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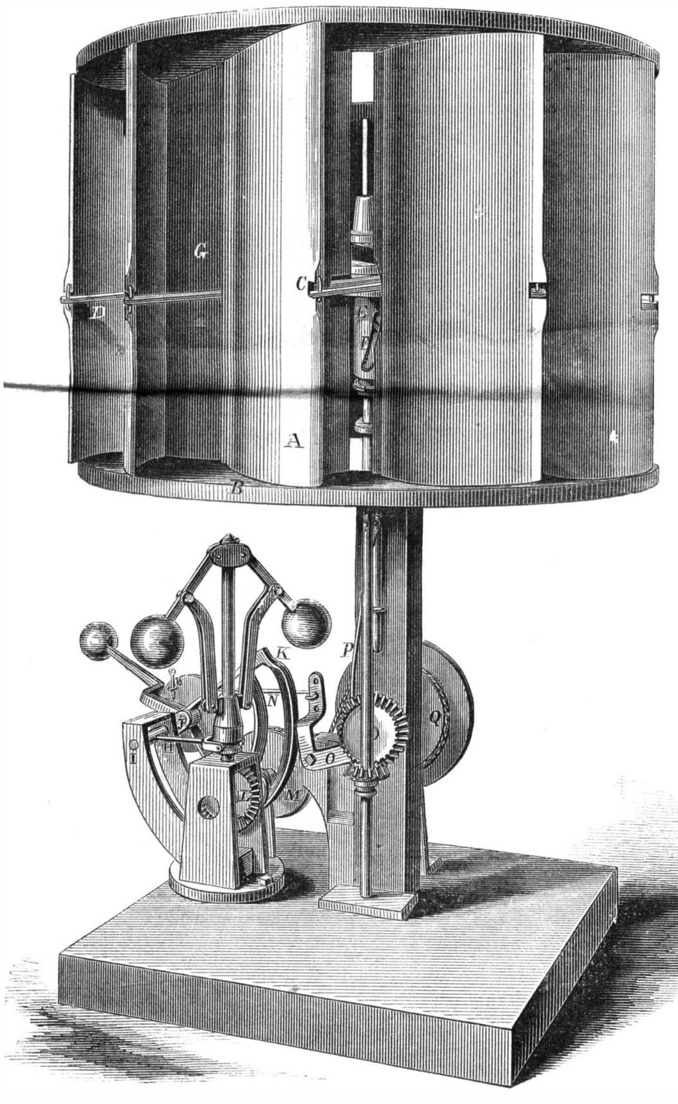
Self-regulating Wind-wheel.

A convenient and well-constructed wind-wheel is a most economical and efficient motive power in some localities. Many small manufacturers, carpenters and other mechanics can use them to great advantage. In Western towns, where fuel is scarce and wind is cheap and very abundant, if we may use such an expression, a good wind-wheel would be a valuable motive power. We think the plan of this machine a good one, and believe that it will work with economy and require little repair if properly made and taken care of. It is simple in its principle, as will be seen by referring to the engraving and description. The vanes or wings of the wheel are self-regulating, and are opened or closed by the action of the governor. The construction of this wheel and governor is as follows:—The vanes, A, are swung on centers in the flanges, B, and have joints, C, at the middle, to which rods D, are connected. These rods proceed to a central disk on the main shaft inside. The disk itself is attached to a sleeve, E, having a slot, F, in it. This sleeve slides over a tube (also on the shaft), and there is a pin which allows on the sides of the diagonal slot, F, and causes the disk to rotate enough to open and close the vanes. The slotted-sleeve turns, but the tube on the shaft has a vertical key which allows it to move up and down without revolving.

The vanes of the wheel are so arranged that when opened to their greatest extent, as shown in the engraving, they form a V-shaped pocket with another set of wings or vanes, G, inside, so that the force of the wind is utilized to its utmost. When the vanes recede, however, or close, there is an aperture between the inside edges of the two sets of vanes through which the current escapes to the center of the wheel; in this way the velocity of the revolutions can be fully regulated.

The governor of this wind-wheel is also peculiar, and is the subject of a separate patent. It consists of the usual balls and lever, but the lever, H, is attached to a rock-shaft, I, on which there is an arm, J. At the extremity of this arm a curved link, K, is fixed in the slot of which a friction pinion works. This pinion is on the same shaft that the bevel gear, L, is, and at the further end of the same shaft there is a pulley, M, keyed. It is easy to see that when the rocks-haft, I, is moved, the arm, J, will give the link a horizontal motion, or sufficiently like it to throw the inner face of the curved link against the friction pinion; this action causes the link to move on its own center at the end of the arm. On the side of this arm, J, may be seen a face-plate; as the link moves, this plate turns with it and draws the rod, N, attached to the elbow, O, in one direction or another, according as either side of the link happens to be in gear with the friction pinion. When this occurs the vanes above are shifted, for the vertical shaft, P, is connected to the tube on the main shaft so as to cause this effect. The governor is driven by a belt from the pulley, Q, which in turn is worked by the bevel gears in front.



BURNHAM'S SELF-REGULATING WIND-WHEEL.

This wheel and governor is an ingenious arrangement, and is well adapted for the work required of such machinery.

The wheel was patented on the 5th of April, 1864, and the governor on the 23d of February, 1864—both through the Scientific American Patent Agency. For further information address the inventor, Mr. John P. Burnham, at Chicago, Ill.

Mock Salmon.

We have heard of mock-turtle soup and "chicken soup" made out of veal stock, but it seems there is still another novelty in store for us. Sturgeon, formerly a much despised fish, are now taken in great numbers in the Delaware river and sold to provision-dealers in this city. The meat is put up in cans spiced and made palatable otherwise; a contemporary says the flavor is scarcely inferior to salmon, and that large quantities go abroad as ship-stores. When we have coffee with fancy names revamped from the spent-grounds of hospital stores, tea grown in New Jersey—milk pure from the cow and the pump, sherry wine from potatoes, and spiced salmon from sturgeon, who shall say that the waste products of nature and art are not utilized?

An "Army and Navy Button Co." has been organized at Waterbury, Conn., with a capital of $75,000.

Great Paraffine Oil Patent Case.

The first patent in England for the production of paraffine oil was, if we mistake not, issued to James Young, of Manchester, in 1850. Two years later (March 23, 1852,) Mr. Young patented his invention in this country, and since that date he has established a large manufactory of paraffine in Bathgate, Scotland—a full account of which was published on page 309, Vol. IX. (new series), Scientific American. The patent has been on trial in England before Vice Chancellor Sir John Stuart, and occupied the attention of the court for thirty-five days. A bill was filed by Messrs. Young, Meldrum, and Binney, manufacturing chemists, of Bathgate, for an injunction to restrain the defendants, Messrs. Fernie, Carter and Robinson, manufacturers of oil at Leeswood and Saltney, from an alleged infringement of a patent granted to the plaintiff Young in October, 1850, "for improvements in the treatment of certain bituminous substances, and in obtaining products therefrom;" those products being paraffine and paraffine oil. The substances which the patentee in his specification said he treated were bituminous coals; and the coals which he deemed best fitted for obtaining paraffine oil, from which he procured paraffine, were usually called "parrot coal," "cannel coal," and "gas coal." The main objections to the validity of the patent were, that there was no novelty either in the process or the material used, and that the patent altogether was something already well known. The defendants, however, failed to establish these objections, and the Vice-Chancellor gave an unconditional judgment in favor of the plaintiffs on all the issues, condemning the defendants to pay all costs as they are taxed.

Shingles rendered Fire-proof.

Mr. John Mears says, in the Boston *Cultivator*, that he has prepared shingles in the following manner, and after an experience of eleven years, and using seven forges in his blacksmith's shop, he has never seen a shingle on fire, nor has a nail started. The shingles are prepared in the following manner:—"Having a large trough, I put into it a bushel of quicklime, half a bushel of refuse salt and five or six pounds of potash, adding water to slack the lime and dissolve the vegetable alkali and the salt—well knowing that pieces of an old lime pit, a soap barrel, or a pork tub, were not the best kindling stuff, and having long since learned, while at the Vineyard Sound, that hot salt-water whitewash would endure far longer than that made with fresh water, absorbing moisture, striking into the wood and not peeling and washing off. I set the bundles of the shingles nearly to the bands, in the wash for two hours; then turned them end for end. When laid on the roof and walls, they were brushed over twice with the liquid, and were brushed over at intervals of two or three years after."

Live fish, pickerel or trout, will keep a cistern free from worms, dirt or smell.

Benjamin Franklin's Useful Labors.

Parton, in his "Life and Times of Dr. Franklin," recently published by Mason Bros., gives the following interesting summary of the valuable labors of that eminent statesman and philosopher:—

"He established and inspired the 'Junto,' the most sensible, useful, and pleasant club of which we have any knowledge.

"He founded the Philadelphia Library, parent of a thousand libraries, an immense and endless good to the whole of the civilized portion of the United States.

"He edited the best newspaper in the colonies—one which published no libels and fomented no quarrels, which quickened the intelligence of Pennsylvania, and gave the onward impulse to the press of America.

"He was the first who turned to great account the engine of advertising—an indispensable element in modern business.

"He published 'Poor Richard,' by means of which so much of the wit and wisdom of all ages as its readers could appropriate and enjoy, was brought home to their minds, in such words as they could understand and remember forever.

"He created the Post-office system of America; and forbore to avail himself, as postmaster, of privileges from which he had formerly suffered.

"It was he who caused Philadelphia to be paved, lighted, and cleaned.

"As fuel became scarce in the vicinity of the colonial towns, he invented the 'Franklin Stove,' which economized it, and suggested the subsequent warming inventions, in which America beats the world. Besides making a free gift of this invention to the public, he generously wrote an extensive pamphlet explaining its construction and utility.

"He delivered civilized mankind from the nuisance, once universal, of smoky chimneys.

"He was the first effective preacher of the blessed gospel of ventilation. He spoke, and the windows of hospitals were lowered; consumption ceased to gasp, and fever to inhale poison.

"He devoted the leisure of seven years, and all the energy of his genius, to the science of electricity, which gave a stronger impulse to scientific inquiry than any other of that century. He taught Goethe to experiment in electricity, and set all students to making electrical machines. He robbed thunder of its terrors and lightning of its power to destroy.

"He was chiefly instrumental in founding the first high school of Pennsylvania, and died protesting against the abuse of the funds of that institution in teaching American youth the language of Greece and Rome, while French, Spanish, and German were spoken in the streets and were required in the commerce of the wharves.

"He founded the American Philosophical Society, the first organization in America of the friends of science.

"He suggested the use of mineral manures, introduced the basket willow, and promoted the early culture of silk.

"He lent the indispensable assistance of his name and tact to the founding of the Philadelphia Hospital.

"Entering into politics, he broke the spell of Quakerism, and woke Pennsylvania from the dream of unarmed safety.

"He led Pennsylvania in its thirty years' struggle with the mean tyranny of the Penns, a rehearsal of the subsequent contest with the King of Great Britain.

"When the Indians were ravaging and scalping within eighty miles of Philadelphia, General Benjamin Franklin led the troops of the city against them.

"He was the author of the first scheme of uniting the colonies—a scheme so suitable that it was adopted in its essential features, in the union of the States, and binds us together to this day.

"He assisted England to keep Canada, when there was danger of its falling back into the hands of a reactionary race.

"More than any other man, he was instrumental in causing the repeal of the Stamp Act, which deferred the inevitable struggle until the colonies were strong enough to triumph.

"He discovered the temperature of the Gulf Stream.

"He discovered that north-east storms begin in the south-west.

"He invented the invaluable contrivance by which a fire consumes its own smoke.

"He made important discoveries respecting the causes of the most universal of all diseases—colds.

"He pointed out the advantage of building ships in water-tight compartments, taking the hint from the Chinese.

"He expounded the theory of navigation which is now universally adopted by intelligent seamen, and of which a charlatan and a traitor has received the credit.

"In Paris, as the antidote to the restless distrust of Arthur Lee, and the restless vanity of John Adams, he saved the alliance over and over again, and brought the negotiations for peace to a successful close. His mere presence in Europe was a moving plea for the rights of man.

"In the Convention of 1787, his indomitable good humor was, probably, the uniting element, wanting which the Convention would have dissolved without having done its work.

"His labors were for the abolition of slavery and the aid of its emancipated victims.

"Having, during a very long life, instructed, stimulated, cheered, amused and elevated his countrymen, and all mankind, he was faithful to them to the end, and added to his other services the edifying spectacle of a calm, cheerful, and triumphant death, leaving behind him a mass of writings, full of his own kindness, humor, and wisdom, to perpetuate his influence and sweeten the life of coming generations."

Waifs of Animal Life in California.

As the capricious and extraordinary season of 1864 advances, the zoological life of the valleys and mountains, pestilent to the cultivator but diverting to him who wanders by flood and field, increases and multiplies. The ground squirrels, the kangaroo or jumping rat, and gopher mole, furnished with pouches and baskets to store spare morsels—all three of which burrowing animals are represented in our State by distinct species of each family—abound and multiply this year as they never seemed to abound heretofore, and almost defy efforts of extermination. They all breed below the earth in colonies, and not only devour the crops of vegetables and grass on the surface, but attack with greediness the roots of all fruit trees under ground and commit an immense amount of injury. The squirrel is said to bring forth six at a birth, four or five times a-year, and the other two congeners four every three months, which is about as bad as rats and rabbits.

The kangaroo rat, however, is confined to a few localities on the coast and in the mountain valleys, but is specially abundant in many parts of the Tulare country. There are not less than twenty kinds of these small *rodentia* not bigger than a squirrel, which are met with inside the confines of California, several of which live above ground, and seldom trouble the farmer: but all the underground ones are his unrelenting and pertinacious enemies. One of the sylvan rats, twice the size of a mouse, constructs a nest of sticks in the unmolested oak groves, as big as an Indian hut and as high as a two-cord pile of wood.

The fore-mentioned *rodentia* increase in a tremendous ratio in the settled parts of the State where the cultivators and herdsmen have thinned off their natural destroyers—the bears, lions, coyotes, cats, skunks, ferrets, hawks, owls, and snakes. Every green crop is attacked by the squirrel, and they are terrible on all eggs and young chickens this year, and very wasteful where grain and hay are stored.

A tired citizen wandering in the country a few days ago, tells us that he came across a mustard field in blossom, where he sat down for hours admiring the hundreds—the swarms of humming-birds, hunting up musquitoes and *aphids*, flashing in and out and filling their crops to depletion among the fragrant flowers of the beef-eater's condiment, which by the way, makes the best of honey pasture for the busy bee in California.

Bears and lions have made great havoc among the cattle and horses, as their food of oats and wild fruits is everywhere scarce this season. As the former are thick in the mountain pastures where the stock animals have been recently taken, which have to be accustomed and acclimated to their new ranges, great numbers have been lost; and it is feared that the sheep in thousands will soon fall a prey to these enemies, if not to regular nostalagia, before they can be thinned off by December next.

Ants, flies, musquitoes and tarantulas, with all sorts of weasels and bugs, infest the air and the water in vicinities where they were very seldom known before, and are becoming excessively troublesome.

Geese and ducks have been multitudinously abundant and familiar this year. They have effected much damage in localities where the young grass is first seen and longest preserved, and have done great injury to young grain.

Crows, ravens, and rooks, are as thick as musquitoes near willow swamps, and a bigger set of thieving rascals never waylaid the good things of the farmer or orchardist, and the black villains now turn up their noses at worms and caterpillars.

Hundreds of hives of bees in lazy, neglectful or ignorant hands, have deserted to the forests or been starved out, as their flowery pastures dried up early in February; and even among experienced apiarists they will do very bad, and occasion unusual expense and labor.

The orioles, finches, linnets and canaries, of rainbow colors, and indigenous to the country, of which there are over twenty-five species, the most of which carol delightful notes, and well worthy the arts of the bird fancier, are extremely familiar and plentiful near houses, and in the neighborhood of springs and water pools. The social blackbird, or chenate of California, in clattering, surging, fife-noising flocks, is seen in sections of cultivated lands or the neighborhood of swamps, often in such clouds and swarms as to seem myriads. The house martin was curtailed of the usual rations of mud for his adobe nests, and is very scarce generally; but the blue-coated swallow has made up for its absence, and fills the air near sunset, cramming his crop with musquitoes and such vermin as most infest the heavy atmosphere of the declining day.

We forgot to mention the velvet, mouse-colored mole, without eyes and with very small teeth; he is "death" on "garden sarce." Hoot owls or *takalotees* make awful music and bar-room too-loo-koos in the groves near by, looking after toads, frogs and birds and the little ground owl, a fellow-citizen in the burrows with squirrels and snakes. The ground owl is very spiteful this hot year. He is seen skimming and scouring near to earth, over the plains and hills, hunting up his little bugs, beetles, mice and small frogs. He is a quick, choleric, nervous, excitable little fellow this California ground owl, the dimensions of a pigeon and gray as a badger. And badgers and possums are unwontedly familiar in places where they had not been seen before in years, and with skunks unusually plentiful, smelling not sweet but loud, they make havoc on eggs and chickens, and, thank heaven, squirrels and gophers they scatter some. And we are reminded here that Don Coyotte, a mighty sly and greedy fellow, has made his teeth tell on many a fat young wether and calveling not out of the months, and which the herdsman had taken his best care of, as most likely to live and make up some of his losses. As to tame animals, it is now undoubtedly well known throughout the State for 1864 that no calving, foaling or lambing is worth a pound of salt. The mothers have no milk and the young must die.

It is a pity the natural history of California is not better known. It merely exists in long, dry, scientific lists and catalogues scattered in hundreds of volumes in every language and country of Europe and America, and no Goldsmith or Audubon has worked their gambols and tricks and sly ways, or habits and uses of vantage and disadvantage into model lessons yet. The arcana of the mountains, valleys, and uplands is even yet very imperfectly listed, particularly the insect life; but it is high time they were, for all this kind of thing has gone on since the year One, during the howlings of war and the pipings of peace, and science never stands still no more than human passions, by the beneficent law of Providence.—*San Francisco Bulletin.*

Messrs. Chubb & Son, iron-safe makers, of London, England, have recently constructed a safe for a bank in India, in size 14 feet long, 10 feet deep, 8 feet high, and weighing 17 tuns. The outer doors are fastened by four locks throwing 27 bolts.

The Way Imphee and Sorghum were Introduced.

In the Agricultural Report for 1862, J. H. Smith, of Quincy, Ill., gives the following account of the introduction of sorghum and imphee:—

"Of the cane plants hitherto cultivated in the North there are two distinct kinds, though similar in their habits, characteristics, and wants, viz., the Chinese cane and the Imphee or African varieties. The former is from the north of China, the latter from the south-eastern coast of Africa. Only one kind of the Chinese cane is known to us. Its first introduction was made in France, and was briefly as follows: Count d'Montigny, in the year 1851, and while he was the French consul at Shanghai, in China, in compliance with an official request, sent to the Geographical Society of Paris a collection of plants and seeds which he found in China, and which he thought would succeed in his own country, and among these this celebrated plant which we have in America. It strikes us at once as a curious instance of the manner in which momentous results often depend upon the slightest thread, when we consider that of the package sent by the Count to Paris only one single seed germinated in a garden at Toulon, and that if, by any attack of insects, by injudicious planting, cultivation or manuring, or any one of a thousand possible mischances, the plant springing from this one seed had been destroyed, France and America might for years have been without knowledge of the Chinese sugar-cane. The capitalist might never have hesitated whether to invest his means in buildings and machinery for purifying its juice, and the farmer never counted the cost of its cultivation. Fortunately the plant grew and escaped all dangers, and in due time furnished the seeds sufficiently matured for subsequent propagation.

"The Chinese cane has a very lofty and well-proportioned stalk, with a graceful, bushy, bowing top. Its seeds are of a very dark purple color and almost black. Among the principal difficulties which it has to encounter during its growth are our heavy plant winds. These winds break and bend the plants to the earth, and when broken or bent they seldom make good sirup. The Chinese are more slender and more liable to be thrown down than the Imphee canes. We have never succeeded in making much sugar from the Chinese plant, but it makes a more pleasant sirup than the Imphee tribe and is far more free from acid. Whenever the cane is injured in any way, it changes the color of the sirup and gives it an acid taste.

"The Imphee canes are from the south-eastern coast of Africa, as already stated. Mr. Wray, of England, tells us that there are sixteen different kinds of these African canes. The Imphee tribe, which have been introduced by this gentleman, are certainly far superior to all others for sugar-making. Their crystallization is much coarser than that of the Chinese, which is of a quite floury texture; and there is evidently a marked distinction found in our experiments between the Imphee cane and that which is called the Chinese sorghum in respect to their real value for producing sugar, the former giving about seven-tenths, while the latter gives only about two-tenths sugar. The juice of the Imphee is of far more limpid, and contains much less of that mucilaginous substance, known among farmers as white glue scum, than that of the sorghum; subsequently it crystallizes much more easily, and we believe that there is as much real sugar in the Imphee canes as there is in any of the sugar canes raised in the tropics. We have taken from one gallon of mush sirup, weighing thirteen pounds, eight pounds of sugar, as coarse-grained as any of Southern production, showing that it has sufficient body and capacity for being refined into the best kind of sugar that the market could afford. We are convinced that this work of refinement is merely a matter of time."

Failure of the Austrian Iron-clads.

According to the following extract of a letter from the Vienna correspondent of the London *Times*, the Austrian Government has failed in its experiments with iron-clad vessels of war:—"In military circles it is said that Admiral von Tegetthoff would probably have been victorious in his recent encounter with the Danes had not the Reichsrath refused to grant a part of the sum which was required by the Government for the fleet. The representatives of the nation declined to furnish the Naval Department with the means of constructing new armor-plated vessels until those already built had been properly tried, and recent occurrences have proved that they acted very wisely in so doing. The *Don Juan*, the best of the Austrian iron-clad vessels, shipped so much water in her trip to the North Sea that she was in some danger of going to the bottom. Had the whole sum demanded been granted by the Reichsrath the water would still have found its way into the powder-room of the *Kaiser* and *Don Juan*, and their crews have been troubled with sea-sickness! Twelve millions of florins were voted for the navy during the last session of the Austrian Parliament, but, unfortunately for the country, the deputies of the people had no means of seasoning the wood used in the construction of the three or four iron-plated frigates which are now lying in the port of Pola. The captain of an English man-of-war some time ago examined the vessels in question, and he told me that the money spent on them had been thrown away. The information received from the British officer was subsequently confirmed by a Trieste merchant of the very highest respectability, who said that to his certain knowledge one-half of the wood used in the construction of the three iron-clad vessels last made was 'green.'"

Ames's Wrought-iron Gun.

The Ames' Works, at Falls Village, are making a cannon which weighed twelve tuns in the rough. After incessant but hitherto unsuccessful applications, Mr. Ames has obtained an order from the Department for 15 cannon, which he is confident will prove far superior to any in use, and will carry *seven* miles, and will admit of a charge twice as heavy as the Dahlgren gun. His process is as follows:—A bar of round iron 18 feet long, 10 inches diameter at one end and 14 at the other, is made to serve as the handle of the gun. Upon the larger end of this are welded one by one large bars of iron of about 2 feet in length, until a round mass has been formed of 30 inches in diameter, perfectly solid. This is to serve as the breech of the gun, and the end is upset by a horizontal steam hammer until it is perfectly even and true. After this the gun is built up of sections of the full size (circumference) of the gun, of about five inches in length—the entire gun (14 feet long when completed) being composed of thirty transverse sections. These sections are made up as follows:—a cylindrical block of the best refined iron is turned out 7 inches long, 10 inches in diameter, and with a 4-inch hole through its length. This is fitted closely into an iron band or hoop made from bars of iron 6 by 7 inches; and this is again fitted into another band of 3 inches in thickness. These bands are closely welded, and as solid as the best mechanism can make them. When thus put together it will be seen that the whole forms a cylindrical section (or wheel) of 30 inches in diameter—the greater length being near the center.—*Boston Commercial Bulletin.*

Save your Old Files and Rasps.

A correspondent of the Maine *Farmer* says old files and rasps may be made nearly equal to new ones. First boil them in soap, ley, or a mixture of slacked lime and soda in water. This done, wash them in water and directly throw them into a vessel full of diluted sulphuric acid, formed of one part acid and six parts water: let them remain here for some time, the exact period being easily found by taking out a file, observing whether the nicks appear sharp or not; as soon the sharpening is effected, the files must be taken out and washed in another vessel containing a solution of soda, about an ounce of soda to a pail of water.

[The best way to repair an old file is to go and buy a new one. We always advocate economy in every case—*economical economy*—not that sort which saves at the spigot and leaks at the bunghole. Files recut in this way do not pay for the trouble; and for general use it is better to go and buy a new one than potter with acids, soap, lye, etc.—Eds.

Sir Macdonald Stephenson has projected a comprehensive system of railways in China. An application has already been made for permission to build a line of 75 miles, from Shanghai to Soochow. The East India railways, constructed by English capital and influence, are a success, and it is augured that the prospect in China is, in some respects, superior, inasmuch as the Chinese are much the most enterprising people.

Old and New Atlantic Telegraph Cables.

We are indebted to Cyrus W. Field, Esq., for the following descriptions respectively of the cable submerged between Ireland and Newfoundland, by the Atlantic Telegraph Company, in 1858, and of the cable now being manufactured for the same company by Messrs. Glass, Elliot & Co., at Morden Wharf, East Greenwich:—

OLD ATLANTIC CABLE, 1858.	NEW ATLANTIC CABLE, 1864.
Conductor—A copper strand, consisting of 7 wires (6 laid round one), and weighing 107 lbs. per nautical mile.	*Conductor*—A copper strand consisting of 7 wires (6 laid round one), and weighing 300 lbs. per nautical mile, embedded for solidity in Chatterton's compound. Gage of single wire ·048=ordinary 18 gage. Gage of strand ·144 =ordinary No. 10 gage.
Insulator—Gutta-percha laid on in three coverings and weighing 261 lbs. per knot.	*Insulation*—Gutta-percha, 4 layers of which are laid on alternately with four thin layers of Chatterton's compound. The weight of the entire insulation 400 lbs. per nautical mile. Diameter of core ·464, circumference of core 1·392.
External Protection—18 strands of charcoal-iron wire, each strand composed of 7 wires (6 laid round one), laid spirally around the core, which latter was previously padded with a serving of hemp saturated with a tar mixture. The separate wires were each $22\frac{1}{2}$ gage, the strand complete was No. 14 gage.	*External Protection*—10 solid wires of the gage ·095 (No. 13 gage), drawn from Webster and Horsfall's homogeneous iron, each wire surrounded separately with five strands of manilla yarn, saturated with a preservative compound, and the whole laid spirally around the core, which latter is padded with ordinary hemp, saturated with a preservative mixture.
Weight in air 20 cwt. per nautical mile.	Weight in air 35 cwt. 3 qrs. per nautical mile.
Weight in water 13·4 cwt. per nautical mile, or equal to 4·85 times its weight in water per knot; that is to say, it would bear its own weight in a little less than 5 miles depth of water.	Weight in water 14 cwt. per nautical mile, or equal to eleven times its weight in water per knot; that is to say, it will bear its own weight in eleven miles depth of water.
Breaking strain 3 tuns 5 cwt.	Breaking strain 7 tuns 15 cwt.
Deepest water to be encountered, 2,400 fathoms, or less than $2\frac{1}{2}$ nautical miles in depth.	Deepest water to be encountered 2,400 fathoms or less than $2\frac{1}{2}$ nautical miles in depth.
The contract strain was equal to 4·85 times its weight per nautical mile in water.	The contract strain is equal to 11 times its weight per nautical mile in water.
One knot, being in fathoms $=1{,}014\times4=\frac{42170}{2400}=$ 2·05 times the strength requisite for the deepest water.	One knot, being in fathoms $=1{,}014\times11=\frac{11154}{4200}$ $=4{\cdot}64$ times the strength requisite for the deepest water.

The Engineer of the "Sassacus."

James M. Hobby is the name of the engineer of the U. S. steamer *Sassacus*. This officer stuck to his post amid the most trying circumstances. Even after he had been severely scalded by steam escaping from a shot-hole in the boiler, he stood by and worked the ship out of the reach of the enemy. The *Sassacus* was in action with an iron-clad rebel ram, and the contest was most severe. Such men as Mr. Hobby are an honor to their profession.

In 1766, 207,600 lbs. of powder, which was stored in the church of St. Nazaire, in Brescia, Italy, was fired by a stroke of lightning, and the explosion reduced about one-sixth of the city to ruins, and killed 3,000 of the inhabitants.

Hydrostatic Scale.

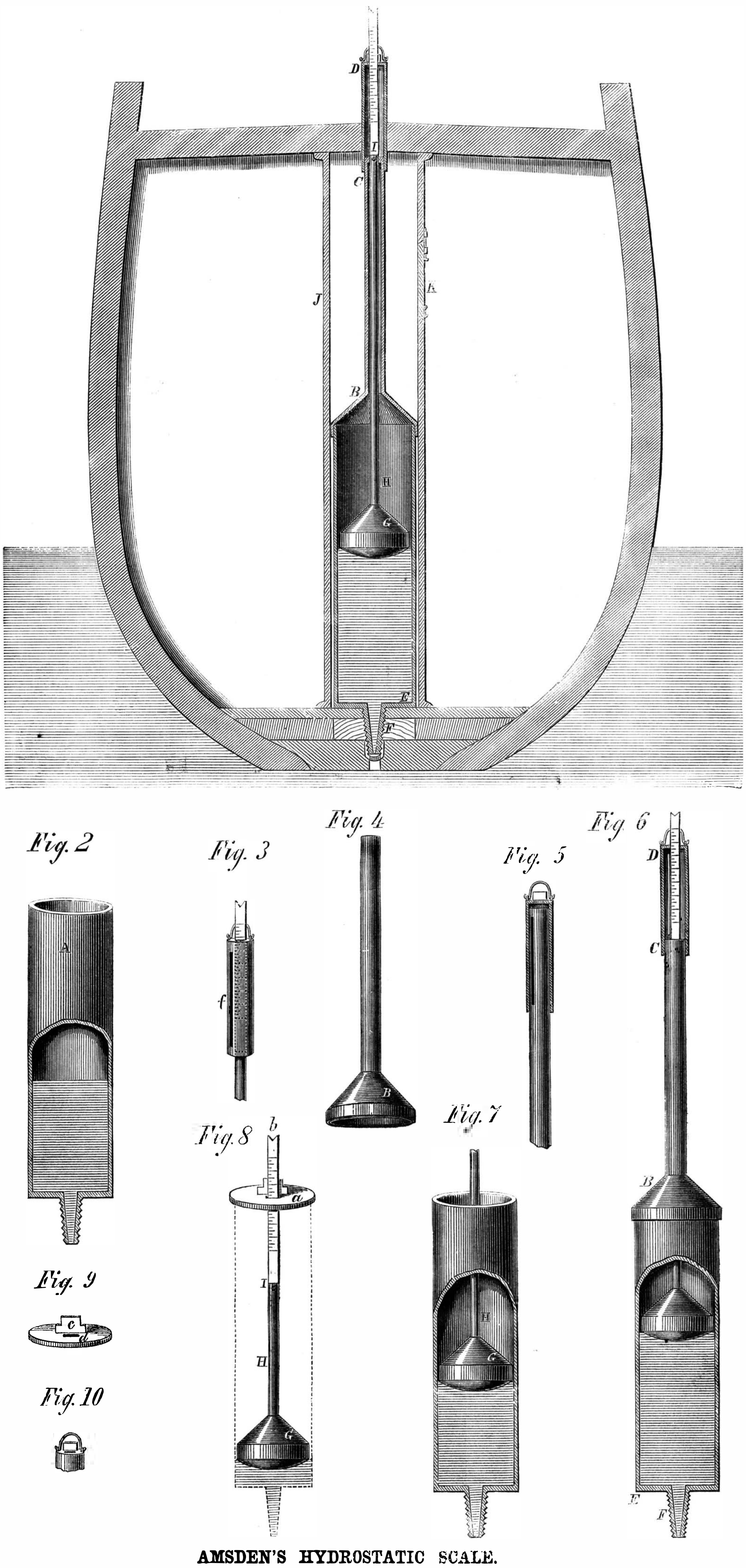
The object of the apparatus illustrated herewith is to weigh canal boats, barges and vessels of any description conveying freight, and their cargoes, and to measure and exhibit the true weight with undoubted accuracy and at less expense than under the present system of weigh-locks. It does not require any balances, counterpoises or their equivalents. The apparatus is philosophical in principle, simple in design, and concerns such important interests of State, freight and boat-owners, that it is entitled to receive a careful and impartial consideration of its merits.

The engraving shows a view of the machine attached to the boat or barge; the various parts and details are presented and explained by the figures and letters on the engravings. The construction and the principle of application are so easy of comprehension that every one will understand it from the following description:—

It consists of a copper cylinder (A, Fig. 1) from four to five inches in diameter in the lower part, and narrowed from B to C and D, upward—the whole being four feet, or longer if it is to come to the deck. At the bottom, E, a tube, F, which has a screw on it, is fastened water and air-tight in the hole bored through the middle of the keelson and keel, and passes nearly through the keel. At the end of the tube, F, is a perforated cap, convex downward, and through which the water can pass freely upward into the cylinder as the boat sinks, and thus rise to its level on the outside of the boat. In the cylinder is placed a hollow float or buoy, G, which in its widest part is one-eighth of an inch distant from the cylinder, so as to move without friction. From the top of the buoy rises a smaller copper tube, H, which is connected by a screw to a flat silvered stem of copper, which rises to the top of the cylinder, and passes through a guard or flange, at D, on the upper side of which is the zero, or mark for the light weight of the boat. The perforated cap below F is near the bottom of the keel, to prevent any obstructions from passing upward. The instrument has a simple contrivance at the top, C to D, for depressing that part of the cylinder through the deck, and also the flat stem, which will project still higher, so that these parts may be removed from the way of the men when not in use, and be covered by a lid on the level of the deck. It is thus easy of access and use when the weight is to be taken. Copper is used in the construction of the instrument because it is uncorrodible by water; the whole is inclosed in a strong case or square frame, J, rising to the deck to prevent any injury to the instrument. A door, K, is made, or can be made in the frame, so as to make this part of the frame accessible.

Figs. 7, 8 and 9 represent the plan of this instrument as arranged for open boats. In Fig. 8 the cover, *a*, sets upon the cylinder and has a small slot, *d* (Fig. 9), in it to guide the scale, and also a guard, C, to indicate the hight to which the index rises. In Fig. 10 a simple contrivance is shown for holding the float down when not in use; this is a bail, *a*, which is turned over the notch end, *b* (Fig. 8), of the scale, for the purpose alluded to. In Fig. 6 the scale and slide are shown as they will stand when weighing the cargo, and the slot, *f* (Fig. 3), has a small bolt working in it, attached to the stem, so that the slide can be made fast when pushed down out of the way.

This scale has been examined and reported on some years ago, by a committee of scientific gentlemen. Since the first patent was issued important improvements have been made, which are also covered by a patent dated March 8, 1864, and it is claimed that this scale is very necessary to economy both of water and a true exhibit of the actual freights on the boats. The proprietors say that the reports of the committees show that a great saving results to the State, forwarders, boat-owners, etc., in the adoption of this scale, by cheapening freight, increasing the accuracy of measurement, and by avoiding all damage to the boats from racking in the old-fashioned weigh-locks, and all loss of water (always very great) incurred in the use of locks. Canal-boats cost double what they did when this scale was first brought out; there is a greater scarcity of water, and increased competition, and it therefore becomes an important question whether this improvement should not be adopted. The item of expense in the way of damage to the boats when weighed, especially when heavily loaded, is variously estimated at nearly one-third of their value. One other advantage to be derived from the use of this scale is the facility with which the condition of the



AMSDEN'S HYDROSTATIC SCALE.

boat, as regards leakage, can be seen. A glance at the scale is sufficient to reveal whether the water is gaining or diminishing in quantity. The attention of boat-owners, forwarders, underwriters, and the canal administration, should be directed to this improvement as lately patented, and if it be such as these committees and its friends claim for it, they should secure its early adoption.

Patents in this country and Great Britain have been secured through the Scientific American Patent Agency. All further information can be had by addressing Dr. O. Reim, Springfield, Ohio.

CONCERNING MELODEONS AND THEIR MANUFACTURE.

It is difficult to conceive of two things more antagonistic than music and mechanism. In the first we have melody, in the second discord. Of course in speaking of music we *mean* music; not the remorseless agitation of an instrument which poor players inflict upon persons unfortunate enough to be in their vicinity. The genius of man is capable of almost anything, and this assertion is well illustrated by the improvements which have been made in the melodeon of late years by Messrs. Carhart, Needham & Co. We were especially struck with this fact by a recent visit to their factory, in Twenty-third street, in this city. Ordinarily but little mechanism is used in the construction of musical instruments. By this we mean machines for special purposes. There is not a workshop in the land but what uses iron and wooden planing machines, etc., and these are as common as knives and forks in households. For really ingenious and labor-saving machinery, which will do in half an hour sextuple the amount that a man could, commend us to Carhart, Needham & Co.'s workshop.

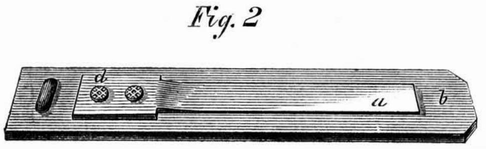
It is a pleasure to go through it. For those who admire the skill and cunning which can put pieces of iron and brass together so that they are not machines, but great inspirations—like paintings or poems—this factory will have charms. The tools are not melodious in their nature, but they make music, and there is nothing to remind the reader in his rounds that he is witnessing anything else than the ordinary transactions of a factory. We have been at some pains to obtain facts in regard to the melodeons made in the works alluded to, and the result of our researches is here presented.

THE REED.

A melodeon is in all essential points an accordeon upon legs. The sound is produced in the same way, and by the same agents, namely a current of air, driven with greater or less velocity, through a brass block, having a brass tongue fitting an opening in

Fig. 1

Fig. 2

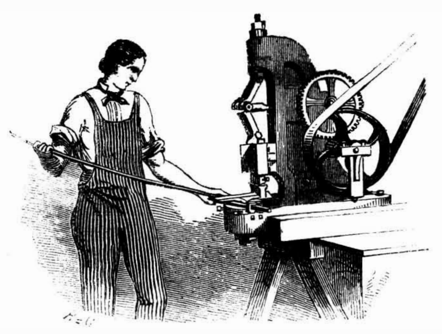


the same, as in Fig. 2. The reed itself is *a*, or the small tongue of brass, and this is set in a block, *b*, called the reed-block. Other points will be alluded to hereafter. It is merely the vibration of this reed that makes the sound, and the order of the sounds, the melody. The wires strung along the telegraph routes vibrate in high winds, and the tone or key is regulated by the force of it. In fitful gusts the wires breathe as softly and sweetly as an eolian harp, and an imaginative person might say that it was a fitting refrain to the sorrowful details of battle and of sudden death which they convey.

These reeds, therefore, make music by vibration, and though the initiated may deem it a simple thing to dwell upon, the unprofessional reader will be glad to know that the reed which gives the tone, C, or pitch, C, as it is called, vibrates five hundred and twelve times in a second. In doing that it rises nearly $\frac{3}{16}$ths of an inch, and consequently travels in one minute upwards of 450 feet, or as far as the piston of a steam engine in the largest of our river steamers. These details illustrate popularly some of the physics of music.

It is in the elaboration of this little reed-block and the reed that the greatest ingenuity has been exercised. The raw material of the reed is simply a strip of sheet brass, a full tenth of an inch thick, some two or three inches wide, and several feet in length. The operator takes this strip in convenient lengths for handling and puts it under the die of a press, as shown in the engraving. This die cuts out one blank, which is simply a flat bar of brass. The bar then goes to a machine, invented by Mr. Carhart, which planes the edges and one face. From this machine it passes to another which cuts the slot in the block. These processes occur very rapidly.

The slot in the reed-block is made by a small circular cutter, also in a machine, which we have no space to describe at length. Every mechanic knows that in cutting through a thin plate of metal with a circular cutter a thin fin, or jagged edge, is left at the ends where the cutter enters and stops. To remove this edge by an ordinary file is no great task if one has plenty of time; but in order to make musical instruments at a low price they must be made quickly, and therefore elaborating a small orifice like the one mentioned is too costly.



Mr. Carhart has provided a peculiar file for this purpose, which is a very curious thing in itself. We shall not excite the reader's curiosity any further, for details respecting it are contraband, and cannot be published. It is so economical and efficient, however, that the greatest benefit has been received by the inventor from its use in his work.

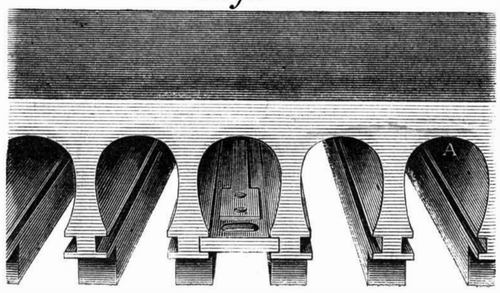
The reed—or as the the uninitiated would call it, the tongue—is also peculiar. In former times it was punched out. Experience has proved, however, that punched reeds are not durable. The metal is condensed so much about the base of the reed (where the square shoulder is) that the cohesion of the particles is destroyed, and the reed breaks at the place designated. The improved practice is to saw them out by means of a series of delicate cutters set in a wheel. This process takes more time than punching, but a much better piece of work is produced.

When the reed is sawed out it is riveted on to the block by another machine, which, although insignificant in its appearance, has worked a complete revolution in this branch of making melodeons. The appearance of the rivet head can be noticed by referring to Fig. 2, at the commencement of this article. It will be seen there that there are two raised heads, *d*, crossed with lines. These heads are portions of metal pushed up out of the reed-block, as at *e*, in Fig. 1; there is no pin or solid rivet in the reed or its block, and the saving of time in punching holes, cutting off the pins, putting them in and closing them, as practiced in the old method, is apparent at once to the professional reader.

After the reed is in its place in the block it is planed on top. The thickness of the reed is less at the base than at the free end, and the tone of the reed is determined by this planing. So accurately does this planing machine work that the reed, when delivered finished from the machine, is within a sixteenth of a true note, and requires only a little adjustment to make it perfect. When we add that the tuner, in giving the reed its proper pitch before it is finally placed in the instrument, uses a smooth file, and that *one rub* of this file is sufficient to alter the tone materially, it will be seen that the machine must be very nicely adjusted to make the reeds correct, or nearly so, at first. We cannot dwell longer upon the reed, however, interesting as it is; the tube board, or that detail of the instrument which receives the reed-block, demands attention; viewed as the product of machinery it is marvellous.

THE REED BOARD

Fig. 3



is simply a strip of plank, the length of the key-board full of little cells, as shown in Fig. 3. In each of these cells there dwells one of the reeds we have seen made, and under the bottom of the cell there is a valve placed with soft kid.

Now as the performer works the bellows by his feet he produces a vacuum therein. So when his nimble fingers press the ivory keys before him, the valve alluded to opens, and the air rushing down upon the reed below makes it vibrate most rapidly. This is the mechanism of music, and the Oratorios of Handel, the "Creation," "the Deluge," and others, are in reality reduced to certain mechanical movements. So many blasts of the bellows, so many keys pressed upon at such and such times, will produce some of the most exalted and refined emotions in the human breast that the soul is capable of receiving.

The cells, or tubes as the makers call them, where the reeds set, are all made by a most ingenious machine, contrived by Mr. Carhart. This machine is automatic, and the strip of plank out of which the board is made, having been placed in a certain position, the cutter goes on and produces all the cells, as at A, and performs its office with a regularity and exactitude which is almost human. This machine will rank with the automatic lathe of Blanchard; for it is not only capable of executing work in straight lines but also carves scrolls for lyres, and similar work, with such nicety and rapidity that no hand-work can approach it. The cutters revolve with great velocity, 7,700 times a minute, and the speed of the driving belt is just one mile in a minute.

There is another little detail in this reed-board which commanded our attention, and this is the small groove the reed-block sets in. This groove is about a tenth of an inch wide and deep, and is made by a swiftly revolving cutter. Each groove is an exact fac-simile of the other, and those made years ago will fit any reed-block made to-day. One of these tube boards is cut in five minutes, and the rapidity with which the details are executed is worthy of notice.

Another discovery of Mr. Carhart's—that of bending the reed to enhance its tone—voicing it as Mr. Carhart says—is one which has proved beneficial to them and very much enhanced the character of these melodeons for sweetness and power. Fifteen years ago the reed instrument was very generally despised. At the present time there are over 20,000 melodeons made annually on the plans of Mr. Carhart, involving principles for which he has obtained patents.

It is not alone from this utilitarian point of view that the improvement of the melodeon and reducing its cost by introducing machinery has been valuable to society. By directly giving to the masses opportunities of cultivating a musical taste (which tends to refinement of soul more than any other accomplishment) very much has been done towards elevating and ennobling them. We stood by the side of one of these reed organs in the sales-room, and heard one of the most skillful players in the country test it. The room itself was hard, angular, and devoid of grace; but just about the instrument, as the player touched the keys, there was an atmosphere full of tranquility and of peace. It was easy to understand why the spirit of devotion in a church is aided by music, or the education of children rendered more pleasant where the melodeon or piano is introduced. The slow and solemn notes of praise rose in rich harmony from the brazen reeds as they trembled soft and low with the air current flowing through them. Sonorous, full-bodied, flute-like tones, that emulated the wind among the pines in June, or the laugh of a trout brook rippling over its graveled course.

Ancient mythology speaks of the statue of Memnon, which, as the first rays of the morning sun fell upon it, gave forth sweet music, so that the people in that age believed it to be inspired, and forever wondered at the cause of the sounds. There may have been a reed inserted in the mouth of this statute by some cunning craftsman of the period, having a valve which opened by expansion or the heat of the sun's rays; this once accomplished, the morning air breathing through pipes would cause the reed or reeds to give forth airs. Be this as it may (mere speculation on our part) the reeds that Messrs. Carhart, Needham & Co. make, discourse music enough, if the skill of the performer is equal to the quality of the instrument. And in both hearing and seeing the wonders of this factory we consider that our afternoon was well spent.

Correspondence

Mariotte Law---Expansion.

MESSRS. EDITORS:—The well-known law of pneumatics is simply this:—If you take a vessel holding one cubic foot of air, and with sufficient pressure you diminish the volume of air to one-half a cubic foot, you have two quantities of air in one space; or, as it is usually expressed, you have a pressure of two atmospheres. If you take the mercury column in a barometer as the measure of pressure, the atmosphere supports a column 30 inches high, and two atmospheres occupying one space will support a column of mercury 60 inches high—and so on for three, four, or more quantities. Hence the axiom, "double the pressure is half the volume;" but should the air be quickly compressed there would be an increase of temperature from the compression of the heat (or molecular action) contained in one volume of air, and, consequently, there would be a little more than one-half the volume for double the pressure until the temperature was the same as the original volume that was compressed. Now take this quantity of compressed air and suddenly remove the pressure, and it would not quite be double the volume, but after the temperature had been acquired of the original quantity, it would be exactly double the volume.

The foregoing statement is the complete definition of the much-talked of "Mariotte law." The only plausible way that this law can be applied to steam is as follows:—One cubic inch of water will make one cubic foot of steam at the pressure of one atmosphere, or it will make one-half a cubic foot of steam at the pressure of two atmospheres—and so on; by doubling the pressure it will make half the volume nearly.

The actual proportions of volume and pressure, according to the tables published by Pambour, Lardner, Brande, and others are one cubic inch of water at—

1 atmosphere	pressure	makes	1,669	cubic	inches	steam
2 "	"	"	881	"	"	"
4 "	"	"	467	"	"	"
8 "	"	"	249	"	"	"

whereas, if the Mariotte law perfectly applied to steam, the volumes would be for 1 cubic inch of water at—

1 atmosphere	1,669	cubic	inches	steam
2 "	834·5	"	"	"
4 "	417·25	"	"	"
8 "	208·125	"	"	"

So that 417 cubic inches steam at four atmospheres' pressure does not have water enough to make 1,669 cubic inches of steam at 1 atmosphere by 12½ per cent. nor 208 cubic inches steam at 8 atmospheres by nearly 25 per cent.

That 467 cubic inches steam, at 4 atmospheres' pressure would, on gradually removing the pressure to one atmosphere, enlarge itself to 1,669 cubic inches, had not, as far as it was possible to learn, been determined experimentally up to the year 1860. During that year it was tried in an apparatus suggested by myself, the tables of which I may furnish in a future paper.

The application of the Mariotte law to the use of steam expansively is stated in the "Treatise on the Steam Engine by the Artisan Club," edited by John Bourne, London, 1849, as follows:—"If the steam valve be closed when the piston has descended through one-fourth of its stroke, the steam within the cylinder will exert one-fourth of the initial pressure at the end of the stroke, ... and, as a summary of the ascertained effects of expansion will induce a more careful examination of the principle at a future stage of our progress, we may here set down some of the most notorious. Let the steam be stopped at ½ the stroke its performance is multiplied—

	1·7 times
at 1-3 stroke	2·1 "
" 1-4 "	2·4 "
" 1-5 "	2·6 "
" 1-6 "	2·8 "
" 1-7 "	3·0 "

To reduce the statement of Bourne to a correct comparison with Pambour, it stands thus:—1 cubic inch of water makes 281 inches steam at the pressure ot 7 atmospheres; now this expanded 7 times ought to make $281 \times 7 = 1,967$ cubic inches steam at one atmosphere; whereas one cubic inch of water at 1 atmosphere pressure makes only 1,669 cubic inches steam—a deficiency of near 20 per cent. I remark here, that it is not known that Bourne ever tried one single experiment, or knew of one that verified these "notorious facts;" they are mere theoretical hypotheses.

Let us now look at Regnault's statements of the motive power of elastic vapors. He knew all about the Mariotte law, but he says (London and Edinburgh *Philosophical Magazine*, October, 1854): "According to the views which I have adopted regarding the mode of generation of the power in machines moved by elastic fluids, the motive power produced by the expansion of any elastic fluid is always in proportion to the loss of heat undergone by this fluid in the part of the machine where the power is produced. During the last few years several distinguished geometricians have endeavored to deduce this principle from abstract considerations founded upon hypotheses of greater or less probability. For my own part I have long labored to bring together the experimental data by means of which the theoretical motive power, produced by a given elastic fluid, which undergoes a certain change of volume, as well as the quantity of heat which becomes latent in consequence of this change, might be calculated *à priori*. Unfortunately these data are very numerous, and most of them can only be determined by extremely delicate and difficult experiments."

Herein is the difference between air and steam, if a cubic foot of air at two atmospheres' pressure be contained in a tight vessel for a thousand years, it will give out its elastic force on removing the pressure, while a cubic foot of steam must give out its force in a few seconds, or else its force is entirely lost. Also the relative volumes of air at different pressures, of which the Mariotte law is the exponent, depend on the same temperature; whereas the different pressures of steam depend wholly on different temperatures; for instance steam at the pressure of—

1 atmosphere	is	212° Fah.
2 "	"	250° "
3 "	"	274° "

Now the slightest increase of pressure at these temperatures, or slightest decrease of temperature at these pressures, will turn the whole of the steam to water; while an increase of pressure on the air will only diminish its volume to the amount due to that pressure.

The modern received opinion promulgated by Joule, that heat is converted into force in the steam engine, is in accordance with the statement made by Regnault, that the amount of power developed by the expansion of any elastic fluid is always in proportion to the loss of heat undergone by this fluid in the part of the machine where the power is produced. The quantity of heat, or, as it is expressed, the "total heat," as ascertained by M. Regnault from actual experiment, in a cubic inch of water in steam at—

1 atmosphere	pressure	is	1,178° Fah
2 "	"		1,190° "
4 "	"		1,203° "
8 "	"		1,218° "

If the force is all a heat-force, and it is properly applied in moving the piston of a steam engine, and as it is not possible to increase this heat by expanding the steam, it would seem as if some of the modern theorists are endeavoring to make out that the steam can work three or four times over, or, as some of the most enthusiastic say, "expand a thousand times." The experiments of Regnault, to determine the theoretical motive power of expansion, being "extremely delicate and difficult" are not applicable to so rude a machine as a steam engine, they of course furnish no rule to calculate the motive power produced by expansion in a steam engine.

We are finally left to recent experiments on the steam engine itself, and these, so far as they have been fairly tried, show that the "notorious" multiplying of its performance by expansion is founded upon "hypotheses" of no great probability.

W. ROWELL.

New York, June 22, 1864.

THE LAST MEETING OF THE POLYTECHNIC.

The Polytechnic Association of the American Institute held its last meeting for this season, on Thursday evening, June 16, the President, D. S. Tillman, Esq., in the chair.

THE FLOW OF WATER THROUGH PIPES.

Mr. Root described an experiment which he had tried to ascertain the effect produced on the flow of water through pipes by dividing the pipes with perforated diaphragms. In a three-inch tin pipe he inserted ten diaphragms at equal distances with a hole three-fourths of an inch in diameter through the center of each diaphragm. The pipe was perforated on the upper side by a minute hole in each space between the diaphragms, and water was admitted under a head. The jet from the minute opening nearest the end of the pipe where the water was admitted rose to the hight of ten inches, the next jet to the hight of nine inches, the next to the hight of eight, the next to seven, the next to six, and so on to the last, where the water rose one inch, and it flowed out of the three-quarter opening at the end of the pipe without any projectile force, falling perpendicularly.

Mr. Dixon explained that the obstruction in the flow of the water was caused by eddies formed between the diaphragms. He described an experiment tried in Jersey City of making enlargements in a pipe, and it was found that four or five enlargements diminished the flow of the water sixty per cent.

PAPER FROM CORN HUSKS.

The regular subject for the evening, "The Utilization of Waste Products," being called—

Mr. Watson presented some samples of paper and cloth made of corn husks by the process of Moritz Diamant, as improved by Dr. J. C. Schaeffer, and Dr. Auer von Weisbach, all of Austria. As this process will be fully described in the SCIENTIFIC AMERICAN, we occupy no further space with it here. In the discussion which followed—

THE WAY ITALIAN PEASANTS EAT,

was described by Professor Joy. He said that in riding by the fields in the morning you would see a large kettle of Indian meal and water boiling over a fire in the field. When the mush is cooked it is poured out upon a large flat stone, when the men, women and children gather about, and take it up in their hands and eat it. At noon you will see the same process, and at night the same. They eat little else than mush. At first there was a prejudice against the American corn, as they call it, but now it is almost the only article of food among them.

The time having arrived for the usual summer vacation, the Association adjourned to the second Thursday in September.

Miniature Engine.

The Philadelphia *Ledger* thus describes a small steam engine exhibited at the Sanitary Fair, in that city:—"The old "Curiosity Shop" has had an addition to its wares in the shape of a miniature steam engine. It stands upon a space less than an inch in diameter. It is a high-pressure engine constructed principally of gold and silver, and is composed of over one hundred and fifty pieces. The diameter of the cylinder is one-sixteenth of an inch, length of stroke three-sixteenths of an inch, diameter of fly-wheel five-eighths of an inch. The cylinder, cross-head and beam are made of gold, the boiler of silver, and in five separate sheets. The screws which hold the several parts together are so small that the threads on them can scarcely be seen with the naked eye. The engine, boiler, stack, and plate on which the whole rests, weighs less than one-half ounce. It is believed to be the smallest working steam engine in the world, and will run about three thousand revolutions per minute.

RECENT AMERICAN PATENTS.

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

Stamping Mill.—This invention relates, first, to a certain means employed for taking the powder or dust from the mortar chamber and conveying it to the deposit chamber; said means consisting of a blast generated by a fan or an equivalent device arranged in connection with a blast spout in such a manner that the dust will be taken from the mortar chamber and conveyed to the deposit chamber, and the same blast made to act continuously so as to avoid the admission of fresh external air and the consequent mixing of dirt and other light impurities held in suspension in the external air with the quartz powder or dust, The invention relates, second, to the employment of a valve arranged in connection with the mortar chamber and blast spout in such a manner that, by regulating or adjusting the valve, the quartz may be reduced to a greater or less degree of fineness. The invention relates, third, to an improved mode of securing the dies in the bed of the mortar, whereby said dies are firmly held in position and very readily adjusted in the mortar bed and detached therefrom. The invention relates, fourth, to an improvement in the construction of the frame of the mortar, whereby the frame is rendered extremely durable and well calculated to resist the jars and concussions caused by the stampers in the prosecution of their work. Zenas Wheeler, of San Francisco, Cal., is the inventor of this improvement.

Machine for cutting Lead-pencils.—The final operation in the manufacture of lead-pencils is that of cutting off the ends of the same after they are otherwise completely finished. This operation, simple as it appears to be, requires great care, because it must be done after the pencils are already varnished, and without proper precaution the varnish is liable to become tarnished, and, furthermore, in cutting the ends the edges of the wood and the ends of the lead are liable to splinter, and thereby the market value of the pencils is considerably deteriorated. For these reasons this operation requires particular care, and heretofore it has been accomplished entirely by hand labor at great expense and loss of time. The object of this invention is a machine by which the operation of cutting off the ends of lead-pencils is accomplished automatically, requiring no hand labor except that of feeding the pencils to the machine, which can be performed bya child, and leaving both the ends of the wood and those of the lead perfectly smooth. Albin Warth, of Stapleton, N. Y., is the inventor of this machine, and he has assigned his whole right to Aerhard Taber, of 133 William street, New York.

Harvester.—This invention relates, first, to a novel and improved cutting device, the same consisting of two reciprocating cutters placed one above the other and working in opposite directions and through slotted fingers, each provided with a tongue which are between the two cutters, and all arranged in such a manner as to admit of a short stroke and rapid movement of the cutters with a very moderate application of expenditure of power, thereby insuring the work being done in a perfect manner and without the liability of the cutting device becoming choked or clogged. The invention relates, second, to an improved means employed for operating or driving the two cutters, which means consist of a rack at the inner end of each cutter and a vibrating toothed segment placed between the two racks of the cutters and gearing into the former; the segment being operated by means of an arm connected by a ball-and-socket joint with a pitman connected with the driving shaft; all being arranged in such a manner as to cause the necessary motion to be transmitted from the driving shaft to the cutters in a very direct manner and with but little friction. The invention relates, third, to an improved arrangement and application of a supporting wheel for the cutter-bar, said wheel being attached to an arm which projects at right angles from the front side of a socket to which the inner end of the cutter-bar is attached, whereby the cutters are made to conform to the inequalities of the ground over which they may pass and be supported or retained at all times in a proper working position. The invention relates, fourth, to a novel and improved means for connecting and disconnecting the traction wheels of the machine with the sickle-driving mechanism, whereby the connection and dieconnection may be made with the greatest facility and without subjecting any of the gears and working parts of the machine to the wear and tear hitherto consequent on such manipulation. The invention consists, fifth, in an improved mode of hanging the axle of the traction wheels of the machine as well as the driving shaft thereof, whereby all warping or springing of the frame of the machine is compensated for, and the working parts allowed to operate equally as well if the frame should warp or spring (a contingency of not unfrequent occurrence) as if it retained its proper shape. The invention consists, sixth, in an improved mode of bracing the cutter-bar so as to diminish side draught, and at the same time retain the cutter-bar in proper position. J.W. Prentiss and E. M. Birdsall, of Penn Yan, N.Y., are the inventors of this harvester.

Tanning Apparatus.—This invention consists in a platform revolving on the top of a tank or vat containing the tanning liquor, and provided with an open box or framework extending from its lower surface down into said tank or vat, in combination with frames on which the hides or skins are stretched, in such a manner that by placing said frame with the hides or skins in the open box and imparting to the platform a rotary motion, the tanning liquor is brought in intimate contact with all parts of the hides or skins, and the operation of tanning is considerably facilitated. It consists, also, in the employment of movable baskets in combination with the frames containing the hides or skins and with the revolving platform, open box and tank or vat, in such a manner that the introduction and removal of the frames containing the hides or skins into and from the tanning vat, can be effected with comparatively little labor and loss of time; it consists, finally, in the application of adjustable frames provided with movable bars and arranged in such a manner that each frame is capable of holding two sides of hides or two skins properly stretched, and at such a distance, one from the other, that the tanning liquor has free access to all their parts, and when the tanning is completed, the leather requires no further labor to be straightened or brought in the proper form. Henry Liebermann, of Paducah, Ky., is the inventor of this improvement.

Blast Furnace.—This invention consists, first, in a blast furnace, the hearth of which, when bisected by a horizontal plane, presents a narrow, long rectangle, the two short sides of which are to be used as working sides, and its two long sides for two or more rows of tuyeres, and whose long and short sides increase gradually from the hearth up to a point near the throat, in such a manner that a perfectly steady and gradual descent of the charges from the throat to the hearth is effected, and the ore, fuel and fluxes (as charged in horizontal layers), preserve the same relative position toward each other while descending from the throat to the hearth of the furnace; and, furthermore, the reduction of the ore can be effected in less time and with less fuel than it can in a furnace of the ordinary construction; it consists, further, in the employment, in combination with a long rectangular hearth, of a double row of tuyeres, each tuyere being placed so as to be between two of the opposite sides, in such a manner that a smelting and oxidizing zone of uniform temperature and little vertical depth is obtained throughout the entire length of the furnace, and the process of reducing the ore is effected with less fuel and in less time than in furnaces having the tuyeres arranged in the ordinary manner. It consists, further, in the arrangement of one or more fireplaces and fire-flues under the bottom and through the walls of the furnace, in such a manner that a uniform and quick heating of the external walls of the furnace during the erection of the same, and particularly previous to lighting the charge in its interior, can be effected, and thereby the successful working of the furnace is rendered practicable, and its durability considerably increased. It consists, finally, in the employment of slotted air-chambers in place of or in combination with the tuyeres, in such a manner that the cost of mechanism used for introducing the blast into the furnace is considerably reduced without diminishing or impairing the effect. Woldemar Raschette, of St. Petersburg, Russia, is the inventor of this furnace, and he has assigned it in full to Alex. Trippel, of No. 18 Exchange Place, New York, who is to be addressed for further information.

HEAT PRODUCED BY DIFFERENT KINDS OF FUEL.

Several men of science have undertaken series of experiments to ascertan the exact quantity of heat developed in burning a given quantity of various substances. The most satisfactory of these experiments are those of Andrews, and those of Favre Silberman. Andrews inclosed the substance to be burned, together with just the quantity of oxygen required to burn it, in a close copper vessel with thin walls, and immersed this vessel in water—the water being carefully weighed. The substance was then set on fire by an electric current, and the temperature of the water was measured before and after the burning by a thermometer so delicate that it indicated 1-500th of a degree. The apparatus of Favre & Silberman was essentially the same, though they adopted some extra precautions to guard against the influence of the external atmosphere. The table below gives the results obtained by these two experimenters. It will be observed that the rise in the temperature of the water is given in degrees of the centigrade thermometer, which may be reduced to Fahrenheit degrees by multiplying the amount by 9 and dividing by 5:—

Substances burned	Heat Units.—Lbs. of water raised 1° C., by 1 lb. of each compound......	Lbs. of water raised 1° C., by combination of 1 lb. of oxygen........	Compound form'd	Observer.
Hydrogen......	34462	4307	HO	Favre & Silbermann.
Hydrogen......	33808	4226	HO	Andrews.
Carbon.........	8080	3030	CO_2	Favre & Silbermann.
Carbon.........	7900	2962	CO_2	Andrews.
Sulphur........	2220	2220	SO_2	Favre & Silbermann.
Sulphur........	2307	2307	SO_2	Andrews.
Phosphorus....	5747	4509	PO_5	Andrews.
Zinc...........	1301	5285	ZnO	Andrews.
Iron............	1576	4134	Fe_3O_4	Andrews.
Tin.............	1144	4230	SnO_2	Andrews.
Copper.........	602	2394	CuO	Andrews.
Carbonic oxide.	2431	4258	CO_2	Andrews.
Carbonic oxide.	2403	4205	CO_2	Favre & Silbermann.
Protoxide of tin	521	4349	SnO_2	Andrews.
Suboxide of copper........	256	2288	CuO	Andrews.
Marsh gas.....	13063	3266		Favre & Silbermann.
Marsh gas	13108	3277		Andrews.
Olefiant gas...	11942	3483		Andrews.
Olefiant gas...	11858	3458		Favre & Silbermann.
Alcohol.......	6850	3282		Andrews.
Alcohol........	7183	3442		Favre & Silbermann.
Ether	9027	3480		Favre & Silbermann.
Oil of turpentine	10852	3294		Favre & Silbermann.
Bisulphide of carbon....	3401	2692		Favre & Silbermann.

SPECIAL NOTICES.

Timothy Rose, of Cortlandville, N. Y., has petitioned for the extension of a patent granted to him on Sept. 24, 1850, for an improvement in water wheels.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Sept. 5, 1864.

George K. Snow, of Watertown, Mass., has petitioned for the extension of a patent granted to him on Oct. 15, 1850, for an improvement in machines for folding pa er.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Sept. 26, 1864.

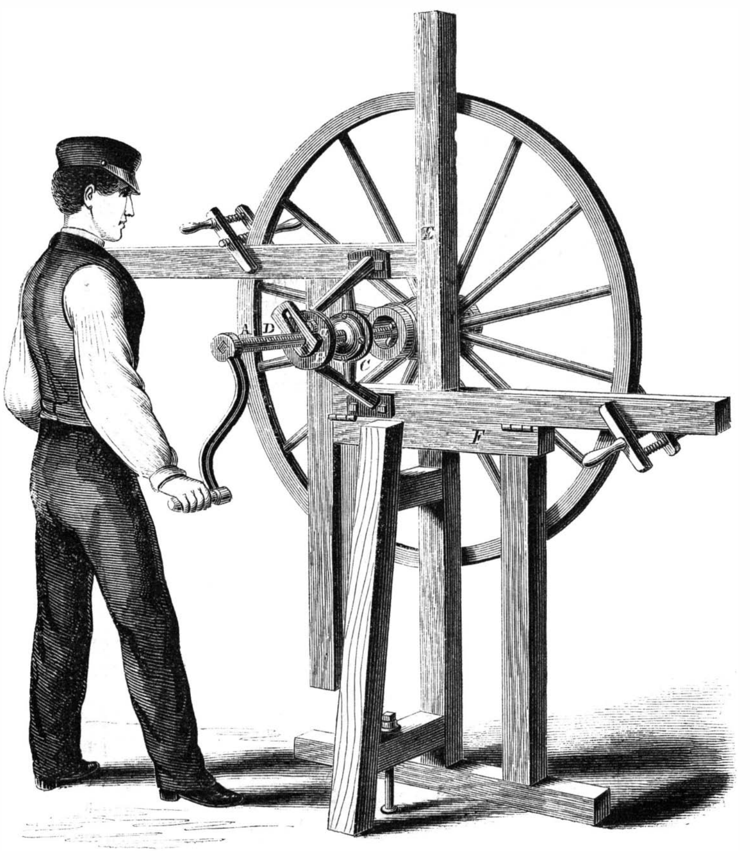
All persons interested are required to appear and show cause why said petitions should not be granted. Persons opposing the extensions are required to file their testimony in writing, at least twenty days before the final hearing.

Improved Wagon-box Setter.

Fitting a set of carriage wheels with a gouge and chisel to receive the boxes, if well done, is a tedious operation. Workmen generally cut out every part too large except the end of the hub, in order to make a quicker job. This injures the wheel by giving the spoke tenons less bearing surface. By using the machine illustrated herewith the workman cannot fail to bore the hub as square and true with the rim, as if it was secured to the face-plate of a lathe. The machine also saves a great deal of the labor, besides making a carriage worth much more from the character of the workmanship upon it. Frequently the spokes do not stand at right angles with the hub; but as the wheel is secured by the rim to the arms of this machine, the workman cannot fail, and the hole must be square with the fellies and of any size or taper required by carriage-makers. The hub is at all times accessible when on the machine, so that the box can be tried occasionally to see if it fits. The machine is simple to operate, and not liable to get out of order.

The following description will enable every one to understand the operations of this hub-borer:—

The shaft, A, is a feed and cutter bar combined; the end near the workman is carried in a bearing, B, so arranged as to be secured permanently to bore a straight hole, or else permitted to have play so that the shaft may move in a circle in order to bore a taper hole. This latter peculiarity is obtained by holding the center of the cutter-bar fast, or so that it may turn merely on its axis, in the socket joint, C. In this latter detail there is a nut which nearly fits the socket, and has an oscillatory movement in the case, but does not revolve with the shaft, being prevented from doing so by projections cast upon it fitting recesses in the socket. This nut gradually feeds the cutter bar into its work, as the handle is turned. At the outside of the bearing, B, there is a slide, D, which has a diagonal slot cut in it; it works between checks, *a*, so that when the slide is moved one way or the other, the cutter-bar is pushed out of the center to a corresponding degree; it then stands obliquely with the hub, and the machine will then bore a taper hole. The slide is fixed in its place when set to the proper point by a set-screw on the under side. The frame, E, the wheel is fastened to, has hinges at F, so that the wheel can be easily set in its place and made ready for operating upon. This is a very neat, simple and ingenious arrangement for the purpose, and will do all that is claimed for it by the inventor. Mr. A. D. Stockwell, a carriage-maker in Binghamton, N. Y., certifies that it is the best he ever used. It was patented on the 30th of September 1860, by T. G. Pearsall, of Apalachin, and S. A. Garrison, of Union, N. Y., through the Scientific American Patent Agency. For machines, territorial rights (except New England and New York State, all but Tioga county, which are sold), or additional information, apply to G. T. Pearsall, sole proprietor, Apalachin, Tioga county, N. Y.



PEARSALL'S WAGON-BOX SETTER.

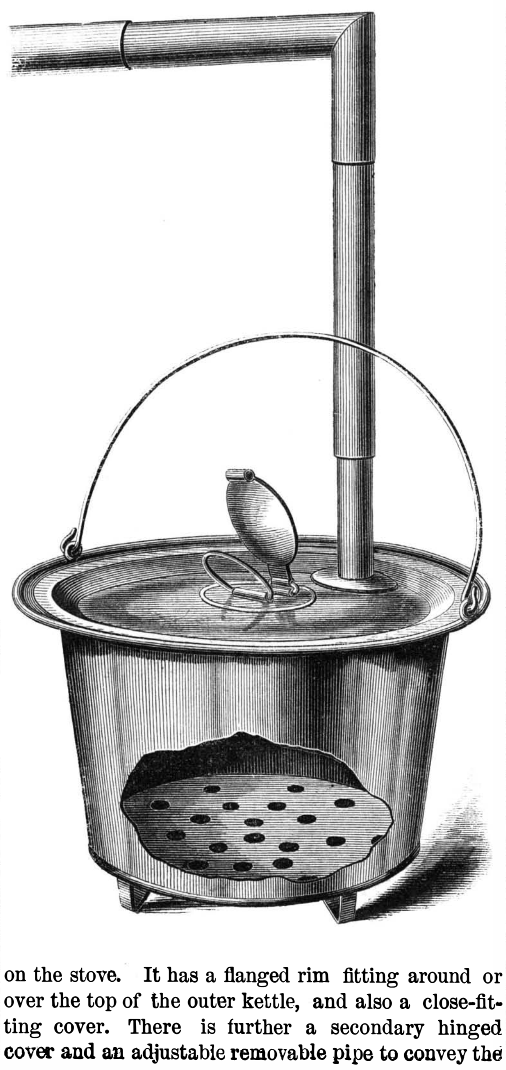
Mechanical Hair-brusher.

A correspondent, writing from England, gives the following description of the sensation produced by the new mechanical hair-brusher:—

"When I went in to get my hair brushed, had sat down before the glass, and been tucked in as usual, with bib and dressing-gown, the hair-dresser took up one of his circular brushes and hitched it to the revolving band over my head. In a moment I felt a silent fanning, as if some monstrous butterfly were hovering over me; this was the air of the twirling brush, which caught my hair up and laid it down, and traveled all over my head with incessant gentle penetration. It crept down my whiskers and searched my beard with the same tender and decided effect. There was no scratching, not even of the neck and ears, but the skin of cheeks and chin was reached and swept. It was a new sensation. I felt as if I should like to be brushed continuously for a month."

BRITAIN'S POTATO-BOILER.

This convenient article for the kitchen is simply a tin or sheet-metal kettle, to be placed within any kettle in common use. The inner kettle is shown in the engraving provided with a perforated bottom (to drain off the water) with riveted legs to allow it to stand



on the stove. It has a flanged rim fitting around or over the top of the outer kettle, and also a close-fitting cover. There is further a secondary hinged cover and an adjustable removable pipe to convey the steam from the kettle into the stove-pipe. The adjustable pipe is made in separate sections to allow it to be lengthened or shortened as required. When preferred, the steam pipe and secondary cover may be omitted.

This kettle combines several advantages—it saves time, and the labor of lifting a heavy iron-kettle to pour off the water, it removes the danger of burning the hand, and provides a convenient method of keeping the potatoes warm, it also saves loss often caused by the potatoes being broken into fragments.

This potato-steamer was patented through the Scientific American Patent Agency on the 6th of October, 1863. For further information address the patentee, C. Britain, St. Joseph, Mich.

Ornamental Uses of Mica.

The application of mica to ornamental purposes is extensively practiced in Paris. When thus employed it is first cut to the desired thickness, then coated with a thin layer of fresh isinglass diluted in water, and the gold or other surface applied, after which it is allowed to dry. The sheet of mica can be easily rendered adherent to almost any article by glueing. The artisan then takes a pattern of copper, with a design cut on it, and places it on the reverse side of the mica, and with a small brush removes any superfluous parts; the required design thus remaining on the parts which have not been brushed. He then applies the colors either one or more times, as may be necessary, and afterwards coats the whole with a solution of liquid glue diluted in spirits of wine, which is applied for the purpose of rendering the mica pliable. When this is effected, the mica with the design upon it is applied to the frame of the other object and fastened with glue. The junction of several pieces of mica is made imperceptible by first glueing them together with Venetian glue, and then applying a hot iron to the parts where the mica is joined together, the parts being thus completely united. From its unalterable nature, mica preserves the gilding, silvering or coloring from deterioration, and from its diaphaneity the articles so treated will preserve all their brilliancy. They are further preserved in a state of perfect cleanliness, as anything that soils them may at once be removed by washing.

THE GOODYEAR EXTENSION CASE.

The arguments in this case were concluded some weeks ago; the matter now rests in the hands of the House Committee on Patents, and it is possible that it may slumber there until the next session of Congress, when another effort will be made to secure favorable action upon it.

It must now appear quite evident to the Committee that public opinion is against another renewal of this patent; we therefore hope that the Committee will be prepared before the adjournment of Congress to report adversely to the prayer of the petitioner. Such action on its part would seal the fate of the patent beyond the power of resurrection, and assure the public that Congress will regard with disfavor all similar attempts of certain patentees and monopolists to keep alive, by special legislation, patents that have enjoyed the fullest benefits of the laws. We maintain that our patent laws afford adequate protection to all inventors, and beyond the protection thus afforded it is unwise to go, as it tends to make the whole system odious, and to give unequal advantages to large moneyed corporations who control valuable patents.

HEAVY HEN.—"John Smith," our news friend, has shown us half a dozen double-yolked eggs, laid in one week by a single hen, that weighed 1 lb. 4 oz. All the eggs of this valuable specimen, laid this spring, are double-yolked.—*Old Colony (Mass.) Memorial.*

[Rather a small hen to lay such heavy eggs. Agriculturists should not lose sight of this style of hen.—EDS.

THE

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VOL. XI. NO. 1....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JULY 2, 1864.

Contents:

(Illustrations are indicated by an Asterisk.)

AMERICAN STEAMSHIPS.

Our merchant steam marine has long been celebrated for the speed and economy of magnificent vessels. In point of economy, particularly, we have excelled all other nations, and there are few foreign vessels afloat which can compare with some of our latest steamships. One of the greatest items of expense in steam lines is fuel, and the most lively interest attaches to everything relating to a diminished consumption of it; particularly at this time, when the cost of the article seems to be so well sustained at advanced rates that there is no prospect of its falling.

For the past three years the Pacific Mail Steamship Company have been renewing their fleet of ships, and they have now some vessels which challenge the admiration of every one for their unequalled performances.

These ships are first-class, and full-powered as regards engines; the speed they attain for the amount of coal burned is worthy of special notice. The *Constitution* was the first of these new ships, and the *Golden City* the second; both are essentially the same dimensions and model, being 364 feet long, by 45 feet beam; tunnage (carpenter's measurement) is 4,400 tuns. The engine has a cylinder 105 inches diameter by 12 feet stroke, an adjustable cut-off, and an overhead beam.

The voyages of these vessels are made under different circumstances, as regards the load carried. From San Francisco to Panama, they are light, and average 14 feet draft on an even keel. The log of the *Golden City* is before us, and we make our extracts from it. On the return trip the draft is much greater, and averages 17 feet. The distance run by the *Golden City* on the trip from San Francisco to Panama, averaged 218 miles in 24 hours. During this trip 393 tuns of coal were burned, or one tun of 2,240 pounds, part anthracite and part Cardiff (Welch) per hour. The steam pressure was 12 pounds and the revolutions 13,625 (average) in 24 hours. *The point of cut-off was* 14 *inches* (average). On the return trip from Panama to San Francisco, the distance run in 24 hours averaged 253 miles, while the coal (anthracite and Cumberland) consumed in doing this duty was 39 tuns, about 3,360 pounds per hour with 15,084 revolutions in 24 hours. The point of cut-off was $32\frac{1}{4}$ inches. Average pressure $17\frac{1}{2}$ pounds. These trips are from Dec. 12th, 1863, to Jan. 4th, 1864, inclusive.

Such a record as this is extraordinary, and no ship but an American one, and no engine but a beam-engine has ever achieved it. The *Golden City* has Sewel's surface condenser and the Martin boiler (so much abused and derided of late), and there is no question at all of its economy for the duty it does. The amount of waste in the fuel is but 12 per cent. Here we have a ship of 4,400 tuns burthen, making 9 miles an hour on 2,240 pounds of coal. Comment is unnecessary. It appears from these figures that the cost of producing a horse-power on the trip from Panama to San Francisco, was about $3\frac{1}{2}$ pounds of coal per hour. This force is not produced so cheaply as it is by some investigators (speculators, perhaps we might say) of the marine steam engine, who make a horse-power for any number of pounds of coal less than four that the fertility of their imaginations can supply, but it is the actual amount of one trip taken at random from the log of a ship doing duty, and making money for her owners. The facts stated will bear investigation.

It is gratifying to us, as a people, that our engine and ship builders are capable of producing machines and models which defy competition. Those persons who mourn over the monopoly of the sea now enjoyed by foreign nations, may be assured that when peace reigns again, we are fully capable, so far as vessels go, of outstripping all others.

A LAW OF COMBUSTION.

Numerous and careful experiments have developed the law that the heat generated by the burning of any substance is pretty nearly in proportion to the weight of oxygen with which the substance combines in burning. For instance, the combustion of one pound of hydrogen gas will raise the temperature of 33,808 lbs. of water one degree of the centigrade scale, while the burning of a pound of tin will raise the temperature of only 1,144 lbs. of water one degree. But the pound of hydrogen in burning combines with 8 lbs. of oxygen, while the pound of tin combines with only about one-fourth ($\frac{16}{59}$ths) of a pound of oxygen. A simple calculation will show that the quantity of heat generated by the combination of a pound of oxygen is very nearly the same in both cases. A pound of oxygen in burning hydrogen will raise the temperature of 4,226 lbs. of water one degree, while in burning tin it will raise the temperature of 4,230 lbs. of water one degree.

This law does not hold, however, in cases where the combustible in burning undergoes a change of form, from the gaseous to the solid, or from the solid to the gaseous state. For instance carbon in burning to carbonic oxide is changed from the solid to the gaseous form, and in this case a pound of oxygen generates only 2,962 units of heat, while in burning this carbonic oxide into carbonic acid, where no change of form takes place, a pound of oxygen generates 4,258 units of heat. In burning zinc the oxygen is changed from the gaseous to the solid state, and in this case a pound of oxygen generates 5,285 units of heat.

When either the combustible or the oxygen is changed from the solid to the gaseous form, a portion of the heat is absorbed, and the amount of sensible heat is dimished, but when the change is the opposite way the sensible heat is increased.

Even where no change of form occurs in either of the combining elements, the amount of sensible heat developed may be modified by a change of volume; an increase of volume diminishing the sensible heat, and a contraction of volume adding to the heat set free.

There are indications also that the law is further modified by influences which are not fully understood. On another page we give a table of the heat produced in burning a number of substances as ascertained by the best observers; an inspection of this table will prove both the general truth of the law and the numerous variations from it.

PRESERVING FRUIT.

Nearly every one is fond of preserved fruits, but as generally made they are extremely unwholesome; at the present price of sugar "sweetmeats" made in the ordinary way are too expensive to be thought of by persons of ordinary means. Fruit demands—like the Jew in the *Merchant of Venice*—pound for pound, or as much sugar as fruit, and only the best and most costly kinds of the sugar should be used. It is very generally understood that the process of preserving fruit in air-tight cans is not only cheaper but far better than the old-fashioned way. By this method one-fourth the usual quantity of sugar is required, and instead of being a thick agglutinated mass when done, the cherries, plums, or what not, retain their natural color and flavor when properly put up. They not only appeal to the palate but please the eye, which is not the least important point gained in preparing food.

All that is necessary to succeed in preserving fruits in this way is to exclude the air from the jar. This is cheaply effected by boiling. The jars should be of glass, for through it the condition of the fruit can be seen perfectly and detected if it ferments, whereas with other material no warning is given until the vessel bursts and the material is wasted, if it has not been well prepared. Some of our contemporaries prefer corks and cement for closing the mouths of the bottles or jars, but we regard this method as infinitely more troublesome, more costly, and less reliable in the hands of inexperienced persons than those cans which have an india-rubber gasket in the mouth, which is compressed by a screw stop or its equivalent.

With these jars any one can make a tight joint if they screw it up properly. A very great defect with cans of this kind is that the gaskets or rubber rings are too thin and the mouths of the jars are uneven. If the bottom of the stopper is uneven as it generally is, it bears upon the gasket in some places while it is open in others. This is a very annoying fault, and makers of such jars would consult their own interests by testing each can and its cover before it leaves their hands. This is easily done with water. If the jar when capped is not water-tight it certainly will not be air-tight. Another fault is in leaving great cavities inside the glass tops where they are made lighter. These cavities should be filled with plaster by the purchaser, for they hold air and tend to the very evil they should prevent. A cheap and convenient way is to take a piece of stout fine linen and cover it thickly inside and out with a cement made of beeswax and rosin. This latter article is very dear at present, and there is a good substitute for it in a pitch made from coal tar, which may be had in large cities by going down on wharves where vessels are being calked, or in ship chandlery stores. The fruit should be put in a pot surrounded by boiling water, and the jar filled within an inch of the top. If it is fuller the air below, as it rises, causes the contents to overflow and wet the top of the jar, so that the cement does not stick. When the fruit rises to the mouth of the jar then is the time to apply the cover. Clap on the linen, covered thickly with cement, and tie it tightly. When the fruit is cold the cover will be depressed an inch or more if there is no air beneath. If the cover lies flat the air is not expelled and the fruit will spoil.

Another way to test the vacuum is by suddenly turning the jar upside down when cold. If there is much air within, it will be seen escaping in bubbles through the mass to the top (in this case the bottom) of the jar. There will be some air at any rate; it is impossible to get a perfect vacuum in any vessel whatever. If the first trial fails the cemented cover should not be pulled off. Place the jar in warm water again and bring it to a boil. If there is air below, the cover will rise like a light biscuit. Take a pin and make a small hole in the top and it will fall; then just at the moment the juice rises to the opening (or a little before) have ready a lump of cement and clap it over the pin hole. If this is done dexterously the operation cannot fail, and when cold the cover will show for itself whether it is tight or not. The necessity for waxing the cloth thoroughly and tying it tightly will be apparent when the pressure it has to sustain is born in mind; that upon a jar two inches in diameter at the mouth being forty-five pounds. Fruit preserved in this way is much cheaper, more economical and healthier. So far as the palate is concerned there is no comparison with the old-fashioned plans.

THE London Gutta-percha Company assert that the gutta-percha used to insulate the telegraph cable between Dover and Calais, which has been laid thirteen years, exhibits no deterioration in its insulating properties. They also publish a certificate of William Thomson, of Glasgow College, stating that his tests show that the loss of electricity from imperfect insulation in a circuit of 2,000 or 3,000 miles would be insignificant.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JUNE 21, 1864.

Reported Officially for the Scientific American.

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

43,170.—Knitting Machine.—Walter Aiken, Franklin, N. H.:

I claim the needle plate as made with the depression, a′, arranged below its needle groove, a, and to operate with a needle when made with a projection to extend downward from its shank, as set forth.

43,171.—Roofing Material.—Stephen M. Allen, Woburn, Mass.:

I claim as a new article of manufacture the herein described roofing or sheathing for covering buildings, awnings, etc., the same consisting of sheets composed of animal and vegetable fibrous matter combined and pulped in the manner of pasteboard, substantially as set forth.

Second, In combination with sheets consisting of animal and vegetable fiber combined as before described, I claim the saturating of the same with coal tar or resinous matter, substantially as set forth.

Third, In combination with leather paper saturated with resin or coal tar as described, of sand, gravel, marl applied to the outside, substantially in the manner and for the purposes set forth.

Fourth, Cementing to the leather, paper when saturated with resin or coal tar and coated with sand or other like substances as described, a sheet of felt made of hair or wool, with or without vegetable fiber, substantially in the manner and for the purposes set forth.

43,172.—Lining Barrels, etc.—Gustavus Arnd, New York City:

I claim, first, A lining for barrels, etc., produced by spreading on their inner surface a solution of india-rubber or allied gums and curing the same by the introduction of steam or hot air, substantially as and for the purpose specified.

Second, The within-described process of producing a lining for barrels, etc., by vulcanizing or mixing a solution of india-rubber or allied gums after the same has been spread on the surface to be protected.

[The object of this invention is particularly to render coal oil or petroleum barrels perfectiy oil and water-tight.]

43,173.—Feathering Paddle Wheel.—Felix Barbaires, Solano County, Cal.:

I claim, first, The regulating lever, P, or its equivalent, in combination with the accessory stationary shaft, G, by which the position of the paddles, N N, can be varied at pleasure, when constructed and operated substantially as herein described.

Second, The shape of the paddle, N, with wrist, M, and its pivots, M′, when constructed and operated substantially as herein described.

Third, The eccentric, I, with its strap flanges, J J′, arms, K K, and their connection with the paddle wrists, M M, when constructed and operated substantially as herein described.

Fourth, I claim the combination and connection of the main shaft, A, with the accessory shaft, G, regulating lever, P, eccentric, I, strap flanges, J J′, outer and central arms, E E′ E″ and K, and their respective connections with the paddle, N N, substantially as described and for the uses and purposes as hereinbefore set forth.

43,174.—Pianoforte.—W. W. Batchelder, New York City:

I claim the bars, e e, applied in pianofortes, and radiating from the part or parts of the sounding board having a good vibrating quality and connected to the sounding board at points of inferior vibrating quality, substantially as and for the purposes specified.

43,175.—Car Coupling.—John S. Bell, Hackettstown, N. J.:

I claim the slide, D, with pendant bar, E, attached in combination with the spring, F, block, G, pin, C, and link or shackle, I*, all arranged substantially as and for the purpose herein set forth.

I further claim the shaft, H, with the arm, I, attached, provided with a notch, e, the spring, J, for holding the link or shackle in the notch and the retaining or holding spring, K, or its equivalent, substantially as and for the purpose set forth.

[This invention relates to a new and improved car coupling of that class which are commonly termed self-coupling, and it consists in a novel arrangement of parts for keeping the link or shackle in a proper position for entering the draw-head of an adjoining car, and it further consists in a novel arrangement of a pin and slide arranged in such a manner that the slide will sustain the pin when the former is raised, and the slide be capable of being forced back by the entering link of the draw-head of an adjoining car so that the pin may drop within the link and form a connection.]

43,176.—Composition for stiffening Hat Bodies.—James M. Bottum, New York City:

I claim the combination of the material named, for the mixture as herein specified, to stiffening hat bodies, or for any other articles where the same result is required.

43,177.—Machine for cutting Splints.—J. C. Brown, Brooklyn, N. Y.:

I claim the revolving cutter cylinder, C, and the fixed cutter, a, when combined and arranged substantially in the manner and for the purpose specified.

43,178.—Machine for stripping Leaves from Sugar Cane.—Derwin E. Butler, Chesterfield, Ohio:

I claim the stripper, E, in combination with the clamp, G, attached to the sliding bar, B, and either with or without the knife, D, all arranged to operate substantially as and for the purpose set forth.

I also claim the connecting of the clamp, G, to the bar, B, by means of the cord, I, substantially as shown for the purpose of giving a quick and long movement to the clamp under a slower and shorter movement of the bar, for the purpose specified.

43,179.—Mode of securing Shoes to Horses Feet.—Lauren Carpenter, Lake City, Minn.:

I claim the elastic band, B, in connection with the shoe, A, screw rods, C D, and screw, E, all arrang substantially as and for the purpose herein set forth.

[This invention consists in a new and improved mode of securing the shoe to the foot or hoof of the horse, whereby nails are dispensed with and the shoe rendered capable of being readily attached to and detached from the foot or hoof, and also capable of having its parts readily adjusted to compensate for the growth of the hoof.]

43,180.—Force Pump.—Aaron Carver, Little Falls, N. Y.:

I claim the cylinder, A, provided with ports and valves at both ends, substantially as described, in combination with the peculiarly constructed piston, P, and hollow piston rod.

I claim the combination and arrangement of the recess, X, in the pipe, I, with the hole, W, and the hole in the piston-rod, the hole in the piston-rod being opposite the recess, X, when the piston is down.

43,181.—Corn Planter.—E. C. Chesney, Abingdon, Ill.:

I claim, first, The bill-shaped shoes, H, on the circumference of the hollow planting wheels, D, in combination with the tappets, c, triggers, d, and seed boxes, E, all arranged and operating substantially as and for the purposes set forth.

Second, The sliding frames, G, in combination with the planting wheels, D, constructed and operating substantially as described.

Third, The arrangement and combination of the cam, L, lever, M, bolts, l, foot lever, J, tongue, K, and planting wheels, D, all constructed and operating in the manner and for the purpose substantially as herein specified.

[This invention consists in the arrangement of one or more bill-shaped shoes on the circumference of a hollow planting wheel rotating freely on a stationary axle in combination with a tappet attached to said axle and acting upon a trigger which connects with a seed slide extending into a seed box in the interior of the planting wheel in such a manner that for each revolution of the planting wheel on the ground the seed slide or slides in the shoe or shoes are actuated and a quantity of seed is deposited in the ground in hills at the desired distances apart.]

43,182.—Shuttle for Looms.—Augustus D. Clark, Wilkinsville, Mass.:

I claim my improved shuttle having its spindle-head, D, its spring-catch, F, and spring retainer, E, constructed, arranged and applied together in manner and so as to operate as set forth.

43,183.—Heel-cutting Machine.—Oliver G. Critchett, Stoneham, Mass.:

I claim a heel cutting machine so organized that a cutter is made to rotate on its own axis for the purpose of cutting and to travel around a stationary heel for the purpose of forming its contour, substantially as specified.

Also the means for operating the cutter, and causing it to traverse about a stationary heel, the same being the universally jointed shafts and the cam groove arranged to operate substantially as specified.

Also in combination with the carriage which presents the heel to the mechanism which forms the curvilinear outline the knife which cuts the front of the heel, and the gage which arrests at the proper point the cut of the knife, substantially as described.

43,184.—Apparatus for gumming, cutting, and mounting Photographic Prints.—Daniel H. Cross, Shaftsbury, Vt.:

I claim, first, The angular cutting blades so arranged and operated as to fit the die-stand or compressing punch—the two forming shears—to cut and mount photographic, or other prints or cards, in the manner herein described for the purposes specified.

Second, I claim the sliding spring clamp for the purpose of holding and gumming the prints, and placing them centrally on the die punch, in combination with the yielding table, as herein described.

Third, I claim the combination of the card-receiver, the spring-follower, and the reciprocating frame, for alternately placing the cards in position to receive the prints and discharge the same, in the manner herein set forth.

43,185.—Coal Screen.—John R. Deihm & Jasper Snell, Pottsville, Pa.:

We claim a cylindrical coal screen composed of a series of segments, constructed and connected together in the manner substantially as herein set forth.

[This invention consists in constructing the screen of a series of segments composed of longitudinal cast-iron bars connected by transverse wrought-iron rods, the former being cast on the latter so as to obtain a firm connection of the parts, the segments being attached to bands at their ends, all so arranged that a very superior coal screen is obtained, in consequence of the parts being always retained in proper position, and a free escape allowed for the coal and dirt, while the segments are rendered capable of being curved or bent to suit the required diameter of the screen.]

43,186.—Match Safe.—Seidel de Mackiewicz, New York City:

I claim the employment of an ignition or roughened surface for matches, composed of wire gauze, made substantially in the manner herein shown and described.

[The match-holders so commonly employed are usually provided with a rough surface composed of sand or sand paper, upon which the match is rubbed in order to produce ignition. Such sand surfaces soon become destroyed by use. This improvement consists in making the rough surface of wire gauze, which forms a cheap and enduring material upon which the match may be regulated with the same facility as upon sand paper. The invention is applicable to every form of match-holder.]

43,187.—Ring and Traveler Spinning Frame.—John C. Dodge, Brooklyn, N. Y.:

I claim the connection of the waste detacher with the ring, so as to be attached to it and with it, be removable from the ring rail or socket plate, the whole being substantially as specified.

43,188.—Composition for Tanning.—Samuel Dunseith, Philadelphia, Pa.:

I claim a tanning liquor composed of the ingredients herein described, when prepared and used in the manner specified.

43,189.—Machine for enamelling Elliptical Frames, etc.—G. W. Ferguson & H. H. Ferguson, New York City:

We claim, first, The combination of an adjustable tool, H, mounted on a rod, G, with the eccentric wrist-pins, h h′, which are adjustable in slotted cranks, F F, rotating in the same direction, and with the rotating cross or platform, B, all constructed and operating in the manner and for the purpose herein shown and described.

Second, The hinged arms, j, in combination with the tool-holder, I, clamp, J, bar, G, and rotating cranks, F F′, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the employment or use of an adjustable tool mounted on a rod which is secured to two eccentric wrist-pins which are adjustable in slotted cranks secured to the upper ends of arbors to which a rotary motion is imparted in the same direction and from the same shaft, which imparts motion to the platform carrying the picture frame or other article on which an ellipse is to be described in such a manner that said tool in describing an ellipse retains a position corresponding with the radius of curvature at every point, and the various moldings produced by it will be of uniform width and shape throughout.]

43,190.—Collar Clasp.—Valentine Fogerty, Boston, Mass.:

I claim the collar clasp made substantially as and for the purpose described.

43,191.—Preserving Railroad Ties.—Benjamin S. Foreman, Morrison, Ill.:

I claim the application to railroad ties of a composition made of the materials and applied as and for the purpose herein set forth and described.

43,192.—Printer's Ink-roller.—Lewis Francis & F. W. Letmete, New York City:

We claim, first, Combining glue and glycerine to form a composition for the manufacture of printer's inking-rollers.

Second, We claim combining glue, glycerine and molasses for the same purpose.

43,193.—Flask or Retort.—Sidney L. Geer, Norwich, Conn.:

I claim the chemical flask or retort above described made of clay, or any mineral compound, glazed within and encased by a metal pocket around its sides and bottom, as a new article of manufacture.

[This invention consists in making chemical flasks of clay or any mineral compound, glazed within, and encased around its sides and bottom within a metal pocket so as to protect it from blows or other causes of injury. It is meant for the use of chemists and dentists in generating nitrous oxide gas, and for similar uses.]

43,194.—Pipe Vise.—Francis Glasser, Mystic Bridge, Conn.:

I claim a pipe vise so constructed as to open to permit the entrance and removal of the pipe in a direction perpendicular to its axis, by means distinct from that employed for clamping the same, and to allow when closed of being firmly secured against being opened by the action of the clamping device, substantially as herein set forth.

43,195.—Metallic Shield for the Army and Navy.—Wm. F. Goodwin, Powhatan, Ohio:

I claim the construction, arrangement and operation of shields for the purposes and in the manner described, the same consisting essentially in the employment whether as a fixed or movable attachment to ships or to any wheeled or otherwise supported frame of metal plates curved so as to present its concave surface outwardly, *i. e.*, facing the enemy, substantially as herein set forth.

43,196.—Printing Press.—George P. Gordon, Brooklyn, N. Y.:

I claim, first, The use or employment of a revolving ink distributing table or disk operating a second revolving ink distributing table or disk for the purpose of thoroughly and evenly distributing the ink and imparting the same to the inking rollers.

Second, I claim the use or employment of the revolving inking rollers in combination with a revolving ink-distributing table or disk, for the purpose specified.

Third, I claim the use or employment of the revolving inking rollers, in combination with a revolving ink distributing table or disk, operating a second revolving ink distributing table or disk, for the purpose specified.

Fourth, I claim the use of a platen, vibrating substantially as shown, in combination with a stationary bed, and a revolving ink distributing table or disk operating a second revolving ink distributing table or disk, for the purpose or purposes herein shown.

Fifth, In combination with a platen, vibrating substantially as shown, I claim the use or employment of a stationary bed, revolving inking rollers and a revolving ink distributing table or disk, or a revolving ink distributing table or disk operating a second revolving ink distributing table or disk, for the purpose specified.

43,197.—Oil-cup for Carriage Axle.—Lyman Gregory, Battle Creek, Mich.:

I claim the combination of the conical or conveying orifice, c, of the oil-cup, the sponge, F, or its equivalent, and the rod, f, connecting the sponge with the lid, D, all substantially as and for the purposes herein specified.

43,198.—Spinning Machine.—Peter W., Thos. H., and Alfred Greenwood, Philadelphia, Pa.:

We claim, first, giving to the delivery rollers, B B′, the reciprocating rotary motion, independent of the ordinary feed or delivery motion substantially as described.

Second, The combination of the bar, G G′, arms N, and P, the rack, K, and pinion, L, arranged and operating substantially as described.

43,199.—Method of applying Torpedoes for Harbor Defence.—John D. Hall, Philadelphia, Pa.:

I claim the within-described system of pipes and pumps or other forcing apparatus applied for the discharge of torpedoes at one or more points in the width of the bed of the channel of a harbor, substantially as and for the purpose herein set forth.

[This invention consists in the employment of a system of pipes placed on or underneath the bed of the channel leading to the harbor, and one end of each of which is connected with a pump or pumps, or suitable forcing apparatus, placed within a suitable fortification on shore or at any suitable distance therefrom, and the other ends of which are arranged at suitable intervals in the widths of the channel, the said pipes serving as conductors through which to force torpedoes by the pump or pumps, or other forcing apparatus, and deliver the same under the bottoms of enemy's vessels attempting to pass through the channel over the said pipes.]

43,200.—Distributing Grain in Mills.—Charles S. Hamilton, Fond du Lac, Wis.:

I claim, first, The use of the revolving spout, L, for receiving the grain as the latter is elevated and distributing the same to the different bins, substantially as set forth.

Second, I claim the combination of the chain of buckets and the revolving spout, substantially as described.

Third, I claim the arrangement and combination of the revolving spout, L, the shaft, M, and index, N, with the chain of buckets or elevating devices, substantially as described.

43,201.—Device for collecting Gases from Petroleum and other Wells.—H. M. Hamilton, Franklin, Pa.:

I claim the application to the pipe or stock, A, of a pump used for pumping petroleum, salt or other wells, of a chamber, D, with two apertures, a b, one at the bottom to carry off the liquid and the other at the top to carry off the gases in the manner substantially as herein specified.

[This invention consists in the application to the upper end of the pipe or stock used for pumping petroleum, salt and other wells, of a chamber or series of chambers with two discharge openings, one at or near the bottom through which the liquids which are brought up from the well descend to be conducted to their appropriate receptacle or tank, and the other opening in the top of said chamber, through which the gases emanating from the well ascend to be conveyed to a tank or other proper vessel, from which they can be drawn and used for fuel or illumination.]

43,202.—Bridge Girder.—David Hammond and W. R. Reeves, Canton, Ohio:

We claim, first, The arch constructed of the side pieces, a a, top pieces, b b, claping pieces, c c, bolts, d d, and nuts, e e, the whole combined substantially as herein specified.

Second, The combination of the arch constructed as hereinbefore specified, the string piece, D, suspension rods, B B, diagonal braces, C C, and shoes, E E, substantially as herein specified.

[This invention consists in a novel construction of a wrought iron arch, and novel combination of an arch, a string piece, suspension rods and diagonal braces, whereby a girder is obtained of great strength and stiffness with a comparatively small weight.]

43,203.—Device for Hanging Door-bell.—J. O. Harris, Ottawa, Ill.:

I claim, first, the employment of the wheels, C, when grooved substantially as described, and provided with the pin, c, or its equivalent, arranged and operating substantially as and for the purpose shown and specified.

Second, I claim the employment as aforesaid, of the grooved wheels C, provided with the pin, c, or its equivalent, in combination with the bell wire, D, arranged and operating as herein described and set forth.

Third, I claim the combination and arrangement of the wheel, C, when provided with a groove upon one side as shown and the pin, c, with the bell wire, D, as and for the purpose described.

Fourth, I claim the combination of the grooved wheels, C, the pin, c, the bell wire, D, the looped wire, E, or its equivalent, and the hook h, arranged and operating as and for the purposes specified and shown.

43,204.—Rotary Pump.—C. H. Harrison, San Francisco Cal.:

I claim, first, The combination with cylinder, A, of the eccentric, L, and cylinder, F, when the latter has a rolling motion on the inner circumference of cylinder, A, substantially in the manner and for the purposes described.

Second, I claim in combination with the cylinder, A, eccentric, L, and cylinder, F, the partition, C, dividing the chamber, B, in two compartments, one of which is connected with the suction pipe and the other with the discharge pipe of the pump substantially as herein described.

Third, The combination of the cylinder, F, with the movable partition, a, joint, k, and slide, b, substantially in the manner and for the purposes described.

Fourth, The hinged check-valve, M, when applied to rotary pumps, and when constructed substantially as herein described.

Fifth, The application to the eccentric, L, of the friction strips, S' when made of hard wood so as to work on the inner circumference of the cylinder, F, substantially in the manner and for the purposes herein described.

Sixth, I claim the holes, V, in the circumference of the cylinder, F, when the latter is constructed and arranged substantially as herein described.

43,205.—Door Sheave.—Robert G. Hatfield, New York City:

I claim the construction and arrangement of a sheave and roller in such manner that when in use, the axis of the latter will have imparted to it a translatory as well as a revolving movement upon the bearings formed in the body of the sheave, substantially as described.

43,206.—Carriage, Chair, and Cradle combined.—G. W. Hank, Chicago, Ill.:

I claim, first, Constructing the body of the carriage of two parts, B and C, arranged and operating substantially as and for the purposes specified and shown.

Second, I claim the combination of the rockers, L M, with the platform, K, constructed, arranged and operating as and for purposes delineated and described.

Third, I claim the combination of the parts, B C, with the chair top F, provided with the hole N, arranged and operating as and for the purposes shown and set forth.

Fourth, I claim the combination of the chair, B C, the top, F, and revolving arms, J, as and for the purposes shown and described.

43,207.—Harrow.—J. H. Hendee, Jackson, Mich.:

I claim, first, the combination of the hinged sections, F F, forward hanger frame, E, and wheeled carriage, substantially in the manner and for the purpose described.

Second, The construction and arrangement of the hanger frame, E, substantially as and for the purpose described.

Third, The arrangement of the hinged sections or beams, F, in combination with the hooks on the axle, A, and the staples on the sections substantially as and for the purpose described.

43,208.—Dummy Locomotive Truck.—Isaac L. Hilt and A. W. V. Rausch, Frankford, Penn.:

We claim, first, the two independent trucks, A A, pivoted to and combined with the supporting frame, D, by means of pedestals, I I', which are arranged directly over one of the axles of each and which serve at the same time as a means of transferring the weight of the said frame to the axles subtantially as herein specified.

Second, The two pedestals, I, I', constructed with pivot-like heads to enter sockets e e, attached to the bottom of the car body, and thereby keep the body in place upon the supporting frame, D, of the engine and driving mechanism substantially as herein described as well as pivot the said frame to the trucks.

Third. The combination of the two counter shafts, K, K', one constituting the crank shaft of the engine and the other coupled with it by cranks and connecting rods, and one geared with one of the axles of one of the independend trucks, and the other gearing with one of the axles of the other of said trucks for the purpose of applying power to axles of both trucks substantially as herein specified.

Fourth, the intermediate countershaft, K2, and its cranks, g2 g2, applied in combination with the countershafts, K K', and connecting rods, i i, substantially as and for the purpose herein specified.

Fifth, the sliding boxes, f f, applied in combination with the frame D, and forward axle of the forward truck to slide longitudinally upon the said frame and allow the axle to slide within them, thereby providing for the support of a portion of the weight of the boiler and heavy parts of the engine upon the said axle while providing for the vibration of the truck substantially as herein described.

Sixth, Keeping the cogwheels of the driving axles in line with the frame, D, and the pinions of the countershafts by so fitting them to their respective axles that they are free to oscillate laterally thereon, and fitting their hubs to openings in the pedestals, I I', or their equivalents substantially as herein specified.

[This invention consists in certain improvements in the running gear of dummy locomotives and steam railway cars, whereby greater facility is afforded for turning the curves, and the driving power is applied to trucks at both ends of the locomotive or car, and the body of the car is relieved from all jarring otherwise caused by the engine and their attachments.]

43,209.—Device for Heating Waxed Thread in Sewing Machine.—Amos Holbrook, Jr., Lynn, Mass.:

I claim the combination of a fluid gas joint with the rotating horn of a sewing machine, substantially as and for the purpose set forth.

43,210.—Bobbin Winder of Sewing Machine.—A. C. Kasson, Milwaukie, Wis.:

I claim the smooth surfaced pressure roller, D, applied in combination with the bobbin winder of a sewing machine substantially as and for the purpose herein specified.

[The object of this invention is to provide the bobbin winders of ewing machines with a means of laying the thread even upon the bobbins, which while being effective is so simple as to add little to the cost of the winder.]

43,211.—Beehive.—Washington Kennedy, Roxbury, N. Y.:

I claim a series of removable boxes or hives, B B B, each provided with elevated central chambers, C, slat slides, h h, slat tops, f i, slides, E E, and surplus honey boxes, D D D', the whole enclosed in a case A a b, all as herein described and for the purposes specified.

[This invention consists in the employment or use of a series of bee compartments constructed and arranged in a novel way and in such a manner within a house or case that the bees can be confined to one appartment until more room is required when they are admitted to another compartment, the whole being devised that the parts are very accessible, old comb allowed to be removed, the bees prevented from swarming, space being readily removed and the bees kept in a healthy state.]

43,212.—Fly Trap.—David Lake, Smith's Landing, N. J.:

I claim, first, the combination and arrangement of the bait wheel, z, bait trough, o, guides, L L, shoulders, 1 l, cap, T T', sliding bolt, P, and stay plate, H, substantially as described, and for the purposes set forth.

Second, The combination and arrangement of the tube, J, opening, z, sliding valve, K, and guides, O O, substantially as described, and for the purposes set forth.

43,213.—Fire Damper Regulator.—Philip Lamb, San Francisco, Cal.:

I claim the arrangement of the spring, C, spring adjuster, H, piston rod, F, piston, B, steam cylinder, A, steam pipe, a, and slotted damper arm, E, all as herein specified and for the purpose set forth.

[This damper regulator is composed principally of a cylinder, a piston and a spring, the cylinder receiving steam at one end from the boiler to act upon the piston which is arranged within it, the piston being connected by a crank with the damper and the spring being applied within the cylinder to act upon the piston in opposition to the pressure of the steam which tends to move it in a direction to close the damper.]

43,214.—Calendar Clock.—B. B. Lewis, Hartford, Conn. Ante-dated June 15, 1864:

I claim, first, securing a calendar device to a dial of such a nature as to indicate by a pointer on the face thereof, a given point of time substantially as shown and described.

Second, I claim the collar tube, f, or its equivalent combined with the dial, a, pointer, i, and star wheel, g, substantially as and for the purpose described.

Third, I claim a tube, f, having a collar, x, as described in combination with a dial, a, for the purpose set forth.

Fourth, I claim the employment of a seven tooth or star wheel, g, arranged upon or over the center spindle, b d, in combination with the pointer, i, substantially as and for the purpose described.

Fifth, I claim the employment of a twenty-four hour wheel, k, to produce a successive movement of the seven tooth or star wheel, g once in every twenty-four hours, substantially in the manner and for the purpose described.

43,215.—Vapor Stove.—Russel R. Lewis, New York City:

I claim, first, The combination of the set screw, H, with the fluid and expansion chambers, substantially as described for the purpose of forming a heater cup of the screw head as set forth.

Second, The combination of a heater cup, the standards, or expansion chamber, a fluid chamber, an adjusting screw, and a wick tube, substantially in the manner and for the purpose described.

43,216.—Cooking Stove.—R. Little, Canton, Ohio:

I claim the combination of the oven, B, and fire box, A, with the flues, C, D, angular flues, H, and center return flue, I, when the several parts and flues are constructed and arranged as herein described.

43,217.—Clover-huller.—M. H. Mansfield, Ashland, O.:

First, In a Clover Separating Machine having a cylinder and concave armed with grooved and beveled or roughened teeth, I claim the relative arrangement of the thrashing cylinder B, shakers E E', and shoe, G, all as herein described and for the purpose specified.

Second, I claim the combination of the straw shaker, E, grain board E', hangers, b b', double pitman rod, H, f f, and crank wheel I, as and for the purposes set forth.

Third, In combination with the aforesaid straw shaker, E, grain board, E', and hangers, f f, I claim the adjustable slotted brackets F, constructed and operating as and for the purposes specified.

[This invention consists in placing a straw separator between the hulling mechanism and the screens, so that the mass from said hulling mechanism will be discharged directly on or carried to the straw separator, and the operation of trashing and separating the straw from the pods previous to the latter entering the hulling mechanism can be dispensed with.]

43,218.—Stop Valve.—Francis McGhan, Washington, D. C.:

I claim, first, the combination of the two valves C and C', operating substantially as and for the purpose herein set forth.

Second, In combination with the above, I also claim the threaded hollow stem, A, constructed and operating as described.

[The object of this invention is to produce a simple device both of cheap and durable construction whereby pipes or other water passages may be opened and closed with great facility, and which at the same time will effectually prevent leakage without the interposition of stuffing boxes, packing ring or other similar devices.]

43,219.—Car Coupling.—Henry McKee, of Chandlerville, Illinois:

I claim the two draw heads, A A, provided with vertical projections, a, at each side of their upper surfaces, and with inclined front surfaces, a, in combination with the removable, or detachable hooks, D, and the links or shackles, C, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and improved car coupling, of that class which are termed self-couplings. The object of the invention is to obtain a car coupling, which will be simple in construction, be certain to form a connection when the draw heads of two cars are brought in contact, and be capable of being disconnected with the greatest facility when required.]

43,220.—Evaporating Pan for Sugar and Sirup.—Louis Megowen, of Upper Alton, Illinois:

I claim, first, The oscillating skimmers, C, slotted to fit the partitions, c, of the pan, A, and suspended from gudgeons, b, in combination with the sperical sides, a, of the pan and with the troughs, D, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The well, g, in the last compartment of the pan, A, in combination with the zig-zag holes, c', finishing pans, E, double flues, F, and dampers, i, all constructed and operating in the manner and for the purpose specified.

[This invention consists in the application to an evaporating pan, of oscillating skimmers, hung on gudgeons which have their bearings in lugs or standards, rising from the ends of the pan, and are provided with slots to clear the partitions of said pan, in combination with its covered sides, and with troughs running along their edges in such a manner, that by the action of said skimmers, the skum rising in the several compartments of the pan, can be thrown out into the troughs with little exertion or loss of time.]

43,221.—Blacking-box and Holder.—George H. Monroe, Cincinnati, Ohio:

I claim a blacking box, or blacking box holder, constructed substantially as herein described.

[This invention consists of a blacking box, provided with an L shaped cylindrical rim, in such a manner that the blacking contained in the interior of the box, on being taken out with the brush, is not liable to soil the edges of the lid, and the outside of the same can always be kept clean without difficulty. The invention consists also in the application of a handle to a blacking box so that said box can be easily handled without soiling the figures.]

43,222.—Grain Elevator.—Joseph T. Moulton, Chicago, Ill.:

I claim, first, The circular track, or tracks, D, applied in combination with the elevator, A, and driving shaft, E, in the manner and for the purpose substantially as herein specified.

Second, The carriages, C, in combination with the elevator shaft, B, track, D, and driving shaft, E, constructed and operating in the manner and for the purpose substantially as set forth.

Third, The yoke, E, in combination with the elevator, A, hoisting tackle, g h i, and windlass, F, constructed and operating in the manner and for the purpose described.

[The object of this invention is, to adapt an elevator to the holds of vessels at different stages of the water, the hight of which may vary from 6 to 75 feet at different times of the day, or in different seasons and to avoid entirely the necessity of a belt tightener which is now universally used.]

43,223.—Railroad Car Roof.—J. Palmer, Cleveland, Ohio:

I claim the arrangement of the plates or sections, a b, when lapped continuously together as described, without fastenings, in combination with the ribs, F, ceiling, D, with the roof, A, and car lines, in the manner and for the purpose set forth.

43,224.—Metallic Mold for Molten Glass.—Wm. Pountney, Brooklyn, N. Y.:

I claim the bringing of the molten glass in contact with a thinner portion of the metal of the molds, than the body of the mold itself, so that the part of the mold in contact with the glass will be immediately raised in the temperature so as not to chill the surface of the glass, and at the same time the heat so imparted will be moderated and diffused gradually into the thicker parts of the mold; thereby producing the desired smoothness and appearance of polish upon the surface of the glass, substantially in the manner described.

43,225.—Harvester.—J. W. Prentiss, and E. M. Birdsall, Penn Yan, N. Y.:

We claim, first, The combination of the two reciprocating cutters, I I, both acting against central tongues g, placed between them in the fingers, H, as herein shown and described.

Second, Operating the cutters, I I', through the medium of the double geared vibrating segment, J, and the racks, j j, on the bars, K K, of the cutters, I I', substantially as described.

Third, The wheel, P, placed on the clutch S, which is fitted on the axle, Q, and arranged as shown with or without clutch, T, for throwing the cutter-driving mechanism in and out of gear with the wheel or wheels, B B', without moving or adjusting the cutter-driving-gearing as set forth.

Fourth, The adjustable bearings, V V, N N, for the axle Q, and shaft, M, when constructed and applied to the frames of harvesters for the purpose specified.

43,226.—Accordeon.—Ernest Pries, New York city:

I claim the combination with a portable bellows operated by both hands, of keyboards, A B, and corresponding reeds representing two or more chromatic scales, substantially in the manner and for the purpose specified.

Also, the arrangement of the keys, C C', and D D, substantially as herein shown and described, so that the keys, C', represent the octaves of the keys, C, and the keys, D', the octaves of the keys, D.

[The invention consists in the employment or use in combination with a portable bellows, operated by both hands, of reeds and key boards which represent two or more chromatic scales, in such a manner that a light and portable instrument is produced, which can be used for playing or accompanying tunes in any key the same as a pianoforte or melodeon.]

43,227.—Churn.—John Rankin and J. N. McIntire, New York City:

We claim the employment of a dasher having its beaters so formed and arranged as to feed the contents toward each end of the box, as specified in combination with the vertical breaker ribs, T2, the whole arranged to operate as and for the purpose set forth.

We also claim the employment of the breaker wheel, H, constructed and operating as specified in combination with a surrounding or inclosing case formed with ribs, w and y, and exits, v, the whole constructed and operating as set forth.

We also claim hanging the main gear, L, on an eccentric stud, c c2, in combination with the spring catch and notched box, Z, the whole arranged to operate as and for the purpose set forth.

43,228.—Operating Gun Carriages.—Isaac Rindge, Cincinnati, Ohio:

I claim the combination of the screw and eccentric shaf connected to the lever and turn table, for the purpose substantially as described.

43,229.—Cider Mill.—George R. Ruland, and Wm. W. Green, Jr. Byron Center, N. Y.:

We claim the combination of two endless platforms, D E, and an endless apron, G, passing between them, said platforms being so arranged so that their contiguous surfaces shall come nearly in contact, to produce pressure substantially as and for the purpose herein set forth.

We also claim making the lower sections, a', longer than the upper sections, a, and providing their ends with the cross cleats or shoulders, l l, between which the said upper sections, a, match and fit, for the purpose of confining the pomice during the act of pressing substantially as herein set forth.

We also claim hanging the ways, B B, of the upper platform, on a bearing, f, at one end, and adjusting the other end down to increase the pressure, by means of the rods, i i, projections, g g, and nuts, h h, or some equivalent means, substantially as and for the purpose herein described.

We also claim providing the sections, a' a', of the lower endless platform, with openings or perforations, s s, whereby the cider can escape through, substantially as herein described.

We also claim the receptacle or trough, H, situated between the ways, C C, and inclosed by the lower endless platform, E, said receptacle or trough being so situated as to catch the expressed cider, and discharging it by a suitable spout, substantially as described.

We also claim the packing strips, u or u', in combination with the sections, a a, or the cleats, l l, so arranged that when said sections or cleats close in the act of pressing, the packing strips will shut off the passage of the cider, substantially as herein set forth.

43,230.—Clock.—Chrysostomus Schwippl, New York City:

I claim the arrangement and combination of the hands, A A', central pivot, a, suspended movements, B B', and gear-wheels, b c b' c', all constructed and operating substantially in the manner and for the purpose shown and described.

43,231.—Tire or Hoop-bender.—Melchi Scott, Fairfield, Iowa:

I claim the sliding apparatus, and the pincers combined with the side levers, and the adjustable rack, which being operated by the lever, l l, brings the bar forward until it begins to bend, when the pincers let go their hold until the next time the lever is raised.

I claim also the graduating staff, a, in the lever, l l, with the numbers, 1, 2, 3, 4, 5, 6, corresponding to the numbers on the notched side plates, 1, 2, 3, 4, 5, 6, by which the tire may be made larger or smaller, by means of the corresponding numbers.

43,232.—Preserving Fruit, etc.—Harlow C. Smith, Chicago, Ill. Ante-dated June 16, 1864.:

First, I claim in the construction of stoppers for hermetically sealing jars for the preservation of fruit, the employment of a valve substantially as and for the purposes herein specified and described.

Second, I claim in combination with the above, the cross bar, E, provided with the elastic cushion, e, arranged and operating for the purposes set forth.

43,233.—Mode of preventing Mildew in Canvas, Cloth, etc.—William Stacey, Kittery, Maine:

I claim the use and application of the aforesaid liquid to sail cloth, sails, flags, awnings and tents.

43,234.—Windlass.—E. Stearns, Brooklyn, N. Y.:

I claim the windlass constructed and arranged as hereinbefore described, with two shafts provided each with a series of wheels, the wheels of one shaft varying in diameter, relatively with each other and also varying in diameter with respect to the wheels of the other shaft, and the wheels of one shaft being adjustable so that the two shafts may be connected by gearing, varying in diameter relatively with each other in order to increase or diminish the power and speed of the drum shaft as circumstances may require, in combination with means substantially as described for adjusting the wheels.

I further claim the arrangement of the shafts, K, arms, J M, and the notched plate, N, for adjusting the wheels, D' E' F', and securing them in the desired position substantially as herein set forth.

[This invention consists in providing the driving shaft of the windlass, with a series of wheels shifting or adjustable of different diameters in connection with a series of wheels placed on the draw shaft, and also of different diameters, the adjustable wheels being moved by levers, and all arranged in such a manner, that the driving shaft may be made to communicate motion to the draw shaft, through the medium of gearing which may be varied according.]

43,235.—Boot and Shoe.—B. F. Sturtevant, Boston, Mass.:

I claim a boot and shoe, having its sole or soles and its upper or uppers combined, united or connected with and by means substantially as described.

43,236.—Mode of Connecting two or more pieces of Leather together.—B. F. Sturtevant, Boston, Mass.:

I claim my new or improved art, substantially as described, of uniting or connecting two or more pieces of leather.

43,237.—Stencil-plate.—Joseph Sykes, Muscatine, Iowa:

I claim the main frame, A, provided with recesses, c, in combination with the secondary frame, C, and letters or blanks, B B*, constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in a frame provided with suitable recesses to receive the letters of a stencil alphabet, cut out in suitable pieces of sheet metal, in combination with a secondary frame secured on the inner side of the main frame by means of buttons, in such a manner that by means of the letters of the stencil alphabet any desired word or words can be arranged in the main frame, and securely retained therein by the secondary frame; and after such word or words have been thus arranged, they can readily be transferred to the top of a box, or any other surface, in the usual manner of transferring letters words or names from stencil-plates.]

43,238.—Carriage Hub-band.—S. T. Talcott, Ashtabula, Ohio:

I claim the clutch, F, spring, D, cap, B, button, H, in combination with the flange, C, and band, A, substantially as and for the purpose set forth.

43,239.—Machine for making boxes.—Horace Thayer, Brooklyn, N. Y.:

First, I claim the head, B2, and two forming and pressing wheels, M and N, with suitable means for operating the same, combined and arranged to act simultaneously on the material of a box, or case, with or without the free center, D, substantially in the manner and for the purpose herein set forth.

Second, I claim in box and case machinery, substantially of the character above specified, so constructing and arranging the mechanism which connects the two wheels, M and N, together, and by which they are simultaneously brought to bear against, or to recede from, the box or the revolving mandril, that, to accommodate itself to the seam, or other irregularity or projection upon the surface of the box rim, either wheel, when said projection comes in contact with it, will yield so as to permit the same to pass without inducing any corresponding movement of the opposite wheel, so as to allow the use of rings previously joined, and consequently the production of boxes very rapidly, in the manner substantially as herein specified.

Third, I claim the triangular frame, V, and links, Q R, arranged substantially as represented, relatively to the two rocking shafts, o p, and to the cranks or levers, O P, wheels, M N, and the mandril, B, of a box or case machine, substantially as and for the purpose herein specified.

Fourth, I claim the employment on the wheel, M, of the series of indenting teeth, m, so arranged relatively to the head, B2, and free center, D, as to indent the material in a series of corrugations pressing upon or into the inner face of the end or head, 3, substantially in the manner and for the purposes herein set forth.

43,240.—Mode of making boxes and cases.—Horace Thayer, Brooklyn, N. Y. :

I claim, as a new method of manufacture, the forming of boxes or cases of the character substantially as herein described, by first soldering the edges, 2, of the sides, 1, next introducing the bottom or end, 3, and finally forming the croze by bending the metal at 4 and 6, at one operation, against the outer and inner faces of the end 3, in the manner substantially as herein set forth.

43,241.—Making Boxes.— Horace Thayer, Brooklyn, N. Y. :

I claim, as a new article of manufacture, a box or case having the bottom or end, 3, retained by a series of internal projections, 6, which projections are raised and pressed into the edge of the material forming the bottom or end, 3, by machinery, substantially in the manner and for the purpose herein set forth.

43,242.—Boxes for Transporting Plants.—Merritt L. Thompson, Brooklyn, N. Y.:

Iclaim a box, formed with a perforated head, whereby the contents can be viewed without opening the box, substantially as described.

43,243.—Cooking-stove.—William Tinsley, New York City :

I claim that particular fire or air passage, with its apparatus, the slotted plate, r, and its register (forming, with the curved plates, s s, the triangle) the upper cover, the under valve, p, the ventilator, and the back sides, W W, constructed and operated as set forth, the whole being considered a combination.

43,244.—Acting Wagon-brake.—P. G. Van Houten, Cohocton, N. Y. :

I claim the angular lever, f, in combination with the tongue, a, the pole, h, the attachment of the brake-bar, n, under the reach of the wagon by the rods, p p, to the cross-bar, y, in the manner and for the purpose described.

43,245.—Portable Piano-forte.—Maurice Vergnes, New York City :

I claim, first, Placing the hammer under the key, to leave more room for the sounding-board, in the manner substantially as above described.

Second, The arrangement of the stem, E, with the curved heel of the hammer to make a quick stroke upon the string in the manner described.

Third, The curve, K, made in the stem, into which the point of the heel of the hammer catches, in the manner described and for the purpose set forth.

Fourth, The projection, L, on the hammer, in combination with the lever, M, to raise the damper at the proper time.

Fifth, Sustaining the hammer in its position ready for the stroke by a band of gum elastic, placed in the manner described.

43,246— Roller-stand.— Hervey Waters, Northbridge, Mass.:

I claim a roller-stand, constructed or organized substantially as and for the purpose specified.

43,247.—Bayonet-blank.—Hervey Waters, Northbridge, Mass.:

I claim, as a new article of manufacture, a bayonet-blank having the disposition of its material substantially as described.

43,248.—Stamping-mill for quartz.—Zenas Wheeler, San Francisco, and C. K. Hotaling, Grass Valley, Cal.:

We claim, first, The combination of the fan, L M, pipes, N O, chamber, P, spouts, Q R, and mortar-box, C D, all constructed and arranged to operate in the manner and for the purposes specified.

Second, The valve, S, arranged in relation with the mortar-box, and pipes, N, substantially as shown, to regulate the strength of the blast in the mortar-box, and consequently the degree of fineness or comminution of the quartz, as set forth.

The securing of the dies, I, in the bed, m, of the lower part, C, of the mortar-box, by means of the flanges, o o, at the lower parts of the dies, the recesses, p p, at the sides of the groove, n, and the wire, q, fitting in a groove in the bottom of the dies, and the bed, m, substantially as described.

Fourth, The combination of the posts, a a, socketed girts, c g, shoulders, h h, bed-plate, B, sockets, b b, soft metal, c, and keys, d d, all constructed and arranged as herein described, to constitute an improved frame for stamping-mills.

43,249.—Cultivator.—Almon Williams, Berea, Ohio :

I claim the adjustable reach, F, the slotted hinged frames, G H and M N, in combination with the teeth or cultivators, and slotted hinges, J, in the manner and for the purpose set forth.

43,250.— Slide-valve for Steam-engines. — James A. Woodbury, Boston, Mass.:

I claim the balanced or nearly balanced slide-valve, constructed and operating in connection with the ports, substantially in the manner and for the purpose herein set forth.

43,251.—Soda-water Apparatus.—Elias Wyckoff, Elmira, N. Y.:

I claim the arrangement of the pump, C, within the vessel, B, in combination with the refrigerating chamber, A, and lever, D, constructed and operating in the manner and for the purpose substantially as herein shown and described.

43,252.—Shuttle for machines for knitting loom-harness. —Darius C. Brown, and John Ashworth, assignors to said Darius C. Brown, Lowell, Mass.:

We claim the shuttle as made with the fluted delivery-rollers, controlled by a spring arranged to press one roller toward the other, the whole being as explained.

We also claim the shuttle as made with the guard-plate, h, arranged between or combined with the spool and the fluted delivery-rollers, and carrying the guide-eye and hole substantially as described.

We also claim the combination and arrangement of the elongated auxiliary eye, m, arranged within the shuttle-chamber, and with respect to the eye, l, thereof, substantially as specified, with such eye, l, and an eye, i, and a pair of fluted delivery-rollers, c d, disposed in advance of the spool as herein-before set forth.

We also claim the shuttle as made with the recesses and studs arranged together, and with respect to the curved ends or noses of the shuttles, substantially as represented and described.

43,253.—Chain-pump.—James M. Connel, assignor to himself and H. Eshbaugh, Newark, Ohio :

I claim, first, Applying to the lower end of a chain-pump shaft a metallic boxing, B' C, so constructed that it forms an enclosing socket for the end of said shaft, and also an extension guard for protecting them from wear, and for centering the buckets, substantially as described.

Second, The flaring, or bell-mouth metallic extension, C, applied to the lower end of the tubular shaft, B, and constituting the valve-seat and foot-stock of the pump, substantially as described.

Third, Flaring, or enlarging the lower extremity of the bore of the tubular shaft, B, in combination with the valve-chamber, b, and valve, g g, substantially as described.

Fourth, Constructing the periphery of the wheel, G, with laterally forward supporting lips, and vertically sustaining shoulders, adapted for receiving two links of a chain, having eyes formed at right angles to each other, substantially as herein described.

Fifth, The combination of the looped bucket-links, d, with a driving wheel, G, having its periphery constructed substantially as described.

Sixth, The combination of the chain-pulley, J, with a metallic socket extension, C B', which also constitutes the valve-seats of the valves, g g, substantially as described.

43,254.—Straw-cutter.—Aaron Y. Clough, assignor to Nelson W. Clark, Charleston, Mich. Ante-dated June 18, 1864 :

We claim the arrangement and combination of the devices, D H J and L, as herein described for the purpose set forth.

43,255.—Frame for Pictures, etc. — J. S. Cannon assignor to himself, Andrew J. Cutler and Elias M. Hanover, New Haven, Conn.:

I claim, first, Constructing a picture-frame from a single strip of metal, when the angles are formed in the manner substantially as described.

Second, The combination of a link or loop with the back of a picture-frame, when arranged substantially in the manner described to serve the double purpose herein set forth.

Third, A recessed back, constructed in the manner substantially as described, in combination with a metallic picture-frame, in the manner and for the purpose herein set forth.

43,256.—Chain-pump Chain.—James M. Connel, assignor to himself and H. Eshbaugh, Newark, Ohio :

I claim, first, A chain-pump chain-link, A, constructed with lugs or bent portions, a a, substantially as and for the purpose set forth.

Second, Tying the ends of a chain-pump chain-link together by means of buckets, C, cast about the middle portion of the link, substantially as set forth.

Third, A chain-pump bucket-link, A a a C, constructed substantially as and for the purpose described.

43,257.—Lantern.—Charles Deaves and Ellis S. Archer, assignors to Archer & Pancoast, New York City :

We claim, first, The fastening composed of the bail-shaped rod or wire, B, and projection, c, constructed and applied in the manner substantially as and for the purpose herein set forth.

Second, The sunken annular groove, h, in the top of the lamp, A, surrounding the burner for the purpose of preventing the overflow of oil while the lamp is being filled, and also to admit of the shaft, D, resting on the top of the lamp as specified.

Third, The hook or lip, f, or its equivalent, on the top of the lamp, A, when used in combination with the shaft, D, for the purpose specified.

Fourth, The corrugated aprons, E, applied to the bottom of the lantern, A', in relation to the lamp, A, substantially as and for the purpose set forth.

[This invention relates to a new and improved mode of securing or holding the burner in the lamp, whereby the use of the ordinary screw for that purpose is avoided, and the burner rendered capable of being adjusted with the greatest facility in order to admit of the shaft by which the wick is raised and lowered being placed in proper position to admit of the lantern being closed down on the lamp. The invention also relates to a simple means to prevent the overflow of oil from the lamp while the latter is being filled, and also to admit of the burner having a low position, so that the wick-adjusting shaft may rest upon the top of the lamp and aid in securing the burner in the lamp. The invention also relates to a corrugated apron at each side of the bottom of the lantern, for the purpose of equalizing the supply of air to the burner, preventing heavy drafts, &c. The invention further relates to a new and improved fastening for securing the lantern down on the lamp.]

43,258.—Apparatus for Tanning Hides.—Henry Liebermann, assignor to himself and George Rock, Paducah, Ky. :

I claim, first, The platform, B, revolving on the top of the tank or vat, A, and carrying the open box, D, in combination with frames, E E', on which the hides or skins are stretched, substantially as and for the purpose shown and described.

Second, The employment or use of moveable baskets, E*, in combination with frames, E E', box, D, revolving platform, B, and tank, A, constructed and operating in the manner and for the purpose substantially as set forth.

Third, The frames, E E', arranged with cross-bars, e e*, e' e'*, longitudinal bars, g g', standards, f f', and double side and end rails, substantially as and for the purpose specified.

43,259. — Breech-loading Pistol. — Samuel M. Perry, Brooklyn, N. Y., assignor to Edward S. Renwick, New York City :

I claim the combination of a barrel, having a chamber at each end of larger diameter than the caliber of the bore intermediate between the chambers, with the lock-frame by means of a pivot, said combination operating substantially as set forth.

43,260. — Breech-loading Pistol. — Samuel M. Perry, Brooklyn, N. Y., assignor to Edward S. Renwick, New York City :

I claim the combination of a barrel, swinging on a pivot in advance of the abutment of the lock-frame, with a cup-formed abutment to sustain the cartridge, the combination operating substantially as set forth.

I also claim the combination of the swinging barrel of a fire-arm with the lock-frame or stock, by means of a counter-bored hub on the one and a smaller hub on the other, the two operating substantially as set forth.

43,261.—Fire Escape-ladder.—Robert G. Pike, Middletown, Conn., assignor to Nicholas Pike, Brooklyn, N. Y. :

First, I claim dividing a ladder into sections and joining them by hinges, or any similar joint, in such manner that the sections may be folded flat upon each other, into the form of a seat or chair, substantially as described.

Second, I claim forming and attaching the arms together, and to the chair or ladder, in such a way that they may be used for hooks to sustain the ladder.

Third, I claim the application of one or two ropes to a ladder, substantially in the manner and for the purpose as described.

43,262.—Thrashing and Grain-separating Machine.—J. H. Quick (assignor to H. R. Withington and John Butterworth. Jr.), Trenton, N. J.:

I claim the air passage, contracted in its central portion, in combination with the pendant guard or apron, D, constructed and operating as set forth.

[This invention relates to a new and improved duster attachment for thrashing and grain-separating machines, for the purpose of preventing dust being expelled or ejected from the thrashing machine into the faces of the operators or attendants. The invention consists in the employment or use of a draught-box provided with a pendant guard or apron, and applied to the machine in such relation with the thrashing cylinder as to effectually carry the dust through the machine.]

43,263.—Power Loom.—Conrad Roder, Ceralvo, Ky., assignor to himself and Konrad Froehlich, Philadelphia, Pa.:

I claim, first, The attachment of the hooks, D D, directly to the heddle frames, substantially as and for the purpose herein specified.

Second, The arrangement of the pattern chain, N, or its equivalent, the knives, E E', and levers, F F* and G G*, in combination with the heddle frames and their directly attached hooks, D D, whereby the harness is operated entirely from above, substantially as herein specified.

Third, The combination of the cam, H, levers, J K, rod, j, spring, k, and rods, i i*, the whole arranged in connection with the levers, F F*, to operate substantially as and for the purpose herein set forth.

Fourth, The hinged guides, S S, and adjustable guides, T T, in combination with each other and with the guides, R R, for guiding the heddles, substantially as and for the purpose herein specified.

43,264.—Apparatus for carbonizing Air for Illuminating Purposes.—Warren A. Simonds, Boston, Mass., assignor to himself and S. G. B. Coombs, South Reading, Mass.:

I claim the cylindrical vessel or reservoir divided into chambers, with partitions arranged and constructed as herein set forth and described.

I also claim the construction and arrangement of a sectional wheel, when operated as herein specified.

I also claim the sectional wheel made fast to the shaft, L, when arranged within a sectionally divided vessel or reservoir and operated, for carbonizing the air for illuminating purposes, as herein specified and set forth.

43,265.—Lightning Arrester for Telegraphs.—George A. Stearns, Rochester, N. Y., assignor to himself and Elijah Valentine, Milwaukee, Wis.:

I claim establishing a communication between the line circuit of an electric telegraph and the earth, by the use of charcoal, powdered glass, powdered amber, powdered sulphur, or other equivalent substance, when brought into contact with such line circuit by means of a suitable apparatus, for the purpose of discharging from the wire all atmospheric electricity, before it can be communicated to the registering apparatus, substantially in the manner herein represented and described.

When charcoal, powdered glass, powdered amber, powdered sulphur, or other equivalent substance is employed for the purpose above indicated, and in substantially the manner herein-described, I also claim inserting therein metallic rods or wires, in the manner and for the purpose herein represented and described.

43,266.—Copying Press.—George C. Taft (assignor to Thomas H. Dodge), Worcester, Mass.:

I claim the combination of the handle-piece, G, and thimble-piece, F, with the arch-piece, C, and screw spindle, E, substantially as set forth.

43,267.— Machine for cutting Lead Pencils.— Albin Warth, Stapleton, N. Y., assignor to Eberhard Faber, New York City :

I claim, first, A machine constructed, arranged, and operating substantially as herein-described, for cutting off the ends of lead pencils.

Second, The oscillating flap, C, at the bottom of the hopper-box, B, constructed and operating substantially as herein-described, so that the pencils in the hopper box are agitated without having their varnished surfaces tarnished.

Third, The india-rubber fingers, e', arranged at the bottom of the hopper-box, B, for the purpose of compelling the pencils to pass singly into the sockets of the carriers.

Fourth, The carriers, E, with sockets, f4, and lips, f5, in combination with hooks, e, at the lower ends of the plates, D, constructed and operating substantially as herein-described, so that one pencil after the other is taken from the hooks and deposited in the sockets, f4.

Fifth, The combination of the adjustable heads, E', with the carriers, E, so that said carriers can be adjusted for pencils of different length.

Sixth, The concave cutter, I, in combination with the springs, j', and with the carriers, E, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Seventh, The oscillating grinding wheels, J, applied in combination with the cutters I, or saws, I', in the manner and for the purpose substantially as set forth.

43,268.—Cultivator.—L. B. Waterman (assignor to himself, E. W. Simonds, and P. A. Fischer), Chicago, Ill.:

I claim, first, The braces, T T, and jointed bars, T1 T2, in combination with the pendant shovels, N, when arranged and operating as set forth.

Second, The auxiliary wheeled supports, R, at the rear end of pendant shovel frames, M, in combination with the main supporting wheels, C C, substantially as and for the purpose set forth

Third, The combination of the half rolling beams, f, with the pendant frames, M, and auxiliary supporting wheels, R, substantially as and for the purpose set forth.

Fourth, The combination of the jointed brace, T T1 T2, pendant shovel frames, M, half rolling beams, f, and footlever, i, and hand levers, O P, substantially as and for the purpose set forth.

43,269.—Washing Machine.—Robert Cranston, Edinburgh, Scotland. Patented in England Sept. 17, 1862 :

I claim, first, The reel or drum, C, constructed and operated in the manner and for the purpose substantially as herein set forth.

Second, I also claim the combination of the box, F, with its two outlets, the trough, E, and the gutter, G, with its perforated cover, g, substantially as and for the purpose specified.

Third, I also claim the combination of the reel, C, the roller or knucklers, I, and the brushes, J, arranged substantially as specified.

43,270.—Apparatus for obtaining Photographic Pictures. —J. J. L. Rousseau de Lafarge, Paris, France :

I claim, first, The internally grooved box for carrying the glasses in combination with compartments at the back thereof for holding the bottles.

Second, In combination with the double glass and bottle box, I claim the pintles and gudgeons on the sides thereof for the attachment thereto of two vertical and independent bath vessels, one lined with rubber, or the equivalent thereof, to contain the silver bath for sensitizing the damp collodion, the other made or lined with yellow glass, to contain the iron bath for developing the picture.

Third, Combining with each vessel a hinged flap, provided with rubber or rubber-lined stopper and screws, to form a secure and hermetic joint, substantially as set forth.

Fourth, I claim the construction of the principal or outer frame, with plunging frame or nipper and doors provided with springs for keeping the glass in position.

Fifth, The arrangement of the springs in the flap and their combination with an outside knob and trigger so that the springs may be withdrawn from off the surface of the glass or released at pleasure, substantially in the manner and for the purposes set forth.

43,271.—Lever Paddle.—John Harris, London, England:

I claim the combination of the slotted brackets, k m, and reciprocating pivots, l j, with the slotted handle, F, of the paddle, E, with the working beam, H, and rock shaft, I, all constructed and operating in the manner and for the purpose substantially as herein set forth.

[This invention relates to a certain novel arrangement of lever paddles, rollers, rocking frames, and fulcrums, whereby a greater percentage of the propelling power is usefully applied than by using propellers of the ordinary construction, and which may be used for the propulsion or for the steering of vessels by causing a paddle so to act as to give the inertia of the water a greater purchase, and by bringing the paddle into and from the water with as little resistance from, or disturbance to, the water as possible.]

43,272.—Device for folding Envelopes.—William Henry Hook, Walworth, England :

I claim marking or impressing moistened lines on paper for the purpose of facilitating the process of folding, and the machinery or apparatus employed therein, as described and illustrated in the accompanying four sheets of drawings, or any modification thereof.

43,273.—Anchor.—Edward R. C. Morgan, Mumbles, South Wales, assignor to Abraham Morrel, New York City :

I claim connecting the two flukes of an anchor, hinged to the shank by separate bolts, by a curved bar, G, passing through a suitable hole, h, in the shank, in the manner and for the purpose substantially as described and set forth.

43,274.—Blast Furnace.—Woldemar Raschette, St. Petersburgh, Russia, assignor to Alexander Trippel, New York City. Patented in Russia, Feb. 22, 1862 :

I claim, first, A blast furnace, A, the hearth of which when bisected by a horizontal plane, presents a narrow long rectangle, the short sides of which are to be used as working sides, and the two long sides for two or more rows of tuyeres, and whose long and short sides increase gradually from the hearth up to a point near the throat, substantially in the manner and for the purposes herein shown and described.

Second, The employment or use in combination with a long rectangular hearth of a double row of tuyeres, each tuyere being placed so as to be between two of the opposite side, in the manner and for the purpose substantially as specified.

Third, The arrangement of one or more fire-places, and a series of fire-flues under the bottom and through the walls of the furnace, A, constructed and operating in the manner and for the purpose substantially as set forth.

Fourth, The slotted air-chambers, substituted for or in combination with the tuyeres and applied to the furnace, A, substantially as and for the purpose described.

43,275.—Holster.—William Tileston, Georgetown, D. C.:

I claim the attachment of the wiper, E E, and the sheath, D D, to the holster, A, substantially as described.

RE-ISSUES.

1,704.—Sewing Machine.—S. Pancoast (assignee of Geo. Fetter), Philadelphia, Pa. Patented Oct. 23, 1960 :

I claim, first, The hook or loop-catcher, N, formed substantially as described and illustrated, the said hook being arranged to revolve around or adjacent to a spool case, and being so situated in respect to the eye-pointed needle, and having such a motion imparted to it in connection with its revolving motion that it will seize the needle thread, carry the same around, or partly around, a spool case, and release the said loop of thread, all substantially as set forth.

Second, The guard, M, or its equivalent, constructed, arranged, and operating on the thread which passes from the spool case to the fabric, substantially as set forth.

Third, The stationary spindle, I, with its disk, J, the hollow spindle, G, and carrier, H, the annular cap, L, and spool case, K, the whole being arranged and operating substantially as set forth.

1,705.—Mode of casting Plow Plates.—F. F. Smith (assignor to himself and the Collins Company), Collinsville, Conn. Patented Nov. 20, 1860 :

I claim, in. connection with the making of cast cast-steel plow plates in molds, the opening or loosening up of the mold before the molten metal chills enough to shrink to any extent, for the purpose of relieving the plate or casting, and to prevent it from cracking by the shrinkage of the cast cast-steel in cooling, substantially as herein described.

1,706.—Plow.—F. F. Smith (assignor to himself and the Collins Company), Collinsville, Conn. Patented Nov. 20, 1860 :

I claim a plow the plates of which are made of molten cast-steel, substantially as and for the purpose described.

1,707.—Mode of attaching Door Knobs to Spindles.—Emery Parker, Meriden, Conn. Patented May 5, 1863 :

In combination with a screw-threaded knob, and the screw-threaded angular spindle, I claim the key or clamp piece, b, or its equivalent, fitting a recess in the end of the shank, located entirely within the escutcheon, and concealed thereby from view, in the manner and for the purpose substantially as set forth.

I claim the employment of the independent washer, e, in combination with the spindle, escutcheon, knob, shank, and metal piece, b, when constructed and arranged substantially as and for the purpose described.

1,708.—Buckle.—Frederick Stevens, Harrison Township, N. J., assignee of Luther Fogg, Boston, Mass. Patented June 2, 1863. Re-issued Aug. 11, 1863 :

I claim the connection of the tongue with the surrounding frame by a hinged joint, substantially as described, in combination with its connection with the metallic shank by a second hinged joint back of, and parallel with, the hinged joint by which it is connected with the surrounding frame, substantially as described, whereby the tongue can be made to liberate the end of the strap independently of the bending or yielding of the connection between the shank and the strap, or other article to which it is to be attached.

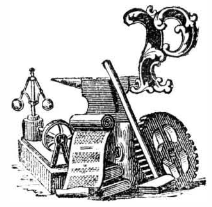
I also claim the curved or bent frame having the inner face of the cross bar, b′, sloping or beveiled, or of equivalent form, in combination with the griping tongue, substantially as described.

And I also claim grooving the griping end of the tongue, substantially as described, when combined with the surrounding frame, substantially as described.

DESIGNS.

1,964.—Lady's Hat.—Wm. E. George, Wentham, Mass., assignor to Joseph Cowell.

1,965.—Plate of a Cook's Stove.—Garrettson Smith & Henry Browne (assignors to J. G. Abbott and C. Noble), Philadelphia, Pa.



PATENTS

GRANTED

FOR SEVENTEEN YEARS !

MUNN & COMPANY,

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

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

CHAS. MASON.

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

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

Very respectfully, your obedient servant,

J. HOLT.

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

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

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

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

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

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

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

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live 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.

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

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

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

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

CAVEATS.

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

REJECTED APPLICATIONS.

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

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

FOREIGN PATENTS.

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

Inventors will do well to bear in mind that the English law does 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 MUNN & CO's Agency, the requirements of different Government Patent Offices, &c , may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

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

INVITATION TO INVENTORS.

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

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

COPIES OF PATENT CLAIMS.

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

THE VALIDITY OF PATENTS.

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

EXTENSION OF PATENTS.

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

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

ASSIGNMENTS OF PATENTS.

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

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

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

Notes & Queries

P. D. G., of N. Y.—You cannot straighten your circular saw by hammering. The face of the hammer, or drop, as well as of the anvil, must be equal in extent to the size of the saw. Manufacturers of circular saws are provided with tools of this description.

B. O., of N. Y.—Chloride of nitrogen is made by passing chlorine through salammoniac. Great caution is requisite to avoid accidents.

L. M. R., of Ohio.—Caloric engines are not made large enough to operate flour mills. They are used chiefly when small power is needed.

J. M., of Pa.—We presume you can obtain rifle barrels of the kind you mention by addressing Messrs. Blunt & Sym, of this city.

G. C., of N. Y.—Plow-shares are painted with blue paint, and varnished.

A. Van V., of N. Y.—The mode of setting your boiler is defective in one point; that is the smoke-box, or more properly the combustion chamber at the end. The boiler is but 13 feet long, and you have a smoke-box at the end 12 feet long. The gases evolved from burning fuel ignite only at certain temperatures, and your smoke-box is so long that the gases aforesaid get so cool that they pass out through the flues unconsumed. Shorten your smoke-box one-half at least; and you may make it even less with benefit. Try it six feet long first. Otherwise your boiler is well set.

E. J. B., of Ohio.—It takes time to burn gunpowder as it does to do anything else. If you will put a very large charge in a gun and fire it over snow, you will find unburned grains on the surface of the snow. The quantity that will burn in a gun depends upon the length and caliber of the gun, the quality of the powder, the size of the grains, and other conditions, all of which perhaps are not understood.

T. N., of N. J.—The proper proportion for cement pipe is one of water cement to three of sand. Gravel from the size of a pigeon's egg down is better than fine sand, and it must be perfectly clean and free from mold or vegetable matter. The cement and sand must be thoroughly mixed before the water is added, and it must be used immediately after mixing. The most common cause of failure is a poor quality of cement.

O. H. R., of N. Y.—We know of no oil that can be burned with a blow-pipe without smoke or smell. A lamp that would burn kerosene in this way would be a valuable invention, now that alcohol is so high. Probably all that is required is a thorough mixing of air with the vapor of the oil.

G. B. S., of Canada.—If you are a Canadian the patent fee will be $500, to be paid at the time the application is made.

F. P. C., of Mass.—Some time ago we gave the rule for calculating the horse-power of a steam-engine as follows :—Square the diameter of the cylinder and multiply the product by ·7854, this will give the number of inches area in the piston. Multiply the area by the pressure of steam and the number of feet the piston travels per minute. This must be divided by 33,000, which is supposed to be the standard for a horse-power. It seems that some have misunderstood this simple matter, and one subscriber asks whether a stroke is one movement of the piston or two. If the whole number of feet traveled by the piston in a minute be reckoned there can be no confusion. Of course, if a piston goes two feet in one movement through the cylinder, in coming back it travels two more, or four in one revolution. By the rule given, a 4-inch cylinder and 12 inches stroke, making 100 turns in a minute, with 50 pounds pressure, is 3·111 horses-power. The square of the diameter is 4 x 4=16; which, multiplied by 7854, gives 12·5664 as the piston area. This again multiplied by the steam-pressure, 50 pounds gives 628·3200, which, multiplied by the distance the piston travels per minute, 100 turns (or 200 feet), gives 125664·0000; this being divided by 33,000 pounds, a standard horse-power, gives 3·111 horses-power. We trust that is clear enough.

J. & S., of N. Y.—B. is right. 100 cubic inches of atmospheric air weighs 31 grains, at a temperature of 62°, and under the average pressure at the level of the sea. If the pressure is doubled, 62 grains will be compressed into 100 cubic inches. Of course, a bottle filled with air is heavier than an empty bottle, and will sink deeper in water.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, June 8, 1864, to Wednesday, June 15, 1864:—

C. H., of N. Y., $25; J. V. C. C., of Conn., $10; C. S., of N. Y., $25; N. & A., of Conn., $41; E. B., of N. Y., $41; H. L., of N. J., $20; A. G. T., of Ill., $20; J. R. A., of Pa., $20; O. G. B., of N. Y., $16; C. A. S., of N. Y., $16; F. R. W., of Ill., $45; J. D., of N. Y., $16; J. V., of N. Y., $20; H. U., of N. Y., $75; H. P. G., of Pa., $40; W. S. R., of N. J., $25; D. C. W., of Mich., $25; I. H., of N. H., $16; J. R. F., of Ind., $16; E. H. B., of Pa., $25; S. L., of N. J., $16; J. B., of Mich., $25; T. S., of N. H., $30; A. W. O., of Mich., $26; R. A. C., of N. Y., $250; G. McK., of N. Y., $15; J. D., of Ill., $10; W. H. A., of N. Y., $25; J. W. H., of N. Y., $16; J. W., of N. Y., $22; L. A. H., of Mass., $16; D. L., of Pa., $25; A. W. H., of N. Y., $35; C. S., of N. Y., $12; H. H., of N. Y., $16; R. P., of N. Y., $31; W. H. A., of N. Y., $16; A. T. T., of N. Y., $20; H. L., of Mich., $20; I. H., of Pa., $20; P. B., of N. Y., $41; J. M. G., of Ill., $20; W. M. S., of Mich., $45; A. J. P., of N. Y., $16; E. H., of Ind., $16; S. N. T., of Wis., $15; B. & G., of Ill., $41; W. T., of N. Y., $16; J. P., of Mass., $25; F. L. T., of Wis., $25; J. R., of Mass., $16; C. L., of Canada, $25; C. & M., of Mass., $16; A. B. R., of Iowa, $25; W. P. W., of N. Y., $25; C. & P., of N. Y., $25; T. & P. S., of Pa., $16; T. S., of Pa., $20; A. B. A., of Conn., $28; E. B., of N. Y., $25; B. & D., of N. J., $15; G. H. G., of Pa., $45; M. J. D., of Ohio, $30; C. E. S., of Iowa, $25; W. L. M., of N. J., $50; H. G., of N. Y., $15; W. M., of N. Y., $16; R. M., of N. Y., $20; A. W. H., of N. Y., $16; I. N. C., of Ohio, $20; E. H. M., of N. Y., $20; E. B., of C. W., $16; E. S. A., of N. Y., $41; J. N. H., of Ind., $45; J. M., of N. Y., $20; J. S. McC., of N. J., $20; C. B., of Ind., $50; T. L. P., of Ohio, $16; J. W. S., of Mass., $16; T. M. S., of Tenn., $20; L. M., of Mich., $25; F. M., of Ill., $16; S. M. B., of Mich., $15; W. H. H., of Ill., $16; H. B., of N. Y., $16; D. F. W., of Maine, $25; L. S. S., of Maine, $26; R. R., of Ill., $10; E. C. S., of Maine, $16; D. L., of Ohio, $32; E. B. B., of Conn., $25; S. & T., of N. Y., $25; E. H. C., of Mich., $45; D. C. H., of Pa., $45; T. & J. C., of Mich., $25.

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, stating 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, June 8, 1864, to Wednesday, June 15, 1864:—

C. H., of N. Y.; J. V. C. C., of Conn.; E. B., of N. Y.; E. H. H., of N. Y.; A. B. A., of Conn.; W. P. W., of N. Y.; T. M. S., of Tenn.; J. P., of Mass.; E. H. B., of Pa.; A. B. R., of Iowa; S. & T., of N. Y.; M. J. D., of Ohio; E. G. W., of Minn.; A. W. H., of N. Y.; C. S., of N. Y.; E. S. A., of N. Y.; L. L. S., of Me.; C. W. & B., of Pa.; H. U., of Conn. (3 cases); L. M., of Wis.; W. S. R., of N. J.; J. H., of Canada; D. F. W., of Maine; E. B., of N. Y.; J. E. A. R., of Cal.; T. & J. C., of Mich.; W. L. M., of N. J. (2 cases); O. & G., of N. Y.; C. S., of N. Y.; C. & P., of N. Y.; E. B. B., of Conn.; A. W. O., of Mich.; F. L. T., of Wis.; D. W. C. W., of Mich.; O. B., of Iowa; N. & A., of Conn.; W. H. A., of N. Y.; H. S., of Iowa; D. L., of Pa.; C. E. S., of Iowa.

TO OUR READERS.

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 enclosing $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.

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.

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.

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* acknowledgement of our reception of their funds.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX., (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 artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. II., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received

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 preserved 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.

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.

MAIN & BROWN'S INDICATOR AND DYNAMOMETER. Now ready.—

THE INDICATOR AND DYNAMOMETER, with their practical application to the Steam Engine. By Thomas J. Main, M.A.F.R., Ass't Prof. Royal Naval College, Portsmouth; and Thomas Brown, Assoc. Inst. C.E., Chief Engineer R.N., attached to the R.N. College. Illustrated, from the Fourth London Edition. In one volume, 8vo, price, $1 50, by mail free of postage.

CONTENTS.

THE INDICATOR. The Indicator scale; To graduate the Indicator scale; When the atmospheric line is to be traced; The use of the small hole in the side of the stop-cock; Method of taking a diagram; It is important to have means of shortening or lengthening the string attached to the Indicator; The pressure of the steam and the state of the vacuum on the diagram do not correspond with the boiler-pressure and condenser-vacuum; The part of the engine to which the string should be attached; On the general configuration of the diagram under given circumstances; The above curves exhibit what has been going on within the engine; The slide diagram; To reduce the motion of the slide when too great; To explain an alteration in the length of the gab-lever affects the diagrams; To explain why the accompanying diagram has a different outline from the standard diagram; Top and bottom diagrams with the slide-rod lengthened; To find the nature of the curve, if the slide-rod be shortened; Top and bottom diagrams with the slide-rod shortened; The effect on the diagram, if the stop on the eccentric be too far advanced; Top and bottom diagrams with the eccentric stop advanced; To ascertain, by inspecting the diagram, if the stop on the shaft be not sufficiently advanced; Top and bottom diagrams with stop of eccentric put back; Slide diagrams with eccentric stop wrongly placed; The nature of the diagram when the portways of the cylinder or the steam-pipe are too small for the size of the cylinder and the speed of the piston; Diagram obtained when the steam is throttled; On the force of the diagram when the expansive gear alone is used; Top and bottom diagrams when working expansively; To show the advantage of expansive working over throttling; The general outline of the diagram may appear satisfactory, notwithstanding the engine is not in good working order; On the series of steps in the upper right hand corner of the accompanying diagram; To explain why, in certain cases, the steam-line (when the expansive gear is used) does not descend so rapidly as in the theoretical case; To ascertain the horse-power of an engine by means of the Indicator; Where accuracy is required a diagram should be taken from the top and bottom of the cylinder; A diagram representing the relative motions of the slide and piston at every part of the stroke; To find, separately, the value to be given to the steam and vacuum pressures; To estimate the work done in a single stroke of the engine; Method of employing the Indicator for ascertaining the quantity of water evaporated by a boiler; To ascertain the friction of the steam engine when working without any load; The diagram does not necessarily return into itself, and form a closed figure; To explain why the first diagram is rounded at the upper left hand corner; Indicator diagram taken when the engine is worked without condensation of the steam; High pressure diagram; Diagram obtained when there was no load on the safety-valve; Air pump diagram.

THE DYNAMOMETER. Method of obtaining the effective horse-power of an engine by the Dynamometer; Pressure of steam and the corresponding temperature and relative volume; Areas of circles of given diameters.

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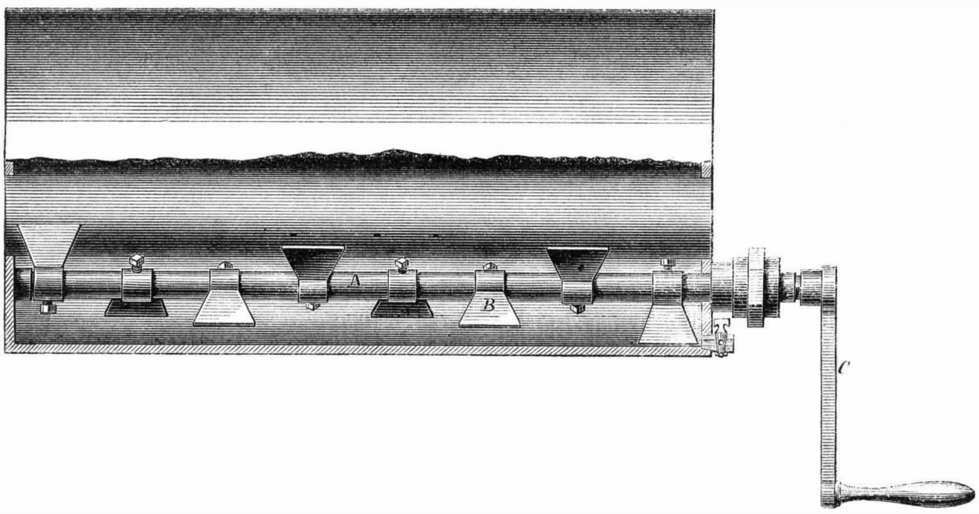

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BI-MONTHLY REPORTS OF THE AGRICULTURAL DEPARTMENT.

The new department of our Government, the Department of Agriculture, is exhibiting commendable enterprise. In addition to, or in place of, the annual reports which were issued in volumes too large to be read by most farmers, and which were circulated by the slow-moving Government printing establishment a full year after they were prepared, Commissioner Newton had decided to issue his reports in the form of small pamphlets once in two months, and we hope that means may be taken to have them printed without any very disgraceful delay. The principal reasons for the change are thus stated by the Commissioner in his bi-monthly report for March and April, the first of the series:—

"Although the annual volume issued by this Department has been published to the number of 130,000, and 60,000 additional copies have been ordered, yet a half million of them would be insufficient to meet the demand for them. Whilst this demand attests the approbation it has received, yet objections have long existed to the volumes that have preceded it from the Patent Office, on the ground that many topics discussed in them should have been earlier considered, and the facts embodied in them made public at an earlier period. Among the most prominent of like topics was such a collection of agricultural statistics as would serve to show the amount of each crop as soon as it was matured or harvested, that the price for it should be placed on the just law of supply; for if a commodity is scarce from the shortness of the crop, he whose labor has not met with its usual reward in quantity, from the vicissitudes of the season, should receive the compensation which the increased price gives, and not he who stands between the producer and consumer. Again, a question like that of the proposed tax on leaf tobacco, suddenly presented for consideration and action; or, like that of the manufacture of sorghum sugar and molasses, which the Department had considered through its chemist, and those engaged in it should learn the results in time for their operations; or, like that presented in this report, of the direction the raising of stock is taking; or, like that of agricultural education, which a recent donation by Congress has invested with unexpected interest, by demanding immediate action upon it—all such subjects, to be effectively acted upon, need to be discussed immediately, and without that delay consequent upon the publication of an annual volume only."

Other reasons for the change are also given at considerable length.

The first number contains 86 pages—more than half being devoted to minute meteorological observations. It seems to us that this information is interesting to the mass of people only when it has been reduced to general laws, and we presume that experience and reflection will lead to its omission from the future reports of the Commissioner. They can be filled with far more interesting and valuable matter.

THE SUBMARINE CABLES OF THE WORLD.

From an official communication of the Gutta-percha Company, London, to Cyrus W. Field, Esq., it appears that 52 lines of submarine cable have been laid by English firms in different parts of the world, all of which are in successful operation with the exception of that between France and Algiers, and it is supposed that that was injured by lightning. The longest line in operation is that between Malta and Alexandria, 1,535 miles. The deepest water in which any working cable rests is 1,550 fathoms—1$\frac{4}{5}$ miles—between Toulon and Corsica. The aggregate length of working lines given in the table is 5,105 miles, and this does not include a number of short lines laid in different parts of the world, nor those laid by Felten & Guilleaume, of Cologne, amounting to more than 1,000 miles. One line has been laid 13 years, five have been laid 11 years, four 10 years, and others shorter periods.

A Skillful Colored Mechanic.

Prof. A. W. Smith, of the Naval School, Newport, R. I., exhibited at our office, a few days ago, a very ingeniously-constructed miniature steam engine and boiler of about 6-fly power, we should judge, which was designed and constructed by Benjamin Boardley—once a slave in Maryland. Attracted by the mechanical genius and skill of Boardley, a few gentlemen clubbed together and purchased him of his owner and gave him his liberty. He soon found employment in the Naval Academy, and under Prof. Smith he now has the sole charge of the philosophical apparatus of the institution.

Joint-stock Companies in England.

Since the passage of an act by the British Parliament, permitting the formation of joint-stock companies with only a limited liability on the part of the stockholders for the debts of the company, a large number of manufacturers have transferred their establishments to joint-stock companies. We suppose the original proprietors generally take a considerable portion of the stock and continue to manage the concern; their object in making the change being to obtain the use of a larger amount of capital.

The Behring's Straits Telegraph.

Mr. Perry M. Collins is the projector of this great enterprise. The Russian Government is constructing a line across the continent of Asia to the mouth of the Amoor river, and from this point to the mouth of the Columbia is about 6,500 miles. It is this gap which the company of Mr. Collins proposes to fill. What they ask of Congress is the right of way across the public lands, the grant of a square mile of land at each station; the stations being 15 miles apart—and the payment of $50,000 a year for the Government use of the telegraph.

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