotas to the States, and establish regulations for the draft.

*Second.*—That if any State shall not by the 15th of August furnish its quota of the additional three hundred thousand volunteers authorized by law, the deficiency of volunteers in that State will also be made up by a special draft from the militia. The Secretary of War will establish regulations for this purpose.

*Third.*—Regulations will be prepared by the War Department, and presented to the President, with the object of securing the promotion of officers of the army and volunteers for meritorious and distinguished services, and of preventing the nomination and appointment in the military service of incompetent or unworthy officers. The regulations will also provide for ridding the service of such incompetent persons as now hold commissions.

By order of the President.

EDWIN M. STANTON, Secretary of War.

### BOLD ATTEMPT TO DESTROY THE ARKANSAS.

On the 20th of July, Col. Alfred W. Ellet, Commander of the ram fleet on the Mississippi, addressed a communication to Flag Officer Davis, proposing to make an attempt to run down with one of his rams the rebel steamer, *Arkansas*, then lying under the guns of the Vicksburgh batteries. Commodore Davis immediately crossed the neck of land which separates his fleet from that of Commodore Farragut, and consulted the latter in relation to the enterprise. It was decided to permit Col. Ellet to make the attempt. The Commodores also agreed that the *Essex*, which is regarded as little less than invulnerable, should go ahead of the ram and attack the *Arkansas*, grapple her, and so distract her attention as to give the ram the best possible opportunity of butting her. Col. Ellet, on his part, agreed to furnish the ram *Queen of the West* for the enterprise, because of her superior power, speed and prestige, and the three commanders decided to make the trial the ensuing morning at daybreak. The *Essex* "coaled" and her crew were sent ashore to fill sand bags, which were packed on her upper deck immediately over the boilers. The *Louisville*, *Cincinnati*, *Benton* and *Bragg* also "coaled" and prepared for the attack. Col. Ellet, selected a volunteer crew for the *Queen*, and told his men in plain terms that he wanted no man to accompany him, who was not ready to risk his life in the project. In a few minutes a crew had volunteered, and declared themselves not only willing, but desirous to lend their services for the destruction of the rebel vessel. On Tuesday morning, July 22d, between 3 and 4 o'clock, Flag Officer Davis's fleet was under way, and with the *Essex* taking the lead, soon approached the bend above Vicksburg. The *Queen* and her gallant crew followed, and as soon as the firing commenced, her full head of steam was put on, and the devoted vessel steered direct for her formidable and dread-inspiring foe. The *Essex* had gone ahead, and as soon as the *Queen* came in sight of the *Arkansas*, the *Essex* was at least half a mile below. This disconcerted Col. Ellet, considerably, for he expected to find the iron-clad vessel in close quarters with the rebel gunboat. Just at this critical moment, too, Flag Officer Davis waved his hand from the *Benton*, to Col. Ellet and shouted, "Good luck, good luck!" which Col. Ellet understood to be, "Go back, go back!" and immediately gave orders for the engines to be reversed. The time thus lost was well improved by the rebels, who gave the *Queen* lasting proofs of the power and accuracy of their guns; besides, the check thus given to her speed resulted favorably to the rebel vessel. The *Arkansas* had steam up, and lay immediately in front of one of the lower water batteries. Col. Ellet and his heroic son, Corporal Edward C. Ellet, of the Fifty-ninth Illinois Volunteers, alone stood upon the upper deck of the *Queen of the West*, and as she approached the *Arkansas*, a shower of bullets from sharpshooters along the shore whistled around their heads. The *Arkansas* discharged her forward and larboard guns at the ram, doing a great deal of damage to her timbers, but injuring none of her crew. She lay with her prow up stream, and pointed out, manifestly desiring to conceal her stern, which, it is stated, was injured a few days before by the explosion of one of our shells. The voices of the rebel gunboat's crew were heard in clamorous blasphemy, rising in terrible distinctness above the clash and clang of the *Queen's* machinery, as she bore down upon her foe, and, as the blow was struck, the blaspheming and terror stricken wretches were hurled to the larboard-side of their vessel, and plunged head-foremost out of her ports to escape what seemed to them inevitable destruction. The ram struck the *Arkansas* immediately aft the third or last gun on her larboard, but the blow was glancing rather than direct, owing to the position of the rebel vessel, which presented a slanting surface to the prow of the ram. It would be difficult to tell the extent of the injury done the *Arkansas*, as the ram found it necessary to make good her retreat on recovering from the shock. Several lengths of the T-iron covering the sides of the *Arkansas* were seen to start from their places and fall half off, but that was the only perceptible damage she sustained. As the *Queen* drew off, some of the rebel gunners rushed to the ports to serve the guns, but Col. Ellet, and his brave son discharged their revolvers into the ports, and thus interfered with the designs of the enemy. The *Queen* then turned and ran up stream, right past a mile of batteries, which were pouring shots into her all the way. As she was simply a wood vessel and not plated, she was terribly cut up, but fortunately no shot struck her boilers or other parts to disable her. A 64-pound shot entered her aft, and traversing the entire length of her cabin, tore all the bedding in the berths over which it passed, and striking the breech of a 32-pounder howitzer, rebounded and wounded Lieut. Hunter in the hip. The only other person injured was John Skelton, who received a flesh wound in the right hand.

It is said that Col. Ellet intends to try it again.

### THE SIEGE OF VICKSBURG ABANDONED.

The Mississippi river is rapidly falling, and Commodore Farragut has withdrawn his vessels down stream to avoid being caught in too shallow water, and Commodore Davis is blockading the mouth of the Yazoo to prevent any more of the iron-plated vessels, which it said the rebels have up that river, from coming out.

### A RICH PRIZE.

The British propeller *Memphis*, about 800 tuns burden, loaded with 1,575 bales of Sea Island cotton, was brought into this port on Sunday, August 3d, as a prize, she having been captured off Charleston Bar by the United States steamer *Magnolia*, while attempting to run the blockade. She had previously run the blockade into Charleston harbor with a cargo of ammunition. As Sea Island cotton is worth now 75 cents per pound, this cargo, reckoning the bales at 400 lbs. each, would amount to $572,500.

### NO DRAFTING REQUIRED IN RHODE ISLAND AND MASSACHUSETTS.

Rhode Island has already just about her full quota of troops in the field, including those called for by the last two proclamations of the President, for 300,000 each. Massachusetts also announces that no drafting will be necessary in that State, but that the quotas for the two calls of 300,000 each will be filled up with volunteers.

### THE NEW IRON SIDES.

The iron-plated frigate, *New Ironsides*, is nearly completed. Her machinery consists of two horizontal direct acting engines with cylinders of 50 inches and 30 inches stroke, intended to make 85 revolutions per minute, with a propeller 13 feet in diameter and 18 feet pitch. The armament consists of 16 11-inch Dahlgren guns, and two 200-pounder Parrott guns.

### GUNBOAT FLEET FOR THE OHIO.

To prevent any more raids into the States north of the Ohio, a fleet of light-draft iron-plated gunboats is to be promptly prepared to patrol that stream. Ten small boats drawing only two feet of water have already been selected and a large force is to be employed to cut them down, and to protect them with thick bulwarks and iron plating in the most approved manner.

## The Philadelphia Mint.

The Philadelphia *Gazette* states that during the month of July, the issue of nickle cents from the Mint was over three and a half million of coins. The rush for them was urgent, young girls, boys and men with bags and baskets daily besieged the Mint to purchase them.

During the month the coinage at the Mint was as annexed.

| | Pieces. | Value. | Total. |
|---|---|---|---|
| **GOLD.** | | | |
| Double Eagles | 3476 | $69,520 | |
| Quarter Eagles | 20,960 | 52,400 | 121,920 |
| Total pieces | 24,436 | | |
| **SILVER.** | | | |
| Dollars | 5,000 | $5,000 | |
| Quarter Dollars | 52,800 | 13,200 | $18,200 |
| Total pieces | 57,800 | | |
| Cents | 3,600,000 | | $36,000 |
| Total Coinage | 3,682,236 | Total Value, | $176,120 |

The work of coining at the Mint of late has been so slack that the services of the females, who adjust the weight of the coins, have not been needed. Ex-Gov. Pollock, the Superintendent, designs henceforth, when vacancies occur, to give the preference to the daughters or wives of those who have died or been disabled in the service of their country.

THE most moderate calculations of the present Ohio grain crop make it at least 30,000,000 bushels, or 10,000,000 bushels more than was raised last year. Of this quantity there will be a surplus beyond the State demand of some 17,000,000 bushels. The Cincinnati *Gazette* calculates that the surplus produce that will be exported from Ohio this year will exceed in value the interest on a thousand millions of dollars.

THE Sanitary Commission, in a report on recruiting, just issued, gives us some statistics which will enable us to give an approximate estimate. They say that an army of 500,000 men in the field, under ordinary circumstances, must have over 58,000 in hospital; that is to say, double the number of able-bodied men resident in Chicago, or a number equal to every other man in Philadelphia.

## SOME CURIOUS FACTS ABOUT SHELLS.

In the July number of *Blackwood's Magazine* is a very readable review of "Jeffreys's British Conchology," from which we take the following extracts :—

THE SEA SERPENT A REALITY.

Look carefully as you pace along the shore, and you may possibly pick up one of the vertebræ of a sea serpent, and so settle that vexed question at once and forever, and immortalize yourself in the annals of zoology by its production. As to the existence of such a creature—call him in scientific language *Enaliosaurus*, or what you will—all that we can say is, men have been hung, and no doubt very properly hung, on far less conclusive evidence.

THE EARTH SWARMING WITH SHELLS.

Something has been said of the exceeding fruitfulness of ocean. But every spot of earth is also more or less inhabited. Many of our readers will have seen and admired the Kentish bank of wild flowers, admirably modeled in wax, in the eastern annex of the New Exhibition. They would have had no idea, perhaps, until they studied it there, of the wonderful variety of floral life concentrated in so small a space. But the animal life which such a spot might contain is even more wonderful still. "There is probably not a square foot of land," says Mr. Jeffreys, "either in a cultivated or uncultivated state, that is not inhabited by mullusca of various kinds." There are said to be above two thousand species of land shells alone; seventy-four belong to our own island. On this said Kentish bank, at early morning, or on a dewy evening, the diligent observer (who has "eyes" in the sense of Mrs. Barbauld's story) might find some half dozen species at least with little difficulty. *Helix Cantiana*, the "Kentish" snail, so called because first noticed in that county, with its rosy red lip and delicate blush, crawling slowly over the leaves and flowers; *Helix hispida*, with its downy covering, like a little hairy ball; *Helix pulchella*—which the French call *la mignonne*—a pretty pale-grey shell, whose inhabitant is very shy, and draws in its shining black eyes (if eyes they be) on a very slight disturbance; hanging on again to a violet bud, glistening in the dew, like a pendant to a maiden's ear, is another with a harder name—*Cochlicopa lubrica;* the minute tower-shaped *Pupa umbilicata*, carrying her (or his? the point is curiously doubtful) young family about on a fold of the shell, like gipsy babies—"a kind of marsupial arrangement;" a *Clausilia*, again, so called from the curious spring door inside the opening of her shell, which she can shut in a moment when alarmed by the approach of a centipede or vagrant ant—both shell and door forming a piece of spiral mechanism which Archimedes might have studied with delight, had there been any conchologists in his days. This *Clausilia*, be it observed, wears her heart on her wrong side, and has the spiral "whorls" of her shell twisted from right to left, "in the wry uncommon way," as old Morton calls it, "whereas all other shells, whether of the land or sea, have a quite different turn—viz., from the left hand to the right, thereby observing, as it were, the sun's motion on this north side of the Equator."

THE REAL ARROWS OF CUPID.

What shall we say of his courtship? "*bizarre*" in the extreme it is, as the Frenchman calls it. But he is a pattern lover. He will spend ten hours at a time—a good deal out of his short life of seven or eight years—in the most quiet but devoted attention to the object of his affections; caressing her occasionally with those pretty little horns, of which no one seems to know whether they are eyes, or ears, or hands. M. Turpin, as Mr. Jeffreys tells us, has watched the pair of lovers for more than that space of time—a proceeding which we cannot think was polite on the part of the Frenchman. How would he like to be watched, under similar circumstances, by a natural-history detective in plain clothes? But what will our readers say when they learn that Cupid's arrows—the real Cupid's arrows, not those you buy on valentines—the "crystal darts" which we always thought were mythical—are actual existences in snail courtship—the loveletters of *Helix aspersa?* Let Mr. Jeffreys tell his own story, which is marvellous enough, in a few plain words—we should be sorry to spoil it by any of our glosses.:—

"They are furnished with crystalline darts, which they shoot at each other after preliminary coquettings. These curious love weapons have been observed sticking in the bodies of snails after such conflicts. They are contained in a special pouch or receptacle ready for use, and are peculiar to the present genus *(Helix)*. Their shape varies according to the species. In some species each individual has only one of these missiles, in another two; and a few have none at all."

Talk after this of exchanging locks of hair, broken sixpences with a hole through them, alternate bites of apple—why, our poor human love tokens are all coarse and prosaic in comparison! Here is the very poetry of love. "The loves of the Snails!" With such a subject still untouched, how long are we to lie open to the reproach that we have no new poets?

SHEEP FATTENED ON SNAILS.

We all know how very excellent the Dartmoor mutton is; few, probably, are aware that it is to the snail we are indebted for the richness of its flavor. A correspondent of *The Field* is quoted as the modern authority; but he only corroborates a very old belief. Borlase asserted it in his "Natural History of Cornwall," a hundred years ago. Mr. Jeffreys gives the passage :—

"The sweetest mutton is reckoned to be that of the smallest sheep, which usually feed on the commons, where the sands are scarce covered with the green sod, and the grass is exceedingly short. Such are the towens or sand hillocks in Piran Sand, Gwithian, Philne, Senan Green near the Land's End, and elsewhere in like situations. From these sands come forth snails of the turbinated kind, but of different species, and all sizes, from the adult to the smallest just from the egg. These spread themselves over the plains early in the morning, and whilst they are in quest of their own food among the dews, yield a most fattening nourishment to the sheep."

SNAILS AS FOOD.

But it is not only sheep to whom snails are palatable. Every one knows that they formed a very common dish with the Romans, who fed them up to an enormous size in their snail preserves—*cochlearia*—and that they are still eaten in many parts of the Continent. We have heard a story of some shipwrecked Frenchmen clearing the sea-side gardens in Devonshire. Even in England they are still considered a remedy for consumption; but perhaps few are aware that they may be bought at any time in Covent Garden Market; we were offered some the other day at sixpence a quart—very excellent snails, we were assured, not professing ourselves to be judges of the quality. The glass men at Newcastle indulge themselves in a snail feast once a year, and collect them from the fields and hedgerows on the Sunday previous. If any reader wishes for a receipt for their cookery, there is one to be found, says Mr. Jeffreys, in old Martin Lister's book "*Historia Animalium;*" and it may be useful to add that, in the opinion of connoisseurs, *Helix naticoides* is "the most tender and delicate, the best tasted, and the most digestible." But the species which is to be seen in the restaurant windows in France is the *Helix Pomatia*.

DRIED SNAILS COMING TO LIFE.

But the poor snail has been the victim, from time to time, of other besides culinary experiments. He has—fortunately or unfortunately for himself—extraordinary powers of vitality. "Some of them," says Mr. Jeffreys, "have been known to live many years shut up in boxes and drawers, and even affixed to tablets as specimens." Dr. Johnston, in his most interesting "Introduction," which Professor Kingsley has not inaptly characterized as a "collection of true fairy tales," speaks of some which had formed part of a collection belonging to a Mr. Simon of Dublin, which revived when placed in water, after having been dried for a period of certainly fifteen years—probably much longer; but another account, which he quotes from Silliman's *American Journal* sounds like a fairy tale indeed. The men employed in cutting the Erie Canal, "near Rome village, sixteen miles west of Utica," found several hundred live mollusks forty-two feet deep, in a diluvial deposit. How many thousand years they had been there it is not easy to say. They might be alive now, but that "the workmen took the animals, fried, and ate them." The same tenacity of life is shown under circumstances even more abnormal. Müller relates "that some snails, from which he had cut off their heads, lived more than a year in this state without food, crawling about, and at the usual time forming their winter epiphiragms." In the case of Müller's unfortunate pets, the power of reproducing the mutilated parts, which this class of animals has been proved to possess, does not appear to have been exercised. But that they have been known to reproduce feet, tentacles, eyes, and even the whole head, after amputation, seems an established fact, thanks to the unscrupulous experiments of science.

## New Steamers.

We continue this week, as below, our list of steam vessels recently constructed in New York. We also give the prominent particulars of an iron steamship just finished in Wilmington, Del.

THE PROPELLER MARY A. BOARDMAN.

Hull constructed by Mr. John Englis; machinery by the Neptune Iron Works; route of service, coast of China; owners, Messrs. Aymar & Co.

*Hull.*—Length on deck, 160 feet; breadth of beam, 27 feet; depth of hold, 6 feet; depth of hold to spar deck, 12 feet; draft of water at load line, 9 feet; tunnage, 650 tuns. Frame of white oak, &c; floors, molded 13 inches, sided 6 and 7 inches, and are 24 inches apart at their centers.

*Engines.*—Vertical direct; diameter of cylinders, 26 inches; stroke of piston, 2 feet 2 inches.

*Boilers.*—One, return flue; uses a blower.

*Propeller.*—Diameter, 9 feet; pitch, 17 feet; material, cast iron.

THE PROPELLER TOUITIA.

Hull constructed by Mr. Thos. Collyer; machinery by the Neptune Iron Works; route of service, coast of China; owners, Messrs. McCredy, Watt & Co.

*Hull.*—Length on deck, 149 feet 6 inches; breadth of beam, 26 feet 7 inches; depth of hold, 10 feet; draft of water at load line, 8 feet 6 inches; tunnage, 500 tuns. Frame of white oak, chestnut, &c. Floors, molded 11 inches, sided 11 inches, and are 22 inches apart at their centers.

*Engines.*—Vertical direct; diameter of cylinders, 26 inches; stroke of piston, 2 feet 2 inches.

*Boilers.*—One, return flue, located in hold.

*Propeller.*—Diameter, 9 feet; material, cast iron.

THE SIDEWHEEL STEAMER JESSE HOYT.

Hull constructed by B. C. Terry; machinery by Messrs. Fletcher, Harrison & Co.; route of service, New York to Newburgh; owners, Messrs. Van Santvoord & Co.

*Hull.*—Length on deck, 225 feet; breadth of beam, 29 feet; depth of hold, 9 feet; draft of water at load line, 4 feet 6 inches; tunnage, 600 tuns. Frame of white oak, chestnut, &c., and fastened in the very best manner.

*Engines.*—Vertical beam; diameter of cylinder, 46 inches; stroke of piston, 12 feet.

*Boilers.*—Two, return flue, located in hold.

*Water Wheels.*—Diameter over boards, 28 feet; material, wood and iron.

THE IRON SIDEWHEEL STEAMER ST. MARY.

Hull constructed by Messrs. Harlan, Hollingsworth & Co., Wilmington, Del.; machinery, ditto; route of service, New York to New Orleans; owner, Mr. Charles Morgan.

*Hull.*—Length on deck, 215 feet; breadth of beam, 34 feet; depth of hold, 10 feet: depth of hold to spar deck, 17 feet 6 inches; draft of water at load line, 8 feet; tunnage, 1,218 tuns. Frame of wrought iron plates, ½ to ⅜ths of an inch in thickness, and fastened with ¾th rivets every 2½ inches. Floors molded 3½ inches, sided 1 inch, and are 19 inches apart at their centers. There are 6 keelsons, 18 inches deep by one half inch thick.

*Engines.*—Vertical beam; diameter of cylinder, 50 inches; stroke of piston, 11 feet.

*Boilers.*—One, return tubular; located in hold, and does not use blowers.

*Water Wheels.*—Diameter, 29 feet; material, iron.

## A Family Mill.

Just at the foot of Cedar Hill, says the California *Territorial Enterprise*, is one of the most "simple and compact" little mills in Nevada Territory. It is a genuine "miner's own" mill—one that is "handy to have in the house." First, suppose a miner's cabin of the average size; then suppose a water wheel, 22 feet in diameter, standing outside of this house, rotating slowly and steadily, with a belt from a small wheel on the main shaft reaching inside the house and turning an arrastra that stands in one corner—and you have the whole mill. The cook stove stands in one end of the cabin, about 6 feet from the arrastra; the bunks are in the same end, about four feet from the stove; near, and in front of the bunks, stands the table; the balance of the furniture, consisting principally of a stool cushioned with a gunny bag, is disposed about the room where it would best seem to set off the interior. This little mill grinds a tun of ore in about 30 hours, the happy owner having nothing to do but throw in a shovelful of rock occasionally, fry porter house steaks, drink coffee, and lie in his bunk and watch the "masheen." There is a dam across the ravine, in which tailings from the hydraulic claims above are caught, and these, together with the float rock to be picked up on the hillside, keep the mill supplied with ore. We were shown some very rich pieces of gold-bearing rock picked up in the vicinity.

## ON FORCE—LAWS OF MOTION.

No subject of a scientific character is, perhaps, of more interest, and less generally understood, than that of force. A few years since, Professor Faraday delivered a lecture on the "Conservation of Force," which was severely criticised afterward in several periodicals, on account of its obscurity. Recently, Professor Tyndall, F. R. S., has been treading upon the same ground, in a lecture "On Force," delivered before the Royal Institution, London. No charge of obscurity can be brought against it. For clearness and precision it is a model lecture, and we give it, as follows :—

We all have ideas more or less distinct regarding force; we know in a general way what muscular force means, and each of us would less willingly accept a blow from a pugilist than have his ears boxed by a lady. But these general ideas are not now sufficient for us; we must learn how to express numerically the exact mechanical value of the two blows; this is the first point to be cleared up.

A sphere of lead weighing 1 lb. was suspended at a hight of 16 feet above the theater floor. It was liberated, and fell by gravity. That weight required exactly a second to fall to the earth from that elevation; and the instant before it touched the earth, it had a velocity of 32 feet a second. That is to say, if at that instant the earth were annihilated, and its attraction annulled, the weight would proceed through space at the uniform velocity of 32 feet a second.

Suppose that instead of being pulled downward by gravity, the weight is cast upward in opposition to the force of gravity, with what velocity must it start from the earth's surface in order to reach a hight of 16 feet? With a velocity of 32 feet a second. This velocity imparted to the weight by the human arm, or by any other mechanical means, would carry the weight up to the precise hight from which it has fallen.

Now, the lifting of the weight may be regarded as so much mechanical work. I might place a ladder against the wall, and carry the weight up a hight of 16 feet; or I might draw it up to this hight by means of a string and pulley, or I might suddenly jerk it up to a hight of 16 feet. The amount of work done in all these cases, as far as the raising of the weight is concerned, would be absolutely the same. The absolute amount of work done depends solely upon two things: first of all, on the quantity of matter that is lifted; and secondly, on the hight to which it is lifted. If you call the quantity or mass of matter, $m$, and the hight through which it is lifted $h$, then the product of $m$ into $h$, or $mh$, expresses the amount of work done.

Supposing, now, that instead of imparting a velocity of 32 feet a second to the weight we impart twice this speed, or 64 feet a second. To what hight will the weight rise? You might be disposed to answer, "To twice the hight;" but this would be quite incorrect. Both theory and experiment inform us that the weight would rise to four times the hight; instead of twice 16, or 32 feet, it would reach four times 16, or 64 feet. So also, if we treble the starting velocity, the weight would reach nine times the hight; if we quadruple the speed at starting, we attain sixteen times the hight. Thus, with a velocity of 128 feet a second at starting, the weight would attain an elevation of 156 feet. Supposing we augment the velocity of starting seven times, we should raise the weight to 49 times the hight, or to an elevation of 784 feet.

Now the work done—or, as it is sometimes called, the mechanical effect—as before explained, is proportional to the hight, and as a double velocity gives four times the hight, a treble velocity nine times the hight, and so on, it is perfectly plain that the mechanical effect increases as the square of the velocity. If the mass of the body be represented by the letter $m$, and its velocity by $v$, then the mechanical effect would be represented by $m v^2$. In the case considered, I have supposed the weight to be cast upward, being opposed in its upward flight by the resistance of gravity; but the same holds true if I send the projectile into water, mud, earth, timber, or other resisting material. If, for example, you double the velocity of a cannon-ball, you quadruple its mechanical effect. Hence the importance of augmenting the velocity of a projectile, and hence the philosophy of Sir Wm. Armstrong in using a 50 lb. charge of powder in his recent striking experiments.

The measure then of mechanical effect is the mass of the body multiplied by the square of its velocity.

Now, in firing a ball against a target, the projectile, after collision, is often found hissing hot. Mr. Fairbairn informs me that in the experiments at Shoeburyness it is a common thing to see a flash of light, even in broad day, when the ball strikes the target. And if I examine my lead weight after it has fallen from a hight I also find it heated. Now, here experiment and reasoning lead us to the remarkable law that the amount of heat generated, like the mechanical effect, is proportional to the product of the mass into the square of the velocity. Double your mass, other things being equal, and you double your amount of heat; double your velocity, other things remaining equal, and you quadruple your amount of heat. Here then we have common mechanical motion destroyed and heat produced. I take this violin bow and draw it across this string. You hear the sound. That sound is due to motion imparted to the air, and to produce that motion a certain portion of the muscular force of my arm must be expended. We may here correctly say that the mechanical force of my arm is converted into music. And in a similar way we say that the impeded motion of our descending weight, or of the arrested cannon ball, is converted into heat. The mode of motion changes, but it still continues motion; the motion of the mass is converted into a motion of the atoms of the mass, and these small motions communicated to the nerves, produce the sensation which we call heat. We, moreover, know the amount of heat which a given amount of mechanical force can develope. Our lead ball, for example, in falling to the earth generated a quantity of heat snfficient to raise the temperature of its own mass three-fifths of a Fahrenheit degree. It reached the earth with a velocity of 32 feet a second, and forty times this velocity would be a small one for a rifle bullet; multiplying three-fifths by the square of 40 we find that the amount of heat developed by collision with the target would, if wholly concentrated in the lead, raise its temperature 960°. This would be more than sufficient to fuse the lead. In reality, however, the heat developed is divided between the lead and the body against which it strikes; nevertheless, it would be worth while to pay attention to this point and to ascertain whether rifle bullets do not, under some circumstances, show signs of fusion.

A collodion balloon filled with a mixture of chlorine and hydrogen was hung in the focus of a parabolic mirror, and in the focus of a second mirror 20 feet distant a strong electric light was suddenly generated; the instant the light fell upon the balloon the atoms within it fell together with explosion, and hydrochloric acid was the result. The burning of charcoal in oxygen was an old experiment, but it had now a significance beyond what it used to have; we now regard the act of combination on the part of the atoms of oxygen and coal exactly as we regard the clashing of a falling weight against the earth. And the heat produced in both cases is referable to a common cause. This glowing diamond, which burns in oxygen as a star of white light, glows and burns in consequence of the falling of the atoms of oxygen against it. And could we measure the velocity of the atoms when they clash, and could we find their number and weight, multiplying the mass of each atom by the square of its velocity, and adding all together, we should get a number representing the exact amount of heat developed by the union of the oxygen and carbon.

Thus far we have regarded the heat developed by the clashing of sensible masses and of atoms. Work is expended in giving motion to these atoms or masses, and heat is developed. But we reverse this process daily, and by the expenditure of heat execute work. We can raise a weight by heat, and in this agent we possess an enormous store of mechanical power. A pound of coal, produces by its combination with oxygen an amount of heat which, if mechanically applied, would suffice to raise a weight of 100 pounds to a hight of 20 miles above the earth's surface. Conversely, 100 pounds falling from a hight of 20 miles, and striking against the earth, would generate an amount of heat equal to that developed by the combustion of a pound of coal. Wherever work is done by heat, heat disappears. A gun which fires a ball is less heated than one which fires blank cartridge. The quantity of heat communicated to the boiler of a working steam engine is greater than that which could be obtained from the recondensation of the steam after it had done its work; and the amount of work performed is the exact equivalent of the amount of heat lost. We dig annually 84 millions of tuns of coal from our British pits. The amount of mechanical force represented by this quantity of coal seems perfectly fabulous. The combustion of a single pound of coal, supposing it to take place in a minute, would be equivalent to the work of 300 horses; and if we suppose 108 millions of horses working day and night, with unimpaired strength for a year, their united energies would enable them to perform an amount of work just equivalent to that which the annual produce of our coalfields would be able to accomplish.

[To be Continued.]

### Wonderful Increase of Human Maladies.

The New Haven *Journal and Courier* thus hits off the sudden increase of human ills since the Government announced its intention to draft :—

It is amusing to see what a sudden increase of practice has forced itself upon Dr. Hubbard, the M. D. authorised to give certificates of exemption from military service. From morning till late at night his office is crowded with those who believe him possessed of the requisite skill to detect even the shadowy lurkings of disease in the deepest intricacies of the system. From the numbers who thus apply to him in affliction, and who look upon him as the man of the times, one would suppose we were sojourning in the midst of a world of lepers. Canes have suddenly become a popular auxiliary of pedestrianism, lungs have collapsed between two days, and the patient expatiates on his sufferings during the intervals of spasmodic coughing produced generally by an internal application of pepper lozenges. It is also noticed that visual organs have suffered more or less since the drafting agitation commenced. Eyes which have never been noticeable for any unusual formation have suddenly been transformed to "right (or left) oblique," and the impromptu squints perseveringly holds this "posish" until their certificate of "defective eyes" is safely pocketed. Others peel off clothing and disclose a newly purchased truss encircling the body somewhere between the hips and throat. In many instances these do the business, but occasionally one is found upside down, when the sufferer leaves and awaits another relapse of internal weakness. The most startliug malady, however, is the frightful increase of deafness! This hitherto anti-contagious disease has suddenly spread to a remarkable extent, and a large number of the afflicted daily apply for exemption. Yesterday one of these sufferers was asked to take postage stamps in change for his fee—a question he very imprudently heard distinctly and repudiated promptly. Indeed, the corner of College and Crown streets is a general rendezvous for the lame, halt and blind, with infirmities varying in magnitude from a soft corn to red ink erysipelas scars under the hair. A list of these unfortunates would demonstrate the need of a regiment of first-class surgeons being immediately detailed to give appetite and tone to suffering humanity in this section of the country.

### American Annual Cyclopedia for 1861.

Messrs. D. Appleton & Co., of 443 and 445 Broadway, New York, have commenced the publicaton of an annual register of important events, and the volume for 1861 is just issued. It is about the size of one of the volumes of their "New Cyclopedia," and contains 780 pages. It embraces a complete history of all the military operations of the year, the acts and important debates of Congress, diplomatic correspondence of both sections, biographie of the prominent officers who have fallen, and brief notices of the principal events, the scientific discoveries, and the meteorological phenomena throughout the world; all arranged in alphabetical order and supplied with a copious index.

It is an exceedingly valuable work for reference and will doubtless meet with a large sale. The publishers announce that the volumes hereafter will be issued in March.

## VALUABLE RECEIPTS.

FULMINATING MERCURY.—The ingredients with which this fulminating substance is made are, mercury, 1 part; pure nitric acid, 10 parts; and absolute alcohol, 8 parts. In order to make this powder, the mercury is first dissolved in nitric acid, and the solution thus obtained is added to the alcohol. When this is effected, a violent reaction ensues, accompanied with evolved masses of white vapor, and the fulminating mercury is precipitated in the form of a dense powder, varying from a white to a gray and a yellow brown color, but the white is the purest and strongest. It is more explosive than gunpowder when dry, but it is kept prepared in a wet state, when it is perfectly harmless. It is employed for making the priming of percussion caps. It ignites and expands so rapidly that one grain of it is considered equal to twenty of gunpowder, when used as a charge to burst a shell.

RESTORING BURNT IRON.—The acting manager—Mr. Wm. Clay—of the Mersey Steel and Iron Works, at Liverpool, England, says that wrought iron crystallized by exposure to heat, or carelessly burnt, "may have its fibers restored by working it under the hammer or in rolls."

PAINT FOR OUT HOUSES.—Pulverized charcoal and litharge (oxide of lead), in equal quantities, mixed with raw linseed oil, makes a cheap and very durable dark brown paint for the rough boards of out houses. It is also a good paint for exposed iron work. The addition of yellow ocher makes it a dark green color.

CEMENT FOR PIPES.—Take 6 pounds of plumbago, 3 pounds of fine chalk, 8 pounds of the sulphate of baryta, and 3 pounds of linseed oil, and boil them together for half an hour. The black lead, chalk and baryta must be reduced to a very fine powder, and well mixed with the oil. A cement is thus obtained which may be employed with great advantage in luting the joints of steam boilers, water pipes, gas pipes, &c.

VARNISH FOR FRENCH PATENT BLACK LEATHER.—One gallon of linseed oil; 1 pound of white lead and 1 pound of litharge are boiled in an iron vessel until the mass becomes ropy when lifted upon a spatula. This varnish is then applied to the leather in four thin coats, each allowed to dry before the other is put on. Another coat is now put on with boiled oil and litharge, in the same proportion, thinned with a little turpentine and lampblack added. When dry, the finishing coat is composed of 10 pounds of the above boiled oil, to which is added 3 pounds of copal varnish, and the whole thinned with turpentine.

TO MAKE CHLORIDE OF CALCIUM.—Add muriatic acid to chalk or limestone in the open air until the effervescence ceases, and then evaporate and fuse the salt by the aid of heat. 100 parts of it may be made to absorb 124 parts of water from the atmosphere. It has been employed for freeing oil of turpentine and alcohol from water. Cigars kept in a box containing a tray with a perforated cover, and some pieces of chloride of calcium in it, are said to improve in flavor. The newly-plastered walls of buildings may be speedily dried by placing chloride of calcium in their vicinity. It also prevents dampness in the walls of apartments situated in moist positions.

A strong solution of isinglass dissolved in gin, is good for cementing pieces of ivory.

## A New Application of Photography.

The Philadelphia *Press* states, that a new application of miniature photographic portraits has originated with Messrs. Whit and Yost, the extensive bible manufacturers, of Market street, Philadelphia. In the bible—the text of which is conformable to the standard of the American Bible Society—they insert, as usual, blank leaves, suitably headed and divided for notices of births, deaths and marriages. Such records in a family bible constitute good evidence in our courts of law. In addition to these they are introducing the novelty of placing several cardboards, perforated for the reception of small photographic portraits, to follow the family register, thus accompanying the record with resemblances of the loved ones whose names are entered there.

This is one of the most useful and important applications of photography that has been brought to our notice.

## CENSUS STATISTICS OF 1860.

[Continued from our last.]

We continue the publication of the statistics embraced in the preliminary chapters of the report of C. G. Kennedy, Esq., Superintendent of the Census of 1860; selecting this week those relating to the production of luxuries.

### MUSICAL INSTRUMENTS.

New England, New York and Pennsylvania produced musical instruments to the value of $5,791,807—an increase of 150 per cent over their own production in 1850, and 124 over the whole value of that branch in the Union in the same year. New York alone made $3,392,577 worth—being $811,862 more than the whole amount returned in 1850. In this branch our manufacturers have achieved marked success. Without claiming for them superiority over their brethren in France and Germany, it is admitted that church organs and other instruments made in this country are better suited to the climate, and in other respects fully equal to those which come from the most celebrated establishments in Europe.

### JEWELRY.

In the New England and Middle States, the production of jewelry and watches reaches nearly eleven millions in value; of silver, silver plated wares, &c., nearly six and one-half millions; making over seventeen and a quarter millions of dollars, exclusive of gold leaf and foil, and the assaying and refining the precious metals, exceeding the product of the whole Union in 1850 by $6,312,500 in value; an increase of over fifty-seven per cent, and of sixty-three per cent on the production of those States in that year. The production of cheap jewelry has been greatly augmented by recent improvements in electro metallurgy.

### GAS.

The quantity returned is but four thousand million feet, of the value of eleven million dollars, but the whole quantity made exceeded 5,000,000,000 cubic feet, the value of which was about thirteen millions of dollars.

### BOOK, JOB AND NEWSPAPER PRINTING.

In New England, the Middle and Western States, the value of book, job and newspaper printing is returned as $38,428,043, of which eleven millions worth consisted of books, the value of the latter being nearly equal to the whole product of the same branch in 1850, which was returned at $11,586,549. The manufacture of paper, especially of printing paper, has increased in an equal ratio, the State of Massachusetts alone producing paper of the value of $5,968,469, being over fifty-eight per cent of the product of the Union in 1850. New York returned paper of the value of $3,516.276; Connecticut, $2,528,758, and Pennsylvania, $1,785,900. Of 4,051 papers and periodicals published in the United States, at the date of the census of 1860, 3,242, or 80.02 per cent were political in their character. 298, or 7.38 per cent are devoted to literature. Religion and theology compose the province of 277, or 6.83 per cent, while 234, or 5.77 per cent are classed as miscellaneous. In 1850 the number of political papers and periodicals was 1,630. In 1860 it was 3,242, being an increase of nearly 100 per cent. In 1850 the number of religious papers and periodicals was 191. In 1860 it was stated at 277, being an increase of 45 per cent. In 1850 the number of papers and periodicals of every class in the United States was 2,527. In 1860 the aggregate under this head reaches, as before stated, 4,051, showing a rate of increase of 60.37. The total circulation of all kinds amounted in 1850 to 426,409,978 copies. In 1860 the annual circulation is stated at 927,951,548 copies, showing a ratio of increase of 117.61.

The total white population of the United States was stated at the date of the census of 1850 to be 19,553,114. In 1860 the census report it at 27,008,081, the ratio of increase being 38.12. These figures show how largely the increment of the newspaper and periodical circulation has exceeded the increase of population during the last ten years.

In 1850 the annual circulation of all kinds afforded 21.81 copies to each white person in the Union. In 1860 the total circulation was at the rate of 34.36 per person. The largest increase, as might have been expected, occurs in the State of California. Of the total circulation in the country, three States, New York, Pennsylvania and Massachusetts, furnish 539,026,124 copies, or considerably more than half of the aggregate amount.

## Casting Cannon at Providence, R. I.

The Builders' Iron Foundry Co., in Providence R. I., has erected a new foundry and commenced casting ordnance for the navy. On the 26th ult., they cast their first 11-inch Dahlgren. The Providence *Journal* describes the operation as follows:—The gun as cast weighs 16½ tuns; when finished it will weigh between 8 and 9. It is 14 feet long, 32 inches in diameter at the breech and 24 at the muzzle.

The pits are calculated for 11 and 15-inch guns. The former is 16 feet deep and 11 in diameter; the latter 22 feet deep and 14 in diameter. The pattern is in two parts, being divided longitudinally from breech to muzzle. These are molded in sections of an iron flask, which weighs eight tuns. The patterns are then removed, the mold finished, and the two sections of the flask put together and fastened. The whole is then put into an oven and baked. This process hardens the sand, and gives it a tenacity to withstand the strain and pressure of the metal when it is poured in. The flask is then placed in a pit in a perpendicular position, when it is ready to receive the molten iron. This is prepared in an air furnace of the capacity of twenty-five tuns. The iron, in bars, is packed in crosswise to permit a free circulation of the flame, for no coal is allowed to come in contact with it. Bituminous coal is used, which is fed in at the front of the furnace. A draft is secured by a large chimney rising from the flue at the back end of the furnace, which keeps the coal actively burning, and draws the flame through the entire length. Much care is required in the selection of the metal, and the combination must be such that the compound shall acquire the greatest possible tenacity. While it is melting the iron must be carefully watched. It is tested once in thirty minutes. A small quantity is poured into a mold forming a bar about an inch square. As soon as it cools it is broken. The grain and color determine the quality and its proper state to pour. As soon as the proper indications are observed, the furnace is tapped and the liquid metal is conveyed into the mold. While it is running, men are stationed along the conductor to watch the stream and intercept any scoria which may form. If these were permitted to flow in, the castings would be imperfect, liable to be honeycombed, as it is termed, which would weaken the casting and cause its rejection at once, or failure when proved.

## New York and Erie Railroad.

From the tables appended to the report of the receiver we compile the following, showing the annual earnings and expenses of the road from 1852 to 1861 inclusive, with the cost of repairs of track and railway, and of engines and cars:—

| | *Earnings.* | *Expenses.* | *Repairs Road.* | *Rep. Equip.* |
|---|---|---|---|---|
| 1852..... | $3,537,766 53 | $1,835,168 10 | $243,471 29 | $378,546 74 |
| 1853..... | 4,318,962 36 | 2,407,373 13 | 398,397 35 | 434,893 88 |
| 1854..... | 5,359,958 68 | 2,742,615 57 | 512,584 68 | 560,582 14 |
| 1855..... | 5,448,993 37 | 2,625,744 87 | 496,171 15 | 336,894 90 |
| 1856..... | 6,349,050 15 | 3,101,053 52 | 544,383 24 | 631,179 03 |
| 1857..... | 5,742,606 51 | 3,344,812 82 | 830,473 70 | 882,086 30 |
| 1858..... | 5,151,616 43 | 3,680,675 76 | 1,015,627 79 | 890,274 17 |
| 1859..... | 4,482,149 32 | 2,974,227 50 | 913,286 02 | 609,650 83 |
| 1860..... | 5,180,321 70 | 3,276,995 48 | 899,808 20 | 718,114 74 |
| 1871..... | 5,590,916 60 | 2,542,891 91 | 903,703 72 | 808,638 10 |

The works of the Long Dock Company, by which the Erie Railway is provided with ample accommodation upon the Hudson River, have cost, thus far, over two and a half millions of dollars. The tunnel, cut through solid rock for 4,300 feet, cost $1,000,000; it has been in use since last May, being traversed by some fifty trains daily. The company has thus a continuous track from Lake Erie to the Hudson River, 460 miles, beside numerous connections. The company has built a passenger house 40 by 460 feet, a freight house 54 by 420 feet, a milk house 37 by 384 feet, an engine house 60 by 399 feet, beside sheds and shops. There are 17 miles of track upon the grounds. By these arrangements vessels can load at once from the cars of the Erie Railway for any port in the world.

## Massachusetts Manufacturing News.

The following is from the Boston *Commercial Bulletin* of August 2d:—The walls of the main building of Stott's new mill at Lowell, are completed, the roof nearly finished, and a large force of carpenters are busy laying the floors. The beams are supported by wooden posts, as they are now considered stronger than iron for this purpose.

At South Groveland, E. M. J. Hale, Esq., who owns the woolen mill, is putting up another factory—160 feet long by 52 wide—that will run eight sets of machinery, and more than double his business there. Formerly there was not thought to be water enough for one mill, but with the improvements in machinery he finds ample power.

Messrs. Bates, Hyde & Co., of Bridgewater, are building two cotton gins for a South American firm, the frames and other wood work of which are of solid mahogany. The wood alone for the two machines cost more than $200, while all the materials and work are of the very best that can be procured.

THE members of the British Parliament serve without any pecuniary consideration. They are allowed no perquisites or even stationary to the extent of a sheet of letter paper, unless when one of them may write a letter in the library of either house. The House of Lords is composed of 459 members, and the House of Commons of 658.

AT Delmonico's Restaurant, corner of Chambers street and Broadway, in this city, a man sometimes orders a dinner which, including his wines, amounts to twenty-five dollars; and in Laurens street, just above Canal there is a sign, "Poor Man's Home—Beds 5 cents—Meals 6 cents."

## Correspondence

### Grooved Frictional Gearing.

The following interesting communication on this subject is from the proprietors of one of the largest and best tool manufacturing establishments in our country :—

Messrs. Editors :—Noticing in your journal the inquiry of Messrs. Pusey, in reference to Robertson's "Grooved Frictional Gearing," and your desire for general information on that subject, we have deemed it well to give the public, through your valuable paper, the benefit of our observation and experience in the matter.

Mr. Bement, while in England and Scotland in 1858, made it a part of his business to investigate the practical workings of the wheels. He, therefore, made the acquaintance of Mr. Robertson, and from him learned the various purposes to which they had been, in his opinion, successfully applied, for he, as is the case with most inventors, was more sanguine of their success than many others. Through the kindness of Mr. R. he learned much of their practical utility, having been shown several pairs of spur and bevel wheels in operation. One pair drove a large circular saw for sawing lumber from the log, the pinion on saw arbor being some 6 inches, driven by a wheel about 5 feet in diameter, and they worked together smoothly and with great power. Mr. Bement saw them on hoisting crabs, as well as on line shafting running at right angles, at the Woolwich Arsenal, and other places. The testimony of those using them (who were not interested in the patent) is, that they ran very well but require to be returned often, on account of the great wear of the surfaces of the grooves above and below the pitch line, as they must slide on each other just in proportion to their distances from the pitch line; consequently they wear quite rapidly.

However, from all the evidence we were able to gather, we believed them practical and had satisfied ourselves that the adhesion is ample for most purposes. Consequently we made a rather bold (some say) and expensive trial of a pair of spur gears on the Vertical Railway Elevator, erected by us, last year, at the Continental Hotel of this city.

Finding it necessary to double gear the screw in order to get sufficient and reliable power to raise the large car with 30 persons in it, and seeing the difficulty of getting the first and quickest motioned wheels to run sufficiently still for a hotel, we ventured to try the frictioned grooved surface wheels. The driver was made 25 inches and the driven 60 inches in diameter, with 7 inches face, the distance between the centers of the grooves being $\frac{3}{8}$ths of an inch. The wheels were perfect in every respect, strong in their proportions and the metal was as homogeneous as possible. They were put in operation and ran well at first with the exception of a slight grinding sound, and were the admiration of all who saw them. Our hope was, that after they had become more perfectly fitted to each other by wearing than it was possible to turn them in the lathe, the noise would cease; but we found a practical error in our theory, which to this day is unexplained. After running them for nine months, the noise became so annoying to the guests of the house that we were obliged to take them out and substitute belting.

We established the fact that they had sufficient adhesion for any purpose, as they drive more than a 12-inch double belt with simply the weight of a 3 feet shaft with 3, 36×5 inch pulleys and the 25×7 inch friction wheel. By means of the screws for pressing the wheels together, we could drive the entire power of the 20-horse engine, with some loss by friction. The wheels were found to be worn together about $\frac{1}{20}$th of an inch. For light powers where noise is not an objection and great speed an object, they will answer very well, but we consider that there are few cases where they will supersede the belt.

We know of no instance where anything like 60-horse power is transmitted in this way, though we doubt not that it could be done, but not practically. In Messrs. Pusey's case, we should adhere to the belt for such great power and velocity, and gearing for slower speeds.

Many have been surprised that the frictional wheels at the Continental Hotel were taken out, while the large beveled tooth gears (24 and 60 inches) running iron to iron were left, and are running with very little noise. Both pairs were constructed with the greatest care and accuracy, and are a fair test of the comparative practicability of both kinds of wheels, which test the public have the advantage of. Bement & Dougherty.

Philadelphia, July 31, 1862.

### Important to Manufacturers.

The following inquiries, lately presented by one of our correspondents, is doubtless representative of the wants of many others of our readers :—

Messrs. Munn & Co.—Some time ago I introduced to the public an article not patented nor patentable, to which I gave a distinctive and original name of ———, and the article is now in regular demand by the trade, under that name—[he purposely suppresses the name of the article.] Another party is now manufacturing a similar thing, to which, of course, I cannot object; but is there no way, such as by patenting a design, to be stamped upon the article, by which I can preserve the name as a sort of trade mark? so that should the jobbers inquire of my opponents for my article, he would have to sell them by some other distinctive appellation.

My difficulty is this: there is an avowed intention on the part of a few manufacturers to drive my article out of the market, not by fair opposition, but by making a worthless thing, so that when a buyer inquires for mine, the reply is, "We have them, they are worthless, but we would as soon sell those as any other;" and thus if a sale is made, their words provo true, and the credit of my goods greatly damaged.

I have sold a great many hundred thousands of these articles, and have had 125 young girls in my factory making them up—the whole process carried through by females from first to last. What is my remedy?

[Reply.—The patent law provides a simple and effectual remedy in cases like the above. Any new and original design for a trade mark, is patentable under the new law, on payment of the following official fees for the periods stated :

| | | | |
|---|---|---|---|
| Design patent for three and a half years, | | | $10,00, |
| ditto | " | " seven | " 15,00, |
| ditto | " | " fourteen | " 30,00. |

In applying for these patents, the law requires, in addition to the payment of the fees, that the applicant shall furnish two drawings of his design, artistically made, together with a written specification, minutely descriptive of that which he claims as his invention. The cost of preparing these drawings and specifications is of course additional to the above fees. The Government does not prepare such papers. If an applicant cannot do it himself he will need to employ some one, experienced in the business, to do it for him. A man may be able to extract his own tooth; then, again, he may break his jaw in the attempt—usually it is wiser to apply at once to a professional dentist, and have the work skillfully done. It is just so in regard to the preparation of patent papers. A pamphlet, containing information, can be had gratis at this office.—Ed.

### Milling and Balancing Stones.

Messrs. Editors :—In the Scientific American of July 12th, in the article "Information about Milling," I think the author's ideas about grinding and cracking the stones quite right, but I differ with him as it regards balancing the runner stone, which is, as he says, "a very important thing in the milling business." In the first place I assert that when a stone is balanced when it is in motion and is perfect in the driver, it will be balanced whether in motion or at rest. But when a stone is balanced when it is at rest and out of balance when in motion, in nineteen times out of twenty this is caused by the driver. For instance: when a stone is at rest it will hang perfectly true on the hemisphere or cockhead of the spindle, but should the driver have a little more lead on one end than the other, it will, when set in motion, crowd the bail on one side of the hemisphere, causing the stone to lop over on one side, and, consequently, to be out of balance. I will now give you my plan of balancing the runner stone :—In the first place I plane off two thin boards, which I lay on the bed stone, one on each side of the spindle, half way to the skirt, and then nail them fast to the floor for the stone to run on; I now place a plank over the back of the stone for a rest, and turn off a small piece on the back of the stone near the outside, so as to be true with the face. I then turn one on the outside of the stone so as to form a square with the other one, and raise the stone clear off the boards and run it up to the proper speed. I now mark on the top of the stone with a lead pencil to find the light side, and then on the outside to find where the swing is, as it is very important that the swing should be got out, so that the spindle will not work itself loose. In order to bring it out, the lead must be placed very low on the opposite side, and if you need any to counterbalance, it must be put as near the top as possible. The lower the lead is the more it will have a tendency to haul the stone over on the same side. Continue to experiment in this manner until you get your pencil marks to reach round the stone, and then you will have a perfect balance of the mill stone. J. T.

Clayton, Iowa, July 19, 1862.

### Steam Shoe Factory at Beverly.

[Correspondence of the Boston Traveller.]

Beverly, July 28, 1862.

Since the destruction of the Rubber Works of this place, a few months since, there has been no grand center of attraction in business circles, until within a brief period. Messrs. Foster & Young have partially supplied this deficiency by the establishment of a Steam Shoe Factory, 90 feet by 25, three stories in hight, with an ample basement. The two prominent features are the introduction of machinery, so far as it can be made available, propelled by steam, and the division of labor. The establishment is still in its infancy, yet there are about 160 males employed—including 60 workmen outside of its limits—and about 30 females, 25 of whom run sewing machines, closing, stitching and binding. At present they manufacture some 500 to 600 pairs per day, or about 175,000 pairs annually.

The basement contains the engine, of ten-horse power, and is also used for storing stock, &c. Here the soles, &c., are cut by machinery, a die being used for this purpose, which forms these parts nearly or quite as they are to be worn. By this process it is supposed that seven per cent of stock is saved—a matter of some importance in an extensive business.

The first floor contains the counting room, cutting room, and a large work room in which there is a recently-invented "lasting machine"—a very decided labor-saving arrangement—and the model sewing machine for bottoms. This machine sews at once through the inner and outer soles, of course saving one seam, as compared with the ordinary method of hand sewing. Although the operator is not yet particularly skilled, he is able to sew a lady's boot in less than 50 seconds. Taking one each minute as the average, it makes an aggregate of 300 pairs per day, at a cost of about a half cent per pair for the labor, instead of about twelve cents when done in the ordinary manner.

On the second floor is the sales room, with a large work room, containing a variety of machinery. Prominent among these is a nailing machine, which not only makes its own nails but drives them with surprising dispatch, clinching each nail, making the work as strong and even stronger than the hand-made work. An experienced workman is able to nail the shoe in 30 seconds, or an average of about 500 pairs per day, without unusual effort.

Then the heel—the lifting having been first cut in the basement and afterward glued together—is cut by a machine in the precise form in which it is to be worn, the process not requiring more than three seconds each. This is afterward nailed on from the inside, with one movement, which requires even less time than in its formation. After this, polishing, sand papering and black balling wheels, &c., nearly complete the work.

It would be an act of injustice, if not ungallant, to omit a reference to the third floor and its occupants. Here, in addition to a large workshop, 25 sewing machines are in charge of as many girls, who make—to speak in moderate terms—a great deal of noise, and perform a great deal of labor. These ma-

chines are also propelled by steam, much to the relief of the operators, who once found "machining" a laborious employment.

In fine, the admirers of specimens of mechanical skill, would spend a leisure hour in this establishment with pleasure if not with profit. With such men in charge—men of experience, skill and enterprise—success is rendered quite certain, while the amount of labor performed by machinery must have a favorable effect in these times, when labor is in demand, and allow the patriotic to serve their country in its present struggles. OBSERVER.

### A New Use for Carbolic Acid.

J. E. Ashby, LL. D., writes from Enfield to the London *Mechanics' Magazine* as follows:—Most persons have by this time heard that there is such a substance as carbolic acid; comparatively few have seen it, fewer still have used it, and no one (so far as I can find) has yet noticed a very remarkable property which it possesses in relation to practical mechanics. For the information of those to whom the substance itself is unknown, a word or two will be sufficient to introduce it to their notice. Carbolic acid is one of the products of the destructive distillation of coal, and till within a few years, vast quantities of it were utterly wasted. When perfectly pure it is a white crystalline solid, which by absorbing water soon changes into a colorless refractive liquid, having a faint odor of roses and tar. It is not an acid in the popular sense, not being either sour or corrosive, and should therefore, perhaps, be generally designated by its other title of phenole. Crude carbolic acid may be obtained in bulk for about a shilling a gallon, and is a dark tarry liquid, containing, perhaps, from ten to twenty different substances, in a state of mechanical admixture. Fortunately, this crude acid is available for the purposes to which I invite the attention of your readers. Just as oil is an antifrictional liquid, so is phenole pro-frictional; or, to state it more correctly, as oil appears to keep surfaces in motion asunder by interposing a thin film between them, so phenole appears to make them bite and bind, by bringing them into absolute contact (after a manner of speaking), and removing even the finest film from between them. Any one may convince himself of this by placing a little upon a perfectly clean and dry oil-stone, and then rubbing up the face of a broad chisel upon it. The sensation of the bite (I know of no other word to express it) is very curious, and renders any further explanation unnecessary; it seems as if the stone and the steel had absolutely nothing between them, or even if they were positively brought together by some attractive force. I have applied this property of carbolic acid to the following operations:—Grinding, filing, boring, and sawing in metal, with great apparent advantage. When dissolved in fifteen parts by measure of methylated alcohol, it forms a milk white emulsion if poured into water, and it may be worth while to ascertain whether such carbolated water would facilitate the ordinary work of the grindstone, a point on which I am not able to speak with certainty.

### Review of the Oil Trade.

The Pennsylvania Oil City *Register*, in its weekly review of the oil trade in that neighborhood, says: Since our last the oil business has awakened somewhat from its Rip Van Winkle-like apathy, and is in a healthier state than for some time past. Prices are ruling firm at fifty to sixty cents per barrel at the wells, with an upward tendency. Some parties are asking one dollar. There is but a small amount offered, and buyers at low figures are quite numerous. During the past week there was quite a flutter in the oil market, owing to the fact that a three thousand barrel well was "struck" on the Tarr Farm on Friday last the 25th of July. A new well known as the Woodford well was being bored, and on Friday morning the gas came out of the whole with tremendous force, blowing the drilling tools, weighing six hundred pounds, some sixty feet in the air, and the well commenced flowing at the rate, it is estimated by those competent to judge, of 3,000 bbls. per day. The price of oil fell somewhat upon the striking of this well, and oil buyers were in ecstacies. But, alas for the vanity of human hopes, on Saturday the tubing was drawn from the Phillips' well near by, and the new well simmered down to 150 bbls. per day, the water courses from the Phillips' well effectually drowning it out. The Woodford is now flowing about one hundred and fifty barrels at the present time. The producers have recovered from their temporary panic. The Blood Farm well, which produced last winter some 4,000 barrels per day, is now dried up, and is not producing anything. Many other localities exhibit the same state of affairs. About fifty wells are being put down on the different farms, and what the amount of the oil will be that they will bring forth, time alone will show.

### The Carte de Visite.

We do not all come out of the photographic studio alike unhappy. There are those to whom the process does justice, as well as those to whom it does injustice; nay, there are some on whom it confers actual benefits, and who show to greater advantage on the carte de visite than in their own proper persons. I have myself sat on two occasions for one of these portraits. On the first I was simply occupied in keeping still and presenting a tolerably favorable view to my features and limbs to the fatal lens; but the result was so tame and unimposing a picture that I determined on the next occasion to throw more intellect into the thing, and finding a certain richly gilded curtain tassel convenient to my gaze, I gave it a look of such piercing scrutiny, and so withered and blasted it with the energy of my regard, that I almost wonder it did not sink beneath the trial.

That look has, I am happy to say, been reproduced faithfully, and no one could see the portrait without giving its original credit for immense penetration, energy and strength of character, and a keen and piercing wit. It is difficult to lay down rules of general application, but it may be safely said that the people who come out of the photographic struggle the best, and who are least injured in the engagement, are people of ordinary appearance, from whom we do not expect much. It is common to hear some lady, who is generally acknowledged to be pretty, urged by her friends to sit for a carte de visite. "You really ought to have it done," they say, "you would make such a charming portrait." The portrait is taken, and is, after all, not charming. On the contrary it is sufficiently the reverse to make the dearest of the victim's female friends happy.—*Dickens' All The Year Round.*

### Population of the United States.

We published sometime since a statement of the population of the United States, in 1860, taken from the census returns, but as these returns have since been revised and corrected by the Superintendent of the Census, we publish his official statement arranged in the following table, which shows the number of inhabitants of the States and Territories at each census from 1790 to 1860, inclusive, and the number of whites, free colored and slaves, respectively, together with the rate of increase of each class during the several decennial terms and for the whole period:—

| *Aggregate Population.* | 1790. | 1800. | *Per cent of Increase.* |
|---|---|---|---|
| Population | 3,929,827 | 5,305,925 | 35·02 |
| White population | 3,172,464 | 4,304,489 | 35·68 |
| Free colored population | 59,466 | 108,395 | 82·28 |
| Free population | 3,231,930 | 4,412,884 | 36·54 |
| Slave population | 697,897 | 893,041 | 27·97 |
| Colored population | 757,363 | 1,001,486 | 32·23 |

| *Aggregate Population.* | 1810. | *Per cent of Increase.* | 1820. | *Per cent of Increase.* |
|---|---|---|---|---|
| Population | 7,239,814 | 36·45 | 9,638,131 | 33·13 |
| White population | 5,862,004 | 36·18 | 7,861,937 | 34·11 |
| Free colored population | 186,446 | 72·00 | 233,524 | 25·23 |
| Free population | 6,048,450 | 37·06 | 8,095,461 | 33·84 |
| Slave population | 1,191,364 | 83·40 | 1,538,038 | 28·79 |
| Colored population | 1,377,810 | 37·58 | 1,771,562 | 28·58 |

| *Aggregate Population.* | 1830 | *Per cent of Increase.* | 1840, | *Per cent of Increase.* |
|---|---|---|---|---|
| Population | 12,866,020 | 33·49 | 17,069,453 | 32·67 |
| White population | 10,537,378 | 34·03 | 14,195,695 | 34·72 |
| Free colored population | 319,599 | 36·87 | 386,303 | 20·87 |
| Free population | 10.856,977 | 34·11 | 14,581,998 | 34·31 |
| Slave population | 2,009,043 | 30·61 | 2,487,455 | 23·81 |
| Colored population | 2,328,642 | 31·45 | 2,873,758 | 23·41 |

| *Aggregate Population.* | 1850. | *Per cent of Increase.* | 1860. | *Per cent of Increase.* |
|---|---|---|---|---|
| Population | 23,191,876 | 35·87 | 31,445.089 | 35·59 |
| White population | 19,553,114 | 37 74 | 26,975.575 | 37·97 |
| Free colored population | 434,449 | 12·46 | 488,005 | 12·33 |
| Free population | 19,987,563 | 37·07 | 27,463,580 | 37 40 |
| Slave population | 3,204,313 | 28·82 | 3,953,760 | 23·39 |
| Colored population | 3,638,762 | 26·62 | 4,441,765 | 22·07 |

| | *Rate per cent of Increase from 1790 to 1860.* |
|---|---|
| Population | 700·16 |
| White population | 750·30 |
| Free colored population | 720·65 |
| Free population | 747·66 |
| Slave population | 466·53 |
| Colored population | 486·48 |

TOTAL POPULATION IN 1860, INCLUDING INDIAN TRIBES.

| | |
|---|---|
| Total population of the States and Territories | 31,445,089 |
| White popnlation of Indian Territory west of Arkansas | 1,988 |
| Free colored population of Indian Territory west of Arkansas | 404 |
| Slave population of Indian Territory west of Arkansas | 294,431 |
| Total | 31,749,281 |

### How to Make Parchment Paper.

Paper resembling parchment in appearance, and possessing several of its qualities, is now manufactured in England from common white paper. The way to make it is described as follows, by Dr. Lyon Playfair, F. R. S., Professor of Chemistry in Edinburgh:—

It is made by a very simple process. Ordinary water-leaf paper, as it is called, that is, common white blotting-paper—for you know it better by that name—is simply dipped into diluted sulphuric acid; but the dilution must be exact. If you err on either side, even within very small limits of error, you get a waste product and not parchment paper. If your acid be too weak, you convert the paper into a gum; and if the acid be too strong you corrode the paper, and do not get what you desire. In order to produce this beautiful parchment-paper, you must take exactly two measures of strong oil of vitriol—sulphuric acid—and one measure of water, and mix them together. They first become heated, and you allow them to cool; and after they have cooled to the ordinary temperature they are ready for use. Nothing is more simple. The best paper for this purpose is that which has been well pulped, or well disintegrated in the making. The conversion of it into parchment paper is an exceedingly simple operation. I now place it in ammonia, which takes away the acid, and there is the parchment paper completed, so that you see nothing is more easy. What have I done? Although I have effected such a transformation in the paper that it is now much stronger than it was before, we have added actually nothing to it. The acid has not entered into its composition. It is the same weight after it has dried as it was before. It is simply a molecular change which has occurred in the character of the paper, the pores of the water-leaf having become closed, and it is now repellant of water. It is a semi-transparent body with great elasticity. You can bend it backward and forward without cracking, and the strength of it is much increased. It is repellant of water, but it allows some fluids to pass by a process of diffusion; and when it is stretched upon a sort of drum, or a sieve frame, or wooden circle, it forms an instrument, which, in the hands of the Master of the Mint, has produced that elegant process of separation, or diffusive analysis, which he has called "Dialysis." The strength of the paper is so much increased by this operation of simply subjecting it to the action of the acid, that a strip of paper which requires sixteen pounds weight to break it when it is in the state of the water-leaf, requires seventy-five pounds to break it after it is passed into the other state.

This property of sulphuric acid with regard to paper was discovered in 1854 by Mr. Gaine; but it was not until some years afterward that Mr. De la Rue, by extensive experiments, was enabled to form parchment paper as a commercial article, and it is now used for a great many purposes. There are some deeds written upon it. And it is now extensively employed by ladies for covering preserve jars, and is used for a great many other useful purposes.

### Trade of the Mississippi.

The first steamboat was introduced upon the Mississippi river in the year 1811. Before that, a voyage from St. Louis to New Orleans occupied twenty-seven days; it now takes about four. The tunnage employed on the river thirty years since was about 7,000 tuns; it was by the last statistics before the business was interrupted about 559,000. The whole steamboat navigation of the Mississippi and its confluents extends 16,674 miles, with a population directly dependent upon it of nine or ten millions, occupying fourteen or fifteen States. The number of steamers alone on the waters was, in 1851, over six hundred. But these vessels form only a part of the river tunnage. As respects the rapidity of the growth of the trade of the river and its branches, it is stated in a report on the steam marine of the United States, made in pursuance of a resolution of the Senate in 1852, that in a period of nine years the steamboat tunnage nearly doubled itself.

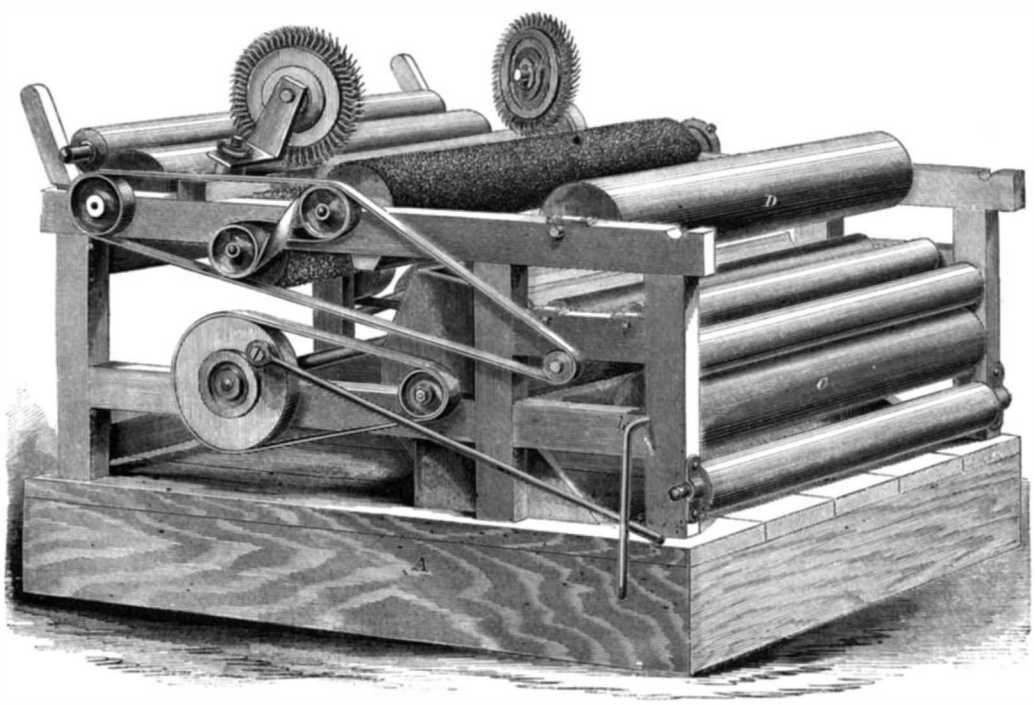
The prosperity of New Orleans before the civil war began was very great, and still on the increase, notwithstanding the numerous railways in the West and South. The commerce of New Orleans, which is mainly derived from the Mississippi and Ohio Valleys, was in 1857, valued at $110,353,436.

### Improved Machine for Drying and Dressing Cloth.

The machine here illustrated is designed for dressing woolen cloths, such as flannels, broadcloths, &c., the cloth being dried, napped, tentered and pressed at a single passage through the machine, all by rotary and continuously-acting motions.

Fig. 1 is a perspective view of the machine, and Fig. 2 is a cross section. The machine stands upon a tight box, A, which contains a suitable length of steam pipe to heat the air within it. The steam is conducted from the pipes within the box through the pipe, *b*, to the hollow cylinder, C, and from that to the hollow cylinder, D. The cloth is carried around these two cylinders, as clearly shown in Fig. 2, around the guiding rollers, *e e e*, and over the opening in the box, F. This box has a revolving fan inside which draws the hot air from the box, A, and drives it against the lower side of the cloth, completing the drying which was commenced by the steam-heated cylinders, C and D. It next passes between the cylinders, G and H, by which it is brushed and has the nap raised, if a nap is required. Beyond the cylinder, H, are placed the wheels, I, for distending the cloth laterally. These wheels are armed at the periphery with hooks resembling card teeth, and they are set at an angle with the edges of the cloth, so that as the cloth is caught by the hooks it is stretched sideways by the rotation of the wheels. The cloth next passes over the cylinder, J, where it is subjected to the action of the weighted roller, K, by which it is pressed, and the several operations of finishing are completed.

*Fig. 1*

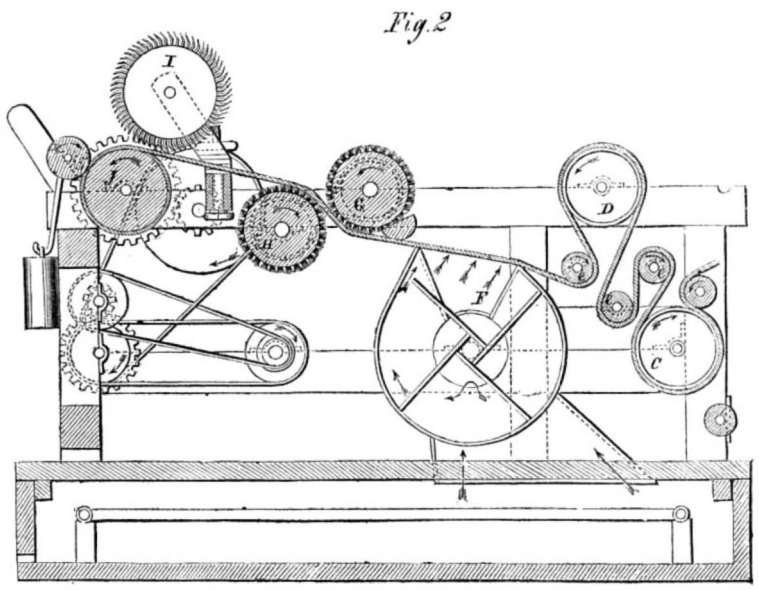


HENDERSON'S MACHINE FOR DRYING AND DRESSING CLOTH.

It will be seen that this machine is exceedingly compact, that it may be cheaply built, and that it requires but little power to operate it. We are told that it makes excellent work and gives good satisfaction.

The patent for this invention was granted through the Scientific American Patent Agency, July 8, 1862, and further information in relation to it may be obtained by addressing the inventor, David Henderson, at Thornton Ferry, N. H.

*Fig. 2*



### Combined Labor and Machinery.

All useful machinery is beneficial. Its object is to save labor and improve the condition of man. In some special cases this may not be so apparent, but it is a fact nevertheless. The seamstress, shoemaker and tailor beheld their finest stitching surpassed by machinery, and when first introduced they believed that it was to be ruinous to them and only advantageous to the capitalist. The sequel has shown that the sewing machine has been more beneficial to the operative tailors and seamstresses than any other classes. The effect of all improvements in machinery is to benefit the operative workers more directly than the capitalist; and, as a general rule, all persons gain by improvements in machinery. None, however, gain so much as those who can unite their own labor with that of machinery. The tailor and seamstress who own sewing machines, and thus combine their own skill with such labor-saving mechanism, enjoy the greatest advantages from them. Most of the wealthiest manufacturers in our country were once operative mechanics, and can date their rise from the combination of their own skill with improved machines invented by themselves. This consideration should stimulate every mechanic to invent and improve mechanism for economising his labor.

It is also self-evident that any mechanic who invents a machine whereby he can accomplish as much labor in one day as he used to perform in six, increases his income in the same ratio.

### Foretelling and Telegraphing Storms.

Storms may and are sometimes predicted a number of hours before they come on; and the telegraph is used to convey information of their approach. In England there is a special department for this purpose under the supervision of Admiral Fitzroy. An English journal says, respecting it, that "no great general storm has visited the country during the past year without being heralded for several hours in advance by the display of signals along the coast, warning seamen to keep off the shore, or, at least, not venture out for the time being."

An English engineer named Adams, strongly recommends that the engineers of locomotive engines should stand upon platforms made with easy springs. Various injuries to the human frame arise from long exposure to the joltings and uneasy motion of trains.

### POWER OF PENETRATION.

We have been shown two plates of iron, one 1½ inches in thickness and the other ⅜ of an inch, both of which were punched through by a bolt less than half an inch in diameter. The bolt was of steel, about 4 inches in length, pointed at the end, but with the extreme point cut off; forming a small flattened surface. It was fired from Mr. Lyman's accelerating gun, with three charges of powder, one at the breech and the two others distributed along the bore. The charge at the breech contained 2 drachms of powder, the second 12 drachms and the third 16. The weight of the gun was 34 lbs., of the shot 4¼ ounces, of the powder 1⅞ ounces; diameter of bore .492 inch. The shot made a hole through both plates, and penetrated a little into the granite block against which they were placed.

Since the above was in type Mr. Lyman has brought in two other targets, showing still greater power of penetration. One of these was a bar of solid iron just two inches in thickness, and two bolts were imbedded in it—one extending nearly through and the other just exhibiting its point—enough to show that it made a hole through the bar. These bolts were of steel with lead packing as the base, they were four inches in length and weighed 4¼ ounces. The bore of the gun was .492 inch. The charge was distributed in three portions, 2 drachms at the breech, 12 in the second chamber and 16 in the third, making 1⅞ ounces in all for the first bolt, and for the second 2 drachms at the breech, 12 for the second chamber and 21 for the third.

The second target was formed of seven plates of best Pennsylvania refined boiler iron (scraps from the new gunboat boilers), each ⅜ of an inch in thickness, making a total thickness of 2⅜ inches. A bolt 8 inches in length from the same gun passed through all of the plates, and penetrated one-fourth of an inch into an iron block behind them. In this case the charge was the same as for the second bolt in the former target. The bolt weighed 6½ ounces—3 times the weight of the powder.

Shot-proof Ships.—A Parliamentary return states that the number of proposals and plans for the purpose of shot proof ships submitted to the British Admiralty between the 1st of May, 1859, and the 1st of May, 1862, amounts to 590. The whole were, in the first instance, referred to the Comptroller of the Navy and the assistant officers of his department for consideration and report.

A Culverin was cast during the reign of Charles V. which was 58 calibers long, and fired a ball weighing 36 lbs. but on trial this piece was found to have actually less range than an ordinary 12-pounder gun. The experiment of reducing its length, by successively cutting it off to 50, 44, and 43 calibers was tried, and it was found that the range increased at each reduction until it gained 2,000 paces.

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VOL. VII. NO. 7.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, AUGUST 16, 1862.


## THE TWO GREAT MONITORS.

Captain Ericsson has made a contract with the Government to construct two large iron-plated ships, which he believes will be the fastest and best sea boats, the most completely invulnerable, and the most formidable for attack, either at long range, or in close quarters, as rams, of any ships in the world.

They will bear a general resemblance to the *Monitor*, with such modifications as have been suggested by experience. One of them is to be 320 feet in length, and the other 341, with 50 feet beam. The vertical sides are six feet in depth, and are to be protected with iron armor plating, 10½ inches in thickness, backed with four feet solid oak.

The turrets are to be absolutely invulnerable. The contract provides that they shall be two feet in thickness, but the contractor has leave to reduce the thickness, provided he can satisfy the Department that less will be sufficient. A target has been constructed of thickness less than two feet, and forwarded to Washington for trial, but Capt. Dahlgren, who has been sending his 11-inch balls through a target like the side of the *Warrior*, with 30 lbs. of powder—making a clean hole at every shot—says that there is no use of firing at this target of Ericsson's, until the 15-inch guns are finished. The turrets will be made of sufficient thickness to withstand the force of the 425-pounders with the maximum charges of the big guns.

The vessels are to be furnished with more powerful engines than any now afloat. Each ship will have two engines of 100 inches diameter of cylinder, with four feet stroke, to make 70 revolutions per minute, with boiler surface of 35,000 feet, and 1180 feet of grate surface. The boilers are of the upright water tubular pattern—a modification of Martin's. The propellers are Ericsson's patent, 21½ feet in diameter, and 30 feet pitch. The contractors guarantee a speed of 16 knots per hour—nearly nineteen miles.

The armament will consist of 15-inch guns, and will probably equal in destructive power that of any French or English ship. It is, however, as rams that these vessels will be the most formidable. Where the plates of the sides meet at the bow they form an iron wedge, 21 inches thick at the base, and terminating in a sharp edge. This wedge is sustained by the plates behind it, 10½ inches in thickness, six feet in depth, and extending the whole length of the vessel, forming the most powerful butting instrument that it is possible to conceive of. Captain Ericsson says, "It will split an iceberg."

## THE SEWING MACHINE BUSINESS AS IT IS COMPARED WITH WHAT IT WAS TEN YEARS AGO.

The rapid rise of the sewing machine business constitutes one of the wonders of this enterprising age. No industrial revolution can equal that which has been produced by it within the short space of sixteen years. The first general notice given to the public that a sewing machine had been invented appeared on page 388, Vol. II. (old series) SCIENTIFIC AMERICAN, 1847. It contained a brief description of Elias Howe's double-threaded lock-stitch machine—the first for practical purposes that had been produced. With respect to its characteristics we then said, "that several patents had been previously granted for sewing machines, none of which operated in a similar manner, nor produced a similar result. The inventor of it has struck out a track of its own, and it would be difficult by any means heretofore known to sew as fast or as well as can be done by this machine." Mr. Howe was then in England making efforts to introduce his invention into that country. Our notice had the effect of drawing general attention to the subject, and it resulted in the exhibition of a single thread chain-stitch machine, by Morey & Johnson, in the Merchants' Exchange in this city on May 6th, the subsequent year. This machine was illustrated and described in page 145, Vol. IV. (old series), SCIENTIFIC AMERICAN, 1849. We believe this was the very first sewing machine which had thus been presented to the public. Taking this as the starting point in the introduction of the sewing machine, there was only a single operating one in existence thirteen years ago. In the subsequent year three other sewing machines, each using the needle and shuttle with two threads and forming the lock-stitch, were illustrated in Vol. V. (old series) SCIENTIFIC AMERICAN. These were Lerow & Blodgets', A. B. Wilson's and W. C. Watson's. In 1851 Lerow & Blodget improved their machine by giving the needle a straight vertical motion; and I. M. Singer also introduced his machine with a straight needle in the same year. Both of these machines were illustrated and described in Vols. VI. and VII. SCIENTIFIC AMERICAN. In the same year the Wheeler & Wilson Sewing Machine Company was organized for manufacturing the new machine, invented by A. B. Wilson, with an adjustable feed motion, straight needle, and double thread, forming the lock-stitch with a rotary crescent looper and disk bobbin. It is not our purpose nor have we space at present to describe the specialties of the different sewing machines that have been brought before the public. Their peculiarities have mostly been illustrated in former volumes of the SCIENTIFIC AMERICAN. Our object at present is to remind our readers of the rapid rise and the importance to which the sewing machine business has attained. In 1852—ten years ago—a few companies had erected machinery and commenced to manufacture such machines for sale, but the number made that year was so limited that a reliable record of them has not been preserved. In 1853 there were 2,529 made, and up to the present time over 200,000. The three largest sewing machine establishments are the Wheeler & Wilson Manufacturing Company; I. M. Singer & Co., and Grover & Baker. The former has made about 85,000 machines, the second 55,000; the third about 55,000. Wilcox & Gibbs since 1859 have manufactured 10,714. There are about a dozen companies now engaged in the manufacture of sewing machines, and the business has given rise to several immense manufactories in which a capital of several millions of dollars is invested in buildings and machinery. The largest of these establishments is that of Wheeler & Wilson at Bridgeport, Conn., which covers several acres of ground, forming a parallelogram with front and rear buildings 540 feet in length; the end buildings 260 feet, surrounding a court in which there are several large structures connected with the manufactory; they employ at present about 500 hands. Singer & Co., have a beautiful iron fire-proof factory which covers four lots in Mott street, this city, and they employ over 400 workmen. The following are the prominent Sewing Machine Companies:—Wheeler & Wilson; I. M. Singer & Co.; Grover & Baker; Wilcox & Gibbs; Finkle & Lyon; Leavitt & Co.; and A B. Howe. All these have their main salerooms in New York. Miles Greenwood, Cincinnati, and five or six manufacturers located in other places are also building machines on a smaller scale. The number now made per annum is, as near as we can learn, about 70,000. The present national troubles have not so affected this business but that all these establishments have done a comparatively good business. Although the large number of 200,000 machines have been made and sold, we must not forget that there are 6,000,000 families in a population of 30,000,000, so that there is still a wide field for future operations in our country.

When reflecting upon the future prospect of the sewing machine ten years ago, the following language was used on page 349, Vol. VII. (old series) SCIENTIFIC AMERICAN:—"The sewing machine is but on the threshold of its career. Private families do not know anything about its use, and shoemakers and saddlers have not yet tasted of its benefits. We suppose that in five years hence we will be wearing shirts, coats and boots stitched with it." Such anticipations have all been realized.

Since the first sewing machine was illustrated in our columns up to the first of July last—embracing a period of thirteen years—358 American patents have been granted for improvements upon it direct and for devices connected with its use. It has been the means of stimulating genius, elevating art, economising labor, and increasing the wealth of our country.

## MANUFACTURE OF STEEL AND BRASS WIRE CLOTH.

Some articles of dress come into very general use, and assume various phases, giving rise to new arts and manufactures. This has been the case with the "hoop skirt." It was in fashion during a certain period of last century, then it disappeared for about a hundred years, and now it has come into very general use again. In its first phase it was stiffened with cords; in its second with cane hoops; in its third with thin strips of brass; and lastly with hoops of flattened steel wire. Corded skirts were too heavy and flexible; cane hoops were too easily broken, and brass strips did not possess sufficient elasticity to enable a skirt to resume its rounded form after being submitted to considerable pressure. The steel hoops which are now employed to stiffen skeleton skirts, are lighter than cane or brass hoops, and they are so elastic and strong that they may be severely bent, and yet the skirt will spring back to its original shape. The manufacture of this wire forms a peculiar art of itself, which we will describe according to the operations which we have witnessed at the steel, iron, copper and brass wire works, and wire cloth manufactory of William Cabble, Esq., in Union Avenue, Eastern District of Brooklyn.

The best steel for making this wire comes from England, in the form of coiled rods, of about ⅜ths of an inch in thickness. The first operation to which it is submitted, is heating it to about a bright red heat in a furnace, adapted for the purpose, by which it is softened. It is next scoured with acid, to remove all oxide from its surface, after which it is coated with rye flour and dried in a special apparatus. It is now clean and soft, and fit for the drawing operation. This consists in reducing the steel rod to a much less diameter, and at the same time greatly extending its length. One end of the rod is first pointed on an anvil, and filed down to the size or number to which it is to be drawn on the "gage-plate." It is next passed through a hole of the same size in a steel draw-plate, which is secured fast to the back of a table, and is then carried forward and fastened to a conical reel, placed upon the top of a revolving vertical spindle on the table. As this reel revolves, it winds the steel rod around it and pulls it through the hole in the steel draw-plate, reducing its size to the wire-gage called No. 7. It takes no less than fifteen-horse power to draw the steel rod down to wire during this first reducing operation. The "wire-gage" means a certain size of wire, not measured by inches, which is known to the trade, and the common measure for the different numbers is a metal gage-plate, with holes in it, called "Stubbs's-gage," from an English maker of such plates. The operation of drawing the wire compresses the atoms of the metal very close together, rendering it hard and brittle. Before it can be drawn a second time, it requires to be softened again in the annealing furnace, and afterward cleaned in the same manner as it was prepared for the first drawing operation. It is next drawn through a smaller hole in a draw-plate, and reduced two sizes, to No. 9 wire, and then it is alternately reduced two sizes and annealed, until it becomes No. 19 wire in size, and has been extended in length from a few yards to no less than two thousand yards. In the drawing operation it is wound from one reel upon another, passing through the draw-plate. Afterhaving been reduced to the requisite size it is flattened by drawing it from one reel and winding it upon another, and passing it between a pair of pressure steel rollers. After this, the flattened wire is next hardened and tempered—two operations which are similar in their nature, and object to the hardening and tempering of handsaws and steel cutlery instruments. The

flattened wire being wound upon a reel, is placed at one end of a long furnace, through which passes a tube containing a molten composition of lead and tin, the temperature of which is uniform. The flattened steel wire is drawn through this tube, and as it passes out at the other side of the furnace at a low, red heat, it is drawn through a trough containing a composition of oil and other melted ingredients, and from thence it is wound upon a reel. By this treatment the wire is hardened, and it now requires to be tempered to give it the desired elasticity or spring. A furnace, nearly similar to the one for hardening, is used for this purpose, only the wire is drawn from one reel upon another, through a clear blast flame. The take-up reel is placed some distance behind the furnace, and as the wire passes out, a flame envelopes it for some distance after leaving the furnace. This flame is caused by the oil on the wire taking fire. Much practical experience is required to conduct the tempering operation, as it is by the length of flame on the wire the operator judges of the heat to which the wire is subjected in the furnace in order to secure the proper temper. The skirt wire which we examined in this establishment is peculiarly tough and elastic. After being tempered, the wire on reels is taken to a large room, where there are two hundred braiding machines, attended by girls. Each reel is placed in a frame near the floor, and the wire passes straight up through the middle of the braiding machine, and is wound upon a top reel. In passing upward, a spool carriage, similar in almost every respect to a cord-braiding machine, and carrying several spools of cotton yarn, cover the wire with cords. The spools are moved back and forth in grooves, by a series of small sun and planet wheels, underneath the roll-plate, and while they are thus moved they braid the yarn around the wire, and thus perfect it ready to be sent to the warehouse, and fit to be placed in skirts. No less than 50,000 yards of flattened steel wire are made and covered daily in this manufactory, and several new machines are now being put up to increase the quantity.

We have thus described how crinoline steel wire is made and covered, and we will now describe how brass wire is manufactured and woven into wire cloth, for Fourdrinier paper machines. The composition of this wire is not exactly a pure brass composed of zinc and copper, but is rather a bronze alloy, made expressly for paper machines in this factory. The alloy for this wire is first cast into the form of a long, flat ingot, about 1½ inches thick, after which it is annealed, then rolled between a pair of pressure rollers, by which it is reduced to about ⅜ths of an inch in thickness, and afterward slit into several bars, with a pair of circular shears. It is next drawn through a gage-plate, in the same manner exactly as steel wire, and is reduced three sizes each time. Before every drawing it requires to be annealed, as brass, like steel, becomes hard and brittle by the drawing operation. In annealing this wire it is placed in coils in the inside of round sheet-iron pans, which are covered and placed in a furnace, where the wire is heated until it becomes soft and tough. The wire-drawer who attends the machine, files down the end of the coil of wire until it can be passed through the proper hole in a steel draw-plate in the same manner as in drawing steel wire. The best draw plates for the steel wire come from England; those for the brass wire from Germany. The drilling of the small holes for receiving and passing the wire through them, is a difficult operation, requiring much skill and experience. Each hole must be perfectly round, or good wire will not be made. The drills for making the holes are long and perfectly square, but tapering to a point, and some of them are very fine. A good wire drawer is capable of making his own drills and drilling his own plates. The size of brass wire for cloth is called No. 36, and is about the 120th of an inch in thickness, and used in coils about 8,000 yards in length. After being annealed and drawn alternately, until it has become No. 36 wire, it is annealed again, cleaned and wound like thread upon spools, for the weaving operation. The loom for this purpose is similar in form to a great old fashioned hand loom, only it is made of iron, weighs about six tuns, and is very strong. A warp of wire is put upon the back beam, as in a cotton or carpet loom; it is then carried through a pair of heddles to the front or cloth beam. The fine weft wire on a spool is secured in the shuttle, and shot from one side to the other through the shed of the warp alternately, and the filling is beat up by a heavy sley, as in common hand loom weaving. Two treddles are used as the cloth is woven plain, but two men are required to throw the shuttle, one from each side. Wire cloth weaving is laborious work; the cloth which we examined contained sixty picks to the inch, and was more regular in texture than most of the cotton cloth that is woven in power looms. Some of the wire cloth made in this manufactory is no less than eight feet wide, but the pieces vary in size according to the size of the paper machines for which they are made. Thus, some pieces are 62 inches wide by 24 feet 10 inches in length; others 32 feet long by 72 inches in width; others 84 inches wide by 25 feet 10 inches in length. Each piece, after it comes out of the loom, has a peculiar wire hem worked upon it by a girl, then it is united to a piece of the same size by a wire hinge, so as to form an endless web for revolving around rollers, and taking up the pulp in the paper machine. All the webs of wire cloth are also measured and stretched in an adjustable screw frame, and thus fitted for the paper machines.

We have thus described the operations connected with the manufacture of brass wire cloth in this establishment. Pure copper wire for the manufacture of electro-magnet coils, is also made here; also iron wire for all purposes—electric conductors, bird cages, and bolting cloths, for millers. Iron wire can be drawn down from No. 18 to No. 40, without annealing. The latter number is that which is employed for bolting cloths. The gage of iron and brass wire is different—No. 36 iron is equal in fineness to No. 38 brass wire.

Mr. Cabble is an experienced English wire manufacturer; and several brothers, bred practically to the business, direct different departments. The operations, therefore, are conducted with as much skill as in any similar establishment in England, where wire drawing has been carried on since 1565, the year when the art was introduced into that country from Nuremburg in Germany. The old method of making wire prior to the discovery that metal rods could be elongated and reduced in size by drawing, was by hammering the metal into thin sheets, then cutting it into strips, and afterward swedging it on an anvil, having a small semispherical groove cut in it. One wire-drawing machine can make as much wire in one hour as an old wire forger could make by hand in a lifetime.

## THE MONITOR AS A SEA BOAT.

Lord Palmerston stated in Parliament that he had positive information that the crew of the *Monitor* came very near being suffocated on the voyage from New York to Fortress Monroe, and the inference drawn was that the vessel was no sea boat. The statement was true, but the circumstances of the case show that the inference does not follow.

The provision made for ventilating the vessel consisted of a blower driven by steam, drawing the air in at two chimneys provided for the purpose; and during the storm the spray was thrown into these chimneys, and wet the belt by which the blower was driven, so that it slipped on the drum, and the blower stopped. The current of air ceasing, the hold was soon filled with carbonic oxide from the furnaces, and the crew would have perished had they not gone up into the turret. The recurrence of this accident can of course be easily obviated.

Captain Ericsson says that the *Monitor* is one of the best sea boats ever constructed. On the voyage from New York to Hampton Roads, though very rough weather was encountered, the inkstand, which was standing unsecured upon the Captain's desk, was not moved from its place. The vessel being so nearly submerged, the waves break over her, and there is no roll.

## Tin.

Four classes of tin find their way into our market. These are denominated Banca, Straits, English and Spanish.

Banca tin is the best, and is the principal sort which we employ. It is always sold for about two and three cents more per pound than any other, because it is a reliable article, and its quality can be taken upon trust.

Straits tin derives its name from vessels which trade with ports in the Indian Archipelago, and pass through the Straits of Malacca. They collect this metal at Singapore and at Borneo.

English tin is obtained in Cornwall, where the most productive mines of this metal in the world are located. The best qualities of English tin, it is said, never reach our markets, the poorer qualities only are exported. The refined English, which is esteemed as good as Banca, and sells for the same price in London, is all kept for British manufacturing purposes; the demand for it being greater than the supply.

Our Spanish tin comes from Mexico and South America. Its quality is poor, owing to the slovenly method employed to smelt the ore.

## Little Nellie, the Child Editress and Publisher.

Among the exchange papers regularly received at this office is a neatly-printed little sheet entitled the *Penfield Extra*, which is edited and conducted solely by a little girl only twelve years old. The story of her life is given in the annexed letter, which we have just received from her, and which was accompanied by a well-executed photograph of herself, taken by Prof. Powelson, of Rochester, N. Y., by whose liberality she is furnished with copies free of charge. Her story portrays the character and intelligence of its authoress, and the sun has impressed upon the paper before us a face which bespeaks genius, perseverance and child-like simplicity. The picture would add ornament to any one's photographic collection, and we suggest (without little Nellie's knowledge of this announcement) that persons who are procuring an assortment of photographs to fill albums cannot do better than inclose twenty-five or fifty cents in a letter to "Little Nellie," at Penfield, N. Y., and ask her to send her photograph.

After thanking us for furnishing her regularly with the Scientific American, she adds:—

My father was an old printer, but becoming sickly and nearly blind, the type and press fell to me, as I was all the one that could use it, as I, from a very a very small child, would set and distribute type for diversion instead of playing with my dolls. I now do all my own work except the presswork, which I hire done. It is hard work, very true, but I think I hear in my dreams my mother whispering to me and saying, "My dear child, be of good cheer, and bring up your little sisters to love Him who is a lamp to your feet and a guide to your path. He will make your burdens easy and cause you to have many friends upon this earth." In speaking of friends it nearly overpowers me with gratitude, it causes my little heart to swell too large for the place it occupies, and makes my eyes to water, my lips to quiver and my pen to tremble; and sometimes I ask the question why the Lord is so kind to me to cause the hearts of so many people to hear my prayers. I am sure I am not deserving the encomiums of the world and the press; I have done naught to merit it. I am nothing within myself but a meek and and lowly follower of my blessed Savior. My photograph will not show you a richly-clad lady in her silks and jewels, but you will observe a little child in a ten-cent calico dress and a little crape sack, and I am thankful that I am not proud or vain. As my picture shows a care-worn expression, many may take me to be older than I am, consequently I would say I was born the 21st day of November, 1849. I wish to earn my bread in the sweat of my face, and teach all other little girls to do likewise. I do not claim that I am superior to other little girls of my age, providing they were forced to make use of all their mental powers at so young an age. Probably I have written more letters during the last month than many girls at eighteen years have written in all their life time; and by my receiving and reading so many letters I must necessarily learn how to write a business letter. I know I am greatly deficient in grammar, which greatly injures my composition, but such as I write is the best I can do, and I must not falter, but try and do my best. I have letters from the highest officials of our nation and I must answer them in some way, and many applaud me for writing so well, considering my age.

Probably I have said all that will be of any interest to the kind editor, and perchance more, so I will close by returning all the thanks in my possession to him for his kindness in sending me the Scientific American, which I am preserving to get bound. I have them all but three numbers, which I failed to get; and may I still be permitted to remain in the kind editor's esteem and he shall ever have the gratitude of NELLIE.

The revenue of Great Britain for the year ending June 30, 1862, was £69,685,789 (about $348,428,945). Compared with the previous year there had been a falling off of £2,177,305. This was due to the excise duty on paper which had been abolished, and also in a slight reduction of direct property tax.

The mining of nickel is carried on at Torrington, Conn., by a New York company, which employs twenty hands, and is putting up works for smelting. The ores are rich. Cobalt and sulphuret of copper are found in connection with the nickel.

## 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. The claims may be found in the official list.

*Manufacture of Gas.*—This invention consists in introducing into a heated retort filled with coal, wood or other material from which illuminating gas can be manufactured, a stream of petroleum or rock oil, in such a manner that by the action of such liquid, the quality of the gas obtained from the coal or other material in the retort is improved, and a rich gas can be produced from the poorest kind of coal or wood, or other material, which, under ordinary circumstances, would hardly be fit for the manufacture of illuminating gas. W. H. Gwynne, of White Plains, N. Y., is the inventor.

*Elongated Projectiles for Ordnance.*—One part of this invention has for its object, the obtaining of a rotary motion of an elongated projectile on its axis in its discharge from a smooth-bore gun, and to this end it consists principally in fitting such a projectile with anti-friction rollers, so arranged to protrude through slots in the sides of the projectile, from a cavity in the interior thereof, that their peripheries may roll in contact with the bore of the gun when the projectile is placed therein, and that their planes of rotation will be oblique to the axis of the said bore and of the projectile, such rollers having springs or their equivalents applied, in combination with their bearings, in the cavity of the projectile, for the purpose of holding them with a sufficient but not too unyielding pressure against the bore, that in rolling in contact therewith, they may, owing to the aforesaid obliquity of their planes of rotation, run in a spiral direction, and so cause the projectile to receive a rotary motion on its axis in its discharge. The inventors are Thomas Goodrem and Charles Jackson, of Providence, R. I.

*Improved Trunk.*—This invention relates to a new and useful improvement in trunks, such as are generally used for traveling, and commonly termed traveling trunks. The invention consists in providing the trunk with a series of drawers, having folding bottoms, and having the case of the trunk provided with the usual lid, and also provided with a hinged removable front, all arranged in such a manner that any one of the drawers may be used separately and all, or any one of them, have its bottom folded so as to increase the capacity or enlarge the dimensions of the interior, by throwing two or more drawers into one, as occasion may require, the drawers at the same time being inclosed so as to prevent the ingress of moisture. The inventor is J. W. Parmenter, of New York City.

*Fire Escape.*—This invention relates to an improvement on a fire escape, for which Letter's Patent were granted, bearing date November 12, 1861, and which consisted in the employment of a flexible ladder, fitted in a box so arranged as to be capable of being tilted when necessary, and admit of the ladder falling to the ground or pavement. In this patented invention the parts were so arranged as to render the device a fixture, or one that required to be fitted permanently to the building, involving considerable expense, as mechanics skilled in such work could only be employed in adapting it to the building. The object of this improvement is to construct and arrange the several parts, in such a manner that the device may be made separately from the building, be perfect or complete in itself, and capable of being applied to any building without the exercise of any mechanical skill, and still possess all the advantages of the patented device. The inventor is Aaron Shute, of Flushing, N. Y.

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CITY RAILROADS.—There are seven lines of horse railroads in New York and Brooklyn. Including double tracks and sidings, their total length is 140½ miles. The total cost of their roads was $5,838,489, not including horses and cars, which are valued at $804,344. The number of miles traveled on these roads last year was 10,950,000 and the total number of passengers carried was 44,167,460. Their gross earnings amounted to $2,202,110.

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BENTON says, "The loss of velocity of a 24-pounder ball by a windage $\frac{1}{40}$th of the diameter, and a charge of 6 lbs. of powder, is 9 per cent."

## MISCELLANEOUS SUMMARY.

THE Madison Wisconsin *Patriot* says a volunteer from that place, in a letter, thanks his father for giving him crooked or bow-legs, saying that on the day before he had narrowly escaped losing both his legs, a cannon ball passing harmlessly through the space occasioned by the "natural crook" of the legs. Everything is for the best.

THE last official reports of the strength of the steam navy of France show that it consists of 360 war vessels propelled by steam, of which number 172 are in commission and 30 are ironclads. Ten iron-plated ships are building (each carrying 36 guns), besides the 6 iron frigates and 12 floating batteries now complete.

AS THE intrinsic value of the nickel cents is about 30 per cent below their nominal value, they will continue to circulate with our depreciated paper currency; and as soon as the mint can supply the demand we shall doubtless have an abundance of this class of change.

THE Nashua (N. H.) Iron Company have just finished for the Government a test plate fifteen feet long, forty inches wide, four and a half inches thick and weighing ten thousand pounds. This plate is considered ball proof, and is to test some new projectiles.

THE Cleveland Ohio *Herald* states, that a raft consisting of three cribs each, 185 feet long and 50 wide, lately arrived at that port. It contains 2,426,000 feet of lumber, and is the largest ever seen on the lakes.

A NEW organ has been placed in the Congregational church at Middlebury, Vt., which weighs about 4½ tuns, and has 1,281 pipes, 198 of which are wood and the other metal.

Somebody truthfully says:—The human heart, like a feather bed must be roughly handled, well shaken and exposed to a variety of turns to prevent its becoming hard.

THE San Franciso papers state, that about $5,000,000 per month in gold and silver are arriving from the mines in that city. The yield of gold this year will exceed that of any previous one.

DURING the first six months of 1862, no less than 16,496,136 lbs. of foreign wool were imported into New York. England supplied 5,734,308 lbs., Buenos Ayres 4,384,295 lbs. and France 3,203,806 lbs.

THE copper mines of Cornwall, yielded 13,212 tuns of copper in 1860, those of Lake Superior 7,560 tuns in 1861.

THERE are 25,000 operatives in Manchester England, out of work, on account of the scarcity and high price of cotton.

THERE are 75,000 tuns of rags converted into paper in England annually. One tun and one third of rags, make one tun of paper.

THE wool clip of Ohio will this year amount to thirteen millions of pounds—two millions greater than the clip of 1861.

THE United States *Economist* estimates that there is fully one hundred millions more specie in the United States than we had two years ago.

### The Deviation of the Compass in Iron Ships.

A lecture on the deviation of compasses caused by the use of iron in the construction of ships was lately delivered by J. T. Towson, Esq., secretary to the Local Marine Board at Liverpool, in the lecture room of Devonport Dockyard. In treating of the deviation of the compass in an iron ship, they must consider that it was affected by magnetism permanent or subpermanent and inductive; the one was a magnet in all positions; the other was a magnet only when in a certain position with regard to another magnet. The permanent was the most considerable of the disturbing forces, and it was an extraordinary fact that a great deal of the disturbing force depended on the direction in which the head of the ship was placed at the time of her building. The steamer *Great Britain* had been knocked about in Dundrum Bay for a whole winter; she had been in both hemispheres; she had been repaired in a dock with her head in a contrary direction to that in which it was at the time of her building; still it was easy to ascertain on examination which way her head pointed at the time she was being built. This was an instance of a vessel retaining her magnetism, nothwithstanding the causes he had mentioned likely to change or disturb it. When the head of an iron vessel was at right angles with the slip on which she was built, then the compasses would be affected by the permanent magnetism; when her head was turned toward her building slip at an angle of 45°, then her compasses were affected by the inductive magnetism. A vessel in heeling over port or starboard would be most likely affected when standing north and south, and a ship proceeding from one hemisphere to the other would be most affected when standing east and west. The lecturer then entered into a series of elaborate illustrations, showing the calculations which should be made in dealing with a subject which was surrounded by so much difficulty. Thus far their investigations had but showed them how little reliance could be placed on the compass at all. It required constant watching—and they might always suspect that it was affected by the magnetism of the iron of which the vessel was constructed. One result of the introduction of iron in shipbuilding operations must be the employment of masters and mates, of superior education. A brief discussion succeeded, and in answer to a question the lecturer stated in his opinion it was not possible to reduce the magnetism of an iron vessel by coating it—if this could be done it must also shut out the magnetism of the earth.

## FIRES AND STEAM FIRE-ENGINES.

The New York City Fire Department is now moved by sensible ideas. After ten years' efforts to introduce steam in place of hand fire-engines, the latter have at last been entirely superseded by the former. A large fire broke out in Beekman street, in the next block to that in which the office of the SCIENTIFIC AMERICAN is located—on the night of the 5th inst., and destroyed three or four buildings and but for the employment of steam fire engines, it would undoubtedly have destroyed a much larger amount of property. Six steam engines were used on the occasion, and respecting their efficacy, we do not hesitate to assert that they did more work than could have been performed by sixty hand engines. Two of the engines were built by the Portland Co., at Portland, Maine; one by the Amoskeag Co., Amoskeag, N. H.; another by Silsby & Myderse, Seneca Falls, N. Y.; a very large one by Lee & Larned, of this city; and one by James Smith, in West Broadway, this city. The steam fire engines now made are more compact than those which were first introduced. They use steam at a pressure of about 100 lbs. and the greatest favorites have horizontal cylinders and are direct acting.

### Large French Locomotives.

Among the great number of locomotives running on the Northern Railway of France are twelve of a class of which the makers, Messrs. Gouin & Co., of Paris, have sent an example to the London Exhibition. These engines are designed for working heavy goods trains at moderate speeds, over considerable gradients. They are outside cylinder-tank engines, with eight coupled wheels, and weigh 43 tuns in working order. The fire box, intended for burning "slack" coal, is entirely behind the back pair of wheels, and measures four feet 10 inches long and 5 feet 10 inches wide on the fire grate, the area of which is 28 2 square feet. The fire bars are exceedingly thin, and have very narrow spaces. The boiler is 4 feet 4½ inches in internal diameter, and contains 356 tubes, 11 feet 6 inches long, and rather more than 19 feet 10 inches in outside diameter, giving a total area of 1,559 square feet. A large superheater is made on the top of the boiler, and through this the chimney is carried back horizontally, presenting 129 square feet of drying surface, the chimney finally bending upward at a point nearly over the foot plate. The cylinders are 18⅞ of an inch in diameter, and the pistons have an 18⅞ inch stroke. The coupled wheels are all 3 feet 6 inches in diameter. The tank contains 1,275 gallons of water, and there is room for 2 tuns of coal. The working pressure of steam is nine atmospheres, or 118 lbs. per square inch. The weight of the engine, loaded, is 10½ tuns on the front axle, 10¾ tuns on each of the two intermediate pairs of axles, and 11 tuns on the hind axle, or 43 tuns in all.


ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 29, 1862.

*Reported Officially for the Scientific American.*

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

### 35,984.—J. A. Bassett, of Salem, Mass., for Improvement in Apparatus for Carbureting Gas:

I claim the arrangement substantially as described of a gas carbureting burner with the tube, H, of porous or textile material connected with the tip, F, of the burner, and in communication with a hydrocarbon reservoir, as set forth.

### 35,985.—J. N. Baumann, of Muscatine, Iowa, for Improvement in Cultivators:

I claim, first, The attaching of the double tree, L, to the crossbar, I, of the standards, G G, when used in combination with the chains, M M, passing under adjustable pulleys, N N, and a whiffletree, P, connected to each chain, substantially as and for the purpose set forth.

Second, The guard or clod crusher consisting of the adjustable bars, R R, provided with parallel rods, o, and attached to the bar, Q, which is also adjustable and secured to the crossbar, K, as set forth.

[This invention consists in an improved arrangement and construction of the machine, whereby growing plants, such as corn, potatoes and the like, may be plowed or cultivated until they reach a great hight, and without the liability of being broken or injured by the implement as it is drawn along.]

### 35,986.—M. S. Beach, of Brooklyn, N. Y., for Improvement in Stereotype Plates:

I claim, first, The composite stereotype, G, produced in the manner substantially as described.

Second, The use of an elastic substance, E, in connection with the stereotype plate, D, and the matrix, C, substantially as and for the purpose herein shown and described.

Third, The yielding block or bed, H, constructed and used substantially as described.

### 35,987.—J. A. Bertola, of New York City, for Improved Amalgamator for Collecting Gold and Silver:

I claim the separate mullers, f f, attached by the links, i, to the cross head, k, by which they are moved, in combination with the basin, e, as and for the purposes specified.

I also claim the basin, e, formed in the manner specified with the curved or trough-shaped bottom, and fitted so that the shaft, d, passes up through the center, as and for the purposes set forth.

### 35,988.—A. S. Blake, of Waterbury, Conn., for Improvement in Weight and Lever Attachment for Doors and Gates:

I claim the combination of the weight, D, lever, C, and rod, E, applied to the door or gate to operate as and for the purpose set forth.

[This invention consists in connecting a weight to a bent lever, which is attached to the framing of the door or to the part of a gate, and connecting said lever to the door or gate by means of a rod, arranged in such a manner, that the weight is made to act in the most efficient way in closing the door or gate, and the latter, when thrown fully open, allowed to remain in that position.]

### 35,989.—C. C. Brand, of Norwich, Conn., for Improvement in Firearms:

I claim the combination of a breech pin, sliding toward and from the butt of the barrel in a recess in the stock, and a lock; the combination being such that the breech pin and lock move together in the recess in the stock, substantially as set forth.

I also claim the combination of the said breech pin and lock with a guide bolt, substantially as set forth.

I also claim the combination of the said breech pin and locks with guide screws to guide the butt of the breech pin, substantially as set forth.

I also claim the combination of the said breech pin and lock with a trigger guard moving with them, substantially as set forth.

### 35,990.—E. D. Burlingame, of Tecumseh, Mich., for Improvement in Thrashing Machines:

I claim the arrangement of the double bolts inside a box, so as to allow the surface of each bolt to be used as a carrier of straw, and separator of seed and chaff from straw, constructing and operating as above described.

And also the arrangement of double bolts inside a box, so as to allow the surface of each bolt to be used as a carrier of straw, and separator of seed and chaff from straw, constructed and operating as above described in combination with a machine for thrashing and separating clover seed, constructed and operating as above described.

### 35,991.—M. E. Burlingame, of Willett, N. Y., for Improvement in Animal Fetters:

I claim the combination with the ring, A, of the rings, C and D, spring, C, and swivel, E, constructed and operated substantially as described and set forth.

### 35,992.—Lorin Burt, of the United States, for Improvement in the Manufacture of Figured Rubber Cloth:

I claim impressing patterns in caoutchouc upon both sides of cloth, substantially in the manner and for the purpose set forth.

I also claim removing the superfluous gum from the cloth by means of rollers or their equivalent, as and for the purpose described.

### 35,993.—Nelson Cross, of New York City, for Improved Folding Chair:

I claim the combination and arrangement of the seat and back, with the movable or sliding arms and the arms rod, substantially as and for the purpose specified.

### 35,994.—W. J. Dodge, of Kasoag, N. Y., for Improvement in Car Couplings:

I claim, first, The combination of the lock, a, and connecting lever, e, for the purposes and substantially in the manner set forth.

Second, I claim the combination of the coupling, c, and governing clevis, e, substantially as and for the purposes described.

Third, I claim combining for joint action as described, the coupling, c, clevis, b, lever, e, and guard, a, for the purposes substantially as specified.

Fourth, I claim the arrangement of parts as described, for the purpose of changing the connection from a self-acting arrangement to a fixed connection, substantially as set forth.

### 35,995.—J. S. Gilman, of Tecumseh, Mich., for Improved Clasp for Harness Tugs:

I claim the application of a screw pressure to the holding of the tug or large straps in and for harness, and more readily adjusting the same by means of the screw metallic box and wedge, as shown in the above specifications and the accompanying drawings, or in any other form substantially producing the same results.

### 35,996.—J. B. Doolittle, of Seymour, Conn., for Improvement in Magazine Firearms:

I claim, first, The combination in a firearm, in the manner substantially as herein described of a cylinder constructed with a series of half chambers, c c, and the sliding yoke, E, constructed with a single half chamber, b.

Second, Combining the yoke, E, and the dog, G, which produces the rotation of the cylinder by means of a lever, H, applied substantially as herein specified, with its fulcrum variable, in the manner set forth.

Third, The combination of the sliding tooth, 13, in the yoke and the fixed tooth, 14, on the frame, substantially as and for the purpose herein specified.

Fourth, The combination of the radial grooves or notches, o o, in the front end of the cylinder and the pin, m, working through the front of the yoke, substantially as herein described for the purpose of locking the cylinder.

Fifth, The hook, l', applied within the opening, a, of the frame, A, in combination with the cylinder, C, and operated by the yoke, E, substantially as herein specified.

[This invention consists mainly in a certain construction of, and mode of operating, a series of chambers by which cartridges are received from one or more magazines in the stock of the firearm, and conveyed to a point opposite the barrel to be fired.]

### 35,997.—J. A. Edick, of Newfane, N. Y., for Improved Machine for Sawing Wood:

I claim the adjustable jointed gage, T, consisting of the shank, u, and hinged arm, t, when the same is connected with the coupling, c', in such a manner that the latter is uncoupled by the action of the log in feeding; and so that the said hinged arm may be turned back for the removal of the cut, substantially as herein described.

I also claim the removal guide standard, I, provided with the supporting slide, M, the brake, O, bearing on the fly wheel, and operated by the cord, N, and the standard, G, having sliding blocks, H H, and pins for adjusting the saw; the whole arranged so that one attendant can manage the same without changing his position; and operating substantially as and for the purposes herein set forth.

### 35,998.—Bernhard Franke, of New York City, for Improvement in Revolving Ordnance:

I claim, first, The combination of the breech and the stop, o, with the finger, y, and the rack and pinion, r s, operating substantially in the manner and for the purpose set forth.

Second, I also claim the combination of the plate, I, with the breeches and nipples in the manner and for the purpose described.

### 35,999.—G. W. B. Gedney, of New York City, for Improvement in Revolving Firearms:

I claim, first, Setting the nipple loosely in the frame, and without connecting it permanently with any part of the arm, substantially as and for the purpose set forth.

Second, I also claim the double circular springs in rear of the cylinder, made as described, and attached to the frame as and for the purpose set forth.

Third, I also claim cutting off the priming at right angles with the position of the primer in the hollow cylinder pin, and carrying the same to the front of the hammer to be caught by the cup of the hammer face, under an arrangement of parts, substantially such as set forth.

Fourth, I also claim in combination with a hollow cylinder pin for containing the priming, the openings, j o, for the purpose of inserting the priming without withdrawing the cylinder pin or plunger, substantially as described.

Fifth, I also claim the spring, or its equivalent, on the under side of the barrel, for the purpose of keeping the cylinder pin and plunger in place, and allowing the latter to be withdrawn independent of the former, or both at once, substantially as set forth.

### 36,000.—S. F. Gold, of Brooklyn, N. Y., and W. A. Foskett, of Meriden, Conn., for Improvement in Steam Heating Apparatus:

We claim constructing the steam chambers in sections so united as to leave air channels between the adjacent sections, the surfaces of the sections constituting the sides of these channels being studded with regularly curved projections, arranged in rows and breaking spaces in the direction opposed to the current, substantially as and for the purposes set forth.

We also claim connecting the aforesaid flat sections centrally at the steam passage, whereby the radiator is made up of a main steam channel and lateral circulating passages, substantially as described.

We further claim in combination with the central opening, d, the diaphragms, D, in the wings, as and for the purposes set forth.

### 36,001.—Thomas Goodrem and Charles Jackson, of Providence, R. I., for Improvement in Rotating Projectiles from Smooth-bored Ordnance:

We claim, first, Having the rollers arranged to rotate obliquely in respect to the axis of the projectile, substantially as herein shown and described, so that the projectile as it moves through the gun will be caused to rotate, all as set forth.

Second, The combination of the rollers, C, with the levers, B, and follower, D, substantially as herein shown and described.

Third, The elastic beds, h, in combination with the rollers, C, and follower, D, as herein shown and described.

### 36,002.—W. H. Gwynne, of White Plains, N. Y., for Improvement in the Manufacture of Illuminating Gas:

I claim introducing into a retort containing coal, wood or other material from which gas can be manufactured, a stream of petroleum or other liquid hydrocarbons, substantially in the manner and for the purpose described.

### 36,003.—H. M. Hall, of Danby, Vt., for Improvement in Shawl pins:

I claim the hook in combination with the head, substantially as described, for the purposes herein set forth.

### 36,004.—D. F. Humphrey, of Saline, Mich., for Improvement in Plows:

I claim, first, The draught rod, B, fitted in the tubular beam, A, and passing through the slot, d, in the front end thereof when arranged with the slide, C, and bolt, c, substantially as and for the purpose set forth.

Second, Attaching the standards, D F, of the land side, H, to the beam, A, by means of the screw or bolt, E, and the bolt, h, the former being fitted directly in the beam, A, and the latter passing through an oblong slot, g, in the plate, G, of the standard, F, and through a lip, i, at the back end of the beam, substantially as and for the purpose set forth.

[This invention relates to an improved plow of that class which are constructed entirely of iron, and consists, first, in an improvement in the draught attachment, whereby the "witch" of the plow may be regulated as desired, and, second, in an improvement in attaching the standards and land side to the beam, whereby the relative portion of the former to the latter may be regulated as desired for the purpose of giving the plow more or less land, as circumstances may require.]

### 36,005.—Rodney Hunt and J. H. Waite, of Orange, Mass., for Improvement in Machinery for Fulling Cloth:

We claim the combination of a soaping or liquoring cistern, or apparatus separate from the main folding space, K, with the said folding space, and the two sets of main and auxiliary squeeze rollers, A B F G.

Also the arrangement of the two cloth guides or conducting partitions, L M, with the main squeeze rollers, A B, their folding space, K, spring jaws, O O, and packing conduit, N, when combined with an auxiliary set of squeeze rollers or the same and a soaping or liquoring apparatus, and arranged in the case as explained.

Also the arrangement of a pair of spring jaws, O' O', and their packing conduct, N, with the main and auxiliary sets of squeeze rollers, arranged in a case, E, and so as to operate as described.

### 36,006.—P. H. Jackson, of New York City, for Improved Vertical Windlasses:

I claim the friction clamp, k, actuated by the eccentric, o, in combination with the lug, i, to clamp and arrest the movement of the wheel, f, substantially as and for the purposes specified.

I also claim the overhanging end, 5, in combination with the clamp, k, wheel, f, and box, a, as specified, to press the said chain wheel to the top of the box, a, and increase the friction, as set forth.

And I claim the pins, 2, introduced through the base of the capstan, e, and keys, 1, in combination with the said heaver, f, to hold said keys in place, as set forth.

### 36,007.—Joseph Jones, of Utica, N. Y., for Improvement in Railroad Car Brakes:

I claim, first, The combination of the thorough springs, d, with the bent shafts, B, connected and operating substantially in the manner and for the purposes herein described.

Second, The central yoke, f, and its connections with the bent shafts, b, as described.

Third, The central action at W, by means of the cam and lever, i, operating on the yoke, f, at a point central to the four wheels of the truck; by means of which all the rubbers are brought down upon the wheels by a simultaneous and perpendicular pressure.

The whole being arranged and operating substantially in the manner herein set forth.

### 36,008.—Henri J. Kritzer, of Albion, Mich., for Improvement in Hot-Air Engines:

I claim, first, The combined arrangement, substantially as described, of the pair of connected heating and condensing cylinders, D' D2, condensing float pistons, J J, lifting rods, M M, and water ports, F F, for the purpose of interposing a body of cold water or other suitable fluid between the condensing and working piston, to lubricate the working parts, facilitate condensation, and to allow the air chambers to be permanently charged, without risk of loss by leakage.

Second, I also claim the use of the sprinkling troughs, L L, in combination with the arrangement aforesaid, substantially as and for the purposes specified.

### 36,009.—W. J. Lemuth, of Green Castle, Ind., for Improvement in Balancing Mill Stones:

I claim the employment or use of adjustable weights, F, fitted in or applied to the runner, A, of a pair of mill stones, in such a manner as to be capable of being adjusted horizontally nearer to or further from the center of the runner, and in line with the top of the spindle of the same, as and for the purpose herein set forth.

[This invention consists in placing a number of sliding weights in recesses in the back of the stone, and in line with the top of the spindle on which the stone rests, whereby the stone (the upper one of a pair which is commonly termed the runner), may be perfectly balanced while in motion, and under any speed, thereby producing better work than those balanced in the ordinary way.]

### 36,010.—W. A. Lighthall, of New York City, for Improved Combined Heater, Condenser and Filter:

I claim the combination of the tank, N, filter, B, condenser, P, and heap, C, when arranged in relation to each other, in the manner and for the purposes herein set forth.

### 36,011.—William Matthews, of New York City, for Improvement in Photographic Albums:

I claim so constructing a photographic frame such as described, that it may be withdrawn from the leaf of the album to insert the picture, as described.

Second, The photographic frame in combination with the album leaf, as in the manner specified.

### 36,012.—T. W. McFarland, of Ottawa, Ill., for Improved Evaporator for Saccharine Juices:

I claim, first, In combination with a fire pan, the employment or use of a pan constructed substantially as is set forth, and for the purposes substantially as described.

Second, In combination with an oscillating fire pan, or a pan having an oscillating motion, a movable or sliding joint, as at c h, that the motion of the one may conform to the stationary position of the other, substantially as set forth, and for the purposes as described.

Third, The arrangement of the strainers, e f, in combination with the conductor, d, and the box or pan to which they are attached, substantially as set forth, and for the purposes as are described.

Fourth, The arrangement of the damper, b, in combination with the flexible tubes, c h, the flues, a a a, and the open flue, I, substantially as set forth, and for the purposes herein expressed.

### 36,013.—James McKenzie and J. C. Millar, of Troy, N. Y., for Improvement in Fulling Mills:

We claim, first, The fulling plates, F and F', when combined one with the other, and having respectively reciprocating motions in opposite directions, the uppermost plate having a variable pressure or frictional contact on the cloth's surface, as herein described, both plates being arranged and operating substantially in the manner and for the purposes as herein set forth and shown.

Second, In combination with the fulling plates, F and F', we claim the feed and drawing rollers, u and v, and the series of fulling rollers, d d and d' d', the frame carrying the rollers d' d' having a reciprocating motion given to it, in horizontal directions, and being adjustable vertically as described, the whole arranged and operating in combination with the fulling plates, substantially in the manner and for the purposes as herein specified and shown.

Third, We claim arranging and mounting the uppermost fulling plate, F, and the lower series of fulling rollers, d' d', in frames that may be adjusted vertically in or upon guides, so that the contact or pressure of the plate and rollers may be duly regulated to the amount necessary, by means of levers and weights, in the manner and for the purposes as herein specified.

### 36,014.—J. H. Meissner, of Jersey City, N. J., for Improvement in Bolts:

I claim the method of constructing a screw bolt of wire, in such a manner that with a solid screw and proper head, the shank or intermediate portion shall retain a certain degree of elasticity not possessed by an ordinary solid bolt.

### 36,015.—G. P. Merriam, of Lynn, Mass., for Improvement in Machines for Forming, Smoothing and Polishing the Heels of Boots and Shoes:

I claim shaping and dressing the heels of boots and shoes, in pairs by means of a revolving cutter or polisher, with its grooved ring, in combination with patterns, N, secured to the heels, and the guide plate, O, operating substantially as described.

### 36,016.—C. A. Murray, of Pittsburgh, Pa., for Improvement in Piston Packing:

I claim, first, The arrangement of the springs, F, in combination with the split hub, G, provided with the conical socket, a, segmental rings, E, and packing rings, D, all constructed and operating substantially as and for the purpose described.

Second, The arrangement of the collar, d, on the head of the screw, I, in combination with the disk, e, as and for the purpose set forth.

[This invention consists in the arrangement on the interior of the ordinary packing rings, of 4 (more or less) segmental rings, which connect, by means of springs, with the sections of a conical socket, in such a manner that by expanding said socket the segmental rings are made to bear upon the inner surface of the packing rings with a yielding pressure, thereby keeping said rings tight without injury to the inner surface of the cylinder; it consists further in the arrangement of a collar at the head of the screw, which serves to operate the conic frustrum, through the center of which the segmental rings are expanded, in such a manner that under said head a steam-tight joint is produced.]

### 36,017.—Cyrus Newhall, of Hinsdale, N. H., for Improvement in Harvesters:

I claim the arrangement of the frame, F, constructed as shown, with the rim, C', shoe, i, and the main frame, A, in the manner herein shown and described.

[This invention relates to an improvement in that class of grain and grass harvesters which are mounted on two wheels, and consists in an improved arrangement of the "off" or right-hand wheel of the machine, whereby the finger bar and sickle are enabled to be placed in line with the axle of the machine, and allowed to conform perfectly to the irregularities of the ground over which they pass, as they are made to rise and fall simultaneously with the wheels of the machine, and, consequently, cut the grain or grass at an uniform hight—the invention at the same time admitting of a direct application of the sickle-driving mechanism to the sickle.]

### 36,018.—Charles Ohlemacher, of Aurora, Ill., for Improvement in Springs to Car Trucks:

I claim the combination of one system of springs, D, with a sill or center beam, C, and three systems of levers, E' E' F F, arranged and applied to the car truck, to operate as and for the purpose herein set forth.

[This invention relates to an improvement in the application of elliptic springs to car trucks, whereby the same are rendered more durable than hitherto, being subjected to an uniform strain or weight, so as not to be overtaxed by the movement of the car during its latera surging motions in passing over curves, &c., &c.]

### 36,019.—J. S. Padon, of Summerfield, Ill., for Improvement in Cultivators:

I claim the arrangement of the adjustable frames, C, and beams, F and G, in respect to each and under the main frame, B, when constructed and operated in the manner described and shown.

### 36,020.—A. G. Parker, of North Gage, N. Y., for Improvement in Corn Planters:

I claim, first, The combination of the adjustable furrow wheels, D, and drag bars, G, with the movable seed boxes, A, when constructed and arranged, in the manner and for the purpose set forth.

Second, I claim the combination of the wheel, c, provided with the movable pins, y, with the levers, z 2 3, rock shaft, 4, and movable arms, S, when the whole are constructed and arranged in the manner and for the purpose set forth.

### 36,021.—I. W. Parmenter, of New York City, for Improvement in Trunks:

claim a trunk composed of a series of draws, or one or more, placed within a suitable case, and provided with folding bottoms, substantially as and for the purpose specified.

### 36,022.—D. C. Payne, of Elkhart, Ind., for Improvement in Grubbing Machines:

I claim the lever, A, lock bar, E, hooked arm, a, and weight, F, with the annular toothed rims, D D′, wheels, C′ C′, and crooked axle, B′, when combined and arranged to operate in the manner and for the purpose set forth.

[This invention consists in a peculiar device for automatically locking and unlocking the wheels of the machine, at the proper moment, in extracting the grub, the former to enable the wheels, in conjunction with the crooked axle, to serve as a fulcrum for the main lever, and the latter to allow the machine to be used for transporting the grub or stump from the field.]

### 36,023.—J. C. Philbrook, of East Sanbornton, N. H., for Improvement in Apparatus for Filling Sacks with Flour:

I claim the said portable folding bag, supporting and filling apparatus, consisting of the hopper and two sets of legs, as arranged and applied in manner and so as to operate together, and for the purpose substantially as herein before specified.

### 36,024.—J. A. Pimentel and W. H. Shute, of New York City, for Improvement in Locks:

We claim, first, The slide or guard, D, in combination with the bolt, B, and central-partition plate, C, arranged substantially as and for the purpose set forth.

Second, The spring catches or stops, m p, arranged to operate as and for the purpose specified.

Third, The double key, K, or one formed of two parts, e f, provided each with a bit, g j, and arranged as shown, to turn independently of each other, when said key is used in connection with a lock provided with a bolt, B, slide or guard, D, and central plate, C, for the purpose set forth.

[The object of this invention is to obtain a lock of simple construction, which will be, if not strictly burglar proof, still very difficult to pick, so much so as to be unpickable to all except expert burglars. The invention is designed more particularly to be applied to trunks, the front doors of dwellings, &c., &c.]

### 36,025.—J. H. Post, of Paterson, N. J., for Improved Sawing, Boring, Molding and Planing Machine:

I claim the combination with the mandrel or shaft, upon which the cutter head is hung, and with the cutter head, of the right and left hand screw threads and corresponding nuts, by which the cutter head may be adjusted to the proper position on the shaft, and also held in position by the screws and nuts, the parts being so constructed and arranged that the resistance of the material will have a tendency to decrease the distance between them by means of the friction of the cutter head upon them, and thus secure the cutter head more firmly in position, and also thereby avoiding the necessity of jam nuts or other appliances to secure the nuts which hold the cutter head in adjustment from displacement, substantially as set forth.

### 36,026.—H. T. Pratt, of Fitchburgh, Mass., for Improved Seats and Backs for Chairs:

I claim the employment or use of a thin sheet, B, of wood, provided with narrow slots, a, in combination with the frame of a seat or back of a chair or other similar article, substantially as and for the purpose herein shown and described.

[The object of this invention is to produce a cheap, convenient, durable and elastic seat and back for chairs, settees, &c., entirely out of wood, and the invention consists in the employment or use of a thin sheet of wood, provided with a number of longitudinal slots and secured to the frame of the seat or back of a chair or other similar article, in such a manner that by said sheet of wood a series of elastic slots are formed, which extend across the frame, and which form a cheap, durable and convenient seat or back.]

### 36,027.—B. D. Reed, of Independence, Iowa, for Improved Fastening for Securing traces to Whiffletrees:

I claim as an improved article of manufacture, a trace loop or cock eye, provided with a tube, B, and spring, C, and otherwise made as herein shown and described.

[The object of this invention is to obtain a fastening of simple construction, which will not admit of the articles which it connects or fastens together, becoming actually detached, and which will, at the same time, admit of being very readily applied to said articles, and also admit of being readily unfastened, in order to detach or disconnect the articles which it fastens together.]

### 36,028.—Coleman Sellers, of Philadelphia, Pa., for Machine for Rolling Photographic Pictures, &c.:

I claim the rotation of the polishing roll or its equivalent, about the large roll or its equivalent, substantially in the manner and for the purpose specified.

### 36,029.—Silas Shepard, of Taunton, Mass., for Improvement in Looms:

I claim the combination with the escapement mechanism, L M, and the yarn beam, B, of the shaft, K, gear, J, three-armed weighted adjustable lever, E F G, rock shaft, D, the adjuster, e, rod, P, and whip roll, C, in the manner and for the purpose herein shown and described.

[This invention consists in the employment of an escapement motion, in combination with the yarn beam of a loom, to operate substantially as hereinafter described, for the purpose of controlling the letting off of the yarn.]

### 36,030,—David Shive, of Philadelphia, Pa., for Improved Egg Beater:

I claim operating the agitators, C and D, or their equivalents, by means of cylinders, B B′, arranged to be rolled or rubbed together between one's hands, substantially in the manner described.

### 36,031.—Christian Sholl, of Mount Joy, Pa., for Improved Sash Fastener:

I claim the arrangement of the plate, C, rollers, a, screws, x x, and spring, m m, used in the box in the frame, and in combination with the grooved sash, as and for the purpose specified.

### 36,032.—Aaron Shute, of Flushing, N. Y., for Improvement in Fire Escapes:

I claim the flexible ladder, F, in combination with the reel, D, and box, A, provided with the door, C, all arranged to operate as and for the purpose herein set forth.

I further claim the particular manner of closing the door, C, securing it in a closed state, and releasing it, to wit: by means of the hooks, h h, attached to the bars, K, actuated through the medium of the arms, j, levers, L, rod, M, and spring or springs, N, in connection with the crossbar, G, at the end of the flexible ladder, F, as herein described.

### 36,033.—W. W. Simrell, of Great Bend, Pa., for Improvement in Axle Boxes for Railroad Cars:

I claim the combination of the oil cup, C, with holes, o o″ o‴, with the support, B, upon journal, J, with holes, h h, when used for the purposes of lubricating the journal, J, when surrounded by the space, p p p, widened at the sides of said journal and contracted under the same, to keep the packing from shrinking away from the journal in manner and for the purpose herein described.

### 36,034.—Daniel Snell, of Little Falls, N. Y., for Improvement in Harvesters:

I claim, first, The combination of the wheel, H, and yoke, I, with their pins and slots, for vibrating the cutters, substantially in the manner and for the purpose set forth.

I also claim, in combination with the finger bar, its alternate projections and openings, the guards, l, made as described, with the cutter bar and cutter resting thereon, in manner and for the purpose set forth.

### 36,035.—E. S. Snell, of North Bridgewater, Mass., for Improved Boot Heel Shave:

I claim the above-described boot heel shave, consisting of the blade, B, capable of being raised and lowered in the stock, A, in the manner described, in combination with the throat guard, C, which may be moved toward and from the blade, B, and be secured in position by the screws, g, and slots, i, substantially in the manner specified.

Second, I claim the arms, e, of the guard, C, and the recesses, f, in the stock for steadying the guard, as set forth.

### 36,036.—William Stow, of Utica, N. Y., for Improvement in Breech-loading Ordnance:

I claim, first, The carriage, composed of the rigidly-connected side pieces, A, cross piece, A′, axle, B, and trail piece, C, and the side pieces, D D, swinging on the axle and carrying the breech piece, F, substantially as herein described.

Second, The lever, J, and catch, K, applied in combination with each other and with the body, H, and portion of the carriage to which the fixed breech piece is secured, substantially as herein specified.

Third, Securing the swinging body, H, to the fixed breech piece, E, during the discharge of the gun, by means of lugs, I I, on the body, and notches for their reception in the parts, D D, of the carriage, to which the breech piece is rigidly secured, substantially as herein described.

### 36,037.—B. F. Sturtevant, of Boston, Mass., for Improvement in Fuse for Explosive Shells:

I claim, in combination with the fuse plug, A, a device which shall enter the same, and so extend beyond or out of its mouth, that on impact against an object during the flight of a shell in which the plug may be, such device may be driven into the plug, and caused to so cut or break it as to enable the flame proceeding from the upper or burning end of the fuse to enter the charge chamber of the shell, as specified.

### 36,038.—B. F. Sturtevant, of Boston, Mass., for Improvement in Fuse for Explosive Shells:

I claim an explosive friction apparatus or a plunger, a friction composition chamber, a plunger case and a friction tongue, combined and arranged so as to be applied to a fuse plug and its fuse, and operate therewith in manner and under circumstances substantially as herein before set forth.

I also claim the plunger, as made with an open bottom and a thin, flexible edge or lower part, capable of being upset or bent, so as not to cut through the shoulder or walls of the fuse plug, under the blow of the shoulder, imparted to the lower end of the plunger at the period of the discharge of a shell from a gun, as specified.

I also claim the extension of the chamber, g, into the chamber, d′, by means of a flexible annular flanch, f, capable of being upset, so as to close the mouth of the chamber, g, as above explained.

I also claim the friction tongue, as made with two or more rasping prongs, arranged substantially as described.

I also claim the arrangement of the walls of the plunger with respect to the shoulder, e, and the fuse socket, a, substantially as described, in order that the plunger, or any portion thereof, may not, at the period of the discharge of a shell from a gun, cause the fuse to be disarranged or driven backward in or through its socket.

### 36,039.—B. F. Sturtevant, of Boston, Mass., for Improvement in Fuse for Explosive Shells:

I claim combining with the channelled head of the fuse case, and the part, B, thereof, one or more eduction passages, e e e, so arranged and formed in the part, B, as to discharge the flame of the priming, either directly upon the entire surface of the cap of the fuse composition, or so that it may be forced thereupon by the resistance of the atmosphere, under circumstances substantially as set forth.

### 36,040.—Benjamin F. Taft, of Blackstone, Mass., for Improvement in Pessaries:

I claim the ball and socket movement of the Pessary in the stem and the slide motion and method of adapting it to different individuals so that the womb can be elevated to any required hight.

### 36,041.—Thomas R. Taylor, of Cleveland, Ohio, for Improvement in Machines for making Horseshoes:

I claim, first, The combination of the reciprocating die, R, and swedges, a a, arranged and operating conjointly in the manner and for the purpose specified.

Second, I claim the cam levers, d d, pivoted to the arm, T, in combination with the swedges, a a, arranged and operating as and for the purpose set forth.

Third, I also claim the cams, j j and j′, and cam slot, k, in combination with the cam, S, slide, U, and arm, T, arranged and operating as and for the purpose described.

### 36,042.—James E. Thorp, of New York City, for Improvement in Pumps:

I claim, first, The arrangement of the two induction valves or two eduction valves, or each two in one cylindrical or other circular box or bore situated transversely to the bore of the cylinder, substantially as and for the purpose herein specified.

Second, The bushes, B, and C, each containing two valve seats and an interposed partition, f, or guard, g, applied in combination with the said transversely situated boxes or bores, substantially as herein set forth.

[The object of this invention is to simplify the construction of double-acting pumps and afford facility for access to the valves. It consists in placing the two induction valves and their seats within the same cylindrical or circular box or bore arranged transversely to the cylinder, a partition being provided in the said box or bore to form two suction chambers; and it also consists in placing the two eduction valves in a similar box or bore without a partition between them, but with a guard so arranged as to serve for both valves, the said box or bore forming a discharge chamber for both ends of the cylinder and connecting both with the discharge pipe. We expect shortly to publish an illustrated description of this improvement.]

### 36,043.—C. F. Walker, of Benfords Store, Pa., for Improvement in Horse Rakes:

I claim the combination of the axle, A, teeth, E, thills, C C, and seat, D, when arranged to operate as and for the purpose set forth.

I further claim the bar or clearer, H, when connected to the axle, A, and thills, C C, and arranged to operate by the movement of the seat, D, in conjunction with the teeth, E, as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient horse rake, which may be constructed at a small cost and by any one of ordinary ability—familiar with mechanics' tools—and at the same time be capable of being operated, that is to say, have its teeth raised and lowered for the purpose of discharging the load and adjusting them again in proper working position, with the greatest facility.]

### 36,044.—W. Westlake, of Milwaukie, Wis., for Improvement in Heaters for Rail Road Cars:

I claim the wind chamber, g, having the valve, h, with its spindle, i, and flanges, j, in combination with the air pipe, f, constructed and operating as described.

Second, I claim the swinging damper, g, and the pipes, o, with the valves, p, in combination with the air pipe, f, and air space, d, and the smoke pipe, e, as and for the purposes described.

Third, I claim the lips, n, for deflecting the air against the fire box, as set forth.

Fourth, I claim the arrangement of the means or devices for operating the draught slide plate, x, from the interior of the car, as set forth.

### 36,045.—T. N. Wheeler, of Rio, Wis., for Improvement in Grain Registers:

I claim the registering of grain measures by means of lever, C, spring, K, and sliding measure, a, substantially as herein set forth.

### 36,046.—Henry Williams, of Chicago, Ill., for Improvement in Corn Harvesters:

I claim, first, The revolving tables, consisting of the shafts, F F′ F″ F‴, in combination with the arrangement by which the revolving motion or the stopping of the revolving motion, or the stopping of the revolving shafts, F′ F″, at the pleasure of the driver, can be effected, substantially as described.

Second, Operating the sickles, Q Q, and the revolving shafts, F′ F″, by means of connecting shaft, E, with shaft, M and M, with F′ F″ in the manner as set forth.

### 36,047.—W. A. Wood, of Hoosick Falls, N. Y., for Improvement in Harvesting Machines:

I claim the combination of the link, crank and geared lever, for raising up, holding up, or lowering the finger bar, substantially as described.

I also claim, in combination with the foot and hinged shoe, which allows the finger bar to turn up, the pivoted tongue, catch, and guide, for giving the shoe an additional elevation above the ground for the purposes of transportation, substantially as described.

I also claim suspending the main frame to the main axle by means of the seat plates, substantially as described.

### 36,048.—W. H. Allen (assignor to himself and Otis Warren), of Fryeburg, Maine, for Improved Apparatus for Leaching Tan Bark, and obtaining Extracts:

I claim my improved leaching apparatus constructed in manner and so to operate substantially as represented and described

### 36,049.—E. M. Benfield (assignor to Benfield & Dawdy), of Maquon, Ill., for Improvement in Machines for Trimming Hedges:

I claim, first, Combining with the frames, A A, constructed as described, the rotary side cutters, e e e e, and stationary cutters, g g g g, and the top or horizontal rotary cutters, k k k k, and stationary cutters, m m m m, the rotary cutters being operated by the driving wheels, C C, through the medium of gear wheels as herein described.

Second, Raising and depressing the front ends of the frames, A A, by means of the inclined beam, I′, arm, P, and spring latch, V, the arm, P, being secured to the rear frame which is jointed to the frames, A A A, at o o, and which is mounted on guide wheels, t t, at its rear end, substantially as herein described.

[This invention is an improved machine for trimming hedges, which is to be drawn and operated by animals, and which will trim off the top and sides of a hedge with comparatively little expenditure of time and labor.]

### 36,050.—Albert Bridges, of New York City, assignor to himself and Alfred Bridges, of Newtown, Mass., for Improvement in Rail Road Car Springs:

I claim, first, The employment in railroad car trucks torsional springs so mounted and arranged as to operate substantially in the manner herein set forth.

Second, The employment in such trucks of the adjustable torsional apparatus consisting of the connection, H, with its nut or equivalent adjusting means in combination with the brackets and levers represented or their respective equivalents as set forth.

Third, The arrangement of torsional springs, M N, or their equivalents in combination with arms, G E F, or their equivalents and with a car truck, so that the equalizing effect shall be obtained substantially as described.

### 36,051.—John Ekin (assignor to himself and William Allison), of Xenia, Ohio, for Improvement in Steam Boilers:

I claim, first, An inner flue, B, containing the fire space and fuel supply chamber, in the described combination with an annular water space, A, surrounded by an annular flue, C, communicating with the flue, B, at the lower or rear end of the water chamber, all substantially as specified.

Second, A grate, F, applied within the flue, B, and provided with one or more apertures, adapted by their size and location to permit the escape of slag after it has been for a time subjected to the action of the burning fuel, substantially as set forth.

Third, The hollow stirrer, G, operating in connection with the grate, F f, substantially as and for the purposes set forth.

### 36,052.—A. C. Ferren (assignor to himself and F. M. Clark), of Decorah, Iowa, for Improvement in Screens for Separating Oats from Wheat:

I claim in combination with a screen, a series of parallel vertical plates, c, attached to the frame, A, of the screen, to operate as and for the purpose herein set forth.

[This invention consists in attaching a series of parallel vertical strips to the upper surface of the screen at such a distance apart that the oats and cockle will be prevented from passing down on the screen sidewise, but retained lengthwise, and thereby prevented from passing through the screen with the wheat, which, being nearly round, can pass through the screen, while the oats and cockle, being oblong, cannot pass through, and are discharged from the depressed end of the screen.]

### 36,053.—A. M. Hill, of Bradford, Conn., assignor to C. A. Miller, of Philadelphia, Pa., for Improvement in Locks:

I claim the arms, D, and D′ constructed, adapted to each other, and arranged for the reception of the square spindle, H, substantially as set forth in combination with the sliding yoke, G, its projections, i and i, or their equivalents, and the latch bolt, E, the latter being connected to and arranged to turn in the said yoke as specified.

### 36,054.—C. B. Long (assignor to himself, Augustus Rice and Jonathan Luther), of Worcester, Mass., for Improvement in device for indicating the elevation of Ordnance:

I claim, first, The combination of the pendulum, C, index pointer, c, and swinging frame or dial, B, having a scale, b, the whole arranged to operate substantially as herein set forth.

Second, The hook, E, applied in combination with the frame, A, and with a slot, g m′, the pendulum, C, to operate substantially as and for the purpose herein specified.

### 36,055.—H. C. March (assignor to himself and Edmund Sisler), of Lawrenceville, Penn., for Improvement in Stove Grates:

I claim, first, The grate, B, having openings arranged substantially as specified in combination with the plate, D, and its projections, i, when the said plate is so constructed and arranged, that it can receive both a lateral and vertical movement independently of the grate for the purpose specified.

Second, So constructing the grate, B, and plate, D, and so applying both to the base, A, of the stove that they can be tilted in the manner and for the purpose herein set forth.

Third, The bar, G, jointed to the plate, D, and arranged for the reception of the detachable lever, I, as and for the purpose specified.

### 36,056.—T. J. Mayall, of Boston, Mass., assignor to Cyrus Wakefield, of South Reading, Mass., for Improvement in Ratan Machinery:

I claim, first, The method of cutting away the knots of ratan, by the employment in combination with two or more pairs of rollers, to impart to the stick of ratan a rectilinear movement, as described of a series of rotating knives operating substantially in the manner set forth.

Second, Opening and closing the knives for cutting away the knots of ratan automatically or otherwise at given intervals of time by means of the herein described arrangement of devices or any other equivalent mechanism operating in the manner substantially as set forth.

### 36,057.—T. J. Mayall, of Boston, Mass., assignor to Cyrus Wakefield, of South Reading, Mass., for Improvement in Ratan Machinery:

I claim, first, The method herein described of dividing and cutting the surface of ratan into longitudinal sections or strips that may be subsequently separated from the core to form strands or braids for seating chairs and for other purposes, by the employment in combination with suitable feed rollers, of a series or cluster of cutter wheels arranged as shown and described so as to revolve by the progress of the stick of ratan and to cut into its surface to the depth required for the thickness of the strand substantially as herein set forth.

Second, Providing the corresponding grooves of rolls for carrying the ratan to and from the cutting mechanism with vulcanized india rubber as described, so that the stick of ratan, while being fed and prop-

erly guided through the machine, may be firmly grasped without bruising or crushing its silicious surface, substantially as herein before set forth.

36,058.—T. J. Mayall, of Boston, Mass., assignor to Cyrus Wakefield, of South Reading, Mass., for Improvement in Ratan Machinery:

I claim the apparatus herein described for dividing the surface of ratan into longitudinal sections previous to the said sections being separated from the core to form strands for chair seating and other purposes—the same consisting of a cluster of lancet knives in combination with and protruding from the cam faces of self-adjusting levers, the whole being constructed and arranged in relation to a suitable ratan feeding mechanism, to operate substantially as herein shown and set forth.

36,059.—G. W. Muir, of Manchester, England, assignor to J. A. Locke, of Boston, Mass., for Improvement in Ventilators for Buildings:

I claim in combination with a ventilating apparatus or an air shaft divided into three or more passages, the external openings to the atmosphere and the internal openings to the apartment, so that whatever may be the direction of the external natural currents of air, some one or more openings shall be exposed to it, in such a way as to receive an entering current whilst other openings are free for the out going current without interference from the external current, as described.

36,060.—C. N. Orpen (assignor to himself and John Gaudu), of New York City, for Improvement in Placing Reservoirs for Lamps:

I claim the socket, a, applied in the reservoir, b, to set over the gas burner, c, as and for the purposes specified.

I also claim the elastic sleeve, d, upon the burner, c, to receive the socket, a, as set forth.

36,061.—L. S. Scofield, of Somerville, Mass., assignor to himself and E. D. Bell, of Malden, Mass., for Improvement in Skeleton Skirts:

I claim the new manufacture of skeleton skirts described, in which the hoops are secured to the tapes by cords which pass through the tapes and through the covering of the hoops and are knotted or tied at each crossing of the tapes and hoops, each of which cords extends continuously along each tape from the top to the bottom and serves to support the hoops in common with the tapes as well as the purpose of securing the hoops and tapes together.

36,062.—C. M. Spencer, of South Manchester, Conn., assignor to Charles Cheney, of Hartford, Conn., for Improvement in Cartridge Retractor for Breech-loading Fire Arms:

I claim the arrangement of the hinged lever, G, with the breech pices, B C, frame, A, and tongue, m, in the manner herein shown and described.

[This invention relates to breech-loading firearms in which are used metallic cartridges, whose cases after having been discharged require to be withdrawn from the chamber of the barrel in a rearward direction, more especially to those arms having a rolling breech substantially such as is described in Letters Patent, No. 27,393, and loading from a magazine. It consists in an improvement in the means of withdrawing the discharged cartridge cases from the barrel.]

36,063.—William Westlake (assignor to himself and C. L. Rice), of Milwaukie, Wis., for Improvement in Ventilators for Rail Road Cars:

I claim, first, Contracting the lower end, e, of the cylinder, K, for concentrating and directing the current of air to the pan or dust receptacle as set forth.

Second, I claim the fan or receptacle, s, provided with the flange or deflection, v, with the spring hoop and cloth, and with the adjusting rod, t, and nut, r, as described.

DESIGN.

1,613.—James Sharkey, of Brooklyn, N. Y., for Design for Gateway and Fence for Burial Plots.

## Books and Publications Received.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston:

The August number of the *Atlantic* has an article on "The New Gymnastics," which, though apparently serving as a valuable advertisement for the writer, is still exceedingly interesting and valuable. It points out an extensive series of agreeable gymnastic exercises which may be performed with cheap wooden dumb bells, wooden rings and wands, and urges the association of both sexes and the introduction of music in these exercises. We commend the article to the attention of those interested in the subject.

Seven volumes of ROBINSON'S SERIES OF MATHEMATICS. Published by Ivison, Phinney & Co., 48 and 50 Walker street, New York City:

Illustrating the rudimentary books of this series with woodcuts we regard as an admirable feature, but introducing the studies with abstruse definitions is, in our opinion, a fatal defect.

THE TARIFF QUESTION. By E. B. Bigelow. Published by Little, Brown & Co., Boston; for sale by D. Appleton & Co., New York City:

This is an elaborate argument in favor of protective duties on imports, accompanied by a great mass of statistics, which the author says have been carefully prepared. The mechanical execution of the work is very creditable to the publishers; the paper and typography are both of superior quality, and the long ranks and columns of figures are arranged in the clearest manner. The author says that whatever difference of opinion there may be in relation to the discussion, here are the facts.

KEY TO BEE KEEPING.—By Martin Metcalf, Grand Rapids, Mich. Price 35 cents:

This is a neat little work containing much valuable information in a condensed and convenient form. Lovers of apiarian pleasures will be well repaid by its perusal.





# Notes and Queries

W. B., of Ohio.—We do not at present desire to publish a series of articles upon geology and natural history. Other matters are of more absorbing interest at this time.

B. F. K., of Conn.—We cannot furnish additional information respecting the turbine of Bryan, Donkin & Co., which is on exhibition at the great Fair in London. We give as full details of the Exhibition as we find practicable.

W. B., of C. W.—We do not see that we can be of any service to you in the matter of introducing your improved mode of making vessels to the attention of our Government, unless you avail yourself of our columns to have an engraving of it published. This will not cost much, and you will give your system a wide publicity.

R.F.N., of Minn.—To double the speed of a locomotive, it will take four times the former amount of fuel to raise steam, according to a well known law in mechanics. You may run the cutting edge of your rip saw at the speed of 2,500 hundred feet per second

P. C. C., of Mass.—We shall be very happy to attend to your application for a patent. We shall mail you one of our pamphlets of advice on this subject which contains all preliminary advice. A patent granted under the new law cannot be extended.

H. W. T., of Pa.—High pressure steam conveyed into a musty cask by a pipe, will remove its disagreeable odor and purify it. The chloride of lime and diluted sulphuric acid have also been used with success in purifying moldy casks.

I. R., of N. Y.—Rotten stone made into a paste with sweet oil is the best mixture that you can use for cleaning fine brass articles. Finish them with tripoli and a piece of soft leather. When brass is very much tarnished, however, the oxide may be most quickly removed by the use of oxalic or diluted hydrochloric acid, after which it should be washed with water and finished with tripoli powder.

W. H., of N. Y.—Grape sugar receives its name from being first obtained from the juice of grapes. It is much less sweet than cane sugar, but it may yet be obtained in sufficient quantities and at such prices as to affect the price of cane sugar. It can be made artificially by submitting starch to ebullition in water diluted with about one per cent. of sulphuric acid. Large quantities of it are thus made in France.

W. W., of N. B.—Jacob Perkins was an American mechanic, but went to London when a young man and made that city his home. He is said to have been the inventor of steel-plate engraving and many other useful inventions. He invented a steam shell in 1824 and obtained a patent for it. The peculiarity of it consisted in filling it with water, inclosing it with a fusible metal plug then heating it in a furnace until it attained to a very high temperature, when the metal plug melted and the water inside instantly flashed into steam, which impinged on the air and threw the shell forward by its reaction.

## Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, July 30, to Wednesday, August 6 Persons having remitted money to this office will please to examine this 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 inform us the amount, and how it was sent, whether by mail or express.

E. P. H., of Ind., $25; H. C., of Ohio, $25; T. S. S., of Md., $25; R. C., of Mich., $25; J. E. C., of N. Y., $15; T. C. A., of Pa., $120; H. B., of Iowa, $25; S. H., of Ind., $25; W. H. L., of Ind., $25; J. N. P., of N. Y., $25; E. W. P., of Pa., $12; J. W. F., of Pa., $10; Z. G. H., of Iowa, $15; S. R., of Mass., $25; G. E., of Ohio, $15; J. H., of Pa., $10; J. B., of Ky., $15; M. H. S., of Ohio, $25; G. V. R., of N. S., $13; J M. S., of Vt., $15; E. W. V., of Ohio, $25; E. B., of Conn., $25; H. B M., of N. Y., $15; P. D. W., of Mass., $15; J. W., of Iowa, $25; H. H. C., of Mich., $25; J. G. H., of N. Y., $25; G. and C., of Iowa, $15; C. C. W., of Ill., $12; A. B. of Mich., $5; W. B., of Mass., $15; P. L., of Ohio, $15; J. B. R., of N. J., $25; C. W. S., of Iowa, $30; J. M. R., of N. J., $15; H. W., of N. J., $20; E. T. S., of N. Y., $45; T. & D., o Ohio, $45; B. S., of N. J., $20, N. C. S., of Conn., $40; S. E. T., of N J., $20; J. B. W., of Mass., $20; L. & K., of N. Y., $20; C. O. G., of Mich., $20; R. K., of Mass., $20; J. L. L., of Pa., $20; B. & B., of Ill., $20; J. P. L., of Mich., 20; C. G. A., of Mass., $20; M. B. S., of Mass., $20; J. W. S., of N.Y., $20; R. B. A., of N.Y., $20; W. H. C., of N.Y., $20; S. B. E., of Conn., $20; S. M., of Del., $20; E. T., of Pa., $20; M. C. B., of Min., $20; W. H. W., of N. Y., $20; A. O. C., of N. J., $25; J. F. G., of N. Y., $25; T. P. M., of N. Y., $25; J. K., of N. Y., $25: W. S., of Mich, $15; A. T. F., of N. Y., $15; M. R., of N. Y., $15; J. M., of N. Y., 15; J. E. K., of N. Y., $15; J. E. G., of N. Y., $15; L. W. P., of Mass., $15; W. A. P., of Cal., $10; W. B., of Pa., $35; J. R., of Pa., $12; M. W. & M., of Mass., $30; J. M. G., of Mass., $250; I. H., of Wis., $25; G. C., of N. Y., $10; F. H., of Conn., $25; O. S., Jr., of Canada, $15; E. & B., of Pa., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from July 30 to Wednesday, August 6, 1862:—

E. & B., of Pa.; F. H., of Conn.; J. W., of Iowa; I. H., of Wis.; J. G. H., of N. Y.; H. H. C., of Mich.; A. B., of Mich.; J. F. G., of N. Y.; J. B. K., of N. J.; W. A. P., of Cal.; J. E. K., of N. Y.; J. R., of Pa.; J. W. F., of Pa.; E. W. P., of Pa.; J. Y., of N. Y.; S. A. S.; of Vt.; T. P. M., of N. Y.; J. N. P., of N. Y.; J. K., of N. Y.; W. H. L., of Ind.; S. H., of Ind.; E. P. H., of Ind.; H. B., of Iowa; R. C., of Mich.; H. C., of Ohio; M. H. S., of Ohio; T. S. S., of N. Y.; E. B. of Conn.; E. W. V., of Ohio.

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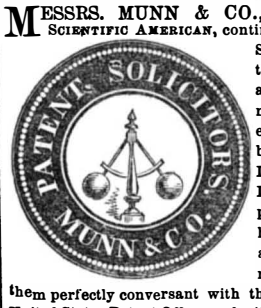


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Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

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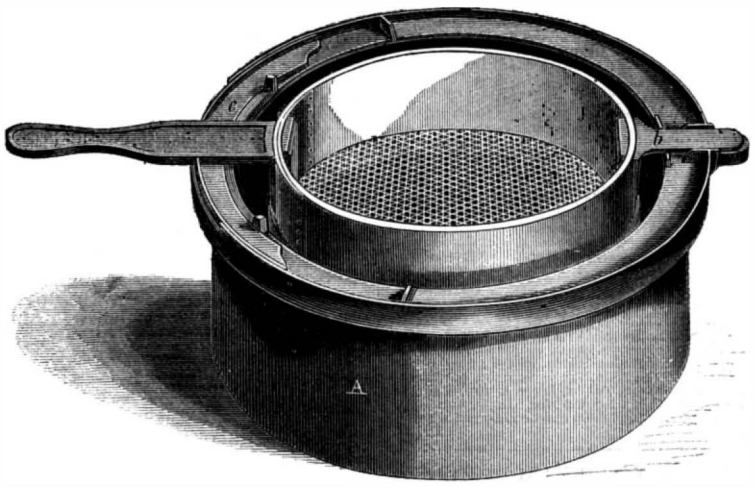
### Improved Coal Sifter.

When any invention proves profitable, it is surprising to see how many other inventions will soon be patented in the same department. Some time since a man made a handsome fortune by a patent coal sifter, and since then patent coal sifters have been coming forth in rapid succession. One of the best of the whole series is illustrated in the annexed engraving.

The cut represents the sifter as placed upon an iron cylinder, A, but it is intended to be placed upon a barrel. It consists of an iron hoop, with flanges projecting downward to embrace the edge of the barrel, and the sieve suspended by two iron bars within the hoop, and in the mouth of the barrel. One of the bars, *b*, has a pivot at its outer end, projecting downward and entering a hole in a lip formed for the purpose upon the outer edge of the hoop. The other passes through a slot in the opposite side of the hoop and is extended to form a handle. A plate, *c*, moves with the handle and keeps the slot closed against the escape of the ashes.




PRATT'S COAL SIFTER.

The inventor claims that this sifter shakes the ashes through more rapidly than any sieve hung in the center.

This sifter was invented by George Pratt, who received a patent through the Scientific American Patent Agency, June 18, 1862. Further information in relation to it may be obtained by addressing Bowers, Pratt & Co., at Boston, Mass.

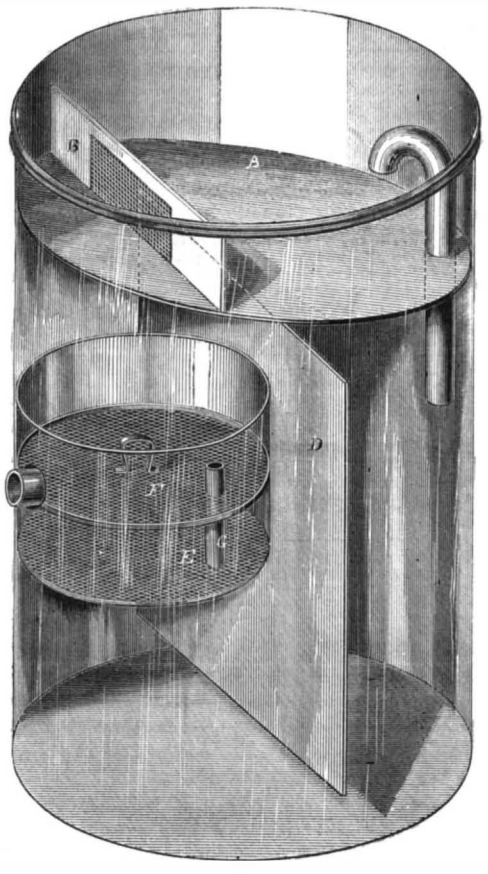
### SHAW'S APPARATUS FOR SAVING SILVER FROM WASTE SOLUTIONS.

Silver is the foundation of photography. When this metal is combined with certain other elements, iodine, bromine, &c., if the compound is exposed to the sun's rays, the hold of the two substances upon each other is loosened in some mysterious way, so that they may be then separated by certain other substances which would have no effect upon them before they had been exposed to the light. This curious power which the solar rays have of acting upon certain compounds of silver makes possible the art of photography.

Silver is purchased by photographers always in the form of the nitrate, and in the process it is converted into the iodide, bromide, chloride, cyanide, sulphide, and other compounds, not all of which are understood. The editor of the *Photographic News* says that not one-tenth part of the silver used enters into the picture, and Prof. Seely, the editor of the *American Journal of Photography*, states the amount at less than one hundredth part. It is estimated that more than a million of dollars' worth of nitrate of silver is annually consumed by the photographers of this country, of which more than 900,000 dollars worth is wasted. To save a considerable portion of this great waste is the object of the invention here illustrated.

The plan is to set a vessel below the spout of the sink in the laboratory so that all the water used in washing the plates and other manipulations may pass through it. The vessel is to contain a supply of some substance that will decompose the silver salts held in solution in the water, and form an insoluble compound which will consequently fall to the bottom. The substance used is the protosulphate of iron, and it is so arranged that it may be dissolved in quantities proportioned to the amount of the liquid that passes through the apparatus.

The cut represents the vessel as made of glass the better to show the internal arrangements, but it may be made of wood or earthen ware. The iron salt is placed in the apartment, formed by the partition, B, and the water from the sink spout falling into the vessel upon the opposite side of this partition rises along the inclined diaphragm, A, till it attains sufficient altitude for a portion of it to flow through the wire gauze which forms a portion of the partition, B, and come in contact with the iron salt. The salt is dissolved and mingles with the water which at the same time begins to flow through the syphon, C, into the lower part of the vessel. Here the insoluble salt formed by the action of the iron is deposited at the bottom, and in order to make sure that none of it shall be washed out by the onward flow of the water, the water is made to pass under the partition, D, and upward through the sieves, E and F. As the sieves may become clogged, an open tube, G, is passed through them to prevent the flow of the water from being stopped.




The sieves are placed loosely in a cylinder so that they may be taken out to be cleaned, and the inclined diaphragm, A, with the syphon, C, is also secured in a movable hoop.

To render the reduction of the silver salts more rapid the inventor suggests that a small quantity of chloride of sodium may be placed in the apartment with the iron.

The patent for this invention was granted July 8, 1862, and further information in relation to it may be obtained by addressing the inventor, J. Shaw (a practical photographer), at Bridgeport, Conn.

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On the 31st of July, the day before the new tariff went into operation, the receipts for duties at the New York Custom House amounted to $837,000, and the day previous to $438,000. Making a total paid into Uncle Sam's coffers in two days of over one and a quarter millions of dollars for import duties. The total amount received during the month of July was $7,188,250 59. The amount received in July, 1861, was scarcely half a million.

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Some wag says of the postage stamp currency, that if we haven't thrashed the South yet, we can lick our new currency, at any rate.

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FROM THE STEAM PRESS OF JOHN A GRAY