# Scientific American.

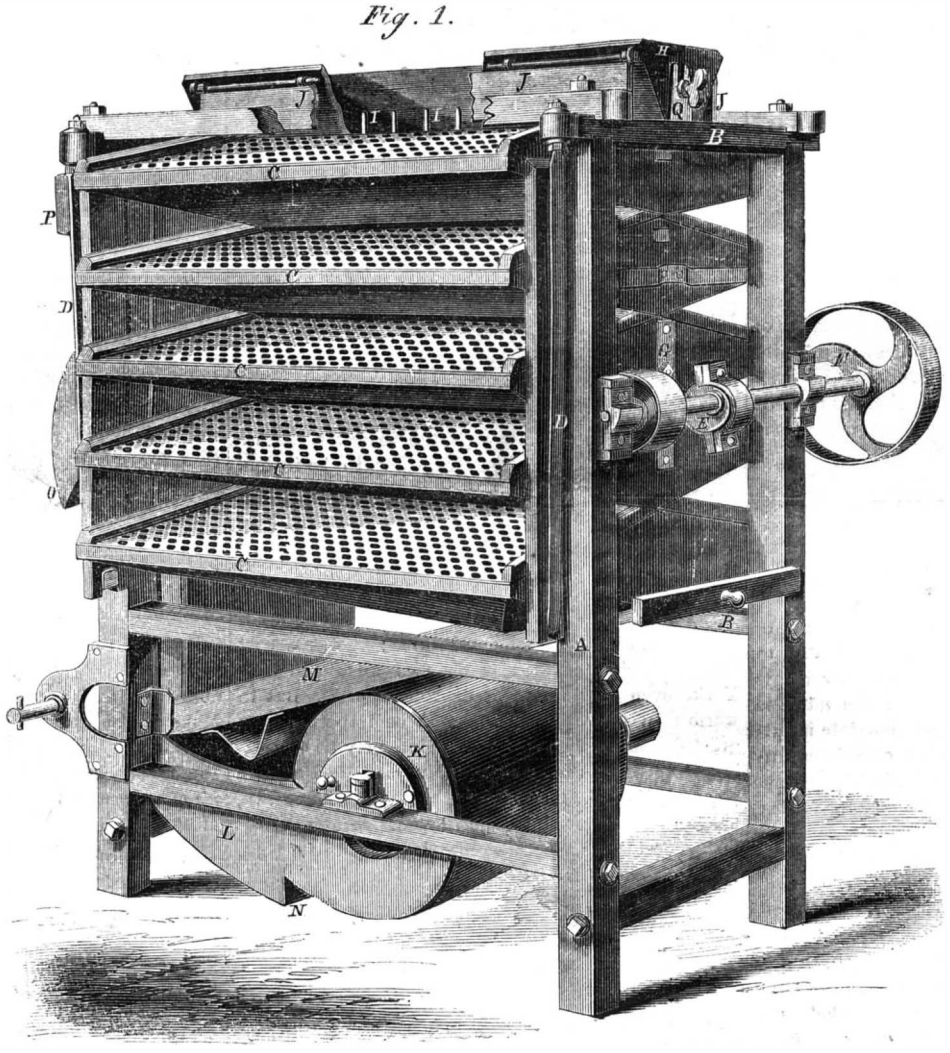
A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

VOL. IX.—NO. 11. (NEW SERIES.) NEW YORK, SEPTEMBER 12, 1863. SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE


**The Hawk-eye double Zig-zag Oat and Grain Separator.**

Few persons are aware of the amount of dirt and rubbish contained in a single cargo of grain. A visit to some of the elevators, which operate in the various grain ports of the country, would enable individuals to obtain some information on this head; and they could also see the huge pile of sticks, newspapers, dust, chaff, and refuse of all kinds, that becomes mixed up with a cargo of wheat or oats in course of transportation. These foreign substances materially injure the grain, and make it musty and unsaleable. Even after the wheat has passed through the elevator, a large percentage of dust still remains, which it is desirable to remove more perfectly before grinding. The subjoined engraving represents a new oat extractor and grain separator, recently introduced by Mr. J. Fargusson, of Dubuque, Iowa. The inventor calls it the "Hawk-eye double zig-zag oat extractor and grain separator," a sufficiently sonorous title; and he claims that it will do its work most effectually; in proof of which statement he has a number of letters from parties using them. The construction and operation of this machine will be readily understood by referring to the following description.

*Fig. 1.*

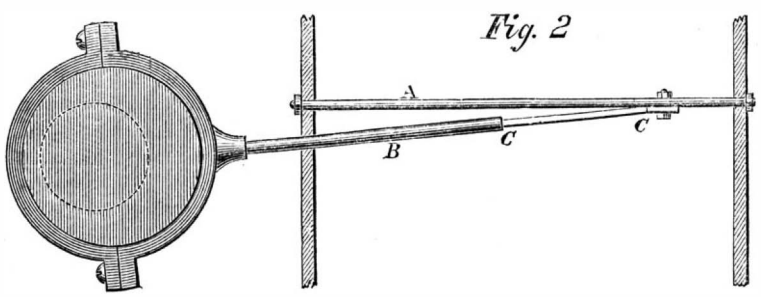



FARGUSSON'S PATENT GRAIN CLEANER.

The stout wooden frame, A, has a bolster, B, on each end, from which is suspended the riddles, C, by the spring hangers, D. The riddle frames receive a reciprocating motion from the eccentric, E, on the horizontal shaft; this eccentric is driven by the pulley, F (as may be seen), from any motive power convenient. The plate, G, has a slot through it, which allows the eccentric rod connecting to the riddles to move freely, and it also serves to strengthen the end of the riddle frame. On the top of the machine is placed the hopper, H, one side of which is broken out to disclose a row of pins, I, which are stationed in the riddle; on the side of the hopper, which can be taken off when required, there are two hinged plates, J, one on each side, which are easily jointed to the rods on which they hang. At the bottom underneath the frame there is a fan or blower, K, which is driven by the usual method, and has a series of chutes, L, or channels connected with it for a purpose which will be apparent hereafter.

The operation of this machine is as follows. On the grain being placed in the hopper and the machine started, the riddles receive a reciprocating motion back and forth; by this action the pins, I, stir up the grain and allow it to circulate freely, while the hinged plates, J, prevent it from falling off at the side prematurely. The grain first enters the hopper, H, then falls on to the center of the upper riddle, dividing, so that half passes down on either side; the oats, sticks, weeds, straws, &c., falling off over the outer end of the riddles, whilst the wheat falls through the holes of the perforated zinc riddles, on to a cant board, or sheet-iron bottom, which conducts it back again to the center of the second riddle, where precisely the same operation is repeated again and again, until it passes over all of the riddles; it then falls on to the head of the cockle screen, M, which takes out the cockle, sand, grass seed, &c., when the wheat falls into the fan blast, passing down through a strong current of air, and is discharged perfectly clean at the bottom of the machine, at N, while the shrunken and sprouted wheat and chicken feed are lifted up and discharged at O. The dust, chaff, light smut balls, and all other impurities passing out of the spout, P, which may be conducted entirely out of the mill house, thus delivering the clean wheat, the oats, chicken feed, the cockle, dust, dirt and chaff, each in its appropriate place. The hopper does not vibrate with the riddles, but is attached to the framework of the machine, by regulating screws, Q, that move up and down, so as to regulate the feed at all times uniformly. The screen, M, may be drawn out at any time, by grasping the knob, R, and it is shown partly drawn out in the engraving.

*Fig. 2*




In Fig. 2 is a representation of the method by which the eccentric rod is connected to the riddles, without using a working joint, and obtaining at the same time a free movement of the rod and riddles. The bolt, A, extends clear through the riddle frames, and has the eccentric rod, B, rivetted to it. This rod is a spring from C to C, while the other portion of it is round; this method of construction permits elasticity of movement, while it is unattended with the disadvantages attaching to other modes of operating these devices; a separate patent has been applied for, on this manner of attaching the rod. Two patents have been issued for this machine, bearing date Nov. 5, 1861, and June 30, 1863; further information can be had by addressing J. Fargusson, Dubuque, Iowa.

A FISH STORY.—During an afternoon's bombardment at Port Hudson, a shell which fell into the river exploded under water; and caused such a shock to the fish, that seventy or eighty rose to the surface and floated there, completely stunned. Many of them were of the largest size, and two skiffs quickly put out from the shore and returned loaded with their piscatorial burden. As buffalo and catfish were then selling among the soldiers (Confederate) at from five to fifty dollars a piece, they proved to be a valuable haul. Catfish at fifty secesh dollars apiece are much cheaper than they are delicate.

### Labor of Original Thinking.

Sir Benjamin Brodie, in his work on "Mind and Matter," states that a man may be engaged in professional matters for twelve or fourteen hours daily, and suffer no very great inconvenience beyond that which may be traced to bodily fatigue. The greater part of what he has to do (at least it is so after a certain amount of experience) is nearly the same as that which he has done many times before, and becomes almost matter of course. He uses not only his previous knowledge of facts, or his simple experience, but his previous thoughts, and the conclusions at which he had arrived formerly; and it is only at intervals that he is called upon to make any considerable mental exertion. But at every step in the composition of his philosophical works Lord Bacon had to think; and no one can be engaged in that which requires a sustained effort of thought, for more than a very limited portion of the twenty-four hours. Such an amount of that kind of occupation must have been quite sufficient even for so powerful a mind as that of Lord Bacon. Mental relaxation after severe mental exertion is not less agreeable than bodily repose after bodily labor. A few hours of *bona fide* mental labor will exhaust the craving for active employment, and leave the mind in a state in which the subsequent leisure (which is not necessarily mere idleness) will be as agreeable as it would have been irksome and painful otherwise.

Mere attention is an act of volition. Thinking implies more than this, and a still greater and more constant exercise of volition. It is with the mind as it is with the body. When the volition is exercised, there is fatigue; there is none otherwise; and in proportion as the will is more exercised, so is the fatigue greater. The muscle of the heart acts sixty or seventy times in a minute, and the muscles of respiration act eighteen or twenty times in a minute, for seventy or eighty, or in some rare instances even for a hundred successive years; but there is no feeling of fatigue. The same amount of muscular exertion under the influence of volition induces fatigue in a few hours.

### The Rhythm of Prose.

In every good prose writer there will be found a certain harmony of sentence, which cannot be displaced without injury to his meaning. His own ear has accustomed itself to regular measurements of time, to which his thoughts learn mechanically to regulate their march. And in prose, as in verse, it is the pause, be it long or short, which the mind is compelled to make, in order to accommodate its utterance to the ear, that serves to the completer formation of the ideas conveyed; for words, like waters, would run off to their own waste, were it not for the checks that compress them. Water-pipes can only convey their stream so long as they resist its pressure, and every skilled workman knows that he cannot expect them to last, unless he smooth, with care, the material with which they are composed. For reasons of its own, prose has, therefore, a rhythm of its own. But by rhythm is not necessarily meant the monotonous rise and fall of balanced periods, nor amplification of needless epithets, in order to close the cadence with a Johnsonian chime. Every style has its appropriate music; but without a music of some kind it is not style—it is scribbling.

### Hints on Gathering Fruit.

The following useful hints are from the *Gardener's Weekly Magazine*:—

"Most people are disposed to gather the autumn fruits too soon. They hear the trees creaking in the wind, and they find the ground strewn with windfalls; from these premises they jump at the conclusion that the fruit ought to be gathered. But a certain percentage of a crop may fall, from various causes, before the crop is ripe. The diseased portion will lose its hold, or the wind may dislodge what is sound, long before the portion which remains firm is fit to gather. A rule is generally adopted by gardeners, that if the pips of apples or pears are turning brown, the crop may be taken; but we should rather say that a decidedly dark and settled hue of the seed is a safer criterion. As to the objection that waiting late into the autumn causes a loss of the fruit by falling, it has little weight; because it is by this process that the weaker and less sound fruit is got rid of, while the best remains. Taking the crop too early will not only injure the good fruit, by causing it to shrivel, but will also render frequent removals necessary, in order to separate from the stock the rotten ones, which would of themselves have fallen from the tree if more time had been given. A most important matter is gathering the fruit without bruising it in the slightest degree. Apples and pears bought in the market are generally much specked, by which their beauty is spoiled; and most of this is occasioned by blows received both in gathering and in rolling the fruit from one basket to another. This can scarcely be avoided when orcharding is carried on largely; but amateur gardeners cannot well give too much attention to gathering their fruit. Any falling should be obviated, and what does fall should be placed separately. A coat, with deep side pockets, is better than a basket hung to the ladder; and such receptacles, being quite under command, may be made to hold a good deal. The kind of weather during which the gathering is performed is a matter of importance. The trees should be thoroughly dry, and a windy day chosen if possible.

### A French Ice Machine.

Small machines have lately been made and sold in Paris, for making ice. A late number of *L'Illustration Universelle* gives an illustrated description of one. A cylinder of sheet tin, with a movable cover at one end, to be kept tightly in its place by a screw when shut, with two openings, one at each end, to receive through two funnels the materials used, and a discharge cock at one end to discharge the contents when the cylinder is to be emptied, are all the apparatus required. This cylinder, when properly charged, is placed on a pair of rockers, to convert five hundred French grammes of water into ice (each gramme being nearly seventeen grains avoirdupois) it is necessary only to place in this cylinder or well, twelve hundred grammes of sulphate of soda and eight hundred grammes of hydrochloride or muriatic acid. Into this preparation or bath, says the inventor, place a form or vesssel containing the water to be frozen. Close the cover fast, and then for seven or eight minutes give the cylinder a see-saw motion on its cradle, and you obtain the desired result. A solid block of ice of five hundred grammes may be produced by this operation.

It is well known that ice may be thus produced, by the use of refrigerating mixtures; but at a cost apparently greater than is charged for ice in New York, even at its present exorbitant price. But in warm climates, where ice has to be imported from great distances, a good ice machine may be of great importance. A French ice machine was illustrated on page256, Vol. V., (new series), Scientific American, and an English one on page 72, same volume. This latter machine is the most complete for the purpose, although expensive, that has yet been devised. It was invented in Geelong, Victoria, and large blocks of ice have been made by it.

### Home-brewed Ale.

G. Burton, in the *Rural New Yorker*, gives his method of making home-brewed ale, as follows:—"The art of brewing is very easy to be understood, for it is exactly similar to the process of making tea. Put a handful of malt into a tea-pot; then fill it with water—the first time rather under boiling heat. After it has stood some time, pour off the liquor just as you would tea, and fill up the pot again with boiling water. In a similar manner pour that off, and so go on filling up and pouring off till the malt in the pot is tasteless, which will be the case when all its virtue is extracted. The liquor or malt tea must then be boiled with a few hops in it, and when it becomes cool enough—that is, about blood heat—add a little yeast to ferment it, and the thing is done. This is the whole art and process of brewing; and to brew a large quantity requires just the same mode of proceeding as it would to make a tea breakfast for a regiment of soldiers. A peck of malt and four ounces of hops will produce ten quarts of ale, and of better quality than can usually be purchased."

The Merrimac and Massachusetts corporations at Lowell, have each been erecting large buildings, the former one 286 by 72 feet, two stories high, and the latter one 100 by 60 feet and six stories high. The two corporations are at present highly prosperous.

## MISCELLANEOUS SUMMARY.

A Telegraphic Circle Round the World.—A Saint Petersburgh journal mentions that an American, named Perry Collins, has presented to the authorities a petition for the construction of a telegraphfrom Nicolaevsky, on the Amoor, to San Francisco. It will cross Behring's Straits, and pass through Sitka, in Russian America. Since then, we learn the petition has been granted, and we may hope soon to hear of the union of two continents, otherwise than by a sub-Atlantic cable.

Mr. Collins is one of those rare and restless North Americans, who cannot die till he has done something for the glory of his native land. We first heard of him in the State of Mississippi; then in California; again as American consular agent at Petropaulovsky, on the Amoor, and last, we see his name blended with those of Kirk, Winans and Harrison—Americans who have done much for Russia.

A Barbarous English Bullet.—In the skirmishing which preceded the evacuation of Jackson, Miss, the rebels used an explosive musket ball of the most destructive and barbarous character. These balls are of the Minie pattern, 69 calibre, hollow, and filled with fulminating powder, covered at the base with a cap. On striking any object they explode with terrible effect. One of these terrible missiles struck one of our men in the leg, shattering the bone into nineteen pieces. The effect of the wound of a simple Minie ball is always considered of a dangerous character, but the new ball above described is positively barbarous. They are of English fabrication, and have been recently introduced into Johnson's army.

Sorghum Sugar Culture.—A very large amount of sugar cane—Chinese, Iniphee and Otaheltan—has been planted in Illinois this year. In a few districts along the Central Railway there are not less than twenty-three hundred acres occupied with sugar cane. The drought, however, has injured the crop, which will only be a medium one. As regards the preparation for making sugar, the Chicago *Tribune* says: "O. M. Brainard & Co. are putting up mills and evaporators at Pera, Onarga, Clifton, Kankakee and Bourbonnais Grove, with a combined capacity of expressing and boiling about 72,000 gallons of juice per day, and they will all be ready for service by the 1st of September."

Remedy for the Bite of Poisonous Flies.—The venom of fly bites proceeds from the virus the flies absorb in feeding upon putrescent animal matter. Make a poultice of bread, softened with a strong decoction of mallows, and when it is ready to put upon the bite, pour on it two teaspoonsful of the *oxy chloride of sodium*, and apply immediately. The cure is effectual.

It is a noticeable fact that there is not a single copper-smelting establishment in New York. In Boston, there are a few works, which were erected for the smelting of the Lake Superior ore, and have monopolized this business, which has proved one of profit. The works are expensive, but the percentage, where sufficient ore is had to keep engaged, is very great.

Aeropathy.—We all know about allopathy, homeopathy, hydropathy, and other *pathies;* but *air-cure* is a new *pathy*, lately promulgated by Dr. Jourdanet, who discovered it in the mountains of Mexico. The air-cure may be good; the water-cure is better; but we think the hard-work cure the best of the *pathies* or therapeutic agents.

A desperate effort was made a few days ago, by the rebels at Key West, to blow up the U. S. Sloop-of-war *Dale*, by drifting an infernal machine under the bows of the vessel. The machine was secured, but not till three men belonging to the *Dale* were killed and two wounded.

During the bombardment of Port Hudson, three Confederate soldiers were killed by a shell from the mortar boats. These men were buried, and a few days afterward another shell from the mortar boats penetrated their graves and exploded among their coffins. They literally found no rest, not even in the grave.

A correspondent wishes to know how long it takes to bore a 24-pounder howitzer, leaving a standing core. Can any of our readers inform him.

### Our Debts and Our Resources.

The national debt on the 1st of July was $1,007,274,366, subject to an annual interest of $42,205,001. By this time the debt may possibly have increased to eleven hundred and fifty millions of dollars, with corresponding increase of interest. This sounds large, but what are the national resources? By referring to the able report of Mr. Kennedy, the superintendent of the last census (1860) we find that in the ten years between 1850 and 1860, the population increased thirty-five per cent; more than 50,000,000 acres of fresh land were brought into cultivation; the produce of manufactories increased from £1,000,000,000 to $1,900,000,000; the banking capital from $227,000,000 to $421,000,000; insurance to $314,000,000. Railroads increased in ten years 22,000 miles, and the capital from $296,000,000 to $1,150,000,000; telegraph lines spread a complete network over the whole country; and an army of emigrants from Europe within the last ten years has marched mainly into the North-west, numbering two million five hundred thousand souls. Iron produced, $41,000,000; agricultural implements increased from $6,000,000 to $17,000,000; machinery from $27,000,000 to $47,000,000; coal from $7,000,000 to $19,000,000; printing from $11,000,000 to $39,000,000; lumber from $58,000,000 to $59,000,000; flour and grist mills increased product from $65,000,000 to $115,000,000; woolen manufactures from $45,000,000 to $68,000,000; leather $37,000,000, in 1850 to $63,000,000 in 1860. Manufactures of boots and shoes $54,000,000; India rubber $5,500,040; gas $13,000,000; wheat 17,000,000 bushels; cotton 5,196,000 bales; butter 460,000,000 pounds; cheese 105,000,000 pounds, (45,000,000 exported); slaughtered animals $212,000,000; tobacco 429,000,000 pounds; of which was produced 3,500,000 pounds in Ohio, 35,500,000 pounds in New York, 5,500,000 in Massachusetts, and little Connecticut 6,000,000 (!) of pounds; wine 1,800,000 gallons; hay 19,000,000 tuns, valued at $20 per tun, $380,000,000. Orchard products $19,500,000. Total tunnage, 5,500,000 tuns, worth $221,000,000, and so on. If we should draw a line across the continent from Norfolk to the Pacific, the United States, even above that line, under the protection of the stars and stripes, could easier pay within a century $5,000,000,000 principal and interest than any nation in Europe could pay its interest alone. The continual improvements in agricultural machinery, much of it steam (economising manual labor) is lifting almost by magic the enormous products of food from the Western prairies; while the great suction pipes, the grand railroad trunks, now numbering eight or ten, are sweeping it with lightning speed to the great city centers on the Atlantic, from whence it is wafted to feed all Europe. We are rapidly approaching the time when, by the mechanical aids in agriculture, we shall be able with the almost spontaneous productions of the rich alluvials of the prairies, to furnish Europe food at cheaper prices than that at which she can raise it with her best crops. It is such facts as these that stiffen confidence in our Government securities, and make the demand for them keep pace with the current wants of the treasury. Interest being paid now in gold is increased by just so much as the premium it bears as compared with currency, and when the day of specie payments shall return, and other values shall be shrinking from those current during a season of expansion and inflation, the Government issues will be recognized as standing on a broader and sounder basis, and gain more in appreciation of the capital than they will lose in the specie premium on their interest.—*Legal and Insurance Reporter.*

### Turpentine and Rosin Manufacture in California.

The Marysville *Appeal* says:—"Since June 5th, John Hart, of this city, has made 1,040 gallons of turpentine, and 125 barrels of rosin. J. W. Jacobson, also of Marysville, has manufactured up to the 22nd of July over 1,000 barrels of rosin. Mr. Jacobson is the pioneer in this business, and was the first to produce the amount required to entitle him to the premium offered by the State, for the first 1,000 gallons of turpentine, and 100 barrels of rosin. He first began the business at Placerville over a year ago. This interesting manufacture, now fairly initiated in Yuba county, is paying its way handsomely, and already employs fifty or sixty men, most of whom are gathering pitch in Yuba and Butte counties, as we have heretofore described. Mr. Hart has two stills running constantly; Mr. Jacobson has one, and J. L. Gibson is about to start another at Forbestown. The turpentine and rosin find a market at good prices, with the large dealers in Marysville. They are of superior quality. The business of manufacturing them will be extended from time to time, and will soon be one of the most important industrial interests of this section. In connection with the above, it is proper to state, that the first ten barrels of pitch were made by Messrs. Hucks & Lambert, of this city, for which they are entitled to the State's bounty.

### Preserving Railway Sleepers by Coal Tar.

On the Reading, Pa., railway, sleepers are being now prepared as follows: The wood is stripped off the bark, and then notched by machinery, to receive the rail with a fair smooth bearing. The sleepers are then placed in drying kilns and kept for 48 hours at as high a heat as they will bear without ignition, the smoke and gases of the heating fires being passed directly through the kilns and among the timber. They are then taken out and while hot their ends are dipped into hot coal tar, after which they are piled away to dry in the sun until wanted for use.

The coal tar is used just as it comes from the gas works. A portion of oil of tar was formerly added, which being found to take the skin off the hands and faces of the workmen, was abandoned.

The kilns are heated, and the boiler, for the engine which drives the notching machinery, is fed with the bark and chips which come off in the work. Each sleeper absorbs about one-third of a gallon of tar by immersion of the ends only, and the whole cost is from 5 to 6 cents a sleeper, depending on the weather and the regularity of the operation.

After heating for 48 hours there is still some sap left in the sleepers, hence they are dipped only at their ends, as it would not do to seal up this sap in the tubes.

The engineer of the road, J. Dutton Steele, Esq, says:

"I do not pretend that this is the very best mode of preserving sills from decay, but I claim that they are more benefitted by this process than any other I know of for the same cost.

"We bark them, dry them, and smoke them, all of which is good; we then dip their ends in coal tar, which is also good; and we notch them by machinery, which is of great importance, as the rails have thus a fair bearing provided for them, and one which secures the flat tread of the wheel on their heads, which prolongs their wear. We use no other than hard wood, such as the oaks, as I find soft woods wear out too fast. The wear of the rail into an oak sill is about one eighth of an inch each year under a heavy trade. So there are other destroying influences besides decay to which sills are subject, and it will be observed that our process hardens them, and in that way does good."

### Ocean Calms.

During the months of July and August, the winds on the Atlantic Ocean were more moderate than during any similar period within the memory of man. Never before have such quick passages been made across the ocean by steamers; one—the *Scotia*—having made the trip between Ireland and the coast of Newfoundland in about five days, and between Ireland and New York in eight days, two hours, including a detention of twenty-four hours in a fog. A Scottish paper, alluding to the calm on the Atlantic, says: "Late vessels arriving at Greenock report the sea to have been as smooth as a mill pond for days, without a breath of wind and scarcely any perceptible swell, and one ship was becalmed for fourteen days, about one hundred and fifty miles off the Irish coast; a remarkable occurrence in a quarter of the globe notorious for the opposite extreme of weather."

It has been assumed by some weather clerks that the quantity of heat, and wind, varies little during the entire year. A long period of calm is succeeded by an equal term of high winds; and a long season of heat by an equal period of cold. If this hypothesis is correct, we may look out for squalls next fall, and plenty of ice in winter.

### The Main Buffalo Herd in Kansas.

To dwellers in those portions of the West where the Buffalo disappeared more than a generation ago, the reports of the immense herds still giving life to the plains beyond, seem almost fabulous. Several Eastern Artists of note are now on an expedition to the Rocky Mountains, and under the head of "Letters from Sundown," one of the party is contributing to the New York *Post.* He thus writes of the main Buffalo herd of Kansas:—

"The sight I saw there no money could buy from my memory. I always thought the Buffalo stories which we hear at the East, and the pictures which we see, must be greatly exaggerated. In truth they are underdrawn. For two miles on the table-land before me, and stretching sideways twice as far, the earth was overwhelmed with one deluge of stampeding buffaloes. It is literally accurate to assert that one could not see the ground between them. I could think of nothing but a black sea, with humps for billows, and the thunder of a shaking prairie for the music of its surge.

Out of every gully, from each side of me, poured in exhaustless streams the laggards of the herd. The Falstaff bulls, who carried years and abdomen; the yearlings, much like their cotemporaries among our own cattle in look and size; the cows, now galloping, now coming with an ungainly trot, followed by their little new-dropped calves—these rushed by, scarcely sheering as they saw me, mad to reach the main herd. I raised my field glass, and far beyond the stampede saw the broad plateaus towards the White Rock Creek covered with quietly feeding bisons, as thick as on the prairie right before me. Flies on the head of a leaking molasses barrel, ants on a hill, ducks on a Florida lagoon, all familiar symbols of multitude, gave hopelessly out before the task of representing that herd of buffaloes. I should like to have been accompanied by a man at home in Gunther, that I might have gained some faint expression for the number of millions between me and the horizon."

### Piccalilli.

Piccalilli is a mixture of all kinds of pickles. Select pickles, from the salt brine, of a uniform size and of various colors; as small cucumbers, button onions, small bunches of cauliflowers, carrots cut in fanciful shape, radishes, radish-pods, bean-pods, Cayenne-pods, mace, ginger, olives, limes, grapes, strips of horse-radish, &c.

Arrange your selection tastefully in glass jars, and pour over them a liquor prepared in the following manner: To one gallon of white wine vinegar add eight tablespoonfuls of salt, eight of mustard-flour, four of ground ginger, two of pepper, two of allspice, two of turmeric, and boil all together one minute; the mustard and turmeric must be mixed together by vinegar before they are put into the liquor; when the liquor has boiled, pour it into a pan, cover it closely, and when it has become cold, pour it into the jars containing the pickles; cover the jars with cork and bladder and let them stand six months, when they will contain good pickles.

Piccalilli is an excellent accompaniment to many highly-seasoned dishes; if well put up, it will keep for years. If you like oil in the piccalilli, it should be braided with the vinegar, and added with them to the boiling liquor.—*Germantown Telegraph.*

### The Exploration of Madagascar.

The Madagascar Company has dispatched an exploring mission, to investigate the agricultural, manufacturing and commercial resources of that magnificent island. The scientific men of the expedition will report on the capability of the production of cotton, cane, coffee, tobacco and indigo; on the flora and fauna of the country; on the general climate and hygienic conditions of particular districts; on the geology and mineralogy of the interior; and will give their views on the hydrography and topography of the island, with reference to commerce. Such is the vast field for the investigation of the explorers. A committee of scientific men, employed by the company, has provided everything necessary for the success of the expedition. Mr. Lambert, French commissioner, an old resident of Madagascar, heads the party, which started from Marseilles, to pass over Egypt and Suez, touch at Reunion, and reach Madagascar early in July.

## THE NEW TORPEDO IN CHARLESTON HARBOR.

It has always been a favorite project with a certain school of military and naval men, to destroy ships by means of large quantities of powder placed in water-tight vessels, sunk in the channels of harbors or rivers. These torpedoes, as they are called, are sometimes fired by contact with vessels, by clockwork arranged to run a specified time—with lines run to the shore, where a man concealed pulls a lanyard—by percussion, or the liberating of a set of hammers—by the aid of galvanic batteries; in short, they have been projected upon all possible schemes, and with but very little success. It would be a curious item for the statistician if we could ascertain how many tuns of powder are lying at the bottoms of the several rivers, lakes, bays, and bayous in the south, and what number of water-logged, sunken, and misshapen cases drift to and fro, at the mercy of the current, utterly powerless for injury. To prevent suspicion and allay any fears caused by floating torpedoes, they have been made in the shape of barrels and sent down with the tide upon unsuspecting ships; but by some miscalculation on the part of the authors of the intended mischief, they have in nearly all cases gone wide of the mark; and out of the countless number made at different periods of time the few casualties arising from them can be counted on the fingers. In the war of the Revolution, the British man-of-war *Rinaldo* (?) which lay near the town of Norfolk, Virginia, was the recipient of a favor of this kind, which was floated down the Elizabeth river. It exploded close alongside and threw an immense body of water on deck; so frightening the crew that they jumped overboard in large numbers. During the present war, torpedoes have been sown like grain in all southern waters, where it was thought they might be efficient; but every one conversant with the gallant deeds of the Navy, can easily remember how many of them have proved fatal. The Mississippi river had quantities of these "queer fish" scattered along its eddies, and near the banks of the stream, where the current was not too rapid; the rebels also sent torpedoes down stream, whenever they thought they could do mischief; but not one that we ever heard of took effect. The catfish may have been astonished by an uproar in their domains, but the ships were unharmed. It is only quite recently that the rebels have obtained any success in the discharge of torpedoes. At the time the *Montauk* assailed Fort McAllister, near Savannah, a torpedo exploded under her stern, and raised the vessel a foot out of the water; but although the submerged hull is only of ½ inch plate iron, it was not even caused to leak, or if so, knowledge of it was withheld from the public. Still later the *Commodore Barney*, a gunboat made out of one of the ferry boats that ply in our harbor, exploded a torpedo in the James river, and was much injured thereby. Yet another infernal machine of this class was forced under the Monitor *Weehawken*, but without any decisive result. The wonder is that all on board these vessels were not destroyed. It is not strange that the hulls were uninjured; for while a violent shock may be given to a vessel by a torpedo, the resistance interposed by the elastic cushion of water will tend to prevent any penetration, or crushing in of the hull, unless the torpedo be near the surface. They are therefore practically useless. The newest invention of this kind is illustrated above, from drawings made by officers in Government employ. It was intended to float with the tide, and explode on any vessel it came in contact with. The machine itself is elliptical in section, and made of wooden staves hooped with iron; the outside being well coated with pitch, to make it water-tight. The cast-iron flanges, A, are fitted to the outside of the torpedo, and screwed to it by bolts. The projecting bosses, B, have the hollow brass plugs, C, screwed into them; this plug is fitted with a plunger, *d*, and a stuffing box, *i*, which keeps the same water-tight. The bottom of the plunger is larger in diameter, as seen at *e*, Fig. 2, so that it cannot slip out. The brass nipple, *f*, is screwed into the lower part of the plug, and has the friction tube, *h*, inserted in it: this is surmounted by a circular piece of wood, *g*. The leather washer, *j*, makes a tight joint at the bottom of the plug flange. The swell of the sea is supposed to throw the torpedo against a vessel with sufficient force to cause an explosion. The charge is about 50 pounds of coarse powder. This machine did no damage, being picked up adrift before it had exploded. Whether it would have injured the iron-clads is a matter of some doubt; but there is no question that a wooden ship would have had a hole stove in her side by this torpedo if suffered to explode as designed.

*Fig. 1*

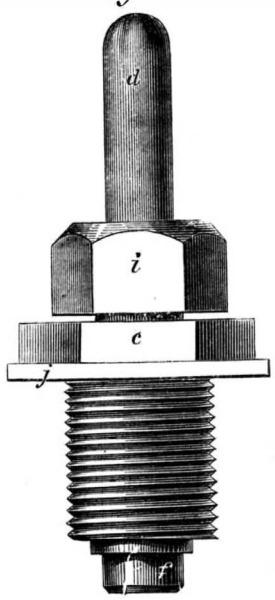



*Fig. 2*

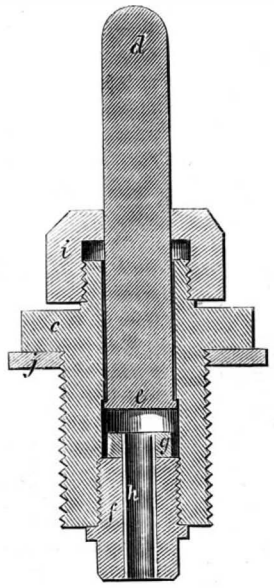
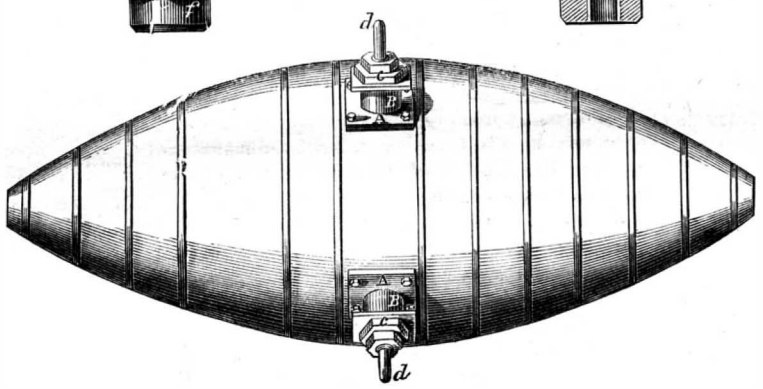



*Fig. 3*




## IRON RAFTS FOR HARBOR DEFENSE.

The latest English papers bring advices respecting the progress toward completion of the new Anglo-rebel iron-clad fleet. Three of these formidable vessels are nearly ready for service; one of them is now on the graving dock at Liverpool, another is ready to launch at Birkenhead, opposite the first-named city, and the third is well under way at Glasgow. These ships are first-class in all respects, having rams, turrets and heavy plating. They are not intended to rust idly in English dockyards, until emergency shall call them forth; but are destined for immediate and urgent duty. Long ago we were informed of the intentions of the rebels respecting our large seaports; and we see now the active steps they are taking to put their threats in force. Supposing this city to be the most desirable point for them to wreak vengeance on, may we not inquire pertinently what means are at our disposal to repel them? It is idle to talk of stone forts; useless to point at the huge guns now mounted at the entrance of the port. Forts and guns are alike ineffectual against opportunity, as found in a foggy morning, or the darkness and obscurity of night. The *Monitor* batteries, invulnerable as they are, might do efficient service; but at this writing, and in all probability for some time to come, their services are required elsewhere, for duty equally as important as the defense of this port. Not only are these facts to be considered, but it must be also recollected that the harbors to be defended are many, and the *Monitors* comparatively few. If the enemy can cross the ocean, he can go anywhere on the coast, and burn cities or compel a ransom for them, which it will be hard for us to pay. These, and other points are to be taken into account when settling the problem of harbor defense. The experience of the past year amply attests the inefficiency of stationary forts, or in fact any fort, stationary or revolving, unless some auxiliary be brought to bear, to detain under fire the ship or ships endeavoring to pass.

The lesson this nation has to bear in mind is that one learned before Charleston. The attack on that city in April last was futile, and the present one proceeds slowly to ultimate success. And why? Fort Sumter is a dust heap, the frowning batteries that encircled it are irregular masses of sand, although their guns are yet formidable; neither the darkness of the night nor the invulnerability of the *Monitors* avails as yet against the other obstructions which thwart our efforts to obtain a speedy success. The inner line of obstructions—the concealed piles, hulks, torpedoes, or whatever the nature of the barricade may be—obstinately bars the approach and renders the utmost caution and skill necessary. These are the defenses on which the rebels relied, and of which they boasted not without reason. They delay our progress at this writing: they defy us utterly: and were they as perfect as they could be made, no entrance to Charleston could be effected.

We believe that the mouth of a roadstead may be most effectually sealed up against invasion, by submerged obstructions; but the nature of such an impediment is the one thing to be carefully studied, and looked at in all situations before it is adopted. If such a hastily gotten up and constructed defense as that at Charleston delays the consummation of the siege, with how much more certainty we can argue that a properly built raft or barricade would be utterly impervious to all assault from an enemy's ship or ships. To our mind the raft forms the best method of obstructing the entrance of our harbors; but the plan of it is, as before remarked, all-important. It will not answer to have this defense rigid and unyielding, for the reason that sufficient force could be brought to bear upon it to destroy it; but it must be elastic and yet strong, and above all inaccessible to the enemy, so that he cannot operate it with any hope of success. Such a raft comprises in itself the essential features of an efficient harbor defense. It is proposed by the inventor, Mr. Theodore Timby, the inventor of the revolving turret, to construct the chains of which this raft is composed from 3-inch iron, and to buoy them up with metallic buoys at a specified distance from the surface; say seven feet, or at any depth deemed most suitable for the object in view. The raft is to be composed of sixty chains, each of the size mentioned, which are stayed to each other by shackles, or other device of an equivalent nature, so that any assault upon the outer chain would be distributed throughout the whole gang, until the force of the shock was lost. If it is argued that the buoys may be pierced, and so destroyed, we have only to point out the depth of water which covers them, as well as the want of knowledge of their exact situation, to make it apparent to the reader that tuns of shot might be fired at them before they could be struck, and that the piercing of one, or two, would not destroy the efficiency of the raft. The cohesive strength of the best cable iron is 46,000 pounds to the square inch, and it is easy from these figures to calculate the enormous

resistance, aside from the buoys, which the chain would possess, and the tensile strain necessary to sever its links. It is no argument to say that the weight of the cable would militate against its usefulness: for there is no weight upon it, the same being sustained by the buoys. The practical reader can conceive in his own mind the effect that would follow upon the collision of a ship with this barrier; presenting as it does an area of 60,000 superficial feet to repulse the foe. A blow upon it would only cause it to recoil, one chain upon the other, until the impulse was lost among the several cables; and the futility of attempting any mechanical operations upon it is apparent when we consider the 180 guns of the revolving fortress, which it is intended to use in connection therewith, discharging once a minute. Without explaining further, every unbiased mind must see that there are few criticisms to be passed upon the principle of this obstruction; that the inventor may modify its arrangement is, of course, possible. The termini of the chains, where they enter the towers, is capable of being guarded efficiently, and no agency but a lawful one can slip its fastenings. In a case like the present, where time is all important, this raft is peculiarly applicable; as it can be made and stretched in comparatively short time, from materials all ready at hand in the navy yards: then in connection with the stone forts, even, and the *Monitors*, we shall present so threatening a front that the rebel vessels will not dare to enter or approach this port. Perhaps, at some future day, when the *Alabama*, or other inimical ship, appears off this harbor and demands tribute, we shall raise a sum to buy her goodwill that would have paid for two such rafts. But in the meanwhile the Government is taken up with issues of the gravest importance. Why should not the State act in this matter, and trust to remuneration from the central Government when the war is over?

## THE MOTION OF THE MOON AMONG THE STARS.

The moon moves more rapidly among the fixed stars than any other of the heavenly bodies, with the exception of meteors and some of the comets. While she rolls around with the sky every day from east to west, she is moving in the opposite direction at the rate of a little more than 13 degrees a day, completing her revolution in about 27 days. This motion of the moon is so rapid that it may be easily observed without the aid of instruments. If we notice one evening what stars the moon is among, we shall find it the next evening among stars a considerable distance to the eastward. The moon does not follow the same track in the heavens as the sun, but it is sometimes about 5 degrees north of the ecliptic, and at others about 5 degrees south. In other words, the moon runs both higher and lower than the sun. This motion of the moon is interesting, as being the single case in all the phenomena of the heavens in which the real motion is the same as the apparent motion. The moon appears to revolve monthly around the earth—and it does so revolve. Its orbit is inclined about 5 degrees to the plane of the earth's orbit.

It is easy by direct observation to understand the causes of the changes of the moon. At the time of the new moon we can always see that the moon is nearly in line between us and the sun, so that only a crescent edge of the illuminated half is turned toward us; while the full moon is always upon the side of us opposite to the sun, rising as the sun sets, and thus turning toward us the whole of its illuminated half. As eclipses of the sun are caused by the moon coming between us and him, these can take place only at the new moon; while the eclipses of the moon being caused by the earth coming between the sun and moon, these can take place only at the full moon.

### Dissolving Views.

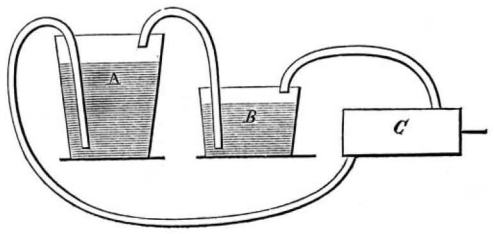
There is no more interesting optical illusion than dissolving views. You sit before a large canvas screen, on which there is a beautiful picture of the interior of a church, with the seats unoccupied; while you sit and watch the picture, the seats become filled with people. Or the church may at first be dark, and the lights silently and gradually come forth upon the picture. There are endless varieties of scenes, which may be changed in a similar manner. These wonderful results are all produced simply by means of two magic lanterns. One has a slide upon which is a picture of an empty church, and the other a slide with a picture of the same church filled with people; the light is first passed through the picture of the empty church, and is then gradually shut off from this and passed through the other—the shadows of both pictures being thrown upon precisely the same part of the screen.

A good subject for a dissolving view would be two aspects of the inhabitants of Charleston. The first picture representing that patriotic people at the time of the rebel capture of Fort Sumter—and the second showing the same boasters taking their departure for the interior counties, when the shells of General Gilmore began to fall among them.

## PLANS FOR COOLING WATER.

There are three properties of matter which have been rendered available in cooling water.

The first and most common is latent heat, or the caloric of fluidity. When one pound of ice is put into 130 pounds of water, if the ice is at a temperature of 32°, it will, by simply melting, without having its own temperature raised at all, reduce the temperature of the water 1°. By the change in its state, from the solid to the fluid form, water absorbs 140° of heat; which heat is not perceptible to the feeling, or to the thermometer; it is hidden—latent. Then the pound of ice-cold water further reduces the temperature of the 140 pounds of water, and has its own temperature raised to an average or mean proportion between the two by mixture.




The second property of matter by which water is cooled is also latent heat, but in a different form—the caloric of evaporation. Water, in changing from the solid to the liquid state, absorbs 140° of heat; but in changing from the liquid to the gaseous state, it absorbs about 1,000° of heat. Consequently, one pound of water in changing into steam or vapor, will cool 1,000 pounds of water 1°; provided that all of the heat absorbed and made latent by the one is taken from the 1,000 pounds. In practice this can seldom if ever be done. But if a vessel of water is surrounded by a cloth jacket which is kept constantly wet, as the water in the jacket evaporates, it will take enough heat frem the water in the vessel to cool the latter pretty rapidly. A still better plan is to have the vessel made of porous earthenware, so that the water may exude and evaporate from the surface. This is practically the best of all known modes of cooling water, where ice cannot be obtained. The vessel should be set in a current of air, when the evaporation will go on more rapidly.

A third property of matter which has been used for cooling water is the power of gases to absorb heat in proportion to their expansion. If air is allowed to expand by reducing the pressure upon it, a portion of its heat is rendered latent; and to bring its temperature to an equilibrium with surrounding bodies it will absorb a portion of their heat—thus cooling them. On the other hand if air is compressed, a portion of its latent heat is made sensible, and a share of this it will impart to surrounding bodies. In this way matches may be lighted, by means of a cylinder and piston. Now, if air is compressed in a cylinder and kept compressed till it has parted with its excess of sensible heat, and then is brought into contact with water and allowed to expand, it will absorb heat from the water, and the water will be cooled. We have known the case of an ingenious mechanician keeping a machine shop employed nearly all winter constructing apparatus for cooling water on this principle. But he did not take into account the difference between the intensity of heat and the quantity. He did not consider that it would take the same sixteen times longer to cool a pound of mercury than it would to cool an ounce, and thirty-three times longer to cool a pound of water than it would to cool a pound of mercury; owing to the fact that water has thirty-three times greater capacity for heat than mercury. He could lower the mercury in a thermometer 20 or 30 degrees in five minutes; but he could not cool a large vessel of water 3 degrees by active pumping for two hours.

Professor Seely has devised a plan for making water very cold, by evaporation. He proposes to force a quantity of air through a vessel, allowing it to become saturated with vapor; then to pass the air through some substance which has a strong attraction for water—the chloride of calcium, for instance—to take out the vapor; and then to force this cold and dry air again through the same vessel of water to carry off another load of vapor. The annexed diagram will explain the apparatus, A being the vessel of water, B the chloride of calcium, and C the force pump by which the circulation of the air is produced.

The efficiency of this apparatus would be greater were it not for the rapidly diminishing capacity of air for moisture as its temperature is reduced. While a cubic foot of air at 100° will absorb 25½ grains of water, the same volume of air at zero will hold but half a grain.

### The Principal Defect in Our Monitor Turrets.

At the first bombardment of Fort Sumter, the *Monitors* had so many of the bolts in their turrets driven in, that a number of persons were disabled, and now Captain Rodgers, one of our most valuable officers, has been killed by a similar disaster.

As our readers are generally aware, these turrets are 11 inches in thickness, made of plates 1 inch thick, bolted together by numerous bolts. The terrible concussion of large shot breaks the bolts, and knocks off the nuts on the ends of them, which are very dangerous to all persons standing near. We know of no more promising field for the employment of inventive genius than improvements in the mode of building up these turrets. Inventors who may turn their attention to it will do well to bear in mind the inexpediency of forging and fashioning very large masses of wrought iron.

### The Lesson of Fort Sumter.

The demolition of Fort Sumter by guns placed at a distance of two and five-eighths miles, has demonstrated the necessity of facing our forts with plates of wrought-iron. When Gen. Totten made his experiments some years since, it was found that plates 8 inches in thickness, when well backed by solid masonry, were practically impregnable by the artillery in use at the time; but the introduction of rifled cannon has so greatly increased the efficiency of ordnance that it may require two 8-inch plates to protect the walls of the forts. This would be enormously expensive, but in the end will be the best economy. Any money expended in building and maintaining an inefficient fort is simply wasted.

In this connection we will renew our suggestion to mount the upper tier of guns in revolving turrets.

### Dull Black Color on Brass.

The *Practical Mechanic's Journal* (Glasgow) states that the dull black so frequently employed for brass optical instruments, may be produced as follows:—First rub the brass with tripoli, then wash it with a dilute solution of a mixture of one part of neutral nitrate of tin, and two parts of chloride of gold; allow the brass to remain without wiping for about ten minutes, after which wipe it off with a wet cloth. If there has been an excess of acid, the surface will have assumed a dull black appearance. The neutral nitrate of tin is prepared by decomposing perchloride of tin in ammonia, and dissolving the precipitated oxide thus obtained in nitric acid.

### The Potato Rot.

Thomas Carpenter of Battle Creek, Mich., communicates the following, as his mode of fighting off the potato rot:—

Now I will tell you how I manage; premising that I never yet had potatoes rot in the ground, and that I am 63 years old. I plant my potatoes in the latter part of April or fore part of May, and in the old of the moon. When they get up six inches high, I

plaster and dress them out nicely. Now for the secret. When the sets show for blossoming, then is the time to take two parts plaster and one part fine salt; mix well together, and put one large spoonful of this compound on each hill; drop it as nearly in the center of the hill as possible. Just as soon as the potatoes are ripe, take them out of the ground; have them perfectly dry when put in the cellar, and keep them in a dry cool place. Some farmers let their potatoes remain in the ground, soaking through all the cold fall rains until the snow flies. The potatoes become diseased in this way more and more every year; hence the potato rot. With such management they should rot.

## THE PHILOSOPHY OF A DRY NORTH-EASTER.

On the eastern coast of the United States the causes of meteorological phenomena are so numerous and complex that they must generally remain in mystery; but occasionally a few forces overpower all others, and thus produce results which we are able to explain. Such is the case with the dry north-east wind which is blowing as we write, and which forms an exception to the usual humid character of the winds from that quarter.

All rain, snow, hail and dew is formed simply by cooling the air. Warm air will hold a great deal more water than cold air; and when a portion of the atmosphere has been warmed and brought in contact with the ocean, lakes, rivers, or moist earth, until it has absorbed a large quantity of water, and is then cooled below the temperature at which it will hold all of the water that it contains, the surplus above the quantity sufficient to saturate it at its reduced temperature is deposited. A south-east wind comes from the tropics, across the warm water of the Gulf Stream, being warmed, and saturated with moisture at that high temperature. When it leaves the Gulf Stream it encounters the cold belt of water along the coast, and is rapidly cooled, so that it can no longer contain the whole of its moisture. Of all the weather signs in this region, there is no other so certain as that a south-east wind will bring rain.

Even a north-east wind usually passes over the waters of the Gulf Stream which spread away toward the coast of Ireland, and when it reaches the land it is cooled; producing rain or snow. But after a long spell of hot weather, when the earth has become much heated, the wind may be warmed instead of cooled by striking the land; and in this case it will not part with its moisture. It is still more likely to find the land warmer than the ocean, if the ocean is filled with icebergs, as at the present time.

If this view is correct, a north-east wind would be less likely to be dry in winter than in summer; and perhaps some of our readers who keep meteorological registers will inform us how the facts accord with the theory.

### Flax in Illinois.

This year has witnessed everywhere in the north a largely increased crop of flax, raised, not as heretofore, for the seed alone, but for the fiber, to supply the wearing material deficiency created by the sad downfall of the braggart King Cotton. From Illinois, a correspondent writes to the *Ohio Farmer* that flax was "very generally sown, and in some sections largely, some putting in as much as one hundred acres. In Central Illinois the straw is short, but the seed is superior. In my travels I noticed that the little old spinning wheel is out, buzzing once more; that the baby again is trying to get its fingers in the flyers, and that the ladies are knitting linen summer stockings. I actually saw a piece of checked, white and blue, flax pocket handkerchiefs. I also saw several men wearing pantaloons made this spring from flax which has lain for years in the loft of the barn."

Serious Accident.—The splendid steamship *Golden City*, lately built for the Pacific Mail Steamship Company, met with an accident on her trip out to California, which obliged her to return to this port. When off the coast of Florida one of the boilers was so badly burned that the arches over the fire-box were almost completely inverted. It will take a long time to repair the damage. It is wonderful and most fortunate that the arches were not collapsed entirely.

## Correspondence

### Treatment of Engineers in the English Navy.

Messrs. Editors:—In late numbers of the Scientific American you notice a discussion in British scientific journals, on the Condition of Marine Engineers in the Royal Navy. As a late chief engineer of that service, I thank you heartily for the candid and just spirit in which you have brought the question before the public. I feel satisfied that a comparison between the condition of Marine Engineers in other countries and those of the English service, will result in improving the condition of the latter; especially in your journal, which is so generally read in England and the United States, and so well known for its efforts to improve the condition of the mechanical trades generally. The truth really very far exceeds what is stated as "Grievances to be brought before the English House of Commons." I have known many young men of talent and good education who found themselves in a manner compelled to leave the service; not so much on account of the pay (small as it is), as from inferior accommodation, and having no real position: for their nominal position goes for nothing; they are consequently consigned to evil companionship, or the alternative—perpetual solitude. The treatment received by Engineers at the hands of officers of the Navy, is too often unfeeling. They are looked upon as interlopers, and treated accordingly. Class distinctions (absurd as they are generally) are something very tolerable in England, in comparison with the length to which they are carried on board war steamers. In short, the treatment is such that no man of any spirit or self-respect could submit to. The result is such as might be expected—an inferior class of men to fill these very important situations. To my certain knowledge, railway drivers, stokers, &c., having got sufficiently "*crammed*" to pass a nominal examination as third-class Assistant Engineers, are often appointed, who frequently render the efforts of the Chief Engineer inadequate to maintain everything in proper working order when on a foreign station.

Clearly, then, the British Royal Navy is no place for educated or talented young men. This system is driving the best skilled workmen to foreign countries. The prejudices against the English Navy are so strong, and the advantages offered in other countries are so great by comparison, that even long after a better state of things is brought about, there will be great difficulty in persuading suitable men to serve their country in the capacity of Engineers.

John Ashurst.

Toronto, C. W., Sept. 5, 1863.

### Launch of the "Re don Luigi di Portugallo."

The two splendid frigates—so long the object of admiration to all observers—which Mr. W. H. Webb has had upon the stocks for the past two years, are now safely launched. On Saturday, the 29th ult., the last one was sent down the ways precisely at 10 o'clock. The dimensions of this vessel are 294 feet in length, 50 feet beam, and 36 feet 6 inches deep. These figures convey a very slight idea of the imposing outlines of the grand hull as it stood upon the ways, and afford no conception whatever of the thoroughness of the work. The occasion of a launch is generally the signal for a simultaneous laudation of all concerned in the building of the ship, from the person who slushes the ways to the proprietor of the yard; but we could not bestow any encomiums on Mr. Webb other than he has already won, or in any way add to the world-wide fame he has achieved. The vessels just launched for the Italian Government will have two powerful engines of 84 inches cylinder and 45 inches stroke of piston, and are to drive a propeller 19 feet in diameter, with a pitch of 31 feet 6 inches: the wheel so arranged as to be hoisted when not under steam. The machinery has all the modern improvements, and is much the same as that fitted to the *Grand Admiral*—the Russian line-of-battle ship built some years since by Mr. Webb. The armor on the *Re don Luigi* will be four and a-half inches in thickness, and the ship will be completely clad from stem to stern; she has also a short ram at the bow. These two vessels, with the others now building abroad, are to form the nuclei of a powerful navy.

### Antidote to Nux Vomica.

Messrs Editors:—In No. 10 of the Scientific American, I notice an article headed "Antidotes of Poisons." In it you say, "for Nux Vomica there is no antidote." About sixteen years since a friend of mine had a dog, which had been poisoned by Nux Vomica, and was nearly dead; I told him to give the animal strong coffee; my friend poured about a pint down the dog's throat, and in the space of half an hour it was well." C. Leavett.

Windsorville, Conn., Sept. 5, 1863.

### Improved Printing Telegraph of David Hughes.

It seems many inventions are the result of accident. David Hughes, when he invented the printing telegraph improvement, was endeavoring to contrive a machine for copying extempore music, so that his melodious improvisations might not be lost. Boarding in the same house with him was the well-known musical composer and piano teacher, Louis Hast, and the very intelligent telegraph operator, Norbonne M. Booth; one supplied him with electro-magnetic instruments, the other gave him the use of a piano; a printing telegraph was the consequence.

Hughes is now living in Europe, enjoying the well-merited fortune which his genius has earned. At the time of his residence in Kentucky, he was twenty-two years of age: a beardless boy in face and stature, and apparently lacking in mental power. His features were careworn: when spoken to he had a constant grin and giggle, not calculated to impress his interlocutor favorably. His ear for music was so acute that he could tell you, to a semitone, the note of anything sounded, from a dry stick to a shovel. This has been suggested by an article on Caselli's Pantelegraphy, found in the July number of the Paris journal entitled *La Science pour tous*. We had lost sight of Hughes, till seeing this article.

The Dry Goods Trade.—The dry goods trade is very active at present in this city. The fall trade has set in under very favorable auspices. A large number of purchasers from distant places are in the city; money is plenty, and buyers are liberal. Domestic cotton goods are duller than any other class. Domestic woolens are active, however, and a large business is doing at satisfactory prices. Many articles are selling in advance of production, especially flannels and goods suitable for women's wear. An extensive manufacturer of goods for ladies' wear informed us last week that his orders and sales are larger than ever they have been before; and he has been in the business for nearly twenty years. The demand for shawls exceeds the supply. Foreign goods have been very active also, and a large amount of goods are now selling, both French and English, at full and satisfactory prices. Plain silks and worsted goods, delaines, alpacas, &c., are particularly active, and immense sales are made of all kinds

## APPLICATIONS FOR THE EXTENSION OF PATENTS.

The following persons have applied to the Commissioner of Patents for the extension of their patents for a term of seven years:—

William E. Nichols, of East Haddam, Conn., for extension of a patent granted on Dec. 11, 1849, on a machine for making cord. It is ordered that this case be heard at the Patent Office, Washington, on Monday, Nov. 23, 1863. All persons are notified to appear, and show cause, if any, why said petition should not be granted. Also; John F. Rogers, of South Bend, Ind., for extension of patent granted Nov. 27, 1849, on an improvement in railroad trucks. Parties are required to appear on Nov. 9, 1863, at the Patent Office, and show cause why said petition should not be granted.

The Work goes on.—Notwithstanding the numerous vessels added to the navy within the past two years, the work of construction is to still go on. The Navy department has just decided to build another fleet of iron-clad vessels. They will be longer and more formidable than any now in the service of this or any other country—being, in fact, perfect copies of the great Ericsson ocean ships, *Puritan* and *Dictator*, which are now building in this city.

### The Government Bakery.

The *Philadelphia Inquirer* thus describes the mammoth bakery, supposed to be the largest in the world in which the bread for the Army of the Potomac, and for the hospitals near Washington, is prepared :

"During my rambles to day I stepped into the Government Bakery, a short distance out of Alexandria, which is managed by Capt. A. B. Mott, of Wyoming county, Pa., attached to the Commissary Department. Capt. Mott kindly showed me through the extensive establishment. I was much surprised at its extent, and pleased at the excellent management and marked cleanliness which prevailed in every department. The bakery, a one story frame building, with its appurtenances, covers a little more than an acre of ground. About two hundred men are constantly employed ; twenty ovens are in operation, and between four hundred and five hundred barrels of flour are daily converted into good wholesome bread, which is furnished to the Army of the Potomac, and hospitals and garrisons around Alexandria. Five hundred barrels of flour will turn out ninety thousand loaves or rations of bread, twenty-two ounces to the loaf. The yeast is made at the bakery from potatoes, malt, and hops, and the bread turned out is of the best quality, there being no deleterious substances worked in to make it weigh heavy, or give it a white, fancy appearance.

According to the army regulations, each soldier is entitled to twenty-two ounces of bread or flour daily ; but by the government doing the baking for its own troops, a great saving is effected in the difference between bread and flour, and the soldiers, who invariably prefer soft bread to 'hard tack' or flour, are greatly benefited thereby. The saving in the month of June alone was three thousand one hundred and seventy-four barrels of flour to the government, in the difference between bread and flour, and the gain in four months has been sufficient to pay all expenses of erecting and supplying the bakery, $23,000, and net a surplus of $7,000 to $8,000 in addition. Gas has been introduced throughout the building, and into the ovens, so that the bakers can see that the bread is not overdone or not baked enough. Water is also introduced, and six hundred feet of hose kept on hand to guard against fire. The railroad passes by the side of the main building, where flour is delivered from the cars into the warehouse, and the bread is taken directly into the cars and sent to the Army of the Potomac, which thus receive fresh bread every day.

Some of the bakers are workmen from Europe, who assert that there is no bakery of this magnitude in the old country, and it is believed to be the largest establishment of the kind in the world. The highest issue of bread in one day from this bakery was 114,550 loaves, in February last. During the month of July only 350,000 loaves were issued, the Army of the Potomac being mostly on the march and subsisting on 'hard tack;' but since its return to the Rappahannock the bakery has been worked nearly to its full capacity."

### On Gas from Tar and Coal.

At a meeting of the managers of Gas Works held at Broughton Ferry, Scotland, lately, Mr. Robert Gray read a paper on the manufacture of gas from coal tar, when treated with superheated steam. In a scientific point of view his experience is valuable, as he failed in all his efforts to obtain an illuminating gas from coal tar. The following are condensed extracts from his paper :

In 1860, Mr. Gray's attention had been called to various paragraphs which appeared in the public press, extolling a "new artificial gas," of a very rich quality, which could be produced in any quantity, at an excessively low price, and in such a short space of time, that gas sufficient for a population of 30,000 could be manufactured in four hours. This was said to be effected by causing superheated steam to traverse hydrocarburets of any kind—this carburetting furnishing, according to the mode of operating and the carburets employed, gas for lighting or for heating purposes." Anxious to adopt any new improvement which would lessen manual labor, he had, in 1860, constructed an apparatus to make experiments with the action of superheated steam on coal-tar. He produced a drawing of the apparatus, and entered into a lengthy explanation of his first experiment, the result of which was that, after working an hour with 7 lb. pressure of steam, 5 gallons of tar in the carburator, only one cubic foot of gas was produced, and that of so poor a nature as to be perfectly unsuitable for the purpose of illumination. The tar used for this experiment was pure as it came from the condensers and hydraulic main, containing naphtha, benzole, and all the other "oils" which chemists tell us exist in coal tar. The tar used for the second experiment had the light volatile matter, such as naphtha and benzole, extracted from it before being put into the carburator. After an hour's working with the same pressure of steam, the gas-holder did not rise a 20th part of a foot ; this result showing that, when the tar is deprived of the volatile substances, the superheated steam has little or no effect upon it. This experiment afforded a most conclusive and satisfactory proof that it is only the light volatile constituents of the tar that are converted into a gas at a high temperature ; and, although it assumed the fluid form of coal gas at a high temperature of 120° Fahr., it did not remain a permanent gas, but was condensed into a liquid at a temperature varying from 40° to 60° Fahr. From the results of all his experiments with superheated steam on coal tar, his opinion was that the tar which is produced from the destructive distillation of coal in close vessels at a high temperature, will never be of any commercial value for being converted into a gas for the purpose of illumination, if the means used to effect the end is the application of heat.

### Our Timber Trees.

At the rate oak trees are now being felled and converted into staves and ship-timber, but few years will elapse before our receding forests will be shorn of every "brave old oak." The demand for lumber of every kind, has caused many farmers to devote the major portion of their time to its sawing and marketing. Even our unpretending little port sends eastward an incredible number of feet in the course of a season, and the business is on the increase. So great is the demand that the mills of the country cannot slice up the trees fast enough to satisfy agents and dealers. If the demand continues, as there is no reason to doubt it will, Ashtabula county will in time be robbed of all her lumber material, with nothing left for home consumption. Whether it is wise to sell ourselves lumberless is a question which should be seriously pondered. At the rate our forests are now dwindling and choice timber disappearing, fifty years hence will find the soil of Ohio, Pennsylvania, and other lumber-producing States, almost as barren as the prairies of the West, or the plains of California. We look upon the policy of a man selling all his timber, because it brings a reasonably remunerative price, as very much like selling off all his hay or wheat in the fall, and having to buy in the winter, paying double what he received for it. But it is useless to speculate upon the subject ; people will sell anything for money, without stopping to regard the future.—*Conneaut Reporter.*

### Flesh in Vegetables.

All vegetables, especially those eaten by animals, contain a certain portion of flesh ; for instance, in every hundred parts of wheaten flour there are ten parts of flesh ; in a hundred of Indian corn meal there are twelve parts of flesh ; and in a hundred of Scotch oatmeal there are eighteen of flesh. Now, when vegetable food is eaten it is to its fleshy constituents alone that we are indebted for restoring to the body what it has lost by muscular exertion. "All flesh is grass," says the inspired writer, and science proves that this assertion will bear a literal interpretation. No animal has the power to create from its food the flesh to form its own body ; all that the stomach can do is to dissolve the solid food that is put into it ; by-and-by the fleshy portion of the food enters the blood, and becomes part of the animal that has eaten it. The starch and sugar of the vegetable are either consumed (burned) for the production of warmth, or they are converted into fat and laid up in store as future food then required. Grass consists of certain fleshy constituents, starch and woody fiber. If a cow, arrived at maturity, eats grass, nearly, or the whole of its food can be traced to the production of milk ; the starch of the grass goes to form fat (butter) and the flesh appears as casein, or cheese. When a sheep eats grass, the flesh of grass is but slightly modified to produce mutton, while the starch is converted into fat (suet). When a man eats mutton or beef, he is merely appropriating to his own body the fleshy portion of grass, so perseveringly collected by the sheep or oxen. The human stomach, like that of a sheep or ox, has no power to create flesh ; all that it can do is to build up its own form with the materials at hand. Iron is offered to a workman, and he builds a ship, makes a watch-spring, or a mariner's compass, according to his wants ; but although he alters the form and texture of the material under his hand, yet its composition remains the same. So as regards flesh, although there be but one "flesh of men, another of beasts, another of fishes, and another of birds," yet their ultimate composition is the same, all of which can be traced to the grass of the field or a similar source. Flesh, then, is derived from vegetables, and not from animals ; the latter being merely the collectors of it. And, as though the plant knew that some future destiny waited the flesh which it makes, it will not use a particle of it to construct a leaf, a tendril, or a flower, but lays it all up in the seed.—*Piesse.*

### The Pennsylvania Oil Wells.

A correspondent of the New York *Evening Post,* writing from Titusville, Pa , furnishes the following in reference to the oil region in that State :—

"Almost as old as the hills surrounding it are the springs which once gave it the name of Oil Creek, and now make its fame world wide. There is but one king here, and all are its subjects. The head and front, the root and branch of every species of business, in its legitimate callings—as well as speculation in its most rampant form—is Oil ; consequently you see, in close proximity on every side, oil depots, oil refineries, oil derricks, oil tanks, oil shippers and the everlasting inevitable oil team—at once a nuisance and a necessity, as you may judge from the fact that two thousand of them have passed over a given point or bridge, where a market was kept, in one afternoon, cutting up the roads in a frightful manner, and reducing them to such a state that, between mudholes, stones and stumps, you may well suppose that pleasure riders are not the order of the day. * * * For bustling activity and teeming population, we resemble western towns ; while dreams of wealth, wilder and more fabulous than the Arabian Nights, have been realized in a day. What do you think of 'the big well' which flows two thousand barrels a day, bringing its owners an income of two dollars a minute, and supplying one-third of all the oil sold here? There has been a million dollars paid by its owners for this well—one small share having been sold for fifteen thousand dollars.

"These are only a few facts out of the many of the wealth accruing privately and collectively to individuals.

"The well owned by the Dalvell Brothers brings them eight hundred dollars a day, and a sixteenth of the Sherman well a hundred dollars a day.

"The revenue which accrues to the Government is five millions a year."

### Wine Receipts.

BLACKBERRY WINE —To make a wine equal in value to Port, take ripe blackberries or dewberries, press the juice from them ; let stand thirty-six hours to ferment, lightly covered ; skim off whatever rises to the top ; then to every gallon of the juice add one quart of water and three pounds of sugar (brown will do), let it stand in an open vessel for twenty-four hours ; skim and strain it, then barrel it, let it stand eight or nine months, when it should be racked off and bottled and corked close—age improves it.

BLACKBERRY CORDIAL.—To three pounds of ripe blackberries add one pound of white sugar; let them stand twelve hours, then press out the juice and strain it ; add one-third of good spirits ; to every quart add one teaspoonful of finely-powdered allspice. It is at once fit for use. Our native grapes produce the best of wine, which is easily made.

COMMON GRAPE WINE.—Take any quantity of sound, ripe grapes, with a common cider-press press out the juice, put it into barrels, cover the bung lightly ; after fermentation has ceased cork it ; place it in a cellar or house. In twelve months you will have good wine, which improves by age ; let it stand on its lees.

### Improved Mold for Casting Tires.

The accompanying engravings represent a mold for casting tires for locomotive and car wheels. It is substantially self-acting, and is so arranged and constructed as to permit of contraction, automatically, as required, to compensate for the natural shrinkage of the metal poured in to form the tire. It also consists in constructing the gates for pouring and the vents for the escape of the gases, so that they are open to the core, or so that the side of the gate is formed by the core; in which case the gate does not interfere with the shrinkage. The overflow, or waste metal is allowed to escape at a lower level than the vents; by this means the metal in the gates cannot cut into the core, or prevent the cope from being withdrawn easily. The following description will enable the reader to understand the construction of this mold; reference being had to the engravings. The cast-iron plate, A, is the bottom of the mold, and has the ring, B, laid upon it, which forms the side of the same; the ring, C, being the cope or cover which surmounts the whole. The cope is divided through the center, and hinged at *a*, so that it can be easily opened; and the lugs, *b*, have a pin, *c*, through them, by which the ring is secured when closed. The holes may be made oval, if required, so that by turning the pin, *a*, slight contraction and expansion will be produced in the ring. The ring, B, is fitted to an annular shoulder, *d*, on the part, A, and the cope to a similar shoulder, *e*, on the ring, B; in this way the rings are kept concentric, and the shape of the mold is preserved; the rings being also fitted with steady pins to prevent them from turning on each other.

The contracting core is formed of a number of cast-iron segments, D, and a corresponding number of wedges, E, interposed between the joints, as shown in Fig. 2; these are fitted with a base plate, F, and a cap plate, G, secured together by the bolts, *f*, at such distances apart as to permit the wedges to work freely to and from the core. The inner faces of the base and cap plates are recessed, as shown at *h*, in Fig. 2, to receive projections, *i*, on the bottom and top of the segments and wedges, and prevent them from falling out of the core, or expanding more than is necessary. The shaft, H, passes through the cap and base plates, and has two crossheads, *j*, fastened on it, which are connected with the wedges, by means of the links, I, arranged so as to act like toggles, and thus force out the wedges from the center by the upward or downward motion of the shaft, H. The shackles, K, are fitted to the shaft for the purpose of attaching weights at the top or bottom, to produce the expansion of the core. The core thus constructed is fitted into a shallow seat in the bottom plate, A, of the mold, and its upper part fits into the cope, C, above the cavity of the mold, in which the casting, L, may be seen. When the core is suspended by the shackle, it slides down the shaft and forces the wedges into the center of the crossheads, and thus leaves the segments free to move inward also. When the core is in the mold over a pit, weights are attached to the lower shackle, this proceeding forces the wedges out and expands the core to its full size. The contraction of the metal poured into the mold is sufficient to overcome the weights and to allow the core to contract within the castings; the resistance is therefore proportioned to the weight, which should be sufficient to maintain a uniform shrinkage. The pouring gates are marked *l*, and the vents *m*; the overflow channels are seen at *n*; the core is made a little larger in the part marked *p*, so that the face of the casting will not be injured by breaking off the gates. Plumbago or soapstone is fitted into the part marked *q*, so that the casting will not stick; and in order to insure these pieces being opposite the pouring gates, a recess is cut in the cope and a steady pin, *r*, inserted. Springs may be used, if desired, in place of the toggles.

A patent for this invention was granted, through the Scientific American Patent Agency, on July 21, 1863, to Jane Brooke, administratrix of William Brooke, the inventor. Further information can be had by addressing Mrs. Jane Brooke, 133 Railroad avenue, Jersey City, N. J., or at room 22, Harlem Depot, corner White and Center streets, New York.

*Fig. 1*

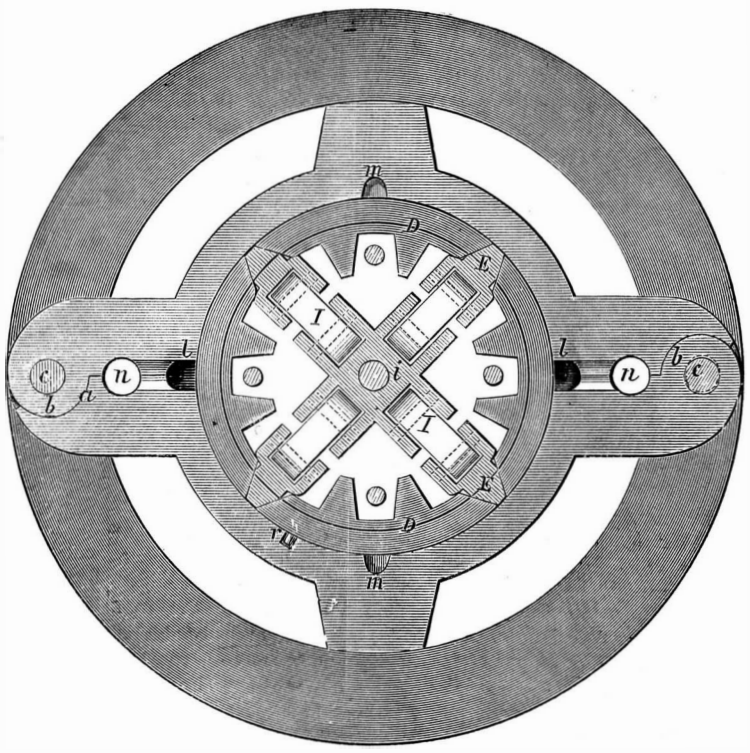
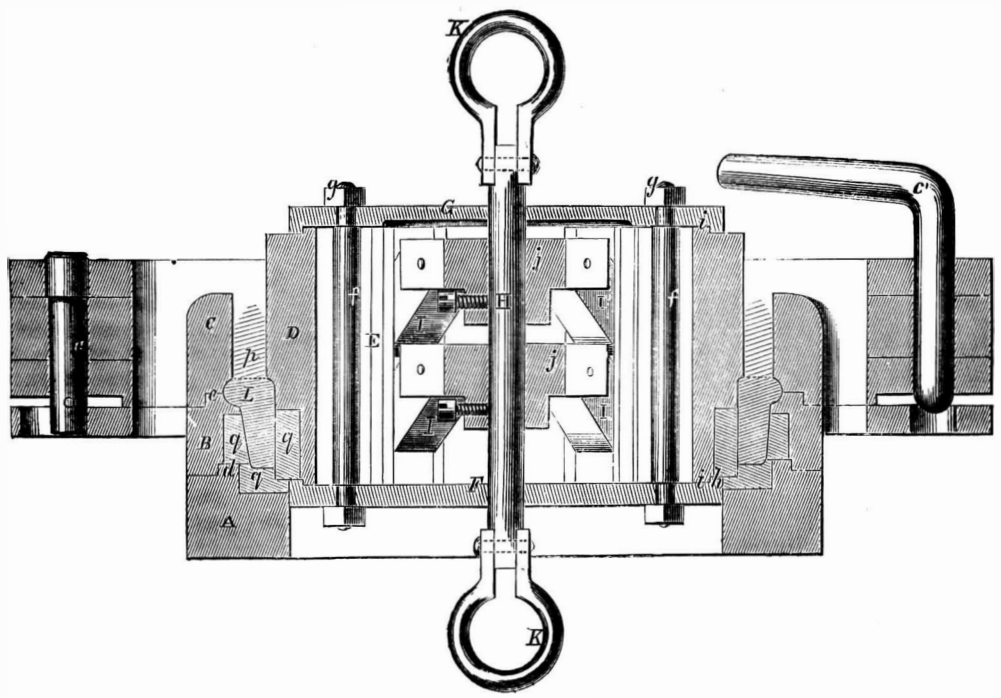



*Fig. 2*




BROOKE'S IMPROVED MOLD FOR CASTING STEEL TIRES

### CATARACT CURED WITHOUT INSTRUMENTAL OPERATION.

The Paris *Medical Gazette* states that a man of 70 has almost been cured of this eye disease, by the application of concentrated fumes of iodized ether. The liquid was put into a bottle, and one eye held over the mouth for a few seconds, five or ten times a day. After some months' use, the sight of one eye was entirely restored and the other much improved. Iodine has been applied in the same manner by some of our American oculists, for diseases of the eye, but we are not aware of it ever having been effectual in curing cataract. This afflicting disease consists of an opaque condition of the crystaline humor (transparent albumen) of the eye, or its capsule. When the opacity is seated in the lens, it is called "lenticular;" and when the membrane is opaque, "capsular cataract;" when both are combined, the cataract is called "capsule lenticular." There are also other varieties of cataract; so that the method applicable for treating one, may be entirely inapplicable to another form of the disease. The opacity is generally slow in its progress, requiring months and sometimes years for its full development. For lenticular cataract the iodine would have no effect, but for capsular cataract it may be beneficial. It requires much experience to decide upon the nature of cataract. At one period cataract was altogether treated by medicine, but this mode has been abandoned; and the remedy now consists in the removal of the opaque body by making a delicate incision with a fine instrument near the cornea and displacing the opacity of the humor, under the hope that by absorption, arising from a healthy condition of the body, it may disappear. All surgical operations for cataract are not successful in effecting a cure. The new matter to be supplied for that which has been removed, from a certain locality, may be opaque, and in all likelihood will be so if the body is not in a healthy condition. Oculists, therefore, are very particular not to operate for cataract unless the patient is in good health. Indeed most diseases of the eye are caused by ill health, and general debility of the body.

EUROPEAN SILK.—According to a circular of Messrs. Arles, Dufour & Co., of Lyons, the silk crop in Europe, which is now drawing to a close, is found to exhibit a decided improvement in comparison with the last, as regards quantity as well as the yield of the cocoons. Everywhere in France and Italy the price of cocoons has been moderate.

COMMISSIONER Holloway, of the Patent Office has five sons in the Union army. One of them is a colonel, another captain, another lieutenant. Some of these young men abandoned lucrative positions, in order to render patriotic service in the cause of their country. All honor to them.

# The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for our months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
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VOL. IX, NO. 11...[NEW SERIES.].....*Nineteenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 12, 1863.


## NEW BLUE COLOR WANTED.

For army clothing, blue has been more universally adopted than any other color. It is possible to dye cloth this color by several processes and different substances; but the exigencies of a soldier's life demand that the color of his clothing should be permanent—that is, unchangeable by exposure to the sun and weather, and the action of alkaline solutions used for washing. Hitherto, only one substance has been generally used, possessing the best qualities for producing this color. It is known by the name of indigo, and is manufactured from a plant into small hard cakes, in which condition it is transported from tropical and intertropical regions, where the plant is cultivated. As a coloring substance, indigo has been employed in Africa, Asia, and South America, from time immemorial. The color which it imparts to cloth possesses the excellent quality of appearing fresh as long as the fabric endures. Within the past two years, the demand for blue army cloth has been so great, that it has been difficult to obtain a supply of indigo for dyeing; more especially as the best qualities of the drug have of late years been imported from sections in the East Indies, where there have been serious disturbances among the native cultivators of the plant. Its price—at all times high—has advanced from one dollar and a half to two dollars and a quarter per pound; and a sufficient quantity of the best qualities cannot be had at all. The introduction of a cheaper substitute for this material, would be of great importance to the community; and would undoubtedly realize a fortune to the inventor.

Within the past three years, colors manufactured from the products of coal tar, have come into very general use, and have superseded colors that were formerly derived from decoctions of various plants and "dye-woods." But the range of these new colors is limited, being chiefly confined to shades of purple and red. It is true that emeraldine—a green coal-tar color—has been manufactured; and also blue—termed *azuline;* but the latter does not possess the durable qualities of that produced from indigo. Still we think that this is the direction to which the chemist should look, as the most hopeful field in which he can labor for obtaining a substitute for indigo. The base—aniline—of coal colors was first obtained from indigo by distillation. Rosaniline is composed of $C_{20}$ (carbon), $H_{19}$ (hydrogen), $N_{13}$ (nitrogen); and blue indigo is composed of $C_{16}$, $H_{10}$, $N_2$ $O_2$ (oxygen). What is called "white indigo" simply contains two atoms more of hydrogen than the blue indigo. There is therefore a close relationship between these colors and substances. The aniline blue which is now made for dyeing silk, is manufactured from the rosaniline products, by acting upon them with acids, under heat, in a close vessel; so that it is reasonable to conclude that a perfect substitute for indigo may be made from the products of coal tar. It is also much to be desired that the new blue color should be as easily applied to woolen fabrics, as the new red and purple colors are dyed upon silk and wool. These require no mordants; the fabric is dyed by simple immersion in a warm bath of the coloring agent. In dyeing wool with indigo, the vats for the goods are very difficult to manage, and are easily spoiled, because the indigo requires to be deoxodized by fermentation, before it will yield its coloring matter to cloth. Woad, bran, madder, &c., are employed as fermenting agents, and much experience and great skill are necessary to manage the operations. Large quantities of indigo are frequently rendered useless, for want of a little care and skill in preparing and managing indigo vats. A new color may be produced to obviate these difficulties, by which blue cloth may be dyed as permanently as with the best Bengal indigo. Never before has our country presented so great a prospect of reward to the discoverer of such a color. Our home woolen manufactures have increased to a prodigious extent during the past two years; and they must attain to still greater importance, as they are necessarily taking the place of cotton fabrics for many purposes.

## THE BODY AND THE MIND.

By the exercise of a very little reflection we shall discover that the mind and the body are both dependent on each other. The mind, more especially, upon the physical structure; for without stimulant from bodily vigor, the brain refuses to work and thought is paralyzed. These are truisms, and are not put forth as embodying any new and startling doctrine. They are so true that all thinking men know the force of the remarks, but fail to take any steps to practice what is suggested by them; for when a man is told that his mind is weak, it implies bodily waste, and he must of necessity recruit the one to improve the other. This article is no plea for gymnasia, or other similar institutions; in fact we look upon these as the last resort for restoring lost animal strength, and invigorating the wasted tissues and muscles of the body. Rather do we seek in these lines to impress upon every person engaged in sedentary pursuits, the absolute need that exists for sensible and diverting bodily activity.

How does the case stand: how do men in general spend the few hours they can spare from business? Let the reader look around among his acquaintance, or ask himself, and he can see clearly that but few persons give the attention they ought to this subject. One individual for instance stands all day in his store, bends over his desk, and wearies out his body and mind by close attention to business. Possibly, at five o'clock he goes home, because he can't stand the strain any longer: what does he do then? He plays five minutes with his baby, or else doses in the corner over a newspaper, all doubled up like a jack-knife. Still other men of business snatch a hasty minute to dine, and come home at night, only to pore over ledgers and business accounts without end. These plans may be very excellent ones to get riches by, but there are demands of the body to be attended to, which neglected, all the wealth in the world cannot compensate for. The obvious remedy is to give each function and organ of the body its proper degree of care. The millionaire will not consent that his horses shall stand idle in the stable, for he knows that by so doing they lose in beauty and spirit; yet he denies to his own body what he recognizes as indispensable for the animal, and suffers his energies to waste for want of use. The mechanic who has an overabundance of muscular exercise, requires intellectual food, that his brains may develop and his ideas be enlarged; while the reverse is true of literary men.

In the beginning of this article we mentioned gymnasia, and their influence; we think that one great feature in developing our frames is too often overlooked, and that is the degree of interest or sympathy an individual has, in his efforts to become robust. Most persons will concede that if a man forces himself to walk about in a pen, open to air and sunlight, for a certain period, he will not necessarily present a picture of perfect health; and that mere tramping over a stated number of miles may not always bring him in sight of the fountains of youth. But let nature inspire the heart of man with all her beautiful sights and sounds; let him feel the sweet influences of the landscape filling his heart with joy and gratitude; and then a walk of half a mile is better for his body than five miles under other circumstances. It is not so much what we do for the restoration of lost physical energy, as *how* we do it. Active exercise is in fact only another name for recreation; and that this is imperatively necessary to a healthy body all will admit. Outraged nature inflicts sore present punishment upon men for their neglect of this law, as well as future unhappiness, in a line of degenerated and figuratively emasculated descendants.

## RESISTANCE OF ARMOR VESSELS.

The London *Daily News* lately contained a long communication from Rear Admiral Halsted, R. N., in which he discussed the merits of the different armor-clad vessels that have been built, and those now being constructed for the British navy; also the effect of shot and shell upon them. He states that those ships which have been built with eighteen inches of teak wood, behind 4½-inch iron plates, exhibited greater powers of resistance to round shot, from smooth bore guns, than ships having 5½-inch plates, backed with only 9 inches of teak. But none of these vessels, he asserts, are proof against Whitworth's 130-pound shells, fired at a distance of 800 yards, with 27-pound charges of powder. He advocates, however, an inner skin of plate, behind all the wood backing of armor vessels, as being a great protection against splinters, and rendering the interior of the vessels fire-proof. The inner plating behind the wood of the frigate *Warrior*, and other broadside British iron clads, is ⅝ths of an inch thick. A greatly increased thickness of this inner plating is suggested. With respect to broadside and cupola, or turret armor ships, Admiral Halsted considers the latter superior. He says: "Of the plans now before us, the cupola ship bids higher than any other, as against both ships and forts, to become the type of future maritime strength. With unapproached facility for carrying and working the heaviest practicable guns, able to be burdened with the heaviest reasonable armor, freed for equipment with the highest powers of speed and sail, and with promise of superior sea-boat qualities, the cupola ship, as a true British invention, claims every support and encouragement the country can extend to her talented inventor, in his arduous struggle for her speedy, complete and successful development, as the future floating symbol of our naval power."

The little touch of national vanity about "the true British invention" may be overlooked, for the sake of the qualities which he points out as necessary to make such vessels truly effective. They must possess a high speed and be good sea-boats. None of our *Monitors*, yet constructed, possess these qualities, but several of those now being built will be good sea-going vessels; and it is expected they will have a high speed. We have constantly urged upon our naval authorities the positive necessity of high speed in any war steamer, to render it effective.

## DECORATING MACHINERY.

The external appearance of some kinds of tools and utensils attracts public attention at once, and provokes criticism of a more or less favorable nature; according as the embellishment is in good or bad taste. In respect to the ornamentation of machines many different opinions exist. There are a certain class of manufacturers who build their machines without any attempt at decoration, and who reject all outward show, as detracting from the real merit of the article—which lies unquestionably in its capacity to do the work it was designed for. Yet another, and in this country a very numerous class, so overload their mechanism with paint, gilding, and gewgaws, that the appearance becomes tawdry in the extreme, and detracts very materially from the pleasure one experiences in looking at what may be an otherwise well-designed and efficient machine. Some locomotive engine tenders we have noticed, are so covered with a maze of scrolls, scratches, and dabs of paint, beginning nowhere, and ending in the same place, that one cannot but think the ghost of some crazy artist had risen at the dead of night, and wandering at random over the innocent iron, left traces of his revel in wild meaningless blotches and patches, without character or purpose.

It seems to us that in all cases where the ornamentation of a machine is determined upon, a safe rule would be to consult the well-established laws of design (and common sense also), before perpetrating abortions which will, perhaps, live long after the offender against good taste has departed. All appar-

atus intended to be placed in an obscure corner, or those parts of machines which are not seen, require no outward adornment: but in other cases, where perhaps hundreds of persons daily use the apparatus, and the whole world, so to speak, criticises and comments upon its appearance, a tasteful and appropriate exterior adds, not only to the beauty of the machine, but to its value; and is at once a mark of enterprise and an evidence of the maker's cultivation.

## COST OF MODERN NAVIES.

The French naval architect, M. Xavier Raymond, in his book on "Les Marines de la France et de'l Angleterre," describes the enormous cost of modern navies, as compared with those of other times, when sailing vessels alone were employed. In the days of Nelson, it was calculated that the number of guns carried was a criterion of the cost of a vessel, and that the cost of each gun was £1,000 (about $5,000.) For steam wooden frigates, the cost per gun is now rated at from £5,000 to £6,000, and for iron-plated frigates it exceeds £10,000. Again, the expense of maintaining a modern steam frigate is almost fabulous compared with the old sailing craft. The *Edinburgh Review* states that the *Warrior* frigate, ready for sea, represents £400,000 ($2,000,000) of the public money; while the *Minotaur* now building, and to be covered with 5½-inch plates will represent $2,500,000. As this thickness of plates has been shattered by guns already in existence, it is now proposed to build other vessels with 8 and 10 inch plating, in which case a single ship will cost about $5,000,000! The *Review* says, "The Americans are confident that they can carry and work at sea 15-inch guns, throwing 450 lb shot, with charges of powder sufficient to pierce and destroy a ship's side composed of 36 inches solid oak and 1 inch of iron lining, protected with 5½ inch plates. They have destroyed such a target at 100 yards distance, and they have done this with cast-iron guns and cast-iron shot. It will not do to shut our eyes to such eventualities. In designing these additional iron-clads, which it is too evident England will be compelled to build, the increasing difficulties of the question must be fairly considered and the magnitude of the cost boldly confronted." In our opinion such huge iron-clad war ships, now proposed for the British navy, might be very efficient at sea against inferior vessels; but in most cases they would be useless in America, for attacks on harbor fortifications or batteries, owing to their great draft of water—ranging from 28 to 30 feet. They would not be able to come within a range of ten miles from New York city.

## REVELATIONS OF THE MICROSCOPE.

Brush a little of the fuzz from the wing of a dead butterfly, and let it fall upon a piece of glass. It will be seen on the glass as a fine golden dust. Slide the glass under the microscope, and each particle of the dust will reveal itself as a perfect symmetrical feather.

Give your arm a slight prick, so as to draw a small drop of blood; mix the blood with a drop of vinegar and water, and place it upon the glass slide under the microscope. You will discover that the red matter of the blood is formed of innumerable globules or disks, which, though so small as to be separately invisible to the naked eye, appear under the microscope each larger than a letter, o, of this print.

Take a drop of water from a stagnant pool, or ditch, or sluggish brook; dipping it from among the green vegetable matter on the surface. On holding the water to the light it will look a little milky; but on placing the smallest drop under the microscope, you will find it swarming with hundreds of strange animals that are swimming about in it with the greatest vivacity. These animalcules exist in such multitudes that any effort to conceive of their numbers bewilders the imagination.

This invisible universe of created beings is the most wonderful of all the revelations of the microscope. During the whole of man's existence on the earth, while he has been fighting, taming and studying the lower animals which were visible to his sight, he has been surrounded by these other multitudes of the earth's inhabitants without any suspicion of their existence! In endless variety of form and structure, they are bustling through their active lives—pursuing their prey—defending their persons—waging their wars—prosecuting their amours—multiplying their species—and ending their careers: countless hosts at each tick of the clock passing out of existence, and making way for new hosts that are following in endless succession. What other fields of creation may yet, by some inconceivable methods, be revealed to our knowledge?

## THE SUN'S PATH AMONG THE STARS.

The sky, including the sun, moon and stars, rolls around us every day, from east to west. But the sun moves each day among the stars about one degree in the opposite direction; completing the circle of 360 degrees in 365 days. As the sun illuminates that half of the heavens in which it is situated at the time, it carries the day with it; slipping the illuminated half of the heavens slowly round from west to east. Hence the several stars rise about four minutes earlier each day than they did the day before; and, in the course of the year, they are each in turn brought up to our view during the night; excepting those that are so near the south pole of the heavens that they never rise.

The sun's path among the stars is not round the celestial equator or equinoctial, half way between the poles, but it crosses the equinoctial at an angle of 23° 28′; so that in midsummer the sun is among those stars which are 23° 28′ north of the equinoctial, and in midwinter he is among those stars which are 23° 28′ south of the equinoctial. An inspection of the simple apparatus described on page 402, Vol. VIII (new series) of the Scientific American will show how this change in the altitude of the sun varies the length of the days.

This motion of the sun was observed and the ecliptic was named long before the true cause of the phenomenon was suspected. It is now known to be produced by the annual revolution of the earth, in its orbit around the sun. The place of the ecliptic among the stars is always the same, while the places of the equinoctial and the poles are constantly but slowly changing.

## POWER TO DRIVE CIRCULAR SAWS.

Differences of opinion prevail among millwrights respecting the amount of power employed to drive circular saws. Undoubtedly the power employed will just be in proportion to the work—the speed of the saw and the character of the lumber cut. The higher the speed and the harder the timber, the greater will be the amount of power required; but how much this is for saws of different sizes, according to their speed and the timber to be cut, is not very well known. Practice, and minute information furnished on these points, by those engaged in sawmills, would be very interesting to a large number of the readers of the Scientific American. On page 128, Vol. 14 (old series) of the Scientific American, it is stated that 12-horse power is required for a circular saw 52 inches in diameter, cutting yellow Southern pine, and running at the rate of 4,600 feet per minute, at the periphery.

A correspondent writing to us from Tioga, Pa., lately, states that 40-horse power is employed in that lumber region, for a 4-foot circular saw, and that this amount of power is for common, not extra work. We had entertained the idea, derived from persons engaged in sawing timber, that about 14-horse power was usually required to drive a 4-foot circular saw, in cutting such timber as white pine, spruce and soft maple; but this amount of power it seems would only be about one-third of that used in Tioga county, Pa.

## A GOOD MACHINE OIL.

The difficulty of obtaining a good machine oil—apart from sperm which is too costly for general use—has been felt by manufacturers, and the evil deplored. Aside from the enormous friction entailed by bad lubricants, the absorption of power is a question of immediate loss, and one that soon makes itself apparent in the yearly bills for repairs. Mr. F. S. Pease, of Buffalo, N. Y., has experimented a long time on the production of a desirable machine oil, which could be afforded at a comparatively low rate; and has so far succeeded that, at the recent Exhibition of the World's Fair, held in London, he was awarded two medals upon its merits. The most eminent English engineers—one of them Mr. D. K. Clarke, professionally well known in this country—have testified to its excellent qualities; and Muspratt, the English chemist, thus states his opinion of it:—

"A qualitative examination of your engine and signal oil proves it to be of a compound nature. In my experiments it burned freely and gave a good light without clogging the wick. It is free from acidity and does not resinify when exposed in a thin stratum to the air. The preceding qualities indicate that the 'Engine and Signal Oil' is well suited to the use for which you have intended it."

Other certificates have been shown us—among them the endorsement of the United States Commissioner at the Industrial Exhibition: but we deem the above sufficient to establish the estimation in which the article is held abroad. Mr. Pease informs us that he has filled large orders for some English railways, and is now supplying the principal lines in this country. We have no hesitation in recommending the oil to manufacturers as a most desirable article.

## RECENT AMERICAN PATENTS.

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

*Envelope Machine.*—This invention relates to a movable slide placed under the lifters, in such a manner that a fresh supply of blanks can be introduced under the lifters at any moment whenever they begin to rise, without stopping the machine; also to a peculiar arrangement of the lifter and table which supports the gum box and under which the blanks are conveyed to the creasing box, in such a manner that the table itself pulls off the blanks from the lifters and retains them in a correct position for the plunger to act upon; and further, to certain improvements in the mechanism employed to impart the desired motion to the gum box in relation to the lifters, to counterbalance the conveyor, to crease, fold, and press the envelopes, and to discharge them from the machine when finished. George H. Reay, of New York city, is the inventor of this machine. The patent has been assigned in full to L. Negbaur, No. 5 Spruce street, New York.

*Ring Spinning Frame.*—In most if not all ring spinning frames heretofore constructed, the rings have been fitted snugly into openings provided for them in the ring rail, without any provision for adjusting them in the said rail. This rail is held in place by lifting rods which work up and down in stationary guides provided for them in the frame, and as these rods and guides wear, the rings become eccentric to the spindles, and cause great irregularity in the draft of the yarns in every revolution of the travelers and spindles, and make imperfect work. The object of this invention is to provide for the adjustment of the several rings in the rail separately, to set them concentric with their respective spindles; and to this end it consists in making the openings provided in the ring rail for the reception of the rings larger than the exteriors of the portions of the rings which are received within them, and in the employment of adjusting screws screwing into the rail from the inner and outer sides thereof, and into the said holes to adjust and hold the said rings therein. Welcome Jenckes, of Manchester, N. H., is the inventor of this improvement.

*Leather-splitting Machine.*—This invention consists, first, in the employment for adjusting the gage roller at the proper distance from the plane of the edge of the splitting knife according to the thickness to which the skin is to be reduced, of a pair of eccentrics or cams attached to the same shaft, and arranged to act one upon each of the journal boxes of the said roller, whereby the uniform adjustment of both ends of the said roller is insured, and the difficulty of adjusting the said roller correctly by separate adjustments, such as the screws commonly employed, at each end, is overcome. It also consists in making the standards or housings which contain the journal boxes of the gage roller adjustable, to bring the said roller more or less on the edge of the splitting knife, whereby the knife is enabled to be better secured against springing or accidental displacement, by obviating the necessity of adjusting it. Horace Wing,

of Buffalo, N. Y., is the inventor of this improvement.

*Bone-black Oven.*—This invention consists in the arrangement within a rotating circular retort, of a continuous flange running spirally around its inner surface from end to end, or along any portion of its length, whereby a gradual and regular movement of the bone-black from one end to the other is obtained, by the rotary motion of the retort about its axis without giving it any inclination from a horizontal position. It also consists in the arrangement of a drying retort or cylinder in the same oven or casing with, and in such relation to and connection with the revivifying retort, that it may be heated by the waste heat from the same fire by which the latter retort is heated, for the purpose of drying the washed bone-black preparatory to re burning, and that the dried bone-black may be delivered continuously from it to the re-burning or revivifying retort. It further consists in a novel mode of connecting the revolving, revivifying retort with the coolers or other receptacles into which the revivified bone-black is discharged. Gustavus Finken, of New York city, is the inventor of this apparatus.

*Horse Pitchfork.*—This invention relates to a new and improved horse pitchfork, such as is used for elevating by means of a horse or other draught animal, hay and grain into mows. The invention consists in the employment of two pairs of hooks provided with arms, those of each pair crossing each other and fitted on a rod, the ends of the arms of each pair of hooks being connected by a crossbar, and the latter having a rope attached to or connected with them, in such a manner that when the loaded fork is raised by means of the rope aforesaid, the hooks will be made to grasp and firmly hold its load, and the hooks, by a simple contrivance readily released at any time, to discharge the load. Silas L Gates, of Verona, N. Y., is the inventor of this improved pitchfork.

*Tailor's Shears.*—This invention consists in having the lower blade of tailors' shears formed with a recess or shoulder, in such a manner that the cutting edge of said blade can be brought down in line, or nearly so, with the pivot connecting the two blades, without unduly weakening said blade, and that by this construction of the shears a draw cut is produced, enabling the operator to work the shears with the greatest ease, and to have the full benefit of the cutting edge from heel to point. Herman Wendt, of New York city, is the inventor of this improvement. For further information address Henry Seymour, 32 Beekman street, New York.

*Rocket.*—This invention is more especially designed for signal rockets for military and other operations. It consists, first, in the application to or within a rocket, of a roman candle, for the purpose of discharging stars of the same or different colors, one after the other, and thereby enabling a greater variety of and more distinct signals to be produced. It consists, secondly, in making the stars of the roman candle with cavities in their upper ends, containing charges of gunpowder or other suitable explosive substance, for the purpose of driving out the balls from the case and igniting them at the same time. It consists, thirdly, in so combining a balloon with a rocket as to make it keep suspended for a time, or retard the descent of a roman candle or other firework discharged from the rocket, for the purpose of making a signal, whereby such firework is rendered visible for a longer period, and the signal enabled to be better understood than if it descended quickly. It consists, fourthly, in the novel construction and arrangement of a series of divergent spiral passages in the bottom of a rocket, for the purpose of obtaining its rotary motion by the escape of the gases eliminated in the combustion of the charge, and thereby dispensing with the stick heretofore commonly used to guide and steady the flight of the rocket. George H. Felt, of New York city, is the inventor of this improvement.

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THE Woonsocket, R. I. *Patriot* says that no town in Rhode Island is improving more rapidly than Burrillville. This is especially true of its manufactures, and these stimulate and advance its agricultural industry. Nearly all its mills are for the product of woolen fabrics; and the success of this branch, for a few years past, has overshadowed almost every other business in New England.


ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 25, 1863.

*Reported Officially for the Scientific American.*

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

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39,620.—Mode of Combining Cider Mill, Corn Sheller, and Fodder Cutter.—James P. Adams, Chester, Ill. Ante-dated Feb. 9, 1863:

I claim the wheel, F, provided at one side with a beveled surface, having radial and tangential rows of teeth, b b', and at the opposite side with knives or cutters, H H, in combination with the reversible hopper, G, leger blade or cutter, I, and feed rollers, J J, operated from the shaft, B, as shown, all arranged as and for the purposes herein set forth.

[This invention consists in combining a wheel, provided with cutters and a beveled toothed side, with a reversible hopper and feed rollers; all arranged in such a manner that corn may be shelled from the ear, apples cut or ground, for manufacturing cider, and straw, stalks, hay, &c., cut for fodder.]

39,621.—Drain Tile Mold.—John J. Alvord, Tecumseh, Mich.:

I claim the sewer and file head for the purposes set forth and described.

39,622.—Beehive.—J. H. Andrews, Almont, Mich.:

I claim, first, A hive provided with a partition, D, having holes, d, made in it; in combination with the boxes, E E, provided with holes, e, in their bottoms and openings, j, in their sides, in line with openings, i, in the sides of the hive, all arranged substantially as and for the purpose set forth.

Second, The manner of securing the back part of the lid or cover, K, and bottom board, B, to the hive, A, as shown and described, to wit: by having said parts provided respectively with cleats, o d, having pins, b p, driven in them which fit into the back of the hive.

[The object of this invention is to obtain a bee-hive of simple construction, which will admit, by a simple manipulation, of colonies of bees being increased without permitting them to swarm; the hive at the same time admitting of two different colonies working in it in separate compartments, and also affording facilities for the removal of old comb when necessary.]

39,623.—Wringing Machine.—Francis Arnold, Haddam, Conn. Ante-dated Nov. 18, 1862:

I claim the vibratory roller frame, m, with proper fastenings for holding it in place, substantially in the manner as and for the purpose described.

39,624.—Tidal Valve for Draining Land.—E. T. Bainbridge, Louisville, Ky.:

I claim the combination of the flume with the valve, constructed, arranged and operating, substantially in the manner described for the purpose set sorth.

39,625.—Retort for Refining Zinc.—William Blake, Boston, Mass.:

I claim an improved retort, consisting of an ordinary retort, A, and a trap or cesspool as specified, or its equivalent, applied either to the entrance or exit passage of the retort, or to each of them, and so as to operate substantially as and for the purpose hereinbefore specified.

39,626.—Sawing Machine.—Isaac W. Bowers, Ovid Center, Mich.:

I claim, first, The vertical and horizontal saws, D F, when used in combination with a reciprocating frame, L, having upright frames, N N', attached to it in which a log, R, is suspended, and the frame, L, operated through the medium of the racks, M M, pinions m m, belts, g g', and lever, J, all arranged as and for the purpose herein set forth.

Second, Suspending the log, R, between the upright frames, N N', by means of the center points or pins, i', attached to the slides, Q Q, which are moved or adjusted through the medium of the racks, b', pinions, c', arms, h', and plates, e', substantially as shown and described to admit of the lateral adjustment of the log, R.

Third, Placing the slides, Q Q, on vertically adjustable bars, O, in the frames, N N', the bars, O, being raised and lowered by means of the racks, s, and pinions, t, as described, when the parts above named are used in combination with the saws, D F, and the frames, N N', are attached to a reciprocating frame, L, all arranged to operate as and for the purpose herein set forth.

Fourth, The pawls, S S, attached to the ends of the frame, L, when used in connection with the saws, D F, and bed pieces, l l, as and for the purpose herein specified.

39,627.—Washing Machine.—Isaac W. Bowers, Ovid Center, Mich.:

I claim the suds-box, A provided with rounded ends, and with rollers, C, as described in combination with the rubber, D, provided with rollers, i, fitted between side strips, d d, having rounded ends and also provided with a perforated top board, f, all arranged as and for the purpose set forth.

39,628.—Cracker-Cutting Machine.—E. O. Brinkerhoff, New York City:

I claim, first, The cross-head, H, with cutters, G, attached in connection with the cross-head, I, the springs, J, and fixed or permanent cross-bar, E, all arranged to operate as and for the purpose specified.

Second, The connecting of the rod, P, to the arm, N, through the medium of the tube, O, and nuts, h h, fitted on a screw or rod, P, substantially as and for the purpose set forth.

[This invention relates to an improvement in the cutting apparatus of cracker machines, whereby the same is made to cut in a more uniform manner than heretofore, without subjecting any of the working parts of the machine to undue strain, and at the same time compensating for any uneven ness in the sheet of dough and ensuring a perfect clean cut at all times.]

39,629.—Machine for upsetting Tires.—Ira D. Card, Danville, Cal.:

I claim, first, The adjustable fulcrum head, G, with the self-acting wedge, F, constructed and operating as described.

Second, I claim constructing the jaws, H H, of the walls of the groove in the manner and for the purpose of operating substantially as described.

39,630.—Grain Dryer.—Louis S. Chichester, New York City:

I claim first, A series of centrifugal drying tables in combination with the stationary intervening funnels for receiving the grain as scattered from one table and returning it to the next table below, substantially as specified.

Second, I claim the central hot-air tube, g, and its openings, i, in combination with the said centrifugal tables and funnels, for the purposes and as specified.

Third, I claim the escape apertures, l, for regulating the escape of the heated air and vapors, in combination with said centrifugal tables and funnels as specified.

39,631.—Truss-Pads.—Henry J. Childs, New York City:

I claim forming the truss pad or pads of brushes for the purposes and as set forth.

39,632.—Painter's Panel.—Albert G. Collins, Washington, D. C.:

I claim the application of canvas to pasteboard as herein above described for the purpose set forth.

39,633.—Harvester Cutter-Bar Connection.—Geo. W. D. Culp, Allensville, Ind., and W. J., Keeney, Florence, Ind.:

I claim, first, Connecting a pitman, B, to a cutter-bar, A, by means of a single conical or conoidal journal, b, passing through a corresponding socket, a, in the heel of the cutter-bar, and confined by an adjustable plate, C, as herein shown and described, so as to employ the entire strength of the projection on the heel of the bar, and admit of tightening up the cone or journal for the whole extent of its length.

Second, Constructing the said point, cone or conoidal journal with a shoulder or collar, b', to constitute a bearing for the confining plate, I, substantially as herein described.

Third, Connecting the pitman to the crank or fly wheel, by means of a rocking box, substantially as set forth.

[The principal object of this invention is to compensate for the wear of the crank pin and rod, by the use of an adjustable conical journal, which may be set up in its socket so as to keep the parts constantly tight until worn out.]

39,634,—Washing Machine.—Samuel Davis, Providence, R. I.:

I claim the combination of the inner suds reservoir holders, R R, and centralizers, T T, with the lever standards, p j, applied to the outer suds reservoir, the whole being substantially and for the purpose or objects hereinbefore specified.

I also claim the improved arrangement of the connection, V W, of the operative levers, g F, with respect to them and their fulcra, o l.

39,635.—Distilling Apparatus.—Henry G. Dayton, Maysville, Ky.:

I claim, first, The combination of the boiler, B, and double still, K, both constructed, arranged and operating in the manner and for the purpose specified.

Second, The single still, L, constructed substantially as described, and heated by a central steam pipe and surrounding jacket, as specified.

Third, The described combination of the single still, L, with the boiler, B, of the double still, K, whereby the steam after heating the double still may be employed for heating the single still, as explained.

Fourth, The combination of the wash boiler, H, with the furnace, C, and boiler, B, constructed and arranged substantially as and for the purpose specified.

[In this apparatus beer in process of distillation is preserved from contact with any metallic surface exposed to direct fire heat. The results are entire freedom from scorching, absence of injurious metallic oxidation, great uniformity of action and saving of fuel.

39,636.—Signal Rocket.—George H. Felt, New York City. Ante-dated July 29, 1863:

I claim, first, The combination of the Roman candle with the rocket, substantially as and for the purpose herein specified.

Second, The construction of the stars of the Roman candle with cup-like concavities for the reception of the charges, e, of gunpowder, by which they are to be discharged from the case of the candle, substantially as and for the purpose herein specified.

Third, The combination of a balloon with a rocket substantially as and for the purpose herein specified.

Fourth, I claim the plug, J, with the central passage, t, and spiral tubes or passages, u u, combined as and for the purpose herein specified.

39,637.—Apparatus for Revivifying Bone Black.—Gustavus Finken, New York City:

I claim, first, The arrangement of a flange or flanges, b, on the interior surface of a revolving retort in spiral or screw-like form, substantially as and for the purpose herein specified.

Second, The arrangement of the drying retort or cylinder, B, in the same oven with the revivifying retort, A, in such manner as to be heated by the waste heat from the fire by which the latter retort is heated.

Third, Combining the revolving retort, A, with the coolers, K K, or other receptacles by means of a stationary head, L, and one or more pipes, J J, and sliding connecting sleeves or couplings, f f, substantially as herein described.

39,638.—Revivifying Bone Black.—Joseph Forest, New York City:

I claim drying bone black by forcing heated air through it substantially as described.

And in combination with the heated air forced through the bone black, I claim applying heat to the vessel containing it (the bone black) at the same time.

I also claim the apparatus described for the purpose specified.

39,639.—Plow.—William Frank, St. Louis, Mo.:

I claim the standards, C, brace, D, lower and top bars, E G, and guide, H, all combined and applied to the beam, A, as shown for the purpose specified.

I further claim the securing of the mold-board, I, to the standards, C, and bar, E, by means of the hook, d, and screw bolt, e, and the swivel screw brace, J, substantially as and for the purpose specified.

[The object of this invention is to obtain a plow which may be readily adjusted for plowing deep or shallow, as may be required, and also readily adjusted so as to take more or less land, that is to say, to turn a furrow slice of greater or less width, and at the same time be capable of having different shares and mold-boards attached to it to suit different kinds of work.]

39,640.—Boiler Furnace.—Alexander Friedmann and F. Emile d'Erlanger, Paris, France. Patented in France, June 10, 1862:

We claim the application, substantially as herein set forth and shown in the drawing, to the fire boxes of steam boiler furnaces of an inner mantel in metal, so arranged as to form an inclined diaphragm or reverberating chamber in and by which are effected the heating of the air required for the combustion of the smoke and the distribution of this air over the ignited surface of the fuel on the grate.

39,641.—Horse Hay Fork.—Silas L. Gates, Verona, N. Y.:

I claim the two pair of hooks, A A A' A', fitted on the rod, B, as shown, in combination with the fixed roller, D, loose or detachable roller, F, rope, E, hook H, and lever, I, all arranged and combined to form a new and improved horse pitch fork substantially as set forth.

39,642.—Revolving Fire-Arm.—M. F. Geraghty, Jersey City, N. Y.:

I claim the employment of the locking ring, D, constructed, arranged, combined and operating in conjunction with the rear portion of the cylinder, C, and the cartridge case, E, as herein shown and described.

[This invention relates to revolving fire-arms for the use of metallic cartridges, inserted in the chambers from in front of the cylinder. Its object is to provide for securing such cartridges in the chambers in such manner that they can neither drop out in front nor move forward therein, and thereby interfere with the revolution of the cylinder, and to this end it consists in the construction of the cylinder of two or more pieces, one of which is movable about the axis, independent of the main body of the cylinder, and constructed to enter grooves provided in the cartridge for its reception.]

39,643.—Closing Fruit Cans.—N. S. Gilbert, Lockport, N. Y.:

I claim the ring of india-rubber, or elastic material, secured by ce-

ment, or otherwise, to the interior of the stopple or cap in the described combination with the tapering neck, B, and shoulder, b, substantially as and for the purposes specified.

39,644.—Manufacture of Bungs.—Lyman Gray, Pittsburg, Pa.:

I claim the method of centering and turning bungs out of small blocks of wood, in the manner as herein set forth.

I also claim the guide box, M, with its opening, P, in combination with the spindle, R, for the purpose hereinbefore stated.

I also claim the lever, L, combined with the sliding spindle, R, by means of the clutch, G, in the manner as herein shown and set forth.

39,645.—Revolving Fire-Arm.—Henry Gross, Tiffin, Ohio:

I claim the cylinder, C, in combination with the tubular recoil plate, B, when the said cylinder is so constructed as to shield the end of the recoil plate substantially as and for the purposes specified.

39,646.—Breech-Loading Fire-Arm.—Henry Gross, Tiffin, Ohio:

I claim, first, The adaptation of a swinging breech piece which has a conical or curved protuberance on its front end and a lever-guard formed on its under-side, to so operate that it will swing unchangingly on its axis within a given space, to a certain extent, and will then move forward so as to close the breech of the barrel with the protuberance and the metal around it, substantially in the manner described.

Second, I claim the segment breech-piece, D, formed on the lever-guard, G, and having a curved protuberance on its front end, when the curved surfaces, d d′, are formed on the segment, D, and the solid metallic portion, B, of the stock, so as to be in the relation shown to the axis of the gun barrel, and so that they, as the lever-guard, G, is drawn back to its place, will cause the breech-piece protuberance, F, to be forced in nearly a straight line and firmly locked in its seats, f f′, without the aid of an auxiliary curved wedge, or other auxiliary appliance, substantially as herein described.

Third, The combination of the slot, e, pin, g, segment, D, lever-guard, G, curved protuberance, F, curve seat, f f′, and curved surface, d d′, all applied and operating substantially as and for the purpose set forth.

Fourth, The arrangement of the one spring latch, J, with respect to the lever-guard, G, and the spring bolt, N, so that the one action of the hand to operate the guard, will release both, the guard and the bolt, substantially as described.

39,647.—Head Block for Saw Mills.—Gebhard Hagenmeyer, Big River, Cal.:

I claim the arrangement and combination of the journals, H and B, working in connection with the parts, D E F and G, and operating in the manner described and set forth.

39,648.—Regulator for Grinding Mills.—A. B. Hamaker, Salunga, Pa. Ante-dated Aug. 14, 1863.

I claim, first, The governors, A′ P, provided with slides, e p, arranged as shown for the purpose of regulating their action, in combination with the sliding sleeve, H, with the wheels, I I′, attached and the friction wheels, L U, or equivalent gearing for the purpose of regulating the space between the mill stones, and also for regulating the feeding of the grain to the same, as herein described, either governor with its concomitant parts being used separately or both combined.

Second, The fluted cylinder, B*, and sliding tube, A*, placed in the hopper, C*, in connection with the lever, W, or its equivalent operated from the governor, P, substantially as shown for the purpose of feeding the grain to or between the stones as set forth.

Third, The combination of the friction wheel, L, with the sliding pinion, N, arranged respectively with springs, M i, and provided with inclined surfaces, j k, to operate in connection with the wheels, I I′, on the sleeve, H, as and for the purpose set forth.

[This invention relates to a new and improved automatic device for grinding mills, the same consisting of a combination of parts for regulating the speed of the stones, the feed or supply of grain to the same and the adjusting of the stones, so as to regulate the space between them, in order that the grain may be ground of the required degree of fineness, and also for regulating the power by which the stones are driven.

39,649.—Stave Machine.—Thomas Hanvey, Elma, N. Y.:

I claim the combination of the box, A, and knife, K, as arranged in the frame, B, with the rollers, R R, whereby the staves are passed directly from the slicing machine to the pressing and forming rollers, thus securing greater perfection in the shape of the stave, and greater compactness in the material than can otherwise be obtained.

39,650.—Churn.—A. H. Hart, Stockbridge, Wis.:

I claim the slide, g, provided with the oblique grooves, i i, and operated by the lever, h, in combination with the dashers, E E, the whole constructed, arranged and operating in the manner and for the purposes herein set forth.

39,651.—Harness and Trace Buckle.—Henry Hise, Ottowa, Ill.:

I claim the combination and arrangement of the arm, C, provided with the rivet-hole, r, the tongue, c, and spring, E, with the frame, A, the slot, a, the crossbar, B, stop, b, and the lever, D, when all arranged, and operate as and for the purposes herein shown and described.

39,652.—Railroad Car Seats.—Stephen Briggs Holden, Meadville, Pa.,

I claim the car seat supported on the supports, D D D D, in combination with the spring, E E, when the same are constructed as described, or any other construction, substantially the same, and which will produce the same results.

39,653.—Recovering Waste Alkalies.—Gardner Howland, Brunswick, N. Y.:

I claim the use of the supernatant alkaline liquor, resulting from the treatment of alkaline lyes with lime, after such lyes have been used in the reduction of crude vegetable fiber.

39,654.—Measure Faucet.—Gilbert Hubbard, Sandisfield, Mass.:

I claim the chamber, A, communicating with the tubes, B C, and provided with the rotating sliding piston, E, and valve, I, all arranged to operate as and for the purpose herein set forth.

I further claim the wheels, F G, in combination with the rotating sliding piston, E, and valve I, placed within the chamber, A, the wheel, F, being provided with a single tooth, c, which engages with the wheel G, and the latter provided with an index, g, which comes in contact with a stop, h, at the side of the chamber, A, all being arranged substantially as and for the purpose specified.

[This invention consists in the employment or use of a rotating sliding piston placed within a chamber which is in communication with the table of the faucet; the piston being fitted within a head provided with a valve and having at one end of it, outside of the chamber, a wheel provided with a tooth which engages with a toothed index wheel, all being arranged in such a manner that liquids may be drawn by measurement from a cask or reservoir, the flow of the liquor ceasing when the desired quantity is drawn.]

39,655.—Hay-loader.—William L. Hubbell, Brooklyn, N. Y.:

I claim, first, The diagonal rakes, n, and o, fitted as specified in combination with the rake, i, and elevating apron, e, as set forth.

Second, I claim the vibrating rake or sweep, r, fitted with swinging prongs substantially as specified in combination with the diagonal rakes, n and o, to gather the hay toward the center as set forth.

39,656.—Washing Machine.—Alonzo W. Ingalls, Buchanan, Mich.:

I claim the combination of the vibratory brush, a a, plane washboard, b b, and springs, k k, for holding the brush away from the wash board, substantially as and for the purpose herein specified.

I also claim the clothes holder, d d, with its springs, e e, in combination with the wash-board and rubber, or brush, as herein set forth.

39,657.—Ring Spinning Frame.—Welcome Jenckes, Manchester, N. H.:

I claim providing for the adjustment of the rings in the rail of a ring spinning frame by making the holes in the rail for the reception of the said rings larger than the exteriors of the portions of the rings which are received within them and applying adjusting screws in combination with the holes and rings, substantially as and for the purpose herein specified.

39,658.—Stitch for Sewing Machines.—R. H. Jewett, Versailles, Ill. Ante-dated March 1, 1863:

I claim the stitch produced with two threads, by passing one thread through the cloth or other material to be sewed from one side thereof in a series of loops and enchaining the other thread on the opposite side of the said material in a series of loops, in such manner that each of the latter passes through one of the protruding loops of the first thread and receives the succeeding loop of its own series as herein specified.

[This invention consists in a stitch of novel character produced with two threads, by passing one thread through the cloth or other material to be sewed from one side thereof in a series of loops, and enchaining the other thread on the opposite side of the said material, in a series of loops, in such manner that each of the latter passes through one of the protruding loops of the first thread and receives the succeeding loop of its own series, such stitch being very strong and possessing great elasticity.]

39,659.—Snap Hook.—Oliver S. Judd, New Britain, Conn.:

I claim, first, Casting or forming the open eye for the joint pivot in combination with the loop, B, and hook, A, substantially in the manner and for the purpose described.

Second, I claim the employment of the spring, E, in combination with the hook, A, and latch, C, when fitted into properly formed recess inside of said hook and latch, in the manner and for the purpose substantially as described.

39,660.—Beehive.—Walter M. Lee, Rosindale, Wis.:

I claim, first, The combination of the comb guides as braces, a, with the sharp edge on the under-side of the comb-bar, A′, substantially in the manner and for the purposes set forth.

Second, I also claim the arrangement, in combination with the hive, of the bottom board, D, riding on wedges, P, and supported by buttons behind, substantially in the manner and for the purposes specified.

39,661.—Collapsible Boat.—C. F. Lichtner, Chicago, Ill.:

I claim, first, Providing the inner keel, B, with the adjustable or folding wings, b b, arranged and operating substantially as and for the purposes herein delineated and described.

Second, I claim the combination of the flexible covering, H, the keel, A, the longitudinal ribs, a, and transverse ribs, C, with the folding wings, b b, arranged and operating substantially as and for the purposes herein specified and shown.

Third, I claim the combination and arrangement of the folding wings, b b, with the inner keel, B, the transverse ribs, C, the standard, D, cross bar, E, and seat, F, constructed and operating substantially as and for the purposes herein shown and set forth.

39,662.—Elastic Syringe.—H. D. Lockwood, Charleston, Mass.:

I claim the metallic sockets, B B, fitted in the ends of the elastic bulb, A, and secured therein, by subjecting the bulb and sockets to a high heat during the process of vulcanizing or otherwise; in connection with the chambers, c, tubular screens, b, and tubes, C, all arranged substantially as shown, to form joints or connections between the suction and force tubes, D, and bulb, A, of an elastic syringe.

[This invention relates to an improvement in that class of syringes in which an elastic bulb is employed to serve as a pump or as a suction and force device. The object of the invention is to obtain a more durable connection than hitherto of the suction and force tubes to the bulb, so that the joints which form said connection will not be liable to work loose and leak by the compression and expansion of the bulb.]

39,663.—Chair for Invalids.—George A. Mansfield, Melrose, Mass. Ante-dated Dec. 21, 1861:

I claim the dorsal snpporter, a, constructed with, or applied to, the back of a chair, substantially as described, and specifically for the objects and purposes set forth.

39,664.—Pianoforte.—Lorenzo Matt, Boston, Mass.:

I claim a sounding board, partially insulated from the case and supported by one or more springs, arranged under its free end, the whole being substantially as hereinbefore specified.

39,665.—Water-proof Mittens for Divers.—Frederick J. Meryman, Boston, Mass.:

I claim the improved manufacture of water-proof mitten, as made with the water-proof and elastic sleeve or wrist extension, C, to so close on and fit to the arm of a diver as to prevent water from gaining access to the interior of the said mitten or glove while being worn, and submerged.

39,666.—Clothes-wringer.—B. D. Morrell, Lisbon, N. H. Ante-dated Dec. 19, 1862:

I claim in combination with the frame of the clothes-wringer, the plates, L, with pins, q q, passing through and capable of moving freely in the projections, k, of the frame, the said plates being arranged in respect to the projections, n, and set screw, M, and operating substantially as and for the purpose herein set forth.

39,667.—Military Cap.—Sarah Mossman, Cleveland, Ohio. Ante-dated July 20, 1862:

I claim, first, Making the cover in two parts so as to be buttoned over the cap, or folded up so as to form a band around the cap, as above described.

Second, The combination of the cape with the cover and cap, as set forth.

39,668.—Coal Sifter.—Robert C. Nichols, Roxbury, Mass.:

I claim the combination of a sifter or screen, g, and pan, h, when arranged and made to operate together in the manner and for the purpose substantially as described.

I also claim making the journals, d, with the flat surfaces as set forth, for the purpose of keeping the pan in position, and imparting the jarring motion to the sieve as above specified.

39,669.—Auger Stock.—Samuel C. Norcross, Norway, Maine:

I claim my improved auger stock having its aperture for the handle, A, its body, B, its groove, C, and ferule or ring, E, its key, D, and its projection and notch or holder, G, its oblique socket, I, constructed and arranged in relation to each other, and so as to operate together as set forth.

39,670.—Snap Hook.—Norman North, Middletown, Conn.:

I claim as an improved article of manufacture the arrangement of the spring, d, fitted and secured in a recess in the outside of the heel of the hook, a, for the purpose of operating the latch, b, substantially in the manner and for the purpose described.

39,671.—Oil Press Mat.—Hassall Nutt, Brooklyn, N. Y.:

I claim the employment or use in the manufacture of oil press mats of the movable central clamp, A, screw clamps, C, frames, B, and rods, a, all combined and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the employment or use of two or more screw clamps in combination with movable frames, and with a central clamp which serves to hold the pins or rods which form the guides for the strands composing the mat, in such a manner that the strands can be gradually and firmly compressed, and a cheap, durable, and well finished mat can be produced with comparatively little labor or exertion.]

39,672.—Tree Protector.—Henry L. Ordway, Ipswich, Mass.:

I claim, first, Providing the disk, C, with the ring or collar, B B′, substantially as set forth and for the purpose described.

Second, I claim a flexible cloth or bag, in combination with a tree protector consisting of a disk, C, and ring or collar, B B′, substantially as and for the purpose described.

39,673.—Apparatus for Cooling the Teeth.—Edward Oudry, Pittsburgh, Pa.:

I claim, first, The arrangement of one or more mouth-pieces, H H′, at the ends of double channeled flexible pipes, F F′, in combination with a refrigerating chamber and pump, constructed and operating substantially as and for the purpose specified.

Second, The arrangement of a partition, i, in each mouth-piece, in combination with two channels, h h, pipes, F F′, and refrigerating chamber, B, all constructed and operating in the manner and for the purpose substantially as shown and described.

Third, The flat tube, D D′, in combination with the refrigerator chamber, B, pump, C, or its equivalent, pipes, F F′, and mouth-pieces, H H′, all as and for the purpose set forth.

Fourth, The thermometer, G, applied in combination with the mouth-pieces, H H′, pipes, F F′, and pump, C, or its equivalent, in the manner and for the purpose described.

[The object of this invention is an apparatus by which a freezing mixture or a cooling medium either in a liquid or gaseous state can be applied to the teeth or any other part of the body in a convenient and expeditious manner.]

39,674.—Nozzle.—Charles Oyston, Little Falls, N. Y.:

I claim the arrangement of a series of divergers, B, or their equivalents connected to each other and to the nozzle, A, by suitable mechanism, substantially in the manner and for the purpose specified.

[The invention consists in the arrangement of a series of wedge-shaped divergers, in combination with a nozzle, in such a manner, and connecting them by suitable mechanism in such a way that they may be projected into the stream emanating from the nozzle, so as to divide it up, or withdraw so as to let it pass free, at the will of the operator.]

39,675.—Hub Machine.—J. B. Ripsom, East Kendall, N. Y.:

I claim clamping and sustaining the wheel in place, by means of the adjustable bars, E, connected with the ring, D, or its equivalent, the adjustable connections, G, and the block, C, arranged, combined and operating substantially as herein set forth.

I also claim in combination with the connections, G, arranged as described, and the block, C, the projections, k k, provided with notches, p p, and shoulders, q q, and the cross-heads, o o, of the screw shanks, for the purpose of retaining said connections in place, at any inclination, substantially as herein specified.

I also claim the combination of the ring, D, independent center, H, and adjusting screws, r r r, or equivalent, relatively to the shaft, B, and the wheel, for the purpose of perfectly centering the latter, substantially as herein described.

In combination with the screw shaft, B, provided with the cutters, K L, and the center, H, I also claim the removable nut, v, for the purpose of easily removing the cutters from the bore, substantially as herein set forth.

I also claim the special arrangement and combination of the whole machine, as herein set forth.

39,676.—Adjustment of Fishing Nets.—William Randolph, Bloomington, Ill.:

I claim, first, The standard, C, constructed and applied as herein shown and described for securing the net in position.

Second, The combination of the anchors, D, chains or cords, E, buoys, F, and winches, G, arranged and operating substantially as set forth.

39,677.—Carriage Seat.—Andrew J. Ritter, Rahway, N. J. Ante-dated June 12, 1862:

I claim, first, Dividing and jointing the seat rail, A, and converting the front part of the seat rail, A, into a movable brace, for the purpose of supporting and working the seat board, C, as heretofore set forth.

Second, The combination of the movable front rail, A, with the fall or seat board, C, and the supporting legs, I I, attached to the under-side of the fall or seat board, C, as and for the purpose herein set forth and described.

39,678.—Powder Injector.—Dwight Russell, M.D., Milford, Mass.:

I claim the new or improved powder injector, as made of an elastic bulb, a flexible probe of the kind described, and a jet and powder-holding thimble or cap, or its equivalent, the whole being substantially as hereinbefore specified.

39,679.—Combination of Bureau and Trunk.—A. V. Rider, New York City:

I claim a trunk and bureau, combined and arranged with catches substantially as shown, so that when the bureau is elevated or raised from the trunk, the former will be supported on the latter by the automatic action of the catches, and the catches be capable of being drawn in or freed from the trunk, as the bureau is grasped to be lowered into the former, as herein described.

[The object of this invention is to combine a bureau and a trunk in such a manner that the bureau when not required for use may be enclosed within the trunk, and the former, when required for use, be capable of being elevated and sustained by the trunk so as to answer the same purpose as an ordinary bureau, while the trunk itself may be made available as a receptacle for clothing or other articles.]

39,680.—Machine for breaking and cleaning Flax, &c.—Gelston Sanford & James E. Mallory, New York City:

We claim making the peripheries of the second pair of rollers travel faster than the first pair, when both pairs of rollers have a reciprocating rotary motion on their axes, substantially as and for the purpose set forth.

We also claim imparting to one or both of the rollers of a pair, a longitudinal reciprocating motion, substantially as described, in combination with a reciprocating rotary motion, substantially such as described, and for the purpose set forth.

We also claim the combination of a pair of toothed rollers having a reciprocating rotary motion, and a longitudinal, reciprocating motion, substantially as described, with a pair of fluted rollers having a reciprocating rotary motion, substantially as described.

And we also claim making the circumferential grooves of the pair of toothed rollers of greater depth than the longitudinal grooves, substantially as and for the purpose specified.

39,681.—Bobbin or Spool.—Benjamin Saunders, Nashua, N. H.:

I claim the improved bobbin or spool, as provided with or having combined with it either a yarn hitching groove, a, or the same and a gage guide, b, the whole being substantially as and for the purpose described.

39,682.—Combined Time and Percussion Fuse for Shells.—John P. Schenkl, Boston, Mass.:

I claim the combination of the band or tape, f2, with the wrench-pin, E, and the rotator, C, and to operate in the manner therewith, and for the purpose or purposes, substantially as hereinbefore specified.

I also claim the combination and arrangement of the notch or recess, t2, with the rotator, C, and the tape or band, f2, applied to it and the wrench pin, E, as specified.

I also claim the rotator as made with the outlet, m, arranged so as to open out of its side or sides in manner and for the purpose described.

I also claim the fuse case as not only constructed with a helical range of holes but with a powder chamber arranged either on the outer surface of such fuse case or in a groove thereof, and with respect to the range of holes and for the purpose of igniting the main or bursting charge of a shell as specified.

39,683.—Mode of unloading Canal Boats.—Thomas Sharp, Chicago, Ill.:

I claim, first, The arrangement of the movable end, a, and swinging bulkhead, b, in combination with the boat, A, constructed and operating in the manner and for the purpose substantially as described.

Second, The truck, B, with an inclined platform, D, in combination with the boat, A, when said truck is placed within the lock of a canal upon suitable guide rails connected with an inclined plane, so that when the water is drawn from the lock, the boat shall rest on the truck and be placed in a convenient position for unloading.

[The object of this invention is a canal boat so constructed and combined with a trunk that a cargo of coal or any other cargo in bulk can be unloaded without the use of the shovel or ordinary manual labor.]

39,684.—Treating Pyritous and other Sulphur Ores.—Matthias W. Sinding, Linlehammer, Norway. Patented in England Oct. 13, 1855:

I claim the process herein described for treating pyritous ores so as to obtain as useful products, sulphur, sulphuretted hydrogen and copper.

39,685.—Manufacture of beer from Malt and Indian Meal.—Joseph Singer, Chicago, Ill.:

I claim the within described process of making beer from ground

corn and barley-malt mixed together in one tub in the relative proportions, and at the temperatures described.

39,686.—Cultivator.—N. E. Smith, Springdale, Iowa:

I claim the draught pole, B, pivoted to the front bar, A, of the machine as shown at a, with its back end resting on the back bar, A′, and having the drivers seat, D, attached to it, substantially as and for the purpose herein set forth,

[The object of this invention is to obtain a corn cultivator of simple construction, which will admit of being readily turned by the driver, and manipulated generally with the greatest facility.]

39,687.—Mounting Ordnance.—Moses Stoddard, Buffalo, N. Y.:

I claim, first, Leveling the gun with reference to ranging its sights in a vertical plane, without regard to the position of the carriage, substantially as herein described.

Second, The combination and arrangement of appropriate mechanism, with a gun and gun carriage, by which the gun may be elevated, leveled and moved right or left by one person while in the act of sighting substantially as herein described.

39,688.—Condenser.—George Stump, New York City:

I claim having the chambers, A B, made separate and independent of each other, and of the tube sheets, C, as and for the purpose herein shown and described.

[This invention consists in the arrangement of one or more ranges of C-shaped tubes in combination with the steam receiving and with the discharge chamber of a condenser or heater, and with a suitable tank containing the condensing water or the liquid to be heated, in such a manner that a comparatively large condensing or heating surface is obtained, and each tube can expand or contract independent of the others by its inherent elasticity, thus obviating the principal difficulty of ordinary tubular condensers or heaters, in which by the expansion and construction of the tubes the joints become leaky and a constant source of trouble and expense.

39,689.—Portable Observatory and Signal Tower.—Eli Tanner, Bowmansville, N. Y. Ante-dated July 10, 1862:

I claim the method of combining the base, the braces and the extension shaft, so as to be separate, or readily separable, for the purpose of readily putting up, and taking down, and packing for transportation, substantially as described.

I also claim the method of arranging and combining the parallel timbers composing the successive sections of the extension shaft, substantially as herein set forth.

I also claim the arrangement and combination of the single rope, m, and the sheaves in the upper and lower ends of the sections, E G H, for the purpose of raising and sustaining said sections, in succession, substantially as herein specified.

I also claim the combination and arrangement of the cross-head, P, rope, i, and windlasses, M M, or their equivalents, substantially as and for the purpose herein specified.

39,690.—Wind Wheel.—James Tomlinson, Racine, Wis.:

I claim the arrangement of theshield, D, in combination with the wheel, A, weighted lever, E, and vane, F, constructed and operating as and for the purpose shown and described.

[This invention consists in the arrangement of a movable shield, in combination with a mandrel, and with the vane, and connected to the same by suitable rods, in such a manner that, by the action of the vane on the shield, more or less of the fans of the wind wheel are covered up or protected against or exposed to the action of the wind, and the power of the wheel is thus rendered self-regulating, according to the greater or smaller force of the wind.]

39,691.—Pipe Coupling.—John F. Ward, Phillipsburg, N. Y.:

I claim the end of the pipe, A′, with its hands, i, and recesses, p p, or their equivalents, and packing, B, when applied to the spherical interior of the socket, a, of an adjacent pipe, A, substantially as and for the purpose herein set forth.

39,692.—Whiffle-tree.—J. D. Weaver, Penfield, N. Y.:

I claim the construction of whiffle-trees, and the attachment of the tugs, g, thereto, substantially in the manner and for the purposes herein set forth.

39,693.—Tailor's Shears.—Hermann Wendt, Elizabeth, N. J.:

I claim tailor's shears the lower blade, A, of which, is formed with a shoulder or recess, b, as and for the purpose shown and described.

39,694.—Making Barrels.—Phillip Werum, Berlin, Ohio:

I claim, first, Cutting the staves from the bolts prepared as herein described, by sawing first into plank whose thickness shall equal the width of the stave, and then cutting them in the opposite direction of the grain, as set forth.

Second, I claim the clamp frame, Fig. 1, for holding the stave in the required position while joining and beveling the edges, as specified.

Third, I claim the expanding drum, centering and holding the barrel while being turned in the lathe, and cutting the chine, as herein set forth.

39,695.—Machine for Splitting Leather.—Horace Wing, Buffalo, N. Y.:

I claim, first, The employment, for adjusting the gage roller, D, at a proper distance from the plane of the edge of the splitting knife of a pair of eccentrics or cams, F F, attached to the same shaft, and arranged to operate one upon each of the journal-boxes of the rollers, substantially in the manner and for the purpose herein specified.

Second, Making the standards or housings, E E, which contain the roller journal-boxes adjustable to bring the roller more or less over the edge of the knife, substantially as and for the purpose herein specified.

39,696.—Barrel Dressing Machine.—Louis Wirthlin, St. Louis, Mo.:

I claim, first, The adjustable clamping levers, g g′, and bilge ring, F, in combination with the spindle, B, substantially as and for the purposes described.

Second, The longitudinally-adjustable rod, D, cross head, D′, arms D2 D2 E E, rock-shaft, E′, and hand lever, E2, combined with the hollow spindle, B, and adjustable clamping levers, substantially as and for the purposes described.

Third, The adjustable blocks, i i i, applied to the clamps, g′ g′ g′, substantially as described.

Fourth, The combination of howeling knife, n2, with a pivoted plate, H′, and a slide, H, substantially as described.

Fifth, The combination of crozing knives, p p′, with a transversely sliding block, J, and lever handle, T, and slide, H, substantially as described.

Sixth, The combination of sliding bed, H, pivoted slide rest, G′, and false bed, G2, all operating substantially as described.

Seventh, Combining with the sliding bed, H, and howeling knife, n2, a blast-pipe, S′, arranged and operating substantially as and for the purposes described.

Eighth, The gage block, r, in combination with the crozing knives, p p′, and the sliding bed, H, substantially as described.

Ninth, In a machine for howeling kegs, &c., I claim making the howeling knife both longitudinally and transversely adjustable, substantially as and for the purposes described.

39,697.—Call Bell.—Nathaniel L. Bradly (assignor to himself, Walter Hubbard and William L. Bradly), West Meriden, Conn.:

I claim the combination of the bell with a clapper suspended in an ornamental stand (without a cup beneath the bell) and with a piston extending upward through the bell; the said combination being and operating substantially as set forth.

I also claim the combination of the piston of the striking mechanism with the striking instrument by means of a connection permitting play and with the piston guide, in such manner that the upper end of the said guide forms the stop for the piston, and prevents the striking instrument from being held in contact with the bell of the piston; the said combination being and operating substantially as described.

I also claim the combination of a heavy clapper suspended in the center of the bell, with the piston extending upward through the bell; the combination being and operating substantially as set forth.

39,698.—Glass Press.—William Otis Davis (assignor to James B. Lyon and W. O. Davis), Pittsburgh, Pa.:

I claim placing the fulcrum of the lever below the bed plate of the press when power is applied to the piston rod, at or near its upper extremity, for the purpose of diminishing the angle of deflection from the perpendicular of the connecting rods, and thus preventing any material lateral strain on the piston rod, and enabling the length of stroke of the piston rod and plunger to be increased, without interfering with the perpendicularity of this motion.

The arrangement of a counterbalance consisting of a weight placed under the bed plate of the press, and connected by chains and pulleys with the moving parts of the press, so as to raise them when the pressure on the lever is withdrawn.

39,699.—Body Loop for Carriages.—Chauncey H. Guard, of Troy, N. Y., assignor to David A. Burr, of Washington, D. C. Ante-dated Aug. 19, 1863:

I claim the use of a metallic bi-angulate clasping socket, C, in combination with a body-loop, B, a metallic compressing clamp, D, and a screw-bolt, E, when arranged substantially in the manner herein set forth.

I also claim the arrangement of the beveled faces of the lower edges of the sides, a a, of the clamping socket, C, in combination with the beveled edges of the embracing flanges, b b, of the clamp, D, when said socket, C, and clamp, D, are combined with a screw bolt, E, substantially in the manner and for the purpose herein set forth.

39,700.—Attaching Revolving Tips to Hose Nozzles.—H. B. Morrison (assignor to C. H. Morrison) Leroy, N. Y.:

I claim the securing of the tip, C, to the nozzle, A, by means of a ring, B, cut or divided at any point or formed of two more parts, and fitted in a recess, c, in the end of a nozzle, A, and having a screw thread cut on its outer side, upon which the inner or lower end of the tip, C, is screwed, substantially as herein set forth.

39,701.—Machine-made Ruffle.—Abby H. Price (assignor to the Magic Ruffle Company), New York City:

I claim the within-described puff ruffle as a new article of manufacture, the same having two equal parts, A A′, folded together, as described, and held in a gathered condition by a single series of machine stitches, substantially in the manner and for the purpose herein set forth.

39,702.—Envelope Machine.—George H. Reay, New York City, assignor to Louis Negbaur, Brooklyn, N. Y.:

I claim, first, The employment of the slide, E, in combination with the rising and falling lifters, F, constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The arrangement of the table, C, over the conveyor, H, substantially in the manner herein described, so that the blanks are held even and in place by the table while being carried by the conveyor to the creasing box.

Third, The slotted lifters, F, in combination with the bar, c*, in the table, C, as and for the purpose herein specified.

Fourth, Feeding the blanks under the table which supports the gum box, instead of over it.

Fifth, The weights, c2, on the front edge of the table, in combination with the conveyor, H, applied and operating substantially as and for the purpose set forth.

Sixth, The balance weight, h3*, in combination with the conveyor, H, applied and operating in the manner and for the purpose herein specified.

Seventh, Arranging the fingers, K, in such relation to the plunger, J, that they hold the flaps of the envelope which have been creased by being passed through the box, I, until the plunger descends again and completes the envelope, by pressing, as set forth.

Eighth, The arrangement of hinge joints, k3, in the shanks of the folding fingers, K, in the manner and for the purpose substantially as described.

Ninth, The cam, m, and roller, m*, or its equivalent, in combination with the plunger, J, constructed and operating substantially as and for the purpose specified.

Tenth, Passing the plunger, J, below the lower creasing edge, i*, of the box, I, in the manner specified, so as to push the finished envelope clear off the box, and leaving the creased envelope below the lower edge of the box, to prevent the same from going back with the plunger.

Eleventh, The ribs or ledges, j′′, on the face of the plunger, as and for the purpose described.

39,703.—Cultivator.—Samuel Rockafellow (assignor to himself and Joshua W. Hoops), Muscatine, Iowa:

First, I claim the combination of the cords, c c, with the draught-pole, E, pivoted at its rear end to the cross-bar, A′, and the foot levers, I I, arranged, constructed and operating as and for the purposes herein delineated and set forth.

Second, I claim the combination of the levers, F, and the rods, H, with the curved handle, G, when constructed, arranged and operating as herein set forth and described.

Third, I claim the combination and arrangement of the beams, D D, adjustable at their front ends, with the rods, H, the levers, F, and curved handle, G, as and for the purposes herein set forth and shown.

39,704.—Pencil and Sponge-holder for cleaning Slates, &c.—John L. Rowe, New York City, assignor to Franklin C. Brownell, Brooklyn, N. Y.:

I claim the clamping slate pencil-holder in combination with the cup at the upper end, receiving a piece of sponge or similar cleaning material, the whole forming a new article of manufacture, as specified.

39,705.—Eyeleting Machine.—Joseph F. Sargent (assignor to himself and Elmer Townsend), Boston, Mass.:

First, I claim the employment of nippers, forceps or fingers to grasp or surround each eyelet successively, and to convey it from the end of the chute to the place where it is set or riveted, in contradistinction to entering each eyelet with a pointed feeder, or to pushing it from behind.

Second, I also claim the rotating hopper arranged to operate on the eyelets, substantially as described.

Third, I also claim making the hopper adjustable to different heights of eyelets.

Fourth, I also claim the chute adjustable to different diameters of eyelets, as set forth.

Fifth, I also claim the combination of an adjustable hopper with an adjustable chute, constructed substantially as specified.

Sixth, I also claim constructing the punch bed of a cylinder, and adjustable piston.

Seventh, I also claim making the piston in sections, substantially as described.

Eighth, I also claim the mechanism for imparting motion to the fingers or forceps, arranged and operated substantially as set forth.

39,706.—Clothes' Dryer.—A. F. Saunders, Chelsea, Mass., assignor to himself and C. B. Rasford, Malden, Mass.:

I claim the arrangement of hanging frames, lever arms and supporting legs, operating together substantially as described and for the purposes specified.

39,707.—Breech-loading Fire-arm.—C. E. Sneider (assignor to himself and Thomas Poultney), Baltimore, Md.:

I claim, first, The recess, m, in the lever, F, and wedge, H, attached to the same, in combination with the hook-shaped lug, e, and shoulder h, when arranged to operate in the manner specified.

Second, The lever, F, having an eccentric or cam, h, formed on one end, and attached to the barrel by a lug, d, and pin, g, in combination with the pin, i, when arranged to operate in the manner specified.

Third, The wedge, H, and hook-shaped lug, e j, in combination with the hinged cap, a, and breech-piece, I, when arranged in the manner described.

39,708.—Construction of Ships of War.—Augustus Walker, Buffalo, N. Y. Ante-dated May 23, 1853:

I claim, first, The combination of the central longitudinal truss framing or arch and double concave bottom, constructed substantially as herein described.

Second, The doubly-arched prow or ram, D3, constructed and supported as described.

Third, The ventilating tubes, I′ I′′, closeable by the stanchions, J J, substantially as described.

Fourth, The casing, H, constructed with a circular arch, h, for sustaining the turret, G, substantially as specfied.

Fifth, In connection with a vessel of the above construction, I claim the sliding pilot-houses, K K, elevated and sustained in any way, substantially as described.

Sixth, The described position and means of working the anchors.

[This invention involves several radical improvements in marine architecture. Its leading objects are to combine strength and seaworthiness with a high rate of speed, to protect the screw propeller from injury, and to afford ample accommodation and free ventilation for the crew, as well as complete protection from an enemy's shots Full engravings and a description of this important invention will shortly appear in our columns.]

## RE-ISSUES.

1,526.—Wood Saw-frame.—James Haynes, Hollis, Maine, Patented Aug. 9, 1859:

I claim a wood saw-frame as made, with a wooden top cross-bar, E, tenoned or firmly fastened in the frame, and combined with the central or bottom wooden bar, D, the wooden front and handle cars, F G, the saw blade, and a straining mechanism, separate from such top bar, or employed and to operate substantially as described.

I also claim the improved straining mechanism, substantially as described, the same consisting of the inclined plane, the rack and strainer or lever arranged and combined with the saw blade and its frame, as specified.

1,527.—Guide and Support for Scroll Saws.—John Richards, Columbus, Ohio. Patented May 27, 1862:

I claim, first, Running the upper portion of a web or scroll saw above the table, in a groove of an anti-friction guide and support, substantially as and for the purpose described.

Second, Operating, practically, an unstrained web or scroll saw, by combining with such saw mills, an upper anti-friction guide, which supports the back of the saw blade, and also sustains the saw blade at its sides or faces, substantially as set forth.

Third, The use of anti-friction guides as a substitute for straining devices, in combination with web or scroll saw blades, the guide to be raised and lowered to suit the thickness of the stuff, substantially as set forth.

Fourth, An anti-friction guide which is adjustable so as to accommodate different thicknesses of saw blades, and to compensate for wear, in combination with the upper portion of a web saw blade, substantially as set forth.

Fifth, The combination of the anti-friction saw support and guide, or the equivalent thereof, with an adjustable guard, or its equivalent, substantially as and for the purpose set forth.

1,528.—Revolving Fire-arm.—Ebenezer H. Plant, of New Haven, Conn., Henry Reynolds, of Springfield, Mass., and Amzi P. Plant and Alfred Hotchkiss, of Southington, Conn., assignees of Willard C. Ellis and John N. White, of Springfield, Mass. Patented July 12, 1859:

I claim the construction of the rear portions of the chambers of the cylinder of a revolver with openings through which the hammer may strike the cartridges, but otherwise closed or partly closed to prevent the cartridge from slipping through, whereby the loading at the front with a metallic cartridge carrying its own priming, and the firing of such cartridge by the blow of the hammer upon its shell, as herein specified, are provided for, without the employment or arrangement of an abutment to press up against the rear end of the cartridge case, all as set forth.

1,529.—Metallic Cartridge.—Ebenezer H. Plant, of New Haven, Conn., Henry Reynolds, of Springfield, Mass., and Amzi P. Plant and Alfred Hotchkiss, of Southington, Conn., assignees of Willard C. Ellis and John N. White, of Springfield, Mass. Patented July 12, 1859:

We claim the hollow flange, b, projecting from the rear of the shell in a backward direction parallel or nearly, with the length of the cartridge, substantially as and for the purpose herein specified.

## EXTENSION.

Fire-proof Safe.—Edward Hall and Joseph L. Hall, Cincinnati, Ohio. Patented Aug. 21, 1849. Re-issued Dec. 18, 1849. Again re-issued March 6, 1849:

We claim, first, The employment of hydraulic cement, in whole or in part, as forming the insulating medium or admixture used between the outer and inner cases of safes and chests, when said inner cases are formed of iron, or other suitable metal, substantially as herein described for the purposes set forth.

Second, Joining the outer and inner metallic cases of safes and chests, by means of the door frame, C, and flanges, b, or their equivalents, when said hydraulic cement, in whole or in part, is used as the insulating medium between said metallic cases, as herein described, and also by means of the anchors or bolts, d, extending from the outer and inner cases into the space between said cases, substantially as and for the purposes set forth.

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

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

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 to $15. Other changes in the fees are also made as follows:—

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

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

During the last seventeen years, the business of procuring Patents or new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

### REJECTED APPLICATIONS.

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

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

### CAVEATS.

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

### FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

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

### ASSIGNMENTS OF PATENTS.

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

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

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

## Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is perserved by a large class of its patrons, lawyers and others, for reference Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

## TO OUR READERS.

**Models are required to accompany applications for Patents** under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

**INVARIABLE RULE.**—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

**PATENT CLAIMS.**—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

**RECEIPTS.**—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

**NEW PAMPHLETS IN GERMAN.**—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

## Notes and Queries

R. P., of Ohio.—We don't know that any proof positive has been brought up against the *ailanthus* tree, to cause its universal extirpation in cities. The unpleasant odor emanating from its bloom made it many enemies, though there may be nothing poisonous in the exhalations. Its tropical foliage and racemes of brown seed capsules make it a fine ornamental tree. We would suggest the catalpa as a substitute suitable to the climate of your latitude.

J. S. M., of C. W.—We have no record of the fastest time made by screw steamships.

E. W., of Pa.—The quantity of water per horse-power required for a steam boiler depends on the pressure of steam and other circumstances, such as leakage, priming, &c. About one cubic foot per hour is allowed for the feed to the boiler of a high pressure engine; but Professor Rankine states that ·347 of a cubic foot of feed water may suffice for the indicated horse power per hour of an expansive working engine.

I. J., of Pa.—The weight of an iron plate 6 feet in length, 24 inches wide and 4 inches in thickness, is about 1,948 pounds.

W. P. N., of Mo.—We have received your letter and sketch of a wind-vane attached to a circular carriage, and you inquire if it would not be a perpetual motion—keep moving of itself after it was started. It would not. After the first impulse was removed, its motion would gradually be reduced, owing to the friction of its parts. A perpetual motion is a mechanical fallacy.

H. H. W., of Ohio.—A comparison of durability between a box placed in a fire with a stream of cold air passing through the box, and one without that protection is almost unnecessary; the difference would be trifling and in favor of the cold one.

W. T., of N. Y.—We cannot answer your inquiries about Kinsella's balloon, and do not care to open our columns to a discussion of its merits. They are probably obvious to most of our readers who have examined it. You had better open a direct correspondence with him on the subject.

G. H. M., of N. Y.—You have found a mare's nest. The item you have taken so much pains to explain to us alludes to the sanitary benefit to be derived from getting up and going to bed at the time specified; which would doubtless be equal to the addition of 10 years to a man's life.

W. R., of Ohio.—A machine which will start of itself and run until its parts are worn out is a perpetual motion. When all England was crazy about the "South Sea bubble," in 1720, a prize was offered for a perpetual motion, but the offer ended the next year with the explosion of the bubble. You ask us "what such an invention is worth?" Just as much as it will bring.

W. B., of Md.—Petroleum is supposed to be shale oil, formed by a natural subterranean process. It has recently become an extensive article of export from the United States. The principal wells are in Western Virginia, Pennsylvania and New York. The most noted oil region is in Venango Co., Pa., near the Allegheny river; a town has sprung up, there, within a short time, equal to the new gold region towns in California. It has its newspaper and railways, its churches and schools, its adventurers and gamblers, just like any other modern city.

A. C. W., of Ky.—How simple a thing is when once known. To make paper adhere to tin, paste, gum, wax, or glue will not effect it, unless the surface is well rubbed with acetic acid or strong vinegar. Many other acids will answer, but vinegar is always cheapest and most convenient. Such knowledge is almost invaluable in domestic economy.

E. T. D., of Pa.—We have already given you all the information we possess—on page 133, current volume of the SCIENTIFIC AMERICAN—respecting Laveissiere's mode of forming hollow ingots for brass tubes.

A. L. S., of Ohio.—You ask why Americans do not use more fruit at their meals. The reason is simply because they have not time, they are such a busy people. It would be more healthy to use more vegetables and fruit at meals; but you can't force them to do so, though your State does produce the best in the world. Flower gardeners might want them to feed on flowers, if they could then sell their flowers higher. Apropos of eating flowers: there is a flower, common to the Bahama Islands, of which a sub-acid pleasant-tasted sauce is made, equally as palatable as tamarind or plum jelly. It is called *sorrel*; the bud with seed-capsule is stewed and sweetened, and is then ready for immediate use. In most countries of Southern Europe you see fruit on the table at every meal: the people are not such meat-eaters as we Americans.

E. D., of Mass.—No reliable accounts of the process of manufacturing Russian sheet iron has ever been published, so far as we know. Notices have appeared several times in public prints, that the secret of making such iron had been obtained by some of our American engineers who had been in Russia; but we have always discredited these statements. If any of our people had obtained the secret, they would have made use of it here before this. You will find a notice of American imitation Russian sheet-iron on page 38, Vol IX. (old series) of the SCIENTIFIC AMERICAN.

W. B., of Maine.—We cannot say why tiles are not more in use for roofing houses in this country. They are said to be cooler than shingles, slate or tin. The old Spanish tile is only seen in some of the old towns of Texas, Louisiana and Florida. They are made of common red clay, in the form of a half cylinder, 18 inches long and 6 wide, and are baked in a kiln like bricks. There is a new, French, flat tile, now coming into use in the West Indies, South America and Mexico, which makes a very handsome and durable roof. Encaustic tiles are flat, enameled, variegated earthen squares, or lozenges, much used and very appropriate for floors in warm countries. The floors of the Capitol, in Washington, are laid with them; and the halls of most of our aristocratic mansions, in Fifth avenue, are paved with the same material. They can be made here, but the best are imported from England.

C. S., of Pa.—Asks how to keep cool this hot weather. Let us ask him if he ever hears of an out-door laborer complaining of heat. The way to keep warm in winter is the best way to keep cool in summer—by exercise, sufficient to keep up a free circulation and a liberal perspiration. It is warmer to sit in the shade, drinking iced juleps and fanning one's self, than it is to work in the sunshine and refresh the inner man by drinking tepid water. Any haymaker or harvester can tell you that. Now, if you don't believe it, try the experiment and you will find out.

S. N., of Mich.—Your inquiry about the asphaltum pavements is easily answered. It is a Belgian invention, used only for side-walks and public promenades, and not for carriage roads, as many erroneously suppose. Stones, gravel, sand and coal-tar, are the materials commonly used in the composition of asphaltum. Stones, the size of a hen's egg, are placed upon the graded street-walk, and rolled even with a heavy roller; a mixture of gravel and coal-tar is then spread over this; and finally, coarse sand and tar forms the superstructure, made even by the heavy roller. It makes a nice smooth walk, very common now in France and Belgium. Its dark color makes it more agreeable than brick or stone; but it does not absorb the rain like bricks, and of course, does not dry so soon, unless the surface is convex to lead off the water.

## Money Received

**At the Scientific American Office, on account of Patent Office business, from Wednesday, Aug. 26, to Wednesday, Sept. 2, 1863:—**

T. A. H., of N. Y., $56; J. S., of N. Y., $41; W. & M., of Mass., $82; P. G., of Mo., $20; F. B. P., of Mass., $15; C. E. M., of Vt., $26; A. W., of N. Y., $250; S. J. A., of Cal., $25; T. B., of Ohio, $25; P. S. F., of N. Y., $16; R. & H., of Mass., $178; S. B. W., of Kansas $16; H. S. W., of Mich., $16; A. B., of N. J., $20; W. R., of Cal., $20; J. W. B., of N. Y., $20; H. & Co., of N. Y., $62; H. C. D., of Mass., $20; D. C., of N. Y., $25; E. F. & J. H., of N. Y., $10; T. R. T., of N. Y., $41; J. D. C., of Ill., $15; E. M., of N. Y., $16; G W. L., of Ohio, $26; K. C. & R., of Wis., $25; E, W., of Mich., $15; J. L. L., of Pa., $16; L. C., of N. Y., $25; R. R. C., of N. Y., $16; A. K., of Pa., $16; H. & S., of Pa., $16; V. G., of N. Y., $28; E. C., of N. Y., $41; R. K., of Mass., $40; G. S. H., of N. Y., $45; N. L. of Ill., $48; A. H., of Ohio, $20; H. G., of N. Y., $25; G. R. B., of R. I., $25; D. A. H., of N. Y., $16; W. H. G., of N. Y., $25; J. O., of Ill., $26; J. H., of Mass., $16; A. H., of Ill., $16; E. J. Y. P., of Gautemala, $310; J. C., of N. J., $16; C. B. D., of Ind., $17; W. G. R., of Mass., $16; W. G. S., of N. Y., $29; H. A., of N. Y., $25; A. F. C., of Conn., $16, W. H. H., of N. Y., $20; F. J., of Minn., $20; D. & K., of N. J., $16; A. G., of N. Y., $16; A. B., of Vt., $45; E. D. B, of N. Y., $20; S. L. H., of N. Y., $16; W. L. F., of N. J., $20; G. T., of Maderia, $15; N. H, of N. Y., $30; A. C. C., of N. Y., $45; C. L G., of N. Y., $100; T, P. R, of Mass., $20; J. E., of N. Y., $20; Y. & C., of N. Y., $31; C. S, of N. Y., $31; R. J. M., of N. Y., $20; R W. & D. D., of N. Y., $20; W. M., of N. Y., $20; W. C. H., of Ohio, $20; N. C. S., of Conn, $20; C. W., of N. Y., $20; G. S., of Ill, $40; J. W. C., of N. Y., $25; T. S., of N. Y., $20; C. L. A., of N. Y., $20; J. B. C., of Conn., $20.

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

**Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, August 26, to Wednesday, Sept. 2, 1863:—**

T. A. H., of N. Y.; D. C., of N. Y.; H. G., of N. Y.; J. S., of N. Y; G. R. B., of R. I.; E. F. & J. H., of N. Y.; T. R. T., of N. Y.; D. A. H., of N. Y.; G. B., of England (2 cases); D. A. H., of N. Y.; W. H. G., of N. Y.; V. G., of N. Y.; H. S. W., of Mich.; H. & K., of Ind.; H. A., of N. Y.; W. G. S., of N. Y.; T. B., of Ohio; S. J. A. of Cal.; J. O., of Ill.; P. L., of Cal.; K. C. & R., of Wis.; C. E. M. of Vt.; L. K., of N. Y.; G. W. L., of Ohio; T. H., of Cal.; J. W of Wis.

## Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

## RATES OF ADVERTISING.

**Twenty-five Cents** per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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ASSISTANT QUARTERMASTER-GENERAL'S OFFICE,
PHILADELPHIA, 24th August, 1863.

SEALED PROPOSALS WILL BE RECEIVED AT THIS office until Tuesday, 15th September next, at 12 o'clock, M., for furnishing Anthracite Coal for the War Department, to be delivered during the year commencing the 1st October, 1863, and ending 30th September, 1864. Coal to be of the best quality Anthracite for use of steamers; to weigh 2240 lbs. to the tun, and to be subject to inspection. The Coal is to be delivered on board vessels in the ports of Philadelphia and New York, in such quantities, and at such times as may be required, furnishing, if demanded, one thousand tons per day. In case of failure to deliver the coal in proper quantity, and at the proper time and place, the Government reserves the right to make good any deficiency by purchase, at the contractor's risk and expense.

The price must be for the coal delivered on board vessels on the terms and conditions above stated. Twenty per cent. will be withheld from the amounts of all payments, which reservation is not to be paid until the contract shall have been fully completed. Payments of the remaining eighty per cent., or balance due, will be made monthly, or when the Department is in funds for that purpose. Each offer must be accompanied by a written guarantee, signed by one or more responsible parties, that the bidder or bidders will, if his or their bid be accepted, enter into obligation with good and sufficient sureties to furnish the supplies proposed. No proposition will be considered unless accompanied by such guarantee. Two or more sureties, in the sum of one hundred thousand dollars, will be required to sign bonds for the faithful performance of the contract, and their responsibility will be certified by a U. S. District Judge, U. S. District Attorney, or Collector. The right is reserved to reject all the bids, if considered to be the interest of the service to do so.

Proposals must be endorsed "Proposal for Coal for the War Department," Signed, A. BOYD,
10 2 Captain and Assistant Quartermaster U. S. Army.

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PATENT FOR SALE.—FISHER'S LAWN OR YARD Mower, Patented 1863. Vibrating cutters; lightest machine made, weighs 35 lbs.; a lad can mow with it. For further particulars, address HENRY FISHER, Alliance, Ohio. 10 4*

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NOTICE TO MANUFACTURERS.—THE UNDERsigned have the sole agency of the United States for the sale of rights, and for manufacturing the celebrated Excelsior Reaping and Mowing Machine extensively used in New York and Pennsylvania, for the superiority of which we hold several State and County medals and hundreds of certificates. In order to supply the demand and introduce them generally, I wish to negotiate with manufacturers and parties desirous of purchasing or leasing State and County Rights for the construction of a portion of thirty-five hundred machines (half of each) in their respective localities. We will have our machines on exhibition at the N. Y. State Fair, held at Utica Sept 15th. Address JOHN J. FULLER, General Agent, Schenectady, N. Y. 11 2*

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

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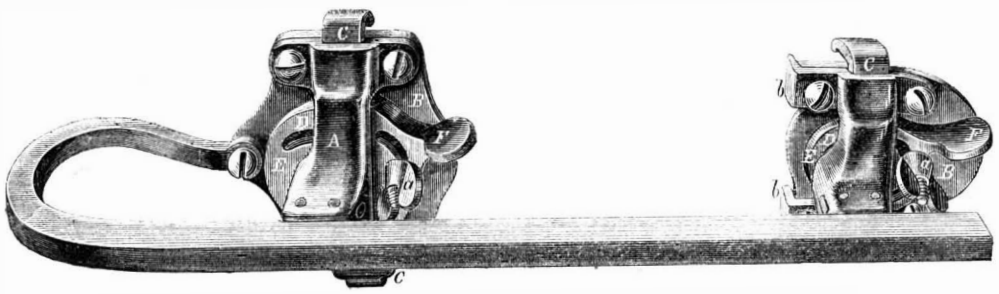
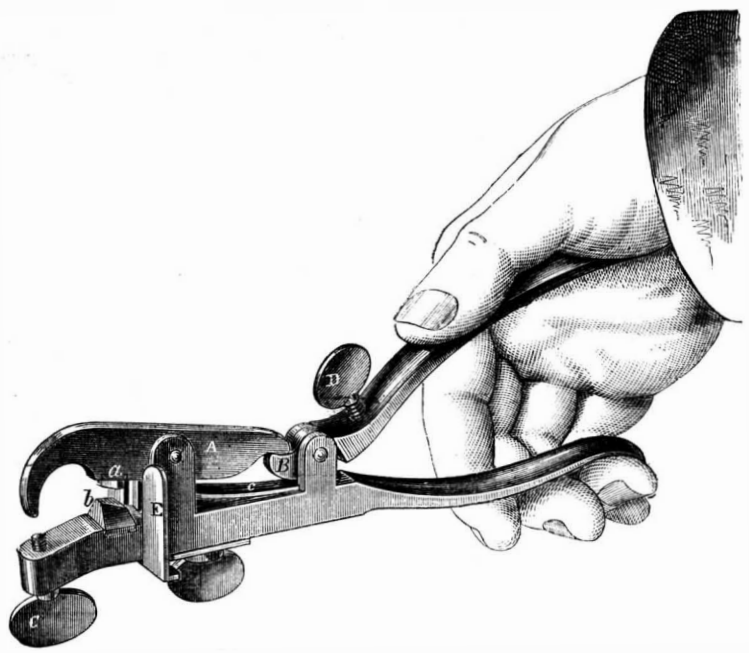


DAY'S PATENT SKATE.

with illustrate still another one—a claimant for public favor in the same line. The skate will be easily understood by referring to the letters and subjoined explanation of it. The iron is rivetted to the standards, A, which carry on their upper faces the heel and foot plates, B; these plates are secured by brackets, between which the clamps, C, work. The opposite ends of these clamps have strong pins in them, which slide in the eccentric slots, D, in the plate, E; these are the whole details. The manner of adjustment is obvious. When the skate is applied to the sole of the boot, the clamps, C, are moved up to it by taking hold of the thumb-piece, F, and turning the plate; by this means the clamps are brought into close contact with the boot, and the thumb-screw, *a*, is then screwed up tight, so as to prevent the plate from moving and loosening the clamps. The same plan is pursued with the heel plate, on which there are two additional projections, *b*, which prevent the foot from working forward. The inventor claims that this skate is exceedingly simple in its construction, not liable to accidental derangement, is easily and speedily put on, or taken off, requires no straps, springs, or screws, and that the same freedom of movement is obtained as in walking. The invention was patented by C. T. Day, of Newark, N. J., on Aug. 11, 1863, through the Scientific American Patent Agency. The entire patent is for sale; further information can be had by addressing the inventor as above.

### Improved Saw Set.

The subjoined engraving represents a new and convenient tool for setting saws. Some instruments of this class are already in public use, but they work upon wholly different principles; this one is very neatly arranged in its several parts with reference to the work required of it; a simple closing of the hand being sufficient to perform the operation. Our artist has so clearly depicted the construction of the tool that it may be seen at a glance. It consists of a metallic bar, A, mounted on a joint, and worked by the toe, B, through the agency of the hand; in this bar, and upon the one below it, there are steel dies, *a* and *b*, which come in contact with the saw teeth and bend them to any off-set desired; this is accomplished by the set screws, C and D. When the saw is inserted, the dies bear on each side of the tooth; when pressure is applied the tooth being the weakest part, is forced down by the die until the end of the bar, A, touches the set screw, C, and the screw, D, bears upon the lower bow; the set can thus be regulated for large and small teeth with the greatest ease; when the hand is relaxed, the spring, *c*, throws the set open again and the operation goes on until completed. The gage, E, is secured by the set screw at the bottom, and affords a means of adjusting the saw blade in its place, and also prevents the teeth from catching in the several parts. We regard this as a very convenient implement; it always sets the teeth exactly uniform, and will not break them as in sets that work by percussion or by nipping the teeth. A patent for this invention was granted to William Nash, assignee of Oliver Newton, through



NEWTON'S PATENT SAW SET.

the Scientific American Patent Agency, on July 21, 1863; further information can be had by addressing William Nash, at Watertown, N. Y. See advertisement on page 175.

### American Mechanics in France.

There is at Montargis, in France, about three hours' ride by rail from Paris, a grand india-rubber factory, operated by steam, and employing from 600 to 700 work people. The establishment was built by the father of Louis Phillippe, and with the dwellings of those employed in it, is said to resemble a sort of baronial estate. The factory is managed by Mr. Hiram Hutchinson, formerly a citizen of Newark, N. J., and President of the Newark India-rubber Company; while the two chief foremen are also Americans—Canfield of Connecticut, and Mix, formerly of the Newark Rubber Company. The establishment is owned by a corporation, who have a factory in Paris and another in Germany, and their enterprise has not only made them enormously rich, but been of very great advantage to France. The fact that three American mechanics hold the chief places in the employment of this great French firm at Mortargis, speaks eloquently in favor of the mechanical skill of our countrymen.

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