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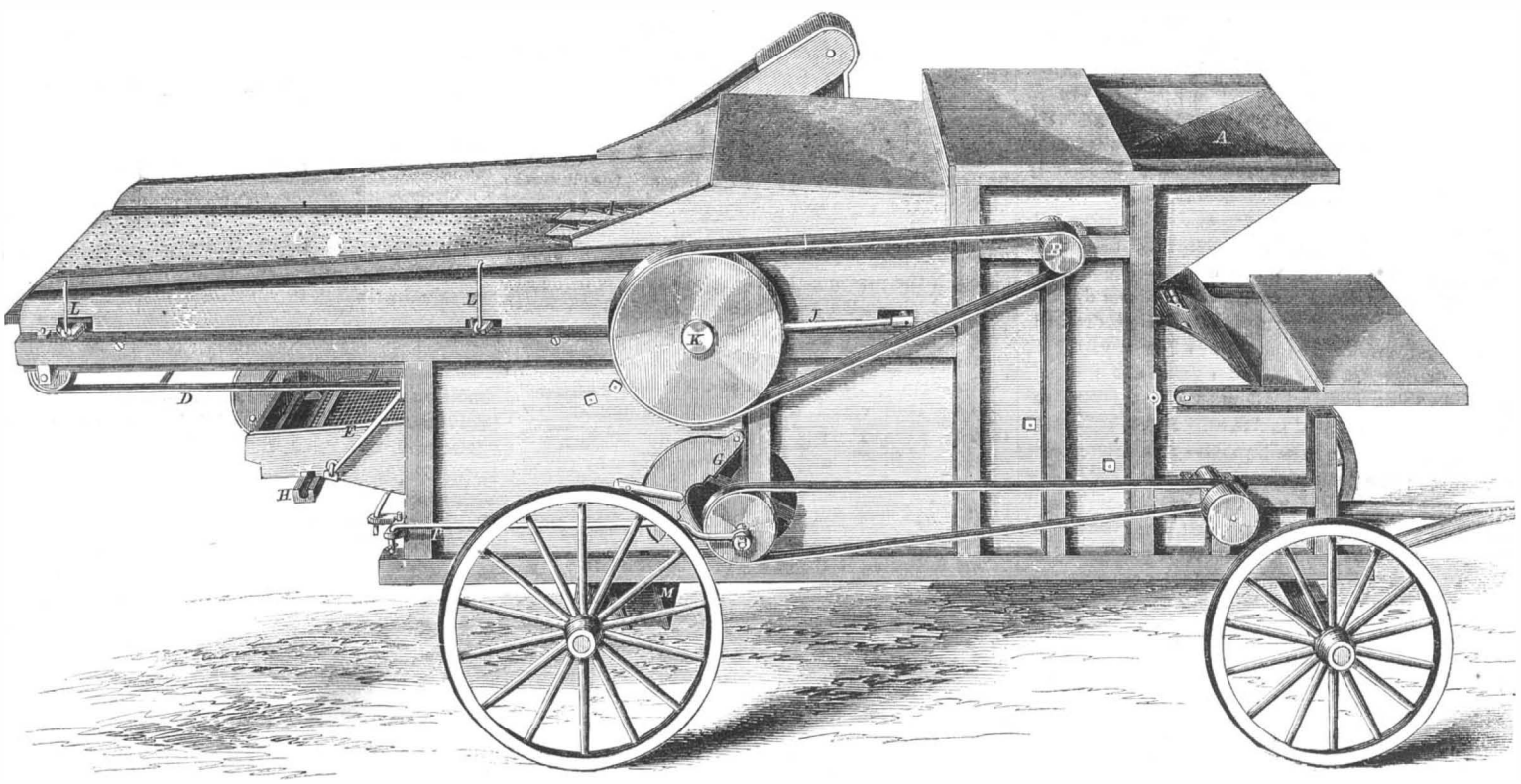
Improved Clover Thrasher and Huller.

No class of men are more indebted to the inventive genius of the country than our farmers. For many years the SCIENTIFIC AMERICAN has illustrated agricultural machinery having the latest improvements, and usually of the best kind; as the demand increases, the number of improved machines brought to our notice keeps pace with it.

The machine here illustrated is mounted on wheels and contains every appliance needful to separate clover-seed from the head. It thrashes, cleans, and thoroughly prepares the seed for use. The clover to be separated is thrown into the opening, A, and passes under a revolving cylinder, whose pulley and operating belt is seen at B. This cylinder, and the concave surface beneath it, is provided with a number of radial teeth or spikes, which tear open the heads and permit the seed to fall out on the perforated table or straw-carrier, C. Below this table there is another, over which the endless apron, D, works, and draws the clover-seed to the screens, E. These screens are placed one over the other and are worked by the crank and rod, F; this arrangement gives a sifting motion by which the dirt and chaff is set free by the fan-wheel, G. One end of the screens rest upon the slide-ways, H. The trough at the end of the screen, receives the partially cleaned seed, and it is then carried up by the elevators to the perforated table, B, and goes through the cleansing process a second time, or as often as is deemed necessary to complete the operation. Three serrated bars, I, are shown on the upper table; these are for the purpose of catching the straw and holding it loosely so that the seed can sift or work underneath it without clogging. The table has also a reciprocating motion given it through the medium of the connecting rod, J, worked from an eccentric on the shaft, K. The ends of the table are supported by the pendent rods, L. When the seed is thoroughly cleaned it is discharged into bags or other receptacles, placed beneath the chute, M. The whole process is extremely simple and efficient, and the work is done, we are assured, in the most thorough manner. The machine is driven by either horse or steam power, and can be readily transported to any point of a field or from one farm to another for use. It was patented on Dec. 16, 1862, through the Scientific American Patent Agency; further particulars may be obtained by addressing the patentees, Messrs. Fosdick & Crawford, at Dowagiac, Mich.



FOSDICK AND CRAWFORD'S CLOVER THRASHER AND HULLER.

New Material in the Arts.

We have recently seen samples of a new substance lately perfected, which promises to become very useful. The principal material is wood dust, combined with other substances in such a manner as to render it extremely plastic; so much so that it can be readily molded into every conceivable form. The inventor has succeeded in combining the finely-granulated portions of several kinds of precious woods in such a manner as to closely imitate the natural appearance, and this process he says he can repeat at will. The specimens we have seen are moldings, arabesques, and reproductions of various ornamental figures from the dies wherein the material was pressed. The dies were only experimental ones, made from plaster of Paris, and the pressure applied simply that which could be exerted by an ordinary copying press; yet with these crude tools very fine samples of carving have been produced. The articles can be afforded, we are told, at an unprecedentedly low price. From an inspection of the material used, and the manufactured articles, we think this new process is destined to become extremely useful and desirable. The love for the beautiful, which all our people possess in such a remarkable degree, can be gratified by the expenditure of very small sums; and we may expect to see furniture, ornamented with figures molded from this substance, sold at prices within the reach of all. The great variety of uses to which the molded wood may be adapted is not the least remarkable feature of it. Among the articles which can be made from it we may specify stereotype plates, figures of birds, beasts and reptiles, toys, picture frames, chair backs of all kinds, in fact almost everything usually made from plastic substances. When properly prepared it is not affected by heat or cold, and withstands the action of the atmosphere, so we are assured by the inventor. Various modifications in the manner of applying this material have been suggested to us, but we cannot allude to them in detail. Those interested in the matter will do well to consult the business notice of it on our advertising page.

The Stevens Battery.

We should be very glad to hear that the Government had decided to accept the very liberal proposition recently made to it by E. A. Stevens, Esq., in regard to the completion of his battery. We have been looking daily for some public announcement to this effect, but have not seen any as yet. The provisions of the obligation Mr. Stevens places himself under are, ostensibly, fair enough; and we do not see how the Navy Department can excuse itself from accepting this splendid vessel. It is rather a singular spectacle to see that Department protesting against being made the recipient of a first-class war vessel when the country needs them so much.

Manufacture of Quinine, Borax and Tartaric Acid.

The following is a condensed description (from the *Chemist and Druggist*) of the above-named chemicals as manufactured at Stratford, England. The works were established in the last century by L. Howard, F. R. S., and are now conducted by his descendants. The premises cover several acres of ground and about 200 men are employed in them.

Quinine is an extract of cinchona or Peruvian bark. It is employed as one of the most effective medicines in the treatment of intermittent fevers, and the demand for it is enormous. Peruvian, Countess's or Jesuit's bark was first introduced into Spain as a remedial agent about 1640, it having cured the Countess of Chinchon, the wife of the Viceroy of Peru, of a dangerous intermittent fever. A few years before, its properties were well known to the natives of the countries lying at the foot of the Andes, who had bestowed on it the appellation of *quina-quina* or the bark of barks. Its introduction into England met with great opposition, from an absurd idea that having received the patronage of the Jesuits, it must be necessarily a poisonous preparation intended for the wholesale extirpation of all good Protestants, under pretence of curing them of febrile maladies. It made its way, however, in spite of this notion, until at the end of the last century it became one of the most popular mendicaments for the cure of fever, gout and rheumatism. An immense impetus was given to its use about the year 1824, when the alkaloids, quinine and cinchonine were first extracted in a state of comparative purity by Pelletier and Caventou, since which period numerous manufactories of these alkaloids have been established. The bark imported from certain localities is sent over in skin cases, from others in coarse woolen bags. Before being used it is sorted with the greatest care. The process of making the quinine may be shortly described as follows :—The crushed bark is exhausted by several boilings with water, acidulated with sulphuric or hydrochloric acid. The several decoctions are mixed and filtered. When cool, slaked lime is added, until the liquid becomes alkaline and dark in color. The precipitate formed is collected, drained, pressed and reduced to powder when dry. It is afterwards digested in rectified spirits and filtered, the spirits being distilled off until the tincture assumes the consistency of molasses. Dilute sulphuric acid is now added, and the liquid is again filtered and crystallized; the yellowish sulphate obtained being decolorized by re-solution with animal charcoal and re-crystallization. It is finally dried with great care, at a very gentle heat, to avoid the slightest efflorescence. Sulphate of quinine is always more or less contaminated with the sulphates of the other alkaloids existing in the barks, such as quinidine or cinchonine.

"The crude material of borax used by Howard & Co., comes from the Tuscan lagoons worked by Count Lardarel. The manufacture consists in fusing the crude boracic acid with half its weight of soda ash on the floor of a reverberatory furnace; the mixture effervesces and is constantly stirred; during the operation a quantity of carbonic acid and ammonia escapes, the latter gases being carefully condensed The fret is then lixivated in iron boilers and allowed to rest until the impurities have subsided. The liquid is then drawn off into leaden tanks and allowed to crystallize very slowly, as the fancy of the market is to admire large crystals. The ammonia which escapes from the reverberatory furnace is condensed and made into liquid ammonia and ammonia bicarbonate, two products which are highly valued as articles of commerce.

"The manufacture of tartaric acid and Rochelle salt is also carried on, on a very large scale. The raw material in this instance is the argols or crude tartar obtained from the various European wine districts. Crude tartar is an impure bitartrate of potash. In order to prepare the pure acid, the rough tartar is dissolved in water, and chalk is added in equivalent proportions until tartrate of lime is precipitated, neutral tartrate of potash remaining dissolved. The tartrate of potash in solution is decomcomposed by chloride of calcium, thus the whole of the tartaric acid is separated as tartrate of lime. The product of the double operation is digested with dilute sulphuric acid, sulphate of lime being precipitated and tartaric acid set free. The clear cold solution is then evaporated, crystallized and re-crystallized, great care being taken to avoid the slightest traces of sulphuric acid. Rochelle salt—the double tartrate of potash and soda—is made by combining an equivalent of carbonate of soda with the purified bitartrate of potash and crystallizing.

Coast Defenses.

Through the *Commercial Bulletin*, Mr. Donald McKay directs the attention of the Massachusetts authorities to the best mode of harbor defenses, and in doing so gives extracts from an English work of Capt. Cowper P. Coles, on the national defenses of England, and from another by Sir S. M. Peto. The object of the communication is to show that against iron-clad naval steamships, fixed forts are of little use; and that the best harbor defenses should consist of iron-cased floating batteries. The following is a quotation from Capt. Coles's work, being the testimony of Capt. R. I. Sullivan before a board of commissioners :—

"'Do you consider that forts of any size or description would prevent the passage of iron-plated ships through a clear channel, however narrow?' 'Most certainly not; nor wooden ships by night, if any great object is to be gained by passing; that applies to every channel as wide as those defended by forts. Not only will iron-plated ships pass batteries easily, but we have especially to fear them, as bombarding vessels, both with guns and mortars. I believe from direct fire they will be safe at 1,000 yards range, if not less. With iron-plated ships especially I have no doubt that no stone fort which has ever been built will ever stand fire against them.' 'Could the forts at Sebastopol have stopped your fleet from going through, if there had been no obstructions?' 'Certainly not. I would mention with regard to ships passing forts, that at Kinburn, our own and the French gunboats ran through the channel close to the forts at night without being struck, or at all events, no casualties occurred; and one of our gunboats the next day, in broad daylight, came through the passage, the whole of the forts firing at her, and within 200 yards. Forts, it has been contended, are less costly than ships, because they are more durable. Now the value of an engine of war is measured by its efficiency, and if forts will neither stop an iron vessel nor prevent her bombarding, then they are extravagantly dear at any price. Even one iron ship may stop at least one other, by engaging her muzzle to muzzle, running down or boarding her; but I defy the whole of the proposed forts to stop even one iron-cased ship.'"

The following is an extract from Sir S. M. Peto's work :—

"Capt. Sir John Hay, R. N., said :—'It has appeared to me that the public money might be better used in constructing floating fortifications than in constructing fixed fortifications. I do believe that the money would be better spent in making movable fortifications (as I would call the iron-cased ships), which would be available for offense and defense.' Rear Admiral R. S. Robinson, Comptroller of H. M. Navy, a thorough and practical man, one of great experience, and having no superior in his profession, said:—'I consider that all defensive war ought to resolve itself into violent aggression upon the enemy. You should provide for the defense of your forts and arsenals, but you should also provide for a terrible assault upon your enemy. In fact, you should be prepared with those engines which would not only defend you when attacked, but which would, if you were driven to the necessity, enable you to carry that war at once, with immense power, to the enemy's own shores. A powerful means of assaulting your enemy is the true defense of your country.' Vice Admiral the Hon. Sir Frederick Wm. Gray stated :—'If money could be found, both for building forts and vessels for harbor defense, I should say, do both; if money could be found for one only at a time, I should say provide the iron-plated vessels first. You cannot advance your forts out to meet the enemy as you could your ships, and if they can pass those forts, they get at such a distance, that the only way of meeting them would be an equal number of ships.'"

Of 100 parts into which the surface of the earth can be divided, Europe contains 7; Africa, 21; Continental Asia, 33; New Holland, &c., 8; South America, 15; North America 16.

Peculiar Customs of the Japanese.

According to a recent authority, one great peculiarity of the Japanese is their mania for squatting; they seem to do everything in this position, and even when a man is plowing in a field he looks as if he wanted to squat. Their habits in many things seem to be so often exactly opposite to ours, that it almost resolves itself into a rule that everything goes by contraries. When they cook a goose, instead of putting the goose on the fire, they put the fire in the goose, thus making a great saving of fuel. In planing or sawing a board, they plane or saw towards themselves instead of from themselves. When you go into a house, instead of taking off your hat you take off your shoes. Instead of saying John Smith, they say "Smith John," and instead of Mr. Brown, "Brown Mister." The country is rich in flowers and vegetable productions. They have carried the art of making paper to great perfection. Dr. McGowan, in a recent lecture on Japanese customs, exhibited an overcoat made of paper, perfectly strong and serviceable. In this country we have paper collars, but in Japan they go further and have paper handkerchiefs, which are very soft and of very fine texture. But they are more delicate than we in one respect; after they have used a handkerchief they throw it away, and are thus saved the trouble of washerwomen. They even weave their paper and make what may be called paper-cloth of it.

Introduction of Foreign Patents.

On page 239 will be found the advertisement of Mr. Rawlings who has opened an office in London for the introduction of patented inventions into Great Britain. Mr. Rawlings is an English gentleman well known in this country, and it seems to us his position is such that he can do a good service to our citizens who have English patents to dispose of. We understand that he has already brought forward a number of useful patents in that country. Mr. Rawlings does not act as agent to secure patents—he simply devotes his energies to their introduction and sale, in respect to which a large field is always open.

The Dry Dock Iron-works.—In our report of the condition of the city machine-shops, last week, we inadvertently did an act of injustice, by adding "Company" to Mr. J. S. Underhill's name, thereby intimating that this gentleman was in partnership with some other person. Mr. Underhill is the *sole owner of the Dry Dock Iron-works*, and has no connection with any other firm. He has several contracts now on hand, as for instance, two large boilers for the steamer *Surprise*, some for the *Ariel* (Vanderbilt's ship) and one small screw-propeller engine, with a cylinder 16 inches diameter by 16 inches stroke. The wheel will be about 7 feet in diameter.

Cheap Sunlight.—An advertisement in another column informs our readers that they can get a New York *daily* newspaper, with the postage paid, for one cent per copy! It seems that the enterprising proprietor of the *Sun* is determined to send his paper to the country at the same rate he sells it in the city—cheap enough for anybody who can read a newspaper. The *Sun*, though small in size, has the substance of all the news in the larger papers.

New York Defenses.—The New York Harbor Defense Commission held a meeting on the 7th inst., and received a communication from Commodore E. A. Stevens, of Hoboken, proposing to sell his famous floating battery for harbor defense, for about half its cost. Several plans were also submitted for blocking the harbor against the entranc of a hostile fleet.

The Atlantic Telegraph.—The subscriptions in this city to the capital stock for laying a new Atlantic cable exceed fifty thousand pounds sterling. The maximum capital of the company is £600,000, divided into shares of £5 each. It is guaranteed 8 per cent. per annum by the British Government on the completion and during the working of the cable.

The first profile taken, on record, was that of Antigonus, who, having but one eye, had his likeness taken to present the "best side" to view; this occurred 330 years before the Christian era.

MISCELLANEOUS SUMMARY.

THE CURING OF MEATS.—A French chemist has lately asserted that scurvy will never arise from the use of salt provisions, unless saltpeter be used in curing; the salt alone answers all the purposes, provided the animal heat be entirely parted with before salting. He claims that the insertion of pork in pickle alone is not sufficient, but that it should be rubbed thoroughly with dry salt after it has entirely parted with its animal heat, and that then the fluid running from the meat should be poured off before packing the pork in the barrel which should be sufficiently close to admit no unnecessary quantity of air, and some dry salt should occupy the space between the pieces; and then pickle, should be added. Great care must be taken to fill the barrel entirely full, so that no portion of the meat can at any point project above the surface of the fluid; for, if this occurs, a change of flavor ensues, such as is known with rusty pork. The pickle, of course, must be a saturated solution of salt and water; that is, so strong that it is incapable of dissolving more salt. It should be remembered also that cold water is capable of dissolving more salt than hot water.

INCOMBUSTIBLE DRESSES.—In the London Polytechnic Institution, Professor Pepper has lately exhibited in a most original and practical manner the relative combustibility of muslin dresses prepared with certain chemicals and dresses not so prepared. He brought forward a lay-figure, attired like a lady largely be-crinolined. A light applied to the skirt of the dress soon caused the figure to be lost in a pyramid of flame, and some of the more susceptible of the spectators shrieked aloud at the frightful representation of a too frequent reality. For the second effect a real lady, attired in garments rendered incombustible by prepared starch, walked up and down between two troughs in which naphtha, furiously flaming, played upon her skirt unscathed. The starch with which the uninflammable dress was prepared contained about ten per cent of the tungstate of soda and the phosphate of ammonia.

GHOSTS.—The *Lancet* states that there has lately been exhibited in London an admirable illustration of what Science can do when it condescends to take the field against Imposture. It forms the subject of a lecture at the Polytechnic Institution, in the course of which is displayed a most ingenious contrivance wherewith any amount of very highly-finished ghosts can be produced to order. These Mr. Pepper, the lecturer, raises by the aid of a strong light, a mirror, a few lenses, and some smoke. Even an audience such as in Æsop's time preferred the imitation of a pig to the genuine squeak of a pinched porker, could not refuse the merit of superior ghost-making to the scientific device at the "Polytechnic," which will do more to upset the lingering faith in the foolish and wicked superstitions about ghosts than a considerable amount of reasoning or argument.

THE BRITISH NAVY.—The navy estimates for the year 1863-4 were recently published. It appears that the Government is able to reduce the expenditure by more than a million of pounds sterling. The number of seamen is 39,000 against 40,000 last year; of boys 9,000, as last year; coast guards 9,000, being 1,150 more than last year; of marines, 1,800. The Naval Coast Volunteers are taken at 8,000, and the Royal Naval Reserve at 16,000, making with men, boys, and marines, a total of 100,000. A parliamentary return shows also that the number of screw steamships in the navy, now afloat, is 414, and of paddles 108. Thirteen screw and two paddle steamships are building. The building of 29 others is suspended. The effective sailing ships afloat are 103; making the total steam and sailing ships in the British navy, on the 1st of February, 669 in all.

SUPPLY OF COTTON.—In the year 1860, 12,419,096 cwt. of cotton was imported into the United Kingdom; in 1861, 11,223,078 cwt., and in 1862, only 4,678,533 cwt. From the United States there came 9,963,309 cwt. in 1860; 7,316,969 in 1861, and only 120,752 cwt. in 1862. From India, 1,822,689 cwt. came in 1860, 3,295,004 in 1861, 3,505,844 in 1862. From Egypt, 392,447 cwt. in 1860, 365,108 in 1861, 526,897 in 1862. The exports of raw cotton from the United Kingdom amounted to 2,235,970 cwt. in 1860, 2,963,285 in 1861, 1,917,095 in 1862.

CHANCES OF DEATH IN WAR.—General Rosecrans, in his report of the battle of Murfreesboro, estimates that of 20,000 rounds of artillery, fired by the Unionists, 728 hit the enemy, and of 2,000,000 rounds of musketry, 13,832 were effectual. This would show that 27 cannon shots, or 155 musket shots, were required to hit one man. Averaging the latter at one ounce each, the weight of metal required in bringing down an enemy would be 9 pounds, while of the former it would require about 225 pounds, or one and a half the weight of the human body. As, however, the proportion killed or dying from wounds would be only about one-fourth of the number put *hors-du-combat*, the figures given above must be increased to the same degree. It will readily be seen how much more destruction is dealt by the musket than the loud-mouthed cannon, when firing either round shot or shell.

CAPABILITIES OF HUMAN STRENGTH.—Dr. Winship has now acquired a lifting power of over twenty-five hundred pounds. His remarkable apparatus is in his office, No. 1 Park street, Boston, where it may be seen by the curious. It is on record that one Richard Joy, of Kent, England, in the year 1703, succeeded in lifting a weight of twenty-two hundred pounds. Dr. Winship has surpassed this by three hundred, and, finding his strength increasing in an undiminished ratio, is still confident of reaching, within a reasonable time, his ultimatum of three thousand pounds. His motive in carrying physical development to this extreme is purely scientific; but he has not yet, we believe, recommended any one to be in this respect his imitator.

THE *Journal des Debats* says :—"A large portion of the public do not seem to be aware that the use of zinc vessels for domestic purposes is extremely dangerous. Vinegar, cider, wine, and in fact all acids which have remained in zinc become poisons more or less violent; this is even the case with milk, which contains lactic acid. Various cases of sickness have occurred, the cause of which has been clearly traced to the use of milk that has been in contact with this metal."

INTERESTING TO SHIP-BUILDERS.—A singular fact was recently mentioned at the Mersey Dock Board, Liverpool. On a question of substituting "cradles" for "blocks" in repairing ships, it was said that the very act of repairing them by the latter method was the means of putting them out of repair. Blocks force the ships' caulking so much that they are frequently found to be leaky, after undergoing a thorough repair.—*Exchange.*

[The above result is not the fault of the "blocks," however, but of the careless *blockheads* who docked the ship.—EDS.

THE LIMITS OF SCIENCE.—A Western steamer burst her boiler a few days since, and a gentleman found on reaching the ground, that an iron bar, six feet long, had gone in at his stomach and projected from his back. A surgeon informed him that if the bar remained it would cause mortification, and if it was removed it would cause him to bleed to death. "Science has its limits," remarked the doctor, "and you have your choice."

THE expense of the national debt in Great Britain, for interest and management during 1862, was about $120,000,000.

Cultivating Mushrooms.

At a late meeting of the Toronto (C. W.) Gardener's Society, one of the members—Mr. Gray—said that good mushrooms may be raised without using spawn, by collecting a sufficient quantity of as pure horse-droppings as possible and preparing it in the usual way. The bed may be formed three feet wide and of any length, according to the quantity of material or the demand for mushrooms. A layer of droppings about nine inches deep is first deposited and covered with loamy earth to the depth of three inches; then another layer of droppings of the same thickness covered like the former, each layer narrower as it advances in hight. When finished it will be in the form of a ridge and should be covered with a coating of hay or straw. The advantage of such a bed is that it will continue to bear for a long time. If a suitable cellar can be devoted to the purpose mushrooms may be had all the year through.

Who are to Fight.

All citizens are subject to military duty who are over twenty and under forty-five years of age, with the following exceptions :—Those who are of unsound mind; those who have been to the Penitentiary; those who have any bodily defect or disease; the Vice-President of the United States; all United States judges; the heads of the Executive Departments of the United States; Governors of States; the only son of a widow dependent on his labor for support; the only son of aged or infirm parents dependent on his labor—if two or more sons of such are subject, the parent may decide which shall go to the war; the only brother of children under twelve years of age, who are dependent on his labor for support; the father of motherless children under twelve, who are dependent on his labor for support; where there are a father and sons in the same family and household, and two of them are in the military service of the United States, as non-commissioned officers, musicians, or privates, the residue of such family, not exceeding two, shall be exempt, and no persons shall be exempt except those mentioned above.

The bodily conditions which exempt from military service are chiefly as follows :—1. Those having disease of the lungs or heart; 2. Loss of forefinger of right hand or toe; 3. Lameness in either foot; 4. Loss of any limb; 5. Having any kind of rupture; 6. Any defect in either eye; 7. Any deafness in either ear; 8. Having a "hump-back;" 9. Subject to any kind of fits; 10. Having chronic sore leg.—*Hall's Journal of Health.*

A Little Locomotive.

There is a locomotive engine, well-named *Tiny*, used in the Crewe Locomotive Works of the London and Northwestern Railroad, England, designed by Mr. Ramsbottom, the locomotive-superintendent of the line, for the purpose of conveying stores and materials of all kinds from one part of the works to another, together with the various parts of the engines being built or under repair. The line on which this engine works is nearly a quarter of a mile in extent, and is laid down to a gage of 1 feet 6 inches. In its course the engine traverses two reverse curves, of 15 feet radius each, and forms a complete *S*, in a space of twenty yards. No difficulty is found in going round these curves, even with a load of 12 to 15 tuns; or in taking 7 feet 6-inch-wheel forgings or tyres on edge, by means of trucks specially adapted for the purpose. The following are the dimensions of this engine. It is of the inside cylinder class, and has the four wheels coupled. Length over all, 7 feet 7 inches; breadth, 2 feet 6 inches; cylinders, 4½ inches diameter, and 6 inch stroke; wheels, 1 feet 3 inches diameter; wheel base, 3 feet; diameter of boiler, outside, 2 feet; length of boiler, inside, 4 feet 6 inches; diameter of flue, inside, 1 feet 5½ inches; length of flue, inside, 2 feet 5½ inches; number of tubes, 37; external diameter, 1¾ inches; and length, 2 feet. Heating surface, tubes, external, 34 square feet; fire-box, 7½ square feet. Total, 41½ square feet. The boiler is supplied by a No. 2 Giffard's Injector, and carries a saddle tank capable of holding 28 gallons. The total weight, in working order, is 2½ tuns.

Boats on the Erie Canal.

The Rochester (N. Y.) *Union* gives the following as a reliable statement of the capacity of the Erie canal fleet, for 1863, derived from an actual survey recently taken :—"There are now building at various points, in New York State, 214 boats, which will be ready for launching on the opening of navigation. These boats will have an average capacity of 200 tuns, thus adding 42,800 tuns to the carrying capacity of the fleet. There were 3,185 boats, good, bad and indifferent, afloat at the close of navigation last fall, and with the new will make a total of 3,399. Something over 2,000 of these boats are suitable for carrying grain; if each of these 2,000 grain boats make eight round trips in the season; and carries a cargo of 200 tuns, the total amount moved would be 3,200,000 tuns, or over 100,000,000 of bushels of wheat."

FOUR bas-reliefs, of colossal dimensions, have been brought to light in the course of the excavations in the ruins of Babylon.

HINTS FOR HOUSEKEEPERS.

There is no periodical on the list of our exchanges that we welcome more warmly than *Hall's Journal of Health*. Our readers are indebted to it for many interesting and valuable suggestions, regarding their moral and physical health, and also matters relating to domestic economy, which we from time to time extract from its pages. The articles are always well written and convey the author's ideas lucidly and forcibly. We commend the above-named periodical to all persons desiring to obtain useful knowledge at a very low rate. Dr. Hall is doing a lasting good by disseminating valuable information in a popular form. The following hints are especially seasonable :—

HOUSEHOLD VERMIN.—Including rats, ants, cock-roaches, bed-bugs, body-lice, &c.—These are to citizens what weeds are to farmers, compelling all to work for a living; and work gives a good appetite, a vigorous digestion, sound sleep, general health, and a good old age. It may be a question of ethics, whether we ought to set our wits to work in devising any short cuts in the direction of exterminating the house-pests above named. Until our doctors of divinity settle this point, the safer side may be taken of erring from ignorance, rather than overt design, if it be an error to wage a war of extermination against every living thing which occupies your premises without your consent, and without paying for "board and lodging." Prevention is the safest and noblest remedy; of these, personal and habitational cleanliness and a big tom-cat are perfectly efficient. But the number of clean housekeepers in the city of New York is not over one in a hundred, judging from the gangrenous green which defaces the "risers" in the steps which lead into our brown-stone mansions and the unswept condition of the gutter part of the street-way, in front of most dwellings. And if any of our readers are curious to see sights, let them "happen in" at some of the "auctions of household furniture," which are so numerous in New York in any April; auctions in first-class houses of families "going to the country," "breaking up housekeeping," or "going to Europe," meaning, three times out of four, perhaps, a "financial smash-up." Let any reader go into any dozen such places, and judge for himself as to the supply of good housekeepers, tidy and clean, in this great Gotham. But do not judge from the condition of the parlors and parlor furniture, but look into cellars and sinks, and closets and attics; inspect bedticks and mattresses, and "comfortables" and woolen blankets. Such sights! And then again, what loads of abominations in the cellar! What piles of bones and bottles; of old shoes and wads of fat; pork-skins, fish-heads, empty mackerel-kits, and Scotch herring-boxes; and other things, too numerous and suggestive to mention; so that if tidiness was the only remedy for house-vermin, New York would soon be like Egypt in olden time, when noisome insects swarmed on the food as it was being passed into the mouth. *Body vermin* breathe through their sides; common sweet oil plugs up their air conduits, and death from suffocation is speedy and certain, always. Ignorance in many cases makes the oil, which is the efficient remedy, merely the vehicle for applying poisons dangerous to man, which have no efficiency whatever in destroying vermin. *Roaches* greedily devour flour paste, and die while eating it, if into half a pint of it, while hot, a dime's worth of phosphorus is stirred, in a tin cup, with a long stick. When this is nearly cold, add a quarter as much grease, to keep it from drying; then smear it on broken glass or dirty board, to be left where they congregate. The "Persian Powder" is harmless to man, but certain death to insects. It is the powdered blossoms and flowers of a Caucasian vegetable, called "Pyrethrum Roseum," of a yellowish gray, odorless, tasteless at first, but leaving a burning sensation. The plant will flourish in our country, and seeds will be furnished by the United States Agricultural Department; address Hon. J. Newton, Department of Agriculture, Washington, D C. It is the best remedy known, because cheap, perfectly harmless to man, and infallibly fatal to insects. *House-flies.*—Take as much each of ground black pepper and sugar as will lie on a dime, moisten with two teaspoons of cream or rich milk, and spread it on a plate or board; the flies eat it, seek the air, and die out of doors. Or, mix the liquor of boiled poke-root with a little molasses, and spread it about on plates. The powder of coculus indicus, which boys use to stupefy fishes, destroys many insects, if scattered about their haunts. As for *rats*, it is best to keep a good cat or terrier-dog; or keep everything eatable on shelves hanging from the ceiling or around the walls. Chloride of lime, wrapped in a rag and stuffed in rat-holes or passage-ways, will sometimes drive them from the house for a few months, until the chlorine odor has disappeared. Five cents' worth of strychnine, mixed in three tablespoons of corn-meal, with a few drops of anise, attracts the rats, but it is too dangerous a substance to come into any household. A tablespoon of plaster-of-paris in powder, mixed with a pint of Indian meal, with grated cheese or oil of anise, is safe and effectual. Ten grains of powdered phosphorus, mixed with a pint of Indian meal, is a good remedy. Powdered potash, strewn in their paths, makes their feet sore, and drives them away. Rats are too cunning to be caught long by any kind of trap. But there is nothing so efficient as a good-mannered, well-trained cat; dogs annoy neighbors by their barking.

WHITEWASHES.—Common lime quickly and perfectly absorbs carbonic and other disagreeable and unhealthful gases and odors; and for this purpose, in times of plagues, epidemics, and wasting diseases, it is scattered plentifully in cellars, privies, stables, and gutters of the streets. It not only purifies the air and promotes physical health, but as a whitewash enlivens and beautifies wherever it is applied. As it is easily washed off by the rain, if not properly prepared as a wash, it has to be so frequently re-applied that it is considered troublesome by many; hence the rich use paint, and the poor use nothing to protect their dwellings, fences, &c., from the ravages of the weather; yet the difference between a well-whitewashed farm and one where no lime is used would amount to a large per-centage in case of a sale. For the physical and moral benefits which may arise from the abundant use of lime as a whitewash, several modes of preparing it, so as to make it more durable, whether applied in-doors or out, are here given, with the suggestion that the same amount of money necessary to keep a man's premises well whitewashed cannot be expended to as great a moral and healthful advantage in any other way:—1. One ounce of white vitriol (sulphate of zinc) and three ounces of common salt to every four pounds of good fresh lime, that is, lime which has not fallen into dry powder from exposure to the atmosphere, with water enough to make it sufficiently thin to be applied with a brush, yields a durable out-door whitewash. 2. Take a clean water-tight barrel, or other wooden cask, and put into it half a bushel of lime in its rock state, pour enough boiling water on it to cover it five inches deep, and stir it briskly until it is dissolved or thoroughly "slacked;" then put in more water and add two pounds of sulphate of zinc—that is, white vitriol—and one pound of common salt; these harden the wash and prevent cracking; this may be colored according to taste by adding three pounds of yellow ocher for a cream color; four pounds of umber for a fawn color, with a pound each of Indian red and lamp-black. 3. Mix up half a pail of lime and water ready for whitewashing; make a starch of half a pint of flour and pour it, while hot, into the lime-water while it is hot. This does not rub off easily. 4. A good in-door white-wash for a house of six or eight rooms is made thus: take three pounds of Paris white and one pound of white glue; dissolve the glue in hot water, and make a thick wash with the Paris white and hot water, then add the dissolved glue and sufficient water to make it of the proper consistence for applying with a brush. If any is left over, it hardens by the morning; but it may be dissolved with hot water; still it is best to make only enough to be used each day; spread it on while it is warm. It is said to add to the value and lastingness of any lime-wash if the vessel in which it is slacking is kept covered with a cloth; this not only confines the heat, but keeps the very finest of the particles of lime from being carried off by steam, wind, or otherwise. When it is taken into account how much buildings and fences are protected against the destructive influences of the weather, if they are plentifully whitewashed in April and November, to say nothing of the cheeriness, beauty, and purity which it adds to any dwelling, it is greatly to be desired that the practice of liberally whitewashing, twice a year, should be adopted by every household in the nation, where paint cannot be afforded, and on every farm.

A Good Way to cook Beef.

To steam beef, procure a cast-iron pot of large dimensions, having at the bottom a shoulder, which is found in most large iron pots, at the point where the diameter is diminished to fit the hole in the stove. Across this hole you place some pieces of shingle; then fill up the pot to the shingles with water; add a few pieces of lemon peel or a little mace if you please; place the meat upon the shingles; cover up tight with a fitted tin cover and place over a hot fire. You must be careful to add water occasionally, for if it should all boil away, of course the gravy would be burned, and the flavor of the meat injured. When finished, the bottom of the pot contains a large quantity of most excellent gravy, which, of course, must be thickened and seasoned. A rump of beef, or a shoulder, forms an excellent piece to operate on. Mutton is also fine. Try it.—*Country Gentleman.*

California Wine.

California bids fair to rival the world in the cultivation of the grape and the manufacture of wine. In the Sonora valley alone there are said to be 607,000 grape vines in a bearing condition and 500,800 which have not yet come into bearing. Already the wines of California, undoubtedly the purest and best coming to us by ship, are offered extensively throughout the Eastern States. Objection is made to California brandy that it lacks the color and strength peculiar to French brandy. But those who know how, and where, and of what the French brandies offered in this vicinity are concocted, give a very decided preference to the California article. A little reading on familiar subjects would cure a large majority of our people of their preferences for any description of European liquors, four-fifths of which never crossed the Atlantic ocean, and a large proportion of the remaining fraction we may be sure are manufactured of anything but grapes in England, where the grape is seldom perfected in the open air.

VITALITY IN HORSES.—Some experiments have recently been made in France by persons skilled in the veterinary art, with a view of ascertaining how long horses may live without food in certain contingencies, as, for example, being shut up in besieged places. These results have been achieved :—A horse may live twenty-five days without any solid food, and only drink. He may live seventeen days without eating or drinking. He can live only five days, when consuming solid food, without drinking. After taking solid aliment for the space of ten days, but with an insufficient quantity of drink, the stomach is worn out. The above facts show the importance of water in the subsistence of the horse and the desire the animal must feel to be supplied with it. A horse which had been deprived of water for the time of three days subsequently drank eleven gallons in three minutes.

OIL of cinnamon was formerly made at Colombo, of the fragments and small pieces broken off in packing. A great quantity of this oil is obtained from the coarse cinnamon, which is considered unworthy of exportation in any other shape. Three hundred pounds weight of the bark are said to yield no more than twenty-four ounces of oil. It at one time used to sell at 10 guineas a quart. Its excellence is determined by its sinking in water. The wood of the tree, when deprived of the bark, has no smell and is chiefly used for fuel.

THE following are the dimensions and weight of the masts of the new British frigate *Prince Consort*:—The mainmast is 116 feet long by 37 inches in circumference and weighs 18 tuns, 4 cwt.; the foremast is 110 feet long by 36 inches in circumference and weighs 17 tuns, 10 cwt.; the mizzenmast is 83 feet long by 24 inches in circumference and weighs 5 tuns 14 cwt.; the bowsprit is 43 feet long by 36 inches in circumference and weighs 4 tuns, 10 cwt; all made of iron.

VALUABLE RECEIPTS.

Browning Iron and Steel Objects.—Gun-barrels and other objects in iron and steel are browned, either to improve their appearance or to preserve them from rust, by giving them at first a thin but entire coating of oxide of iron. The following process is successfully employed in Prussia for browning steel barrels:—Dissolve two parts of crystallized ferric chloride, two parts of butter of antimony, and one part of gallic acid, in the smallest possible quantity of water (about four or five parts); with this moisten a sponge or cloth, and rub the object to be browned. Leave it to dry in the air, and repeat the operation several times. Then wash with water, dry, and rub with boiled linseed oil. Objects browned in this way have a very agreeable dead grey appearance, and the shade deepens according to the number of times the operation is repeated. It is essential to the success of the operation that solid butter of antimony should be used—that is to say, a chloride of antimony containing as little free hydrochloric acid as possible.

Covering Zinc with Brass or Copper.—To give zinc a coat of copper brass for the purpose of subsequent silvering or gilding, the following solutions are used:—For copper alone, a solution of sulphate of copper, saturated at the common temperature, is mixed with a solution of cyanide of potassium, adding as much of the latter as is necessary to dissolve the precipitate thrown down at first. The hydrocyanic acid disengaged during this operation must be carried off by a draft or flue. When the mixture is clear, one-tenth or one-fifth of its volume of liquor ammonia is added, and diluted with water to a density of 8° Beaume. For brass, blue and white vitriol are used in equal proportions, and prepared as before. Two parts of sulphate of zinc and one of sulphate of copper give a bright brass coating. Previous to their dipping, the articles of zinc are rubbed thoroughly with finely-powdered pumice-stone and rinsed with water, after which manipulation they are placed in the bath, and remain there for 24 hours. After that time they are again rinsed in water and wiped off. The copper or brass coating has a very bright look, as if polished, and adheres perfectly. The thickness of the coat may be increased afterward by the aid of a battery.

Gutta-percha Cement.—Melt together in an iron vessel, two parts (by weight) of common pitch, with one part of gutta-percha. It forms a homogeneous mass, which is much more manageable for many useful purposes than gutta-percha alone, and which, after being poured into cold water, may be easily wiped dry, and kept for use. This cement adheres with the greatest tenacity to wood, stone, glass, porcelain, ivory, leather, parchment, paper, hair, feathers, silk, woolen, cotton, &c.

Start the Tomatoes Early.

Those using hot-beds will have their plants up by this time. Those who have no hot-beds can yet gain some weeks by starting them in pots or boxes in the house. After the plants are up and have made two or three rough leaves, transplant them into small pots, and give them plenty of light and air. The small thumb-pots may be used for the first potting, and as they are so small that they readily dry out, a number of them may be placed in a box and surrounded by moss, saw-dust, sand, or anything that will retain moisture. When it is found by turning out the ball of earth that the roots have filled the pot, they may be shifted to those holding about a pint, taking care all the time that the plants have abundance of air and light, and grow stocky. They may be kept in their pots until all danger of frost is past, when they are to be planted out by turning out the ball of earth from the pot. The directions for after-culture will be given at the proper season. Earlier and better fruit is obtained upon light and sandy soil than from a wet and heavy one. The small pear-shaped and the smooth red varieties are the earliest. The Fejee is a few days later, but is so much more prolific and finer every way, that were we confined to one sort we should choose that. From a single year's experience with the French upright, or tree tomato, we think well of it. It is a very compact and dwarfish variety, bearing its fruit close to the main stem. It needs but a single stake to keep it from being blown over, and as it can be planted as near as 15 or 18 inches, probably as much fruit can be got off the same space as from any other variety. It must be started very early, as the fruit is a little late, but it is very solid, and according to our experience thus far, every way desirable. Those who have no gardens, but have room in the yard to set a barrel or two, can obtain a supply of tomatoes with a little trouble. John A. Briggs, of Franklin county, Mass., writes:—"Take a flour-barrel, knock out both heads, saw it in two in the middle, place the halves in any vacant place, fill about two-thirds full of earth, and manure and set your plants in them, and you will find your plants, if attended to, will do as well as in any other place. The writer of this has practiced this method for the last three years with perfect success. None need want for this delicious and healthful fruit unless they are too indolent to try the experiment." The plants grown in this way may be watered with waste water from the kitchen.—*American Agriculturist.*

About Cloves and Allspice.

Cloves are produced by a tree which is a native of the Molucca islands, and were like nutmegs a long time under the exclusive control of the Dutch Government, who for many years would not allow the trees to grow upon any except the island of Amboyua, from whence the highest-priced cloves still come. The tree is from 15 to 30 feet high, with large aromatic leaves and bunches of very fragrant flowers. The spice is the unopened flower-buds, which are beaten off by means of rods and then dried. The little ball at the top of the clove is the unexpanded petals; by softening the clove in hot water these can be carefully laid open by means of a pin. The main portion of the clove is what would be the fruit if it was allowed to go on and ripen. Our word "clove," comes from the French *clow*, a nail. That being the name by which the French call them on account of their resemblance to a little nail. They contain a good deal of volatile oil, upon which their value depends. This oil is sometimes extracted in part and the cloves afterwards sold. These can be told by their lighter color and by having the buttons or rounded portion broken off. Cloves readily absorb a considerable amount of moisture, and it is the custom of large dealers to keep them in a rather damp place in order to make them weigh heavily and look fresh and plump. It is bad economy to buy cloves or any other spice in the ground state as, aside from the risk of adulteration, the oil is absorbed by the paper in which they are put up.

Allspice is from a tree, nearly related to the clove tree; it grows in the West Indies, where it is largely cultivated for the spice, which in this instance is the fruit. The berries are gathered when green, for if allowed to remain on the tree until ripe they have an unpleasant flavor. It is also called Pimento and Jamaica pepper. The name allspice was given because it was thought to have the flavor of cloves, cinnamon, and nutmegs combined.

Northern Sugar.

Every person interested in the development of the resources of the country will rejoice to see enterprises of the kind spoken of below in a prosperous condition. The *Chicago Tribune* says:—

"A firm in this city are embarking quite extensively in the sugar-cane business. They have made arrangements to put up large manufacturing establishments at several points in Iroquois and Champaign counties. Their plan of business is to put up the mills, evaporators, and fixtures, and to contract with the farmers to plant a certain number of acres of cane, and to top and deliver it at the mill as it is wanted for manufacturing—binding themselves to pay 15 cents per gallon for the sirup made from the cane. One thousand acres have thus been guaranteed at Peru, 800 at Buckley, 600 at Onargo, 400 at Kankakee, and 600 at Clifton. Probably similar arrangements will be made at other points. It is intended, we understand, to boil the juice to from 21° to 25° Beaume, and ship it to the refinery at Chicago. The mills will be run by steam, using portable boilers, and steam and fire will be used in evaporating. The work will be carried on under open sheds. Each establishment will cost something in the neighborhood of $3,000. It is supposed by competent judges that should the season be favorable, the yield of sorghum in Illinois this year will reach 100,000 barrels."

Dieting.

Some persons eat themselves to death, others diet themselves to death. When a man is sick he is weak, and concludes that as when he was well he ate heartily and was strong, if he now eats heartily he will become strong again; well-meaning, but ignorant friends are of the same opinion, and their solicitations to eat become one of the greatest annoyances of a sensible invalid. Nature purposely takes away the appetite under such circumstances, and makes the very sight of food nauseating. A sick man is feeble; this feebleness extends to every muscle of the body, and the stomach being made up of a number of muscles has its share of debility. It requires several hours of labor for the stomach to "work up" an ordinary meal; and to give to it that amount of work to do, when it is already in an exhausted condition, is like giving a man, worn out by a hard day's work, a task which shall keep him laboring half the night. Mothers are often much afraid that their daughters will hurt themselves by a little work, if they complain of "not feeling very well;" and yet if such daughters were to sit down to dinner and shovel in enough provender for an elephant or a plowman, it would be considered a good omen and the harbinger of convalescence. A reverse of such procedure would restore multitudes of ailing persons to permanent good health; namely, to eat very little for a few days; eat nothing but coarse bread and ripe fruits, and work about the house industriously; or what is better, exercise in the open air for the greater part of each day on horseback, in the garden, or walking through the woodlands or over the hills, for hours at a time. Objectless walks and lazy lolling in carriages are little better than nothing.

Brazilian Forests.

When we look at the beautiful rosewoods, I think we have hardly begun to see the specimens of the Brazilian forests. Ere long the railroads into the interior, which have been chartered, will bring to the seacoast those giants of the forest. I have been surprised, again and again, in looking at those beautiful trees, which are of the "sensitive plant" character. When the sun goes down, they fold their leaves and slumber, and are not aroused until by the morning sun and singing birds. I observed in some portions of the interior that rosewood was used for very common purposes. In Christian ox-carts the spokes would be made of rosewood. And I use the term Christian ox-carts in distinction from Roman ox-carts, where the axle and wheel turned together. Rosewood is used in carts made like our own. The teeth of cog wheels are often made of it. A gentleman showed me in his sugar-house a beam nearly forty feet in length, and three or four in diameter, which he told me was a violet-colored rosewood. He took me then to his pig-pen, and—would you believe it, ladies?—his pig pen-was made out of rosewood! I would not have you understand that it looked like the legs of a piano-forte. Nothing of the kind; for when left rough and exposed to the weather, it becomes as plebeian in its appearance as our own aristocrat, the black walnut of the Mississippi. When I returned, I brought with me a box of mosaic, made up of perhaps a hundred pieces of Brazilian wood, from the purest white to ebony black.—*J. C. Fletcher.*

At a large drinking-house in Berlin, Prussia, the customers are waited upon by female skaters. The instant a customer takes his seat, one of the damsels darts from the end of the room, skims over the floor, describing graceful curves, and in a moment is at his side and requests to know his wishes. One of these female waiters will collect a number of orders in her round, or carry her beer vessels to her customers without ruffling their snowy froth. The motions performed resemble skating, and strangers are likely to be deceived, but the act is performed by employing small iron rollers, set in strong but neatly-fitting boots. This is all the mystery. It takes time and practice to execute the movements well, and the work is somewhat fatiguing. The floors over which they glide are made of very smooth, hard, polished wood.

Correspondence

"The Science of Aerostation."

Messrs. Editors:—On page 193, current volume of the Scientific American, you presented an elaborate article, illustrated by an engraving, in which it was stated that a gentleman named Thomas L. Shaw, of Nebraska Territory, "thinks he has discovered a means whereby he can govern the direction of the balloon, and move whereSoever he listeth." In commenting upon that claim, you remark that "most of the great inventions of the age have been perfected through patient and elaborate investigation," but with a very proper and wise caution you refrain from expressing an opinion that the "investigation" of Mr. Shaw has produced any practical fruit. An experience covering a number of years, and embracing as much of "patient and elaborate" study as was ever devoted by any other person to the subject, has given me some claim to speak in reference to it. As a result of my observation, I venture to affirm, with a confidence which I am well assured no future events will prove mistaken, that thus far every invention made with the object of reducing the navigation of the air to a mathematical certainty is a failure, and that every apparatus devised for the purpose of controlling balloons in the "ether sea" as ships are governed on the "waste of waters" is a labor-lost experiment. In pronouncing this opinion, in which I include Mr. Shaw's device with all others, it is proper that I—who have as much interest as any other living man in the success of those endeavors—should state why I have been led to entertain it. I will do so, very well knowing that in making contribution to your valuable sheet, "brevity is the soul of wit."

First: Mr. Shaw claims that he can "trim" and "tack ship" in his air-vessel as he would with a pleasure yacht; so that, with a wind traveling in one direction, he can haul close to it and move in another. The fallacy of this assumption must be instantly manifest to any one acquainted with the elementary principles of science. If Mr. Shaw had said that a man could sit in an arm chair, and, by taking hold of its rounds, lift himself off the floor, the declaration would have been quite as truthful. Why is it that a ship can tack against the wind? Clearly for the reason that the hull or body of the vessel is immersed in the water, while the sails, or propelling machinery are in another element, the air. The vessel has a center board, or keel, well down in the water, which presents a resisting force and keeps it from drifting, while the wind bears away the sails and imparts motion. If the ship and sails were all under water, would this be the case? The balloon, net, car and fixtures are all enveloped by a single element, in which and with which it travels, and must necessarily do so. The horse gets a foot-hold and draws, the ship gets a foothold and travels against the wind, but the only foothold for a balloon is a shifting or variable current, with which it must travel.

Second: Mr. Shaw talks about condensing cylinders, but very much like a man who has no practical ideas on the subject whatever. You understand perfectly well, of course, that in order to condense gas a very powerful apparatus is necessary. Nothing else than a steam engine will avail, and for several very cogent reasons. To reduce a thousand cubic feet of gas to fifty feet—the pressure of the atmosphere being fifteen pounds—would require, in order to do it as rapidly as necessary, a steam engine of twelve to fifteen horse-power; no manual apparatus would avail. The cylinder to contain this diminished bulk—the elasticity of the element being considered—must be strong enough to resist a pressure of five or six hundred pounds to the square inch. The best locomotive boilers are capable of withstanding a pressure of only one hundred and twenty to thirty pounds to the inch. [You are mistaken, Mr. La Mountain, boilers of the kind in question bear nearly twice that pressure, or two hundred and twenty pounds to the square inch, working pressure.—Eds.] To reduce a single thousand feet of gas to thirty-two feet, would call for a pressure of four hundred and eighty pounds to the inch; and as the bulk increased, the pressure must do so necessarily. You can imagine how powerful the apparatus called for must be. Mr. Shaw may say that he would "gear up." The answer to this would be, that what he thus gained in power he would lose in time; and in aerostation time is an all-important consideration. Does your inventor propose to carry up a steam engine, the needful fuel, the water which will be evaporated, and a heavy cylinder and compact pump, to retain and condense the gas? Then his apparatus would be so heavy as to require a "flattened sphere" of such size that it would be entirely unmanageable in the wind. Probably the managers of some of your New York gas manufactories could give the gentleman information that would be novel to him, respecting the difficulty of condensing gas.

Third: To have his balloon "tack to the wind," Mr. Shaw proposes to make it with a flat surface. Is not this rather ridiculous? Every amateur who has studied the philosophy of aerostation must understand the fact that balloons are made globular because in that form they present the greatest possible surface, with the least resistance to the atmosphere. If you fashion one 30 feet in diameter, it has a capacity of 14,137 cubic feet, and an ascensive power of 884 lbs.; but one having twice the diameter, or 60 feet, has a capacity of 113,098 cubic feet, and a lifting force of 7,069 lbs. Increase your diameter to 100 feet, and you get a capacity of 523,599 cubic feet, and an ascensive power of 32,725 lbs. It follows that, by retaining this form, you might, if you saw fit, make your balloon of boiler iron, weighing two pounds to the square foot, and by a sufficient increase of diameter, would still have ascensive force to lift it. How with the flattened sphere? It is not possible to make one with a breadth of 20 feet at the equator, however light your material, which will do more than lift itself, and no matter how much you increase the size, you gain nothing. If its diameter extended from New York to Dunkirk, it would hardly elevate itself. Where would Mr. Shaw get power to carry up his steam engine, fuel, water, and condensing apparatus? Again, how does he propose to keep the sides of his sphere flattened? Are they to be made of boards, or zinc, or some other non-yielding material? Otherwise, the "upward tendency" of the gas would inevitably "bulge" them out, and neither Mr. Shaw nor "any other man" would be able to make a net to prevent it. For the "mission" of the net is not to give shape to the balloon, but to hold it in equipoise, and afford fastening for the attendant car.

Fourth: I do not make these remarks in the character of an "old fogy." On the contrary, I have been considered somewhat of a balloon enthusiast myself. I have simply to say that I have practically tested every idea which Mr. Shaw advances, and proved its fallacy. It is quite possible to dispense with ballast to a great degree, and to elevate or depress a balloon by a fan-shaped apparatus, if power can be got to run it; and for this purpose the "perpetual machine" with which you humorously propose to make a voyage to the moon is a desideratum. I had a small model of such a contrivance rigged to my monster balloon "Atlantic," with which I made the longest trip by far on record, from St. Louis, Mo., to Watertown, N. Y., nearly twelve hundred miles. The propeller can, however, only be run by an engine. This occupies room, makes weight, uses fuel. It is perfectly practicable to navigate air, with a reasonable degree of certainty, but this is to be done—not by such means as your inventor proposes—but by taking advantage of certain atmospheric peculiarities, as well defined and fixed as the precession of the equinoxes. There is always traveling from West to East—as I have demonstrated in scores of ascensions with this express object—a current which belts the earth, and the aeronaut has but to enter it, and his direction is fixed. Upon this fact I have often staked my reputation and my life. Of it I am as well well assured as of the flow of the Hudson or, what is better as an analogy, of the great Gulf stream. By this current I am fully resolved—so soon as I shall have completed preparations which I am now making, and events shall leave the public mind free to attend to such matters—to hazard a voyage across the Atlantic ocean, which I am certain I shall accomplish. Meanwhile, understand I do not say that "perpetual motion" machines and "flying apparatuses" and "railroads to the moon" are impossible; I simply insist that no practical contrivance of the kind has *yet* been devised.

John La Mountain, Aeronaut.

Lansingburgh, N. Y., April 10, 1863.

Boiler Explosions.

Messrs. Editors:—I have long been looking for some such explanation as that contained on page 210, current volume of the Scientific American, to account for many boiler explosions which occur without any ascertained cause. There is in the minds of most engineers a conviction that many explosions do not occur from defective construction or inability to withstand the ordinary working pressure. With this idea theories upon theories have been invented, and accepted for the want of something better, until destroyed by the results of practical experience. One of the latest is that by Mr. Z. Colburn, which certainly appeared very plausible, and great credit was given to it. Late experience, however, with our gunboats has not tended to confirm that theory. In some two or three cases shots have penetrated the steam drum of the boiler, and the escaping steam has scalded many of the crew to death. According to his theory the boiler ought certainly, to have exploded; such a result, however, has not followed. Neither is it likely that more than a small proportion of explosions, say 25 per cent, occur from defective plates. I have seen a 4-feet boiler with $\frac{3}{8}$-inch plates tested to 400 pounds. I have also seen an old 4-feet boiler working 40 pounds, which, after it was taken out was found to be only $\frac{1}{16}$th of an inch thick for a considerable length along the junction of the boiler and brickwork. The majority of explosions occur just as the engine is started, or when the water is turned on, or the safety valve eased. The rise of the water over any heated surface by any of these means could not make steam so rapidly that it would not be indicated at the safety valve some seconds before the explosion. The result would be still more slowly attained by means of the cold-water pump. Besides these reasons it is questionable if the over-heated plates could make steam enough to raise the pressure very considerably. Mr. Colburn gives figures to prove they could not. We must look to some other cause than those above-mentioned for many explosions. If it is a fact, as you state, that water may be heated in an open vessel to 360°, and then explode instantaneously, the same result might also occur under pressure. We want no other explanation. And while discussing the subject, I will mention a fact connected with it, which came under my observation. A hand-pump which was used for filling a boiler had its inlet to the boiler in the steam space. Upon using it when the steam was up, every time the water was injected it occasioned a series of loud reports, like those of a pistol shot inside—whether this was occasioned by water or air entering I am unable to say. Perhaps some of your readers have observed the same results. E. Brown.

Philadelphia, Pa., April 7, 1863.

Questions to Millers.

Messrs. Editors:—In a late number of the Scientific American you suggest to parties having the opportunity to try various burr dresses, &c., for grinding, and report the results; and as it will, I have no doubt, be liberally responded to, I would here ask a few questions of experienced millers:—Does a sharp burr (say 3½ feet) make more middlings than a dull one? Does a deep-furrowed burr make more middlings than shallow furrows? Which is best to grind middlings on, a dull burr or a sharp one? Which yields the greater proportion of middlings, an open or a close burr? Which will grind the fastest, and what proportion of middlings is the common yield to a bushel of sound fall wheat in making double-extra or family flour, when no bran-duster is used? Is a bran-duster economical with steam power? If some miller will answer these queries correctly, they will confer a lasting favor on many persons.

A Backwoods Miller.

Wyandott, Kansas, March 31, 1863.

A new sewing-machine manufactory is to be established in East Bridgeport, Conn., on land purchased from Mr. Barnum. We understand that Elias Howe, Jr., is the chief proprietor.

MORE EXPERIMENTS WITH IRON TARGETS--WHITWORTH AND ARMSTRONG GUNS.

We learn from our European exchanges that a new trial of guns and armor plates took place at Shoeburyness, England, on the 3d ult. Four guns were tried, viz.:—One of Whitworth's, of 7½-inch bore, with hexagonal rifled grooves; one Armstrong 9-inch smooth-bore, and one 10½-inch bore, rifled; also one of L. Thomas's rib-rifled 7-inch bore. The target consisted of several iron plates, 5, 6, 7 and 8 inches in thickness, 20 inches in width, and 8 feet in length. It was 11 feet in width and 8 feet high, with an embrasure of 3½ by 2½ feet. The plates were fastened to huge bars of iron, placed vertically and cross-wise, secured with 3-inch through bolts, screwed up behind. This target represented the strongest experimental gun-shield which has yet been constructed. The first experiment was made with Whitworth's 7-inch muzzle-loading rifled gun, weighing 7½ tuns, and nominally throwing a 120-pounder shot, though in reality made for projectiles of the weight of 150 lbs. and upward. This was loaded with 25 lbs. of powder and a flat-headed hardened projectile, weighing 137 lbs. It struck on the left side of the target with terrific force, emitting, at the moment of contact, a sheet of flame as broad and vivid as if another cannon had been fired from the mark in reply. The massive bar frame of 12 inches solid iron behind the plates was dislodged, and an 8-inch plate was cracked. The impact velocity of the shot was 1,240 feet per second. The next shot was from the Armstrong 9-inch smooth-bore, with a 100-pound round shot of wrought-iron, and a charge of powder of 25 lbs. The missile struck full upon the thick side of the target with a velocity of 1,470 feet per second, inflicting a tremendous circular dent 2¼ inches deep, cracking one of the inner plates of the target, and knocking off one of the massive bolt-heads. The target was roughly shaken, but not pierced.

A new bolt was screwed into it and the third shot was fired from the 10½-inch Armstrong shunt-rifled gun. This piece of ordnance weighs 11¾ tuns. It is rifled with 10 deep grooves on the shunt principle—the shot enters freely by the muzzle down one series of grooves, but it is regularly shunted into another series, along which it comes out when the gun is fired, and the grooves for exit being shallower than those for entrance, they, as it were, squeeze the shot with sufficient force to make it take the form of rifling, and give it the rotation on its axis. It was loaded with a hollow-headed conical-shaped shot, 19½ inches in length, weighing 230 lbs., with a 45-lb charge of powder behind it. It sent the shot with a velocity of 1,405 feet per second full on the thick part of the target, inflicting a broad damaging indent, shaking the whole structure a good deal, and cracking an outer upper plate; but still there was no through penetration.

The next shot was by Lynall Thomas's 7-inch muzzle-loader. This gun was 11 feet 6 inches long, rifled on a new plan, somewhat in appearance like the *canon raye* of the French, but with this difference, that instead of three grooves it has three ridges projecting nearly an inch into the bore; the elongated projectiles, 2½ diameters long, fitting into and between the ridges. The shot fired was a wrought-iron one of 151 lbs. weight, with a charge of 25 lbs. of powder. It was the first time the gun had ever been fired, and it hit the white spot aimed at so truly as quite to obliterate the mark, doubling up the shot itself into the form of a huge cauliflower, and making an indent almost as severe as that of the 100 pounder smooth-bore. Its velocity was 1,215 feet per second when it struck. The target appeared much shaken, but was still unpenetrated.

Mr. Whitworth's gun was then again fired, at the same range and with the same charge of powder and shot. The shot was aimed at the untouched plates, below the embrasure, and so close to the ground that the projectile struck the earth first, making a deep furrow; and, of course, considerably diminishing the force of its blow. For this reason it made but a very slight impression, and did no injury to the target that was worth speaking of.

The 10½-inch Armstrong gun was again fired, with a charge of 45 lbs. of powder, and a wrought-iron shot of 230 lbs. This tremendous missile injured the target considerably, and sent fragments of it flying through the air in all directions, with a hoarse roar that was terrible to hear. The force of this terrific blow broke some of the plates in fresh places, knocked the head off one of the bolts, and drove out another like a rocket.

L. Thomas's gun was again fired, with 27½ lbs. of powder, and a steel bolt weighing 133 lbs. Its maker stated he was afraid of his gun, as it was too deeply bored; and it was, therefore, fired with electricity, from a battery some distance off. When the charge was ignited the gun burst into fragments! The explosion was so complete that the masses were scattered in every direction, one piece weighing nearly a tun being thrown to a distance of 140 yards. The experiments were then terminated for the day. This gun had a steel interior tube, and an iron breech banded with a shrunk hoop 13 inches in width and 3 inches thick. The total diameter where it burst at the breech was 29 inches. It was claimed that the victory remained with the target.

Judging from these experiments, it appears that the smooth-bore gun, with a spherical wrought iron shot, was as effective as any of the rifled guns. It appears to us that Sir William Armstrong's shunt principle of rifling is one of the most erroneous ideas that has ever been applied to rifled ordnance. The fate of L. Thomas's gun is unfavorable to its character. A similar accident took place on the 26th ult., at the navy yard at Washington; while experimenting with a 50-pounder it burst, and a fragment of it, weighing 300 lbs., was hurled to a considerable distance.

The Artillery Arm of the Nation.

Some indefatigable person has compiled the following statistics in reference to the artillery now in use by the United States in crushing the rebellion.

There are now over five regiments of regular artillery in the United States service, consisting of over five thousand of the most efficient artillerists in the country. The volunteer batteries number over one hundred. A light battery consists of the following material:—Six field-pieces of brass or iron, four of which are rifled guns of 6-pounder caliber, and two 12-pounder howitzers. The requisite number of men for a light battery is as follows:—One captain, three lieutenants, six sergeants, eight corporals, two musicians, two artificers, one wagoner, and one hundred and twenty-five privates, making a total of one hundred and forty-eight men to a battery. Besides the six field pieces there are six caissons, two ammunition-wagons, and a traveling forge. The number of horses required is seventy-two.

Most of the artillery used in our service are brass pieces, manufactured at the Ames Company's works, Cabottville, Mass. They are mostly for rifled projectiles. The Parrott gun, manufactured at the Cold Spring foundry, is now generally used in the armies of the East, a few batteries of which are in the army of the West. These are very effective guns, being rifled. They are long, slim guns, gradually tapering from base to muzzle. We also use the Napoleon gun—a piece of ordnance shaped somewhat similar to the Dahlgren gun. This also is a rifled cannon, of great strength, and very effective at long range. At the battle of Antietam, a battery of these guns was served with terrible effect against a rebel Georgian regiment, literally mowing the men down in scores with its terrible storm of grape and canister.

We have now in the field some fifty-five regiments of artillery and thirty batteries, comprising about 103,105 men. This force, with six batteries to a regiment, makes the number of guns 2,160, to say nothing of the batteries of siege guns. The number of caissons is 2,160; of tumbrils, 720; and of traveling forges, 860. Seven hundred and twenty baggage-wagons are needed for this large artillery force. The number of horses required for these 360 batteries amounts to 25,340. It is estimated that we have some twenty siege trains, numbering eighty guns of heavy caliber; with these are twenty ammunition-wagons, and twenty traveling forges; the whole requiring a draft of 1,420 horses.

The pay of the five regiments of regular artillery is as follows:—The pay of officers amounts to $222,875 40, and the pay of non-commissioned officers and privates $1,174,964, making a total of $1,397,839 40. The cost of 3,050 horses for five regiments of regular artillery, at $60 83, the Government average price, sums up $123,678 50. The cost of clothing, which consists of overcoats, coats, pants, caps, shoes, shirts, drawers and socks, for the five regiments of regular artillery, is estimated to cost $159,066 60. The equipments for the regular artillery amount to $57,643 10; for small-arms, $39,130; for cannon, $16,100 28; for harness, $10,920; for caissons, $17,400; ammunition-wagons, $11,600; for traveling forges, $1,500; and the baggage-wagons, $4,350. The total cost for the support of the five regiments of regular artillery, exclusive of forage, is $1,004,128 78; but if we add forage and rations, a close estimate of which is $978,970, there will be a grand total of $2,883,008 78.

For sixty regiments of volunteer artillery, the pay of the men annually is $10,825,672 80. The cost of clothing for this vast force is $2,028,799 20; of equipments, $691,717 20; of arms, $1,069,596; of cannon, $513,920; of caissons, $208,800; of harness, $681,600; of tumbrils, $139,200; of traveling forges, $15,000; of baggage-wagons, $52,200; of forage, $2,488,320; and of rations $9,079,320. Add to this the cost and expense of maintaining twenty siege trains at $519,493, and we find the cost of keeping up the volunteer artillery corps to be $34,312,640 20. The total cost of the maintenance of the artillery of the United States, both volunteer and regular, amounts annually to the large sum of $37,195,738 98.

"I Don't Like My Business."

There is no greater fallacy in the world than that entertained by many young men that some pursuit in life can be found wholly suited to their tastes, whims and fancies. This philosopher's stone can never be discovered, and every one who makes his life a search for it will be ruined. Much truth is contained in the Irishman's remark: "It is never aisy to work hard." Let therefore, the fact be always remembered by the young, that no life-work can be found entirely agreeable to man. Success always lies at the top of a hill; if we would reach it, we can do so only by hard persevering effort, while beset with difficulties of every kind. Genius counts nothing in the battle of life; determined, obstinate, perseverence in one single channel is everything. Hence, should any one of our young readers be debating in his mind a change of business, imagining he has a genius for some other, let him at once dismiss you thought as he would a temptation to do evil. If the think you made a mistake in choosing the pursuit or profession you did, don't make another by leaving it. Spend all your energies in working for and clinging to it, as you would to the life-boat that sustained you in the midst of the ocean. If you leave it, it is almost certain that you will go down; but if you cling to it, informing yourself about it until you are its master, bending your every energy to the work, success is certain. Good, hard, honest effort, steadily persevered in, will make your love for your business or profession grow; since no one should expect to reach a period when he can feel that his life-work is just the one he could have done best and would have liked best. We are allowed to see and feel the roughness in our own pathway, but none in others; yet all have them.—*Hunt's Merchants' Magazine.*

Parrott Guns.

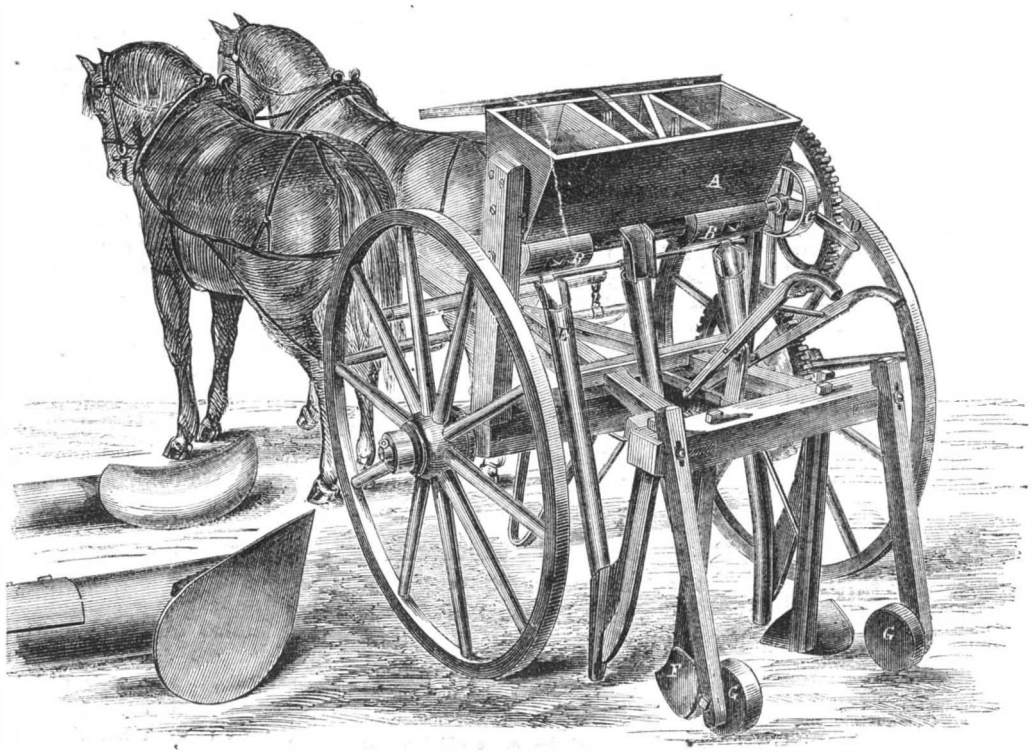
The cost of the smallest Parrott gun—6-pounder—is $200; for 200-pounders $2 000 each, which is said to be one-tenth the cost of the Armstrong gun. The charge of the powder is one pound to every ten of the ball, and the cost of powder and shell for every discharge is nearly $10. The weight of the 200-pound Parrott is a little more than one-half the weight of the Columbiad, which carries the 150 pound solid shot, or the 10-inch shell. The practice with these guns is excellent. Experiments are made daily, and with an accuracy most astonishing. The shriek of the ball, as it flies through the air at a velocity of over 600 miles per hour, is like that of a railroad train at full speed.

Poor Pussy!—It is remarkable that, although the ancient monuments of the Egyptians contain many painted figures of cats very similar to the Syrian examples now in the Zoological Gardens (London), the cat is nowhere mentioned in the canonical books of the Bible as a domestic animal.

Improved Seed Drill.

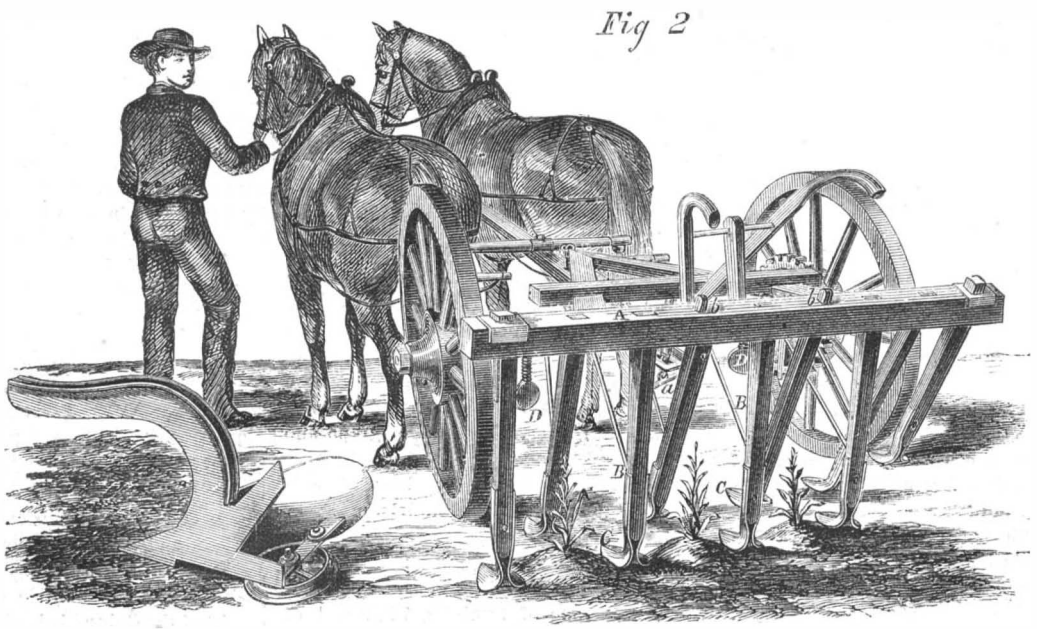
No more useful class of inventions exist than those which aid so materially in reducing the labor of the farmer and in cheapening the grain he raises. It would be a difficult task, we fancy, to reap and garner in the sheaves of grain which ripen in the harvest field, without the aid of such apparatus as have, from time to time, been illustrated in these columns. Appended are engravings of a new seed drill and plaster distributor recently introduced in the West.

Fig. 1 shows the arrangement of the machine. The hopper, A, is divided into three compartments, which have separate apertures, B, at the bottom. In the middle compartment the plaster is deposited, and the seed corn is contained in the two end spaces. The small pulley, C, is keyed on to a horizontal shaft running through the hoppers from end to end; this shaft has a number of teeth upon it which stir up the corn and plaster and draw them over an oval aperture in the bottom. The quantity allowed to escape into the tubes is regulated by the lever, D, seen at the right. The corn deposited in the tubes, E, is plowed in or covered up by the shares, F, and the earth is then packed above by the rollers, G, or wheels following after. The standards, carrying these wheels, can be removed altogether, if necessary, or reversed, in order to suit the changes in the hollow teeth. An enlarged view of the cultivator tooth is shown at the foot of the machine, as also a representation of a plow, in Fig. 2.



TRAVIS'S PATENT SEED DRILL.

The cultivator herewith illustrated is intended for working in growing crops; it has but very few parts to it, and the efficient working of the machine would seem to be secured by the plans of the inventor. The machine (Fig. 2) consists of the triangular wooden frame, A, mounted on wheels and attached to the draught-pole by an eye-bolt; this frame has a series of arms, B, attached, which terminate in the hoes, C. The axle of the machine, on which the wheels revolve, is provided with a long wooden bar placed across it, called a bolster; this bolster can be elevated by the thumb-screws, D. The frame, A, rests upon this apparatus, and thereby adjusts the depth to which the tilling apparatus works in the soil. The plow handles terminate at the lower end in a beam, which works bearings in provided for it in the frame; this bar has a goose-neck at the furtherest extremity from the reader, which works in a slotted plate, *a*, and permits the necessary vibration required by the inequalities of the surface. It also allows the cultivators, or plows, to be moved from side to side of the crop alternately, as the farmer may desire. There is, in addition, a gear wheel made fast to the axle which is intended to operate a seeding machine placed above the cultivator when necessary. The standards, B, have keys, *b*, driven in by the side of them by which they are secured to the frame. Provision is thus made for giving a certain degree of lateral adjustment to the standards, with reference to their distance from the rows of crops. All the standards are strongly braced by the small rods attached to them from the frame; and any sort of plow, or its equivalent, may be affixed to them as they can be readily adapted to suit that form of tooth or plow best fitted to the soil in which they are to work.



These inventions will recommend themselves to the agricultural community by the exceeding simplicity of the working parts. Testimonials of a high character have been forwarded to us respecting their utility and economy of time and labor. These patents were procured, through the Scientific American Patent Agency, on April 8, 1862, for the inventor, Mr. A. B. Travis, of Brandon, Mich., and further information can be had by addressing him at that place.

Photographic Experiments.

The Paris correspondent of the London *Photographic News* says:—

"Messieurs Davanne and Girard have undertaken a series of researches upon the fixing of proofs by sulpho-cyanide of ammonium, as proposed by M. Meynier. They first tried its action upon albuminate of silver, and found that it was much more energetic as a fixing agent than hypo-sulphite of soda. If a certain quantity of albumen be precipitated directly by nitrate of silver, and after the precipitate is washed and treated two or three successive times by sulpho-cyanide of ammonium, the residue carefully washed, we recognize that this residue, dried and calcined, leaves only very minute quantities of silver in the ashes; while, in operating in a similar manner with hypo-sulphite of soda, the ashes contain, relatively, considerable quantities of silver. The sulpho-cyanide of ammonium appears, therefore, to present a real superiority over hypo-sulphite of soda in respect to the absolute fixing of the whites of the proofs. This sulpho-cyanide can be made to replace cyanide of potassium and hypo-sulphite of soda in all their applications. It dissolves, with the greatest facility, all the salts of silver employed in photography—chloride, bromide, iodide, &c. In the state of concentrated solution it fixes negatives very rapidly; and when employed of the strength of 15 to 18 per cent of water, it serves to fix positives. It is a substance which readily crystallizes in fine white deliquescent crystals; it therefore merits the attention of photographers, but it must be carefully studied, for, although the first laboratory experiments appear to have been perfectly successful, yet long and extensive practice may show some inconveniences attending its adoption. Among its known advantages we may place in the first rank that of allowing the operator to handle indifferently negatives and positives, fixing baths, &c., without incurring stains or any other risk."

The Hoosic Tunnel.

The great tunnel on the Troy & Greenfield Railroad through the Hoosic Mountain, is not likely to be completed very soon, although it is several years since it was commenced. The commissioners appointed by the Massachusetts Legislature to examine the tunnel and report upon it, have done so, and the Governor has sent in a message upon the subject to the Senate. In it the statement is made that the commissioners find that a period of eight years will be necessarily employed in the accomplishment of this work; and that the total estimated cost of road and tunnel, including advances hitherto made by the Commonwealth, with interest on past and future advances and expenditures at five per cent, compounded until the expected completion of the tunnel, including also the expenses of altering and enlarging the work already bored, straightening and improving the road and bridges, amounts to the sum of $5,719,330.

ALL the ten-*sous* pieces in France are t be withdrawn from circulation and melted down. New fifty-*centime* pieces will be issued, but the standard will no longer be 9-10ths of pure silver, as heretofore, but 835-1,000ths.

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NEW YORK, SATURDAY, APRIL 18, 1863.

DEFECTS OF AMERICAN FLAX---CHOOSING SEED.

Linen is, perhaps, the most ancient and beautiful of all vegetable fabrics. One hundred years ago only, it was almost exclusively used in all civilized countries for shirting, sheeting and other domestic purposes, and cotton fabrics were then but little known. The rapid progress of the cotton manufacture and its extensive development during the present century are due to an almost unlimited supply, at a low cost, of this staple from the Southern States. Cotton is usually more expensive to cultivate than flax, but it can be prepared for carding and spinning at much less expense. Owing to its present very high price, however, and the prospect of a limited supply of it for the immediate future, much attention is now concentrated upon flax, to take its place in textile manufactures. We believe that flax may now be cultivated and prepared for carding at remunerative prices. Our opinions on this subject have been previously published, and need not now be elaborated. Our object at present is to urge the subject again upon the attention of our farmers, before sowing their seed and to point out some defects which have hitherto characterized American flax. In the records of the transactions of the Rhode Island Society for the Encouragement of Domestic Industry, for 1862 (just published) we find the following paragraph in the report of the committee on flax culture :—

"A noticeable fact relative to all samples of Western flax exhibited to the committee is the weakness of the staple; that it wastes largely by manipulation, and when prepared, appears only suited for coarse fabrics. On the contrary, Canada flax is very strong, wastes much less in handling, and, when properly prepared, seems fitted for the finest purposes. The inferiority in Western flax appears to arise from the different mode of cultivation and after-care. They believe that any failure to work Western flax will be traceable to a want of knowledge on the part of the producer of the best modes of sowing, reaping and curing it, rather than to any other cause; and that experiments to ascertain the best mode of cultivation and cure of it, with a view to its textile use, to be thorough, should begin with the planting of the seed."

This extract deserves the attention of all our farmers who design to cultivate flax. Our American Western flax is described as being defective in three very important features—it is weak, wastes largely in tow and is fit only for coarse fabrics. Nothing worse could really be said against it. And these defects are not due to climate or soil, but to a want of knowledge or carelessness in its modes of cultivation and after-care. We cannot agree with the last clause of the above extract, that further experiments are required in either the cultivation or cure of American flax. In Canada West, which has a climate similar to that of Michigan, we are told that flax of a superior quality is raised. Let our farmers, then, adopt the practice which has obtained in Canada, and without further experiments they will raise flax equally as good. In Canada West there are a large number of Scotch-Irish farmers who were acquainted with the cultivation of flax in Ulster, Ireland, and who have carried their knowledge and practice with them to America. One great defect in American flax is due to the inferior seed that has been used. No farmer expects to raise good wheat, oats or corn from bad seed, and flax in this respect should form no exception to the general rule. But hitherto our farmers have cultivated flax chiefly for its seed, to extract its oil, hence they have paid little attention to it for the purpose of obtaining its fiber. They must now abandon this idea, if they wish to secure good fiber. Russian—not American—seed is the best for this purpose, and the Dutch is next in quality. In the event of not being able to secure these European seeds, flax seed from Canada should be chosen, or very carefully-selected American seed.

THE BEST METAL FOR GREAT GUNS---OUR NEGLECTED WROUGHT-IRON CANNON OF LARGE CALIBER.

In the early ages of gunnery cannon were fabricated of a caliber compared with which the largest modern guns are pigmies. They were mostly made of bronze, although some of them were composed of wrought iron forged in bars and banded with hoops of the same metal. A number of ancient bronze guns varying in caliber from 16 to 30 inches are still mounted on the forts at the Dardanelles, but the largest cannon of this kind was one cast at Moscow, Russia, in 1586. It is 18 feet long, the bore is 36 inches in diameter; its chamber is sufficiently large to hold 500 pounds of powder, and the stone ball which was intended to be fired from it weighed 2,500 pounds; a solid iron shot to fit it would weigh 6,000 pounds. The total weight of this cannon is 97,500 pounds, but like the great bell of Moscow, it has been simply a gigantic curiosity. As the powder used in olden times possessed much less expansive force than that which is now manufactured, and as stone balls were much lighter than those of iron, which are now used, of course these old guns were not subjected to such strains as modern artillery. From the old big guns of the Turks, Russians and others, there was a gradual descent, for two hundred years, to cannon of a smaller caliber. Half a century ago 32-pounders were the great guns on the largest war-ships, and in 1820, the heaviest cannon mounted on our American sea-coast defenses were 24-pounders. About thirty years ago gunnery took an upward tendency and we are still advancing in the construction of large cannon. Instead of 24-pounders for our coast batteries and 32-pounders for the navy, we have now guns ranging from calibers of 3 up to 15 inches—the largest being capable of throwing a shell of 420 pounds, and one of 20 inches caliber, capable of throwing a thousand-pound shot, has been proposed.

The best material of which guns of large caliber should be made is a question of much importance. At present there are four kinds used in the American army and navy. One class is made of bronze; they are chiefly used for boat howitzers and light field-pieces. Another class consists of rifled guns, each formed with a cast-iron tube banded at the breech and the reinforce with wrought iron. Some of these are large; they are used on vessels for long ranges and on land for siege and battery trains. A third class consists of rifled steel guns; the fourth class are made entirely of cast iron. Most of our navy and fort guns belong to the latter class; they are smooth-bores and range from 3 to 15 inches in caliber. As our largest guns are made of cast iron, the natural inference to be drawn from such a use of this metal is, that it is held to be the strongest and best metal for the purpose. This is a debatable question. No better evidence against it could be adduced than the admitted fact of its being unsafe for the manufacture of large rifled guns, which are subjected to greater strains than the smooth-bores. When used in rifled guns, these have to be banded with wrought-iron hoops. Why then should this metal be used at all for large guns? What would be thought of the proposition to use cast iron for musket barrels? It appears to be more unreasonable to employ this metal for large than small fire-arms, because guns formed of a stronger metal could be made lighter, and they would thus be more easily handled. The question naturally arises, why not use the best wrought iron—such as that employed for musket barrels—in the manufacture of heavy guns? This metal is much stronger than cast iron; but it has been urged against its use that large sound forgings, such as are required for cannon, cannot be made; also, that it is more liable to take a permanent set than cast iron; and lastly, that the use of hard cast-iron shot would soon wear them out. The latter difficulty can be overcome by coating the shot with a softer metal, as is now done with elongated rifled shot; the other two objections are not founded on perfectly reliable data; although the greatest difficulty undoubtedly lies in securing good forgings.

We are glad to notice that the authorities of our Navy Ordnance Department have advertised for proposals for the construction of wrought-iron guns of as large a caliber as 100-pounders. We infer from this action that those who have charge of the Ordnance Department believe that superior heavy guns may be made of wrought iron, as our 15-inch cast-iron guns have, as yet, achieved no glory, and they cannot be used with large charges of powder. But we are not left in ignorance as to its fitness for such purposes; we are only astonished that the Navy Department does not make use of the large wrought-iron gun which it has had in its possession for over twelve years. There is now in the Brooklyn navy yard a 12-inch wrought-iron gun which was made at the Mersey Steel Works, Liverpool, for the United States, under the direction of Commodore Stockton. It is as beautiful a piece of ordnance as can be seen anywhere, and it appears to be a very perfect piece of workmanship. It weighs 21 tuns, and is capable of throwing a solid shot of 280 pounds. Prior to the casting of our new 15-inch guns it was the largest cannon in the United States. It has driven a shot through several inches of iron plates bolted together, and why it has not been used and is not now mounted on one of the coast forts is inexplicable to us. We think it may be fired with a greater charge of powder and that it will send its shot with a far higher velocity than any of our cast-iron guns. The same parties who made this gun for our navy fabricated (in 1856) one of the same pattern and of similar material, of 13-inch caliber, for the British navy, and it has proved to be the most destructive battering piece of ordnance in the world. It has been fired repeatedly with 75-pound charges of powder and, at a distance of 800 yards it has sent its spherical shot through the "Warrior target" at Shoeburyness as easily almost as if the iron plates had been stoneware. No less than 8,000 pounds of powder have been used in firing with it, and it appears to be as sound in the bore as when its first shot was discharged, as stated on page 360, Vol. VII. (new series) of the SCIENTIFIC AMERICAN. It seems that the British Admiralty were once as oblivious to the merits of that great gun as our authorities have been to the one in *their* possession. The former gun lay rusting for three years on the sea-shore at Portsmouth, but it is now mounted and its merits appreciated; the latter and older gun we saw last week lying like rubbish in the navy yard, and Col. Mordecai states that "it has never been tried." This statement does no credit to those who have the charge of it. We hope this gun will soon be rescued from its ignoble position, mounted and brought into use. There is not a gun on the harbor defenses of New York that can equal it for smashing and penetrating iron-plated frigates at short ranges.

ARMOR FOR SHIPS OF WAR.

Ever since iron-clad ships were invented there has been a conflict of opinions upon the subject of their armor. The proper thickness, the mode of fastening it, whether single plates or a number of thin ones are the best, with wood backing or without—these are only a few of the questions bearing upon the subject which have received attention. That some one plan has not been universally adopted is owing to obvious natural causes. Each person or Government thinks himself or itself best qualified to judge where his or its immediate interest is at stake.

In this country we have more generally adopted the series of thin plates in preference to heavy single ones; although there are some exceptions to this statement. Abroad, the reverse is true. Thus far we have had more practical experience with iron-clad ships than any other people. The last to adopt these engines of war, we have been the first to put them into actual service, and our success has been wholly with the combinations of thin plating. The gunboats on the Western rivers—*Conestoga* and *Lexington*—were plated with solid iron 2½ inches in thickness, yet they were completely riddled in

the attack on Fort Henry by the ordinary guns at that point; so also was the *Essex* before her re-construction. The Ericsson batteries are all armored on the principle of many layers of thin plates, and they have proved themselves impregnable, so far, to every assault. The arguments in favor of thin plates may be summed up in the following list:—It is claimed that they are stronger for a given weight of metal than thicker forged armor, by reason of the "scale" or cuticle being preserved intact, as well as by the intimate relations of the fibers which occur when small quantities of the metal are subjected to intense pressure; for this reason it is apparent that the structure of thin plates must be, *ceteris paribus*, more reliable than forged ones. By the same reasoning, however, some may assert, that if the requisite machinery existed in this country for giving the same proportionate tenacity and tensile strength to heavy single plates, as good results would be produced. This sequence, although a natural one, is not, it seems by experience, a correct one. A combination of thin plates is said to be more effective in resisting the impact of a heavy shot than a single plate of the same thickness, by reason of their elasticity or reaction after the instant of percussion. All experience goes to prove this assertion; where heavy plates have been shattered to fragments, the thin ones have been displaced and bent but not destroyed, and the injuries to them rarely extend through a whole section of armor. The heavy plates when smashed require much time and expense for their renewal, and are at best a poor substitute for thinner coats in many layers.

Recent improvements have rendered the thin plates still more effectual. The gunboat *Essex* after her misadventure at Fort Henry, on the Cumberland river, was taken to St. Louis and there re-clad on the forward casemate with iron plates only one inch thick; under these were placed india-rubber sheets one inch thick, the whole being inclined at an angle of 45° upon a wooden backing of oak 16 inches through. Thus defended the ship went into service.

"In the action between this gunboat, commanded (at that time) by Commodore W. D. Porter, and the batteries at Vicksburg, Port Hudson and other points on the lower Mississippi river, the forward casemates were struck repeatedly by solid shots, varying from 32 to 128 pounds, some of which were fired from rifled guns at short range. None of those shots penetrated the forward casemate, but some of the larger ones indented the armor plates, started the wood-work and broke in pieces, showing that the force of the shot was entirely spent. The after-casemates, covered with iron of the same thickness, and made by the same manufacturers, but without india-rubber, were penetrated in several places by shots fired from the same batteries and similar guns; in all, over 125 shots struck this vessel at about the same range, proving that this thickness of iron affords no protection when placed immediately upon a solid timber support. In fact, the same may be said of 2½ and 3 inches of iron, if we may form a correct judgment from the results of the actions between the gunboat *Galena* and the batteries at Fort Darling, on James river, Va., and the gunboat *Carondolet* and the rebel ram *Arkansas*, on the morning of the 15th of July, 1862; also the engagement between the gunboat *Benton* (commanded by the late Captain Gwin) and the batteries at Haynes' Bluff on the Yazoo river. This vessel was struck twenty-nine times in this engagement. The first-named vessel's armor plates that were penetrated were 3 inches thick; the latter two vessels, belonging to the Mississippi squadron, were protected with armor plates 2½ inches thick. These plates were penetrated by 8-inch shot, the range being about the same as that when the *Essex* passed the batteries at Port Hudson, on Sept 7, 1862.

"Now, if 1 inch of iron and 1 inch of india-rubber between the armor plates and the timber (on the *Essex*) effectually resisted the penetration of the before-mentioned shots at short range (of which fact there can be no possibility of doubt), when we take into consideration the width of the river, position of the vessel and the locality of the batteries from which these shots were fired, as well as other evidences of the facts, what may be expected of a casemate composed of from three to four sheets of iron, of 1 inch in thickness and the same number of vulcanized india-rubber plates interposed between them, so as to afford a mutual support and to act as one continuous sheet? The probability is that the power of resistance to penetration, of this combination, would only be limited by the ability of the casemate to resist the momentum of the shot and sustain the plates.

"The ability of the armor just-mentioned to prevent a vessel from being swamped, going to pieces or springing leaks during a heavy sea, will depend only upon the depth of hold, width of beam and the manner in which the work is put together, and not merely upon bolts and rivets, as has heretofore been the case."

If all these assertions are correct (and we have good reason to think that they are), attention should be given to the subject immediately. If thin plates and rubber backing are as effective as they are claimed to be, all doubts as to the possibility of making iron-clad ships sea-worthy are set at rest forever.

TAXIDERMY—STUFFING BIRDS.

As the season is at hand when objects of natural history may be collected with facility, we will present some useful information relating to the modes of preserving them. Taxidermy is comparatively a modern art. Reamur, the distinguished French *savant*, was the first writer, we believe, who published a memoir on the method of preserving birds. The skin was first to be steeped in alcohol, iron wires were passed through the legs and body, it was fastened to a board, two black beads placed in the head for eyes, and this was called a "preserved" bird. In 1786 the Abbe Manese published a memoir on the subject, and described the method which is now pretty generally practiced for stuffing, but the substances which he recommended for preservatives were not suited to the purpose. The following composition for treating the skins is used in the museum at Paris and is held to be the best:—White arsenic 2 lbs., hard soap 2 lbs., salts of tartar 2 ounces, and camphor 5 ounces. These substances are beat together under gentle heat in water, until they form a solution capable of being applied with a brush. The instruments used by the taxidermist consist of soft wires, a quantity of tow, several scalpels, scissors, pincers, forceps, files, a hammer, and a collection of beads resembling birds' eyes.

In hunting for birds as specimens, a double-barreled fowling-piece should be used, one barrel loaded with small, and the other with large shot, for shooting birds of different sizes. When a bird is shot, some dry saw-dust (carried in a wallet) should be sprinkled in the wound, and some tow placed in the beak to prevent the blood soiling the feathers. It should then be suffered to become cold, placed carefully in a wallet, and the feathers disturbed as little as possible until it is conveyed to the place where it is to be stuffed. If taken alive it should be killed by introducing a sharp probe between the skull and the first vertebra, to divide the spinal marrow. The bird should be skinned soon after it is shot if the day is hot, but in cold weather this may be deferred for several days. In skinning birds the ruffling and soiling of the feathers must be avoided as much as possible. The body is first separated at the knee joints, an incision made under the wing, and the two wings separated at the first joint; an incision is also made along the breast, and the head separated at the atlas, and the entire skin, with head, wings, tail, and lower joints of legs gently taken off. The brain is next removed from the skull, and the tongue and the eyes taken out. All the flesh must be carefully removed by the scalpel from the neck, wings and legs. The skin thus treated is now smeared inside with the arsenious compound described. The skin is now to be stuffed. Two wires are required for supporting the bird; one of these is first introduced up the leg, and pushed through the body to the head, and into a hole drilled in the skull. The other wire is passed through the other leg between the bone and the skin, but is not carried to the skull; it is merely twisted round the first wire. All the vacuities are then filled up—stuffed—with tow or cotton, and the incision sewed up. The bird is now properly fixed with the wires to support it on a board; the feathers are adjusted and the proper shape and position given, aided by pins and bandages, which are removed as the specimen becomes dry.

Such directions will not enable any person to stuff and mount birds perfectly, because a mere description of any method only serves to assist in commencing operations. By perseverance, however, combined with taste and mechanical skill, a good degree of perfection will soon be attained. Many birds will be spoiled before satisfactory success is achieved. The most common faults of a badly-stuffed bird are a disproportionate fulness of the body to the neck, and *vice versa*. A person who mounts a bird for the first time, usually commits the fault of placing the thighs behind the rump, by setting the body too much forward. Skins of birds may be preserved in alcohol, sent to any distance, and kept for a considerable period of time before being stuffed. A solution of corrosive sublimate and alcohol has been recommended for treating skins by the English naturalist, Warburton; another compound, of corrosive sublimate, rock salt and alum, by Swainson, with a powder of burnt alum and nutgalls to be dusted upon the interior of the skin. Arsenic, however, is the best preservative against both the attacks of insects and putrefaction. The habits of birds must be studied by the naturalist in order to give them the proper form and position in stuffing, in order to illustrate their habits. In another article we will describe the mode of treating other objects.

(To be continued.)

LITERARY NOTICE.

THE NEW AMERICAN CYCLOPÆDIA—A POPULAR DICTIONARY OF GENERAL KNOWLEDGE. Edited by George Ripley and Charles A. Dana. Published by D. Appleton & Co., 443 and 445 Broadway, New York.

That standard work of reference, the *New American Cyclopœdia*, is now completed; Volume XVI. having just been laid on our table. We have had occasion to consult the *Cyclopœdia* frequently and have found in it a great deal of valuable information on diverse subjects. The extent and amount of labor expended on this work are remarkable, and some details concerning it are here appended:—

The present work of Messrs. Ripley and Dana is the first original general cyclopædia completed in this country. The work was begun in February, 1857. A staff of twenty-five writers was engaged, most of whom had desks in a large office provided with a formidable library of books-of-reference printed in various languages. The Astor Library (New York) was, however, an additional and valuable place-of-reference. Besides the regular staff, a number of "outside" gentlemen contributed articles on subjects upon which they were especially competent to treat; and it has been the rule to entrust all papers upon the various sciences and arts to the most eminent professors and experts.

The publishers, Messrs. D. Appleton & Co., have invested $415,000 in this great literary venture. The amount paid to contributors and for the stereotype plates, up to December 12, 1862, was $143,700. The other expenses, on 217,550 volumes printed, of the first fifteen volumes, were—for paper, $111,500; printing, $17,500; binding, 110,000; advertising, circulars, &c., $20,000. Add to this the cost of paper, printing, and binding 10,000 copies of Vol. XVI. = $12,200, and an item denominated "sundries," $100, and we have a grand total of $415,000. Of the literary execution of the work, we, who have occasion to refer to it daily, can speak with satisfaction. The *New American Cyclopœdia* is correct, full in its information and conveniently arranged for ready reference; the articles are concise, yet complete; and the work, continued and finished in the midst of a civil war, is an honorable example of American thoroughness and enterprise. We believe it is the intention of the editors and publishers to issue a supplementary volume, in which any subjects which have claimed treatment since the commencement of the work may have justice done to them; and the issue of an annual volume—a register of important events—which was begun by Messrs. Appleton last year, will hereafter answer the purpose of a supplement for those who want it.

SEVERAL mills in Ashaway, R. I., are now running day and night, manufacturing army flannels. One mill with only thirty-six looms is manufacturing 20,000 yards weekly by running night and day.

RECENT AMERICAN PATENTS.

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

Mold and Composition for casting Horseshoes, &c.—This mold for casting horseshoes is provided with a plate from which a series of pins rise which carry the cores of the nail holes to be produced in the horse shoes, said plate being adjustable by cams and levers in such a manner that on raising the plate all the cores of the nail holes are made to project into the mold in the proper position to produce the nail holes, and on depressing said plate all the cores are withdrawn simultaneously, the whole mold being so arranged that a complete horseshoe can be cast with all the nail holes and with little trouble or labor in molding. The composition from which the horse shoes are cast forms the subject of a separate patent. James Kennelly, of Hartford, Conn., is the inventor of these improvements.

Iron Railroad Car.—This invention relates to certain improvements in the construction of iron railroad cars or those in which that metal is principally used. The invention consists in a novel manner of securing in proper position the longitudinal sleepers of the cars and in the manner of securing the sheet metal siding and wooden filling between the ribs of the car; and also the manner of securing the ribs of the car to the side sleepers thereof, and in the peculiar construction of the roof of the same, whereby it is believed that several advantages are obtained ever the metallic cars as hitherto constructed. Hel em Merrill, of New York city, is the inventor of this device.

Putting-up Smoking Tobacco.—This invention consists in what may be termed tobacco cartridges, or, in other words, in the manufacture of charges of tobacco of suitable quantity for filling a smoking pipe in capsules of paper or other suitable material with openings through or partly through them for draft and for causing the ignition of the charges at the center and the radiation of the fire in all directions therefrom, the objects thereby obtained being economy, convenience and cleanliness. It also consists in providing in the bottom of such a tobacco cartridge a cavity in which is placed cotton or other fibrous or absorbent material for the filtering of the smoke and the collection of the essential oil or liquid matters which are eliminated from the tobacco in the process of smoking, and which not only tend to choke up the pipe but produce unpleasant and pernicious effects if taken into the mouth. E. J. Mallett, of New York city, is the inventor of this improvement.

Turning Cross-head Wrists.—This invention relates to a device for turning the wrists or pins of cross-heads, and for turning any other cylindrical part of machinery which is secured to or formed between arms connected at one end by a permanent crossbar, which prevents the cylindrical part being rotated by entire revolutions in a lathe, and consequently precludes said part being turned with facility. The usual mode employed for turning such cylindrical parts of machinery is to center them in a lathe and allow them to turn one half a revolution, which is all the distance they can turn on account of the crossbar, and then reverse the movement of the article so that it may turn back and then make another half revolution, the cutting tool acting upon half of the part to be turned. The article is then reversed in the lathe and the other half turned. This is a slow and tedious operation, which is avoided by this invention, the latter consisting in the employment or use of a grooved rotating ring having a cutter affixed to it and used in connection with an adjustable bedplate, all arranged to effect the desired end. W. S. Phelps, of Detroit, Mich., is the inventor of this improvement.

Ratchet Brace.—This invention consists in rigidly applying the dog which catches into the serrated wheel, to the handle of a ratchet brace, said handle being provided with a stop and allowed sufficient play to release the point of the dog in such a manner that, by moving the handle in one direction, the dog clears the serrated wheel and permits the handle to turn back independent of the drill in the brace, and by throwing the handle in the opposite direction, the point of the dog is brought to bear on the circumference of the serrated wheel, and the drill rotates with the handle; the invention consists, further in the arrangement of an adjustable clamp sliding up and down on the nut of the ratchet brace or on a stud, which also prevents the clamp from rotating with the nut and which rises from the upper jaw in such a manner that on throwing the handle forward the clamp rotates simultaneously with the brace and its drill, but on throwing the handle back, the clamp rotates with the same and with the movable jaws, and independent of those parts of the brace which are rigidly connected to the drill; and by this motion of the clamp the nut is turned up and an automatic feed is produced, said feed being regulated by a set screw which causes the clamp to bear on the nut with more or less pressure. L. H. Olmstead, of Yonkers, N. Y., is the inventor of the foregoing improvement, which was patented on March 24, 1863.

ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING MARCH 31, 1863.

Reported Officially for the Scientific American.

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

38,019.—Manufacture of Paper for Collars, &c.—Stephen M. Allen, Woburn, Mass.:

I claim the production of paper adapted to the manufacture of collars, wrist-bands, and other similar articles of wear from flax, hemp, jute, or other long-stapled fibrous substance by treating the said fiber in warm water at successively increased temperature as described, in combination with the reduction thereof by mechanical means substantially as herein set forth.

38,020.—Manufacture of Paper from Wood.—Stephen M. Allen, Woburn, Mass.:

I claim the manufacture of paper pulp or paper from wood by performing the operations of cutting the wood in suitable lengths, crushing it in such a manner as to preserve the integrity of the fiber in its longitudinal direction, alternating, steeping, and washing the same at increased temperatures, and finally boiling, grinding, and bleaching the same; the whole in succession substantially as herein described.

38,021.—Method of using Exhaust Steam for Heating Purposes.—Benjamin T. Babbitt, New York City:

I claim conducting the exhaust pipe, D, into and for a certain distance through the chimney, C, or other flue and thence out to the vessel or apparatus to be heated, substantially as herein described.

38,022.—Composition for covering and protecting Iron.—Yousouff Bey, New York City:

I claim a compound for protecting iron from corrosion, composed of the ingredients above named, and in the proportions substantially as above described.

38,023.—Door and Shutter Spring.—Lorenz Bommer, New York City:

I claim the plate, H, with the projection, g, and plate, I, in combination with the pintle, E, and pin, F, constructed and applied substantially as and for the purpose specified.

[This invention consists in the employment or use of a spiral spring provided with a pintle at each end, and arranged and applied to the door or shutter in such a manner that its tension may be regulated so as to act more or less powerfully upon the door, as may be required.]

38,024.—Animal Trap.—Joshua W. Bradbury, Akron, Ind.:

I claim the arrangement of the box, A, hinged bottom, a, revolving sections of top, g g, flanged drums, i i, T-shaped support, B, pulleys, j j, weighted cords, k k, combined hook and trigger, n o, support, m, and spring, D, all in the manner and for the purposes herein described.

38,025.—Mode of hanging Balance Wheels, &c.—Jacob Brinkerhoff, Auburn, N. Y.:

I claim the manner herein described of hanging fly or balance wheels, gear wheels and pulleys, so as to relieve the shaft to which they are attached from lateral strain, as and for the purpose specified.

[In this invention the wheel has formed in one side, and surrounding the shaft to which it is attached, an annular recess or cavity, adapted to fit the turned end of the box or hanger in which the shaft is supported, said box or hanger thereby serving the double purpose of a bearing for the shaft, and an independent bearing for the wheel. This manner of hanging wheels relieves the shaft wholly of lateral strain, and thereby renders it less liable to sag and run out of true than when hung in the usual manner.]

38,026.—Edge Plane for trimming Soles of Boots, &c.—John Brooks & Joseph H. Sanford, North Bridgewater, Mass.:

I claim the combination of the knife and guard so constructed and arranged as set forth, that they may be reversed and transposed as described.

38,027.—Method of affixing Tubes in Steam Condensers.—Wm. F. Brooks, New York City:

I claim the employment of a perforated sheet or sheets of rubber in combination with the tube sheets and ends of the tubes for securing said tubes in place and maintaining a tight joint while allowing for the varying length of tubes due to expansion and contraction as described.

I claim also the ferrule and groove thereon for the purpose described herein.

38,028.—Infants' Exercising Machine.—J. S. Brown, New York City:

I claim, first, The employment of a competent frame, consisting of the platform and pedestal, or their equivalent, sustaining a vibrating lever as set forth, to one end of which lever is attached the chair or couch, and the other end of which is connected with a spring also attached to the aforesaid frame: the combination being substantially as described.

Second, I claim in the above apparatus, the notches in the lever by which the active power or elasticity of the spring is varied at will, as and for the purpose specified, and the perforated strap, N, and pin, 12, or their equivalent, to vary the height of the chair from the platform for the purpose set forth.

Third, I claim the loop, 2, bar, 4, spindle, 5, and bail or bow, E, arranged and connected with the lever and with the chair or couch as and for the several purposes specified.

Fourth, The specific method of arranging the pedal with respect to, and of combining the same with, the lever and the spring so as to operate in connection therewith for the purpose, in the manner, and with the results specified.

38,029.—Furnace for heating Tires.—Oliver M. Brown, Toledo, Ohio:

I claim the above described furnace as a new article of manufacture, the same being provided with a peculiar arrangement of flues with doors, in the manner and for the purposes set forth.

38,030.—Harvester.—Robert Bryson, Schenectady, N. Y.:

I claim, first, The combination in a harvester of the driving wheels, large spur wheels, C C, driving shaft, double bevelled or angular spring latches, g g, hold-back pins, d d, slots, e e, hubs, H H, depressions, h h, and pinions, a a, for the purpose of throwing into and out of action the sickle of the harvester, as herein described.

Second, The combination of spring latch boxes, H H, constructed as herein described, fixed to a rotating shaft, D, with loose spur wheels, a a, driving spurs, C C, beveled spur, E, its pinion, b, longitudinal shaft, F, crank wheel, F', and connecting rod, G, when the same are arranged in connection with a harvester, and operate substantially as herein described.

Third, The employment of the loaded lever, L, attached to the sliding stirrup, I, and connected to the cutting apparatus, so as to enable me to nicely balance, and at the same time to allow of the vertical adjustments of the cutting apparatus, substantially as herein set forth.

Fourth, The friction roller, k, in the stirrup, I I, when placed in such a relation to the rounded head of the pivoted bracket, J, as so serve as an anti-friction bearing for said bracket, essentially as herein set forth.

Fifth, Attaching the short arm of the lifting lever, M, to the balancing lever, L, at a point which is between the extreme end of the short arm of this lever and its fulcrum, substantially as herein set forth.

38,031.—Hydro-carbon Burner.—Mills L. Callender, New York City:

I claim, first, The improved lamp deflector, composed of a combination of mica and metal, consisting of a metallic base ring or flange, f, the mica or similar non-conducting cylinder, d, and insulated dome, b, constructed as above set forth.

Second, I claim the use of a mica, glass, or similar non-conducting cylinder when applied to a lamp top for the purposes above specified.

Third, I claim the method of securing the mica to the metal as above specified.

Fourth, I claim constructing the interior adjustable cone, m, of a combination of mica and metal as above set forth.

38,032.—Fastening Covers to Axle Boxes.—Jacob O. Clute & Philip Kimmey, Albany, N. Y.:

We claim the combination of a flat-sided bolt, C, or its equivalent, with a spring, B, for fastening the covers or caps of car-axle-boxes substantially as herein specified.

38,033.—Manufacture of Flour.—C. Colgate, Lancaster, Ohio:

I claim the admixture of kiln-dried starch with wheat, to be ground therewith in the manufacture of flour, substantially as and for the purposes herein specified.

38,034.—Surgical Splint.—Thomas H. Currie, Webster, N. H.:

I claim, first, The combination of the sides, A B, and A' B', each composed of two pieces, the sacking, C, the screw, E, and the swivel nut, F, the whole arranged to operate substantially as herein specified.

Second, Combining the foot piece, D, with the outer side of the splint by means of the slotted angle iron, F, the screw, n, pin, j, and screw, k, the whole applied substantially as and for the purposes herein set forth.

[This invention consists in certain improvements in splints for the leg, whereby the necessity for bandages is obviated, greater facility is afforded to the surgeon for reducing the fracture, and a better opportunity is afforded to compare the broken limb with the sound one, and greater ease is afforded to the patient.]

38,035.—Bureau Bedstead.—Louis Derome, San Francisco Cal.:

I claim, first, The application to bureau bedsteads of a hinge, D, with its arms or branches terminating in flanges, e e, sliding up and down the guide-plates, h h, for the purpose of allowing the casters, u u, to traverse upon the floor in closing the bedstead substantially in the manner herein described.

Second, I claim the combination of the hinged mattress with a bureau having a movable front when said front is attached to the mattress by means of the hinges, D, substantially in the manner and for the purposes herein described.

38,036.—Machine for bunching and pressing Shingles.—Parker Dexter, Clinton, Iowa:

I claim the movable or adjustable end boards, J J, in combination with the bars or yokes, G G, bars, H H, and eccentrics, C C D D, on shaft, B, all arranged and applied to the frame, A, to operate substantially as and for the purposes herein set forth.

[The object of this invention is to obtain a machine of simple and economical construction by which a suitable number of shingles may be adjusted compactly together and bunched or bound so as to form a bundle.]

38,037.—Machine for making Bread.—William O. Drew, Georgetown, D. C.:

I claim the fluted roller, A, the convex, C, and the adjustable plates, D, the whole arranged and combined substantially as set forth and described.

38,038.—Operating Guns and Gun-towers.—James B. Eads, St. Louis, Mo.:

I claim making the gun-tower in sections so that the top section may be lowered into the hold of the vessel, for the purpose, and in the manner substantially as described.

I also claim leveling the gun in the tower, in the act of raising it, by means of the tripping pin near its point or muzzle, and the guide on the tower, so that a very small port may be used, as the gun must enter it fairly, without striking the sides of the port, substantially as described.

38,039.—Cooked Vegetable Food.—E. C. Frost, Highland Nurseries, N. Y.:

I claim as a new article of manufacture and commerce the condensed product of the *Solanum Tuberosum* in a cooked state for food; prepared substantially in the manner and for the purpose herein set forth.

38,040.—Treating Phosphatic Guanos.—L. D. Gale, Washton, D. C.:

I claim making a concentrated manure by mixing animal matter, previously treated with acid or its equivalent with the guano, substantially in the manner and for the purpose set forth.

I also claim the use of sulphate of lime in combination with the animal matter treated previously substantially in the manner and for the purpose set forth.

I also claim the use of the acids substantially as set forth, for separating the nitrogenous material from the oil, whereby both products are "rendered" quicker and in a purer state than when so separated by boiling or steaming with water only.

38,041.—Brick Machine.—D. W. Gould, Independence, Iowa:

I claim, first, The pressure plate, G, operating as and for the purpose specified.

Second, I claim the sliding plate, M, and cam, N, in combination with the openings, O, and P, for the purposes set forth.

Third, I claim the molds (figures 4 and 5), when constructed substantially as herein described, and operating as specified.

38,042—Breech-loading Fire-arm.—Isaac Hartshorn, Providence, R. I.:

I claim the link, C, and joints, a and b, whereby the cartridge blocks

is first withdrawn from the barrel and the mouth of the cartridge chamber is then elevated as described.

I also claim the bolt, r, arranged and operating as described for the purpose set forth.

38,043.—Self-inking Hand-stamp.—Samuel J. Hoggson, New Haven, Conn :

I claim the horizontal motion imparted to the inking roll by the use of a lever, springs and pressure operating substantially as and for the purpose herein set forth.

38,044.—Plastering Trowel.—Elbridge G. Howe, Millbury, Mass. :

I claim, as a new and improved article of mnufacture, a plastering trowel having its blade and shank formed in one piece, as herein shown and described.

38,045.—Damper.—Francis M. Hubbard, Protection, N. Y. :

I claim the tube, C, the convexo-concaves, a a, the rim, B, when combined with the pipe, A, the whole constructed and operating in the manner and for the purpose substantially as herein set forth.

38,046.—Metal for Horseshoes, &c.—James Kennelly, Hartford, Conn. :

I claim the within-described composition made of the ingredients herein specified and mixed together about in the proportion and in the manner substantially as set forth.

38,047.—Mold for Casting Horseshoes.—James Kennelly Hartford, Conn. :

I claim, as a new and improved article of manufacture, a mold for casting horseshoes provided with a plate, C, carrying the cores, e, for the nail-holes, and adjustable by cams, D D′, as and for the purpose shown and described.

38,048.—Grain-drying Apparatus.—C. W. T. Krausch, Chicago, Ill. :

I claim, first, Facilitating the heating of air for drying purposes on the surface of a red-hot plate, through the agency of a fan and a pipe with a flaring discharge, or by the equivalents thereof, substantially as described.

Second, The combination of means, substantially as herein described, for facilitating the heating of air, for drying purposes, on the surface of a red-hot plate, and discharging and distributing it into a drying chamber, as set forth.

38,049.—Mode of securing Iron Railings to their Posts.—Samuel Macferran, Philadelphia, Pa. :

I claim the combined pin and nut constructed, arranged and operating substantially in the manner and for the purposes set forth.

38,050.—Hernial Truss.—Robert Langworthy, Brooklyn, N. Y. :

I claim the arrangement of the two springs, A C, and pad, B, as set forth, so as to give the pad upward and oblique pressure, in the manner and for the purposes set forth.

[This invention consists in the arrangement of a base spring and an adjusting spring, in combination with an arm extending from the pad of the truss in such a manner that both springs act in one and the same direction, throwing the pad up and back in the direction of the inguinal canal, the pressure being regulated at pleasure by the adjusting spring.]

38,051.—Whitewash Brush.—James Longbridge, Pittsburgh, Pa. :

I claim the use, in the manufacture of brushes, of a prismoidal wedge-shaped frame made of thin sheet metal, and divided into compartments by partitions or traces for the purpose of securing the bristles in a compact body, substantially as described.

Also, in combination therewith, the use of a socket for the handle of brushes consisting of two or more short cylinders cast in one piece substantially as described.

38,052.—Putting-up Smoking Tobacco.—Edward J. Mallet, New York City :

I claim a tobacco cartridge consisting of a charge of tobacco of proper quantity for a pipe, put up in a paper capsule and perforated centrally, either entirely or partly through, substantially as herein specified.

38,053.—Harvester.—John P. Manny, Rockford, Ill. :

I claim the combination of the rim or tread and a plate or series of arms, arranged in, or nearly in, a plane passing through the center of said rim, with a flange connecting the two, and flush with the edge of the rim next the gearing, when constructed substantially as described and for the purpose set forth.

38,054.—Harvester.—John P. Manny, Rockford, Ill. :

I claim mounting the bevel wheel and spur pinion upon a projecting bearing so that the bevel wheel shall be between the gear frame and driving wheel, but outside of the plane of the latter, as set forth, in combination with the crank shaft having its bearing upon the gear frame, substantially as described.

38,055.—Vegetable-cutter.—Rufus Nutting, Randolph, Vt. :

I claim, first, The conical-shaped hollow cylinder in combination with the semi-conical shaped knives or cutters and elliptical or egg-shaped holes, constructed substantially as and for the purposes herein set forth.

Second, I claim the cylinder, C, or its equivalent, for removing from vegetables, before cutting, the dirt and gravel which otherwise would dull the cutters and injure the teeth, stomach and intestines of animals, in combination with the conical cylinder, I, or other device, for cutting vegetables, substantially as set forth.

38,056.—Shovel Plow.—Israel Mosher, Mosherville, N. Y., and Walden Eddy, Union Village, N. Y. :

We claim the combination of the right-angle triangle, d, or its equivalent, with the beam standard, a′, having thereto attached the moldboard, b b, substantially as herein described and set forth.

We also claim the curved extension pieces, i i, in combination with the wings of the moldboard, b b, substantially as and for the purposes herein described and set forth.

We also claim the employment and combination of the shoe, e, with the right-angle triangle, d, substantially as and for the purposes herein described and set forth.

38,057.—Car Coupling.—Ezra Miller, Janesville, Wis. :

I claim, first, The combination of the double beveled coupling hooks, the stirrups, E E, and the springs, N N, all constructed and arranged so as to operate in the manner and for the purposes described.

Second, The spring gate, F, constructed, arranged and operating substantially as and for the purposes described.

Third, The combination of the laterally located spring gates, F F with wings, f f′, stop pin, h, and coupling hooks, C C′, substantially as and for the purposes described.

Fourth, The double-beveled hooks, C C′, disconnected from any coupling or bumper box, constructed, arranged and operating in the manner described.

Fifth, The combination of the hooks, C C′, vertical spring gates, F F, the draw chai s, i j, and windlass rods, i′ i′, substantially as described.

Sixth, Forming, in the rear ends of the coupling hooks, a longitudinal slot, D, adapted to receive a spring, or its equivalent, and to allow of the pivoting of the hooks at their rear ends, substantially as and for the purposes herein described.

Seventh, The combination of the pivoted, slotted, shanked coupling hooks with the forward support, E, and spring gates, F F, arranged substantially as herein described.

38,058.—Rotary Pump.—Henry Pease, Brockport, N. Y. :

I claim, first, The sleeve, s, in combination with the piston stem, e, substantially as described, for the purpose set forth.

Second, The adjustable stuffing-box, B, with the perforated waste chamber, n, substantially as and for the purpose set forth.

Third, The combination of the bearing arm, 2, pulley, F, and clutch coplings, 25 and 6, substantially as and for the purpose set forth.

Fourth, The combination of the support, a, water chamber, 17, stuffing nut, b, and waste chamber, n, substantially as and for the purpose set forth.

38,059.—Manufacture of Paper from Sorghum.—Henry Pemberton, East Tarentum, Pa. Antedated Oct. 1, 1862 :

I claim the manufacture of pulp from the stalks of the sorgo sucre or Chinese sugar barre, as a substitute for linen and cotton rags in the manufacture of white or the better qualities of paper, in the manner substantially as hereinbefore described.

38,060.—Turning Crosshead Wrists or Pins, &c.—Walter S. Phelps, Detroit, Mich. :

I claim, first, The ring, D, provided with a cutter, L, arranged as shown, or in an equivalent way, to be operated or fed automatically by the rotation of the ring, for the purpose herein set forth.

Second, Providing the ring, D, with teeth on its periphery, and fitting the same within a proper bearing formed by a stationary projection, B, and a cap, C, substantially as shown, for the purpose of operating or rotating the ring directly from the driving shaft, F, as herein set forth.

Third, The inclined plate, S, in combination with the plate, A, and screws, Q T, for the purpose of adjusting the work concentrically within the ring, D, or in a proper relative position with the cutter, L, as herein described.

Fourth, The nut or cutter stock, H, in combination with the screw, I, tappet wheel, K, adjustable slides, N N′, provided with the pins, d d′, and the catch or pin, h′, or its equivalent, for the purpose of feeding the cutter, L, to its work, as set forth.

38,061.—Washing Machine.—William R. Richardson, San Francisco, Cal. :

I claim the combination of the eccentric die, E, with the cylinder, B, the plunger, F, sliding in guides, J, and revolving in opening, G, and the roller frame, D, all arranged substantially as and for the purpose set forth.

38,062.—Slide Valve of Steam Engines.—George Rieseek, Pittsburgh, Pa :

I claim constructing and arranging the valve, A, bonnet, B, and diaphragm, E, substantially as herein described and for the purpose set forth.

38,063.—Fence.—Elizabeth T. Shank, administratrix of the estate of Isaac R. Shank, deceased, late of Buffalo, Va. :

I claim the arrangement of the braces, C C′, provided with round holes and fitting on the square rails, B B1 B2 B3 B4 B5, which are fastened in the posts, A A′, by means of keys, b b′, in different planes, substantially as and for the purpose shown and described.

[This invention consists in the arrangement of two or more bearers provided with round holes and sliding on the square rails that are inserted into round holes in the fence posts in different planes or directions and fastened to the same by suitable keys in such a manner that by the action of said braces on the rails each panel is rendered self-supporting, and a strong, cheap and durable fence is produced.]

38,064.—School Desk.—W. Horace Soper, Baltimore county, Md. :

I claim the metallic rod by which the seat is hinged and operated, substantially as and for the purpose specified.

38,065.—Cement Roof.—Abraham Straub, Milton, Pa. :

I claim dispensing with the use of the felt or cloth heretofore required in cement roofs, by the employment of the wooden sheathing herein described; the said sheathing being constructed and applied substantially in the manner described and set forth, for the purpose specified.

38,066.—Subsoiling Implement.—William D. Strowger, Oswego, N. Y. :

I claim an implement for subsoiling, ditching, &c., composed of a solid metal plate, A, and teeth, B, the latter being fitted in the former, substantially as shown, and the plate provided with handles, C C, and a clevis, B, all being constructed and arranged as herein set forth.

[The object of this invention is to obtain an implement of simple construction, which may be advantageously used for loosening stiff soils which cannot be operated upon by an ordinary plow, and also used for disengaging stone on the surface of the ground, as well as for loosening the subsoil, ditching, &c.]

38,067.—Apparatus for pressing Hats.—Henry L. Sweet, Foxboro', Mass. :

I claim the combination and arrangement of the crown and side pressers, F F′, the rim pressers, G G′ L, and the expansive block, I, the whole being constructed and operating together substantially as specified.

I also claim the arrangement of the heating chambers, D E E, with respect to the crown, rim and side pressers, when the latter are constructed and arranged as specified.

I also claim the expansive block, I, as formed of separate sections, and surrounded by an elastic cover, as described, in combination with its expansive mechanism, and with a mechanism for forcing the block and its expansive mechanism downward into the mold or a hat when in the latter.

I also claim the combination of the elastic plate or cushion, P, with the rim, crown and side pressers and the expansive block, as described.

I also claim the adjustable crown and side pressers as made in manner and combined with the lower rim pressers, and provided with adjustments, substantially as described, whereby they may be adjusted with reference to the rim pressers and for hats of different hights, as may be desirable.

I also claim the combination of the annulus, h, and its adjusting screws, with the presser, L, and the expansive block, I, constructed and combined with side and crown pressers, F F′ G G′, substantially in manner and so as to operate as specified.

38,068.—Water Elevator.—Daniel E. Teal, Norwich, N.Y. :

I claim the combination of the ratchet, C, and flanch, b, pawl, E′, ellipse, F, provided with the projection, c, and attached to the crank, D, the oval, F, encompassing the flanch, b, and all arranged substantially as and for the purpose set forth.

[This invention relates to an improvement in windlasses for wells, for which Letters Patent were granted to the inventor, bearing date Nov. 27, 1860. The object of the invention is to attain the same result as by the old plan, but by a simpler means, and one less liable to get out of repair, more economical to manufacture and capable of being manipulated with greater facility.]

38,069.—Deodorizing Petroleum, &c.—J. W. W. Tindall, Liverpool, England :

I claim the employment of urine in combination with mineral acids as described, for the purpose set forth.

38,070.—Coal-oil Burner.—Emil Tritten, Philadelphia, Pa. :

I claim isolating or partially isolating the screw, E, from the wick tube and from the dome, A, by connecting the said screw to the dome through the medium of arms or projections, e e, the plate, D, attached to the wick tube, and projections, d d, on the said plate, substantially as set forth.

38,071.—Carbonizing Wood.—M. A. Lebrun Virloy, Paris, France :

I claim, first, So constructing and operating a furnace for drying or carbonizing wood, peat and other fuel, as that the said fuel is introduced at one side or end of the furnace, and withdrawn suitably dryed or carbonized from the other side, substantially as shown and described.

Second, In combination with a furnace constructed and operated as shown and described, I claim the employment of doors and other openings when so arranged as to allow of their being hermetically closed, during the operation, in the manner and for the purposes set forth.

Third, In furnaces for drying or carbonizing wood, peat or other fuel, constructed and operated as described, I claim the use of taps, valves and registers in the orifices and covers, to increase or diminish according to circumstances, the activity of the fuel and the operation, and for regulating the admission and exit of air, as and other volatile products, substantially as shown and described.

Fourth, The manner, herein described, of collecting and removing from a furnace for carbonizing, wood, peat, &c., a portion of the volatile products after the whole or part of their caloric has been utilized, substantially as and for the purposes set forth.

Fifth, The manner, herein described, of utilizing the waste heat, which, in the ordinary processes of drying and carbonizing, is carried away by the vapors and gas escaping at a high temperature.

Sixth, The method, herein described, of submitting the wood, peat or other material to be treated, first to a low temperature and gradually increasing it to a high temperature.

38,072.—Artificial Teeth.—Samuel S. White, Philadelphia, Pa. :

I claim the combination in a tooth or block of teeth of one or more mortises, a, and one or more holes, c c, substantially as herein specified.

[This invention consists in the construction of a single tooth or a block of two or more teeth with one or more horizontal mortises in the inner face, and one or more vertical holes for the reception of portions of the vulcanite, or other substance, of which the base is composed, by which the tooth or block is firmly secured without being imbedded more than is desirable in or having any portion covered to an undesirable thickness with such substance.

38,073.—Artificial Teeth.—Samuel S. White, Philadelphia, Pa. :

I claim, first, The combination of the groove, a and ridges, b c, extending the whole width of the block or tooth, the ridge, c, furthest from the lingual surface being made more prominent than the ridge b, next the linguid surface, substantially as and for the purpose herein specified.

Second, The arrangement of the holes, e l, in the base of the tooth or block, converging toward each other, substantially as and for the purpose herein described.

[This invention consists in the construction of a single tooth or a block of two or more teeth with a groove and ridges of peculiar form above the lingual surface, and with holes in the base of the tooth or block, converging toward each other, the said groove and holes receiving a portion of the vulcanite, or other material of which the base or setting is composed, and one of said ridges entering the said material for the purpose of securing the teeth to the base in a permanent manner.]

38,074.—Electro-magnetic Fire Alarm.—William Whiting, Roxbury, Mass. :

I claim the within-described combination and arrangement of an indicator to designate the room from whence the alarm proceeds, a series of pyrometers, a magnetic battery, a series of circuit wires and an alarm apparatus, whereby the occurrence and locality of a fire in any part of the building is made known, as set forth.

38,075.—Sputtling Machine.—Martin Wilcox, Middlebury, Ohio :

I claim, first, The application of sieves or screens for dividing the substance of the glaze and distributing it upon the ware.

Second, I claim, in combination with the sieves thus used, the bonnet, G, trough, H, pump, B, chamber, D, all constructed substantially in the manner and for the purpose set forth.

38,076.—Sewing Machine.—John N. Wilkins, Chicago, Ill. :

I claim combining with, and having upon, the front face of the rotating hook of a sewing machine, and a short distance back of the point of the said hook, a projection or shoulder, substantially as described, to hold back the loop after it has been carried around and cast over the spool, as set forth.

38,077.—Straw-cutter.—Ralph Clarkhuff (assignor to himself and L. S. Paine), Lewisburg, Pa. :

First, I claim the throat piece, A, of a cutting box provided with a fulcrum, B, and segment, C, when constructed as and for the purpose set forth.

Second, I claim the lever, F, provided with the arm, L, crosshead, E, set screws, P P and R, and stud, N, as and for the purpose set forth.

Third, I claim making the apron, K, adjustable by means of the stud, N, and set screw, Q, as and for the purpose set forth.

38,078.—Fire-escape.—J. T. Commoss (assignor to himself and T. W. Pepper), New York City :

I claim the combination and arrangement of the car, e, block, d, ropes, g and f, hawser, c, and hook block, a b, the whole constructed and operating substantially as described and for the purpose specified.

38,079.—Wick Tube for Lamps.—Hiram W. Hayden (assignor to Holmes, Booth & Hayden), Waterbury, Conn. :

I claim forming the bearing or support for the shaft of the wick wheels to turn in, by stretching and bending out the metal of the tube between the slots in which the wick wheels work, so as to embrace the shaft between such bent and stretched portion and the outer flat surface of the wick tube outside of the slots, substantially as and for the purpose specified.

38,080.—Lock.—A. M. Hill (assignor to Chas. A. Miller), Philadelphia, Pa. :

I claim the latch, D, hung to the lock, connected to the springs, H and H′, or their equivalents, and arranged in respect to the hub, B, substantially as described, so that a horizontal as well as a vertical movement may be imparted to the outer end of said latch, the whole being combined with a keeper having two inclined planes.

38,081.—Securing Artificial Teeth to Bases.—John Lund (assignor to himself and F. N. Johnson), Philadelphia, Pa. :

I claim forming, in artificial teeth, recesses with pins arranged across the same and embedded in the material of which the tooth is composed, substantially as and for the purpose herein set forth.

38,082.—Iron Railroad Cars.—Helem Merrill, New York City, assignor to himself and D. D. Badger, Brooklyn, N. Y. :

I claim, first, The longitudinal sleepers, A, in combination with the transverse pieces, B, the latter being constructed of sheet-metal bent so as to form a rectangular box, or three sides of the same, and secured between the sleepers in proper position by means of the plates, a, and the rods, C, all arranged substantially as shown, to form a platform or bed for the support of the flooring and body of the car, as set forth.

Second, Connecting the vertical ribs, E, to the sleepers, A, at the side of the car by means of the angle brackets, F, provided with oblong vertical openings, d, with pieces of india-rubber, f f, fitted therein, between which pins, c, which pass transversely through the ribs, E, are fitted, substantially as and for the purpose specified.

Third, The vertical ribs, E, rolled or otherwise formed with three longitudinal grooves, b b′ b′′, in their sides, in combination with the rods, H, sheet-metal siding, C′, and woolen filling, G, all arranged to form the body of the car, substantially as shown and described.

Fourth, The bars or rafters, I, rolled or otherwise formed with a groove, i, at each side, in combination with the rods, K, and plates, J, all arranged substantially as shown to form the roof of the car.

Fifth, The angle or corner ribs, E, formed in one piece or of two pieces connected together at their ends at or about at right angles to each other, in connection with the plates, h, inserted in the grooves, b, of said ribs, to form the rounded or flat corners of the car, as specified.

Sixth, The bars, l, at the ends of the car, fitted on the back parts of the upper ends of the ribs, E, and secured in position by the bolts, n, when said bars, thus arranged, are used in connection with the roofing of the car composed of the bars, I, and plates, J, as set forth.

38,083.—Regulating the Flow of Gas to a Soldering Apparatus.—T. H. Snyder, Camden, N. J., assignor to himself and William Vandyke, Philadelphia, Pa. :

I claim the adjustable notched bolt, M, or its equivalent, in combination with the rod, H, its projecting pin, N, and the treddle, I, or its equivalent, the whole being arranged for regulating the flow of gas through the pipe, B, to the burner, substantially as and for the purpose herein set forth.

38,084.—Machine for making Hoops.—A. A. Wilder (assignor to Rufus Brown), Detroit, Mich. :

I claim, first, the two saws, C C, and guides, G G, in combination with the fluted feed rollers, j j′ k k′, all arranged as and for the purpose specified.

Second, The fluted racking roller, l, and curved plate, M, or its equivalent, for the purpose set forth.

Third, The saws, C C, in combination with the fluted feed rollers, j j′ k k′, racking roller, l, and curved plate, M, all arranged substantially as and for the purpose specified.

Fourth, Sawing or otherwise bringing to a uniform width, hoops or timber for the same, and racking or dividing it at one operation.

[This invention consists in the employment of two circular saws placed on one mandrel, in connection with feed rollers, a pressure roller and a curved plate, all arranged in such a manner that the timber from which the hoops are formed may be sawed of a uniform width throughout its entire length, and the timber then divided into hoops, the whole work being done simultaneously at one operation.

38,085.—Machine for pointing and checking Hoop Bolts. A. A. Wilder (assignor to Rufus Brown), Detroit, Mich. :

I claim, first, The cutter wheel, D, formed of two parts, a a, beveled at their inner sides and provided with the cutters, b b, in connection with a bolt support or projection, h, fitted in the V-shaped recess between the parts, a a, all arranged substantially as and for the purpose specified.

Second, The feed table, E, with the bar, F, attached, provided with a half nut, k, in combination with the screw, H, knife, f, on the cutter wheel, D, and the beveled bar, m, and button, G, or their equivalents, as and for the purpose specified.

Third, The combination of the cutter wheel, D, with the cutters, b b, and knife, f, attached, feed table, E, screw, H, bar, F, provided with the half nut, k, the button, G, and beveled bar, m, all arranged for joint operation, as and for the purpose herein set forth.

[This invention relates to a new and useful machine for pointing the ends of the timber or bolts from which barrel hoops are split, and also for checking the ends of the timber or bolt preparatory to splitting the same into hoops. The invention consists in the employment of a double-beveled rotary cutter wheel in connection with a feed table and checking knife.]

38,086.—Process of copying Writings, Maps, &c.—John Underwood, London, England, assignor to Waldo Maynard and C. R. Thayer, Boston, Mass. Patented in England, April 20, 1857 :

I claim, first, The method of printing or obtaining copies of documents, forms, maps, plans, designs, or any other characters or marks which may be produced upon paper, parchment or other similar material, by forming these characters or marks of a prepared ink and bringing them in contact with prepared paper under pressure, the ink and paper being prepared in such manner that when the two are brought together a chemical action takes place, whereby copies of the said characters or marks are produced, as hereinbefore described.

Second, Preparing copying ink and copying paper, in the manner and for the purposes hereinbefore described.

RE-ISSUES.

1,442.—Method of making Lap Joints of Railway Rails. Aaron Douglass, Paterson, N. J. Patented August 21, 1860 :

I claim the process, substantially as herein described, of making and shaping, by means of sawing and swaging combined, the ends of railway bars, which form a lock joint with each other by the end of one rail lapping upon and into the end of the other, substantially as set forth.

I also claim swelling the necks of the ends of rail bars, when lapped upon each other, substantially as described, for the purpose of giving increased strength to the ends of such bars, for the purposes set forth.

1,443.—Friction Bolt for Flour Mills.—L. S. Reynolds, Indianapolis, Ind. Patented March 29, 1859 :

I claim, first, The use of the revolving bolting reel frame instead of the central shaft, as the support for the knockers, substantially as set forth.

Second, Causing sliding knockers or weights, when arranged within the reel, to strike upon or near the circumference of the reel in such a manner that the concussion of each knocker separately is felt at the points of striking, substantially as herein described.

Third, The sliding knockers, D, in combination with the shaft, K, ribs, H, and rods, E, when constructed and operated substantially as and for the purposes set forth.

Fourth, The springs, G, in combination with the knockers, D, when operated substantially as and for the purposes set forth.

Fifth, The elastic bridge-tree, L', when used substantially as and for the purposes set forth.

Sixth, Holding the knockers, one or more, in a fixed position on their rods, substantially as and for the purposes described.

1,444.—Apparatus for vulcanizing Rubber, &c.—E. A. L. Roberts (assignee of E. A. L. Roberts and W. J. Demorest), New York City. Patented May 10, 1859 :

I claim, first, The general arrangement of the stove, A, and steam-generating and vulcanizing chamber, B C, substantially as set forth.

Second, Constructing the steam-generating and vulcanizing chamber or chambers in one or in a continuous chamber, substantially as described.

Third, The combination and arrangement of the diaphragms, a b c, in connection with the steam-generating and vulcanizing chamber, substantially as and for the purpose set forth.

1,445.—Heating Apparatus.—G. W. Williamson, Goulds-boro' (formerly of Scranton), Pa. Patented January 25, 1859 :

I claim the application to stoves, flues of steam boilers, smoke stacks or chimneys, or wherever it is required to arrest heat or sparks, a series of plates with openings for draft passages alternating as herein described and for the purposes set forth.

DESIGNS.

1,744.—Cook Stove.—Anson Ingraham, Center Cambridge, N. Y., and G. H. Phillips, Troy, N. Y.

1,745.—Floor Oil-cloth.—John Neil, Clinton, Mass., and A. E. Powers (assignors to D., & A. E., & N. B. Powers), Lansingburgh, N. Y.

EXTENSIONS.

Combination of Adjustable Saddle and Winch.—A. G. Polhameus, Nyack, N. Y. Patented March 27, 1849 :

I claim the combination of a winch with a movable and adjustable saddle, connected so that the winch moves with the saddle, the whole being constructed, arranged and operating substantially as herein described.

Harvesting Machine.—Jonathan Haines, Pekin, Ill. Patented March 27, 1849. Re-issued Nov. 6, 1855 :

I claim, in combination with a frame nearly balanced on its supporting wheels and a tongue hinged to said frame, a lever connected to one and projecting toward the driver's stand or seat on the other, so that the driver, who is the sole conductor of the machine, may, from said stand or seat, raise or depress the cutters at pleasure during the operation of the machine, for cutting the grain or grass at any suitable hight above the ground, or for passing over any intervening obstacles, substantially as described.

I also claim, in combination with the operative parts of a harvesting machine, a conveyer, which first carries the cut grain horizontally across the machine, and then elevates it so as to discharge the grain into the bed of a wagon driven alongside of the machine, when the conveyer frame is connected to the bed by a flexible joint, in manner and for the purpose described.

Magazines and other Publications Received.

TOBACCO CULTURE —Practical Details on the Cultivation, Harvesting, Curing, &c. Published by Orange Judd, 41 Park-row, New York.

Early in the present year, the proprietors of the *American Agriculturist* offered prizes for the three best practical treatises on the cultivation of tobacco. Their offer was responded to by no less than eighty different parties, and the fruits of the experience therein described have been published in pamphlet form. All the matter is furnished by persons actually engaged in the cultivation of the vegetable in question, and therefore possesses a practical value which renders it extremely desirable to persons proposing to enter into the production of the "weed." The work is illustrated very fully, and will doubtless be much sought after. Price 25 cents.

Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V. AND VII. (NEW SERIES) complete (bound or unbound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which include postage. Price, in sheets, $1 50. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Nearly all the numbers of VOL. VI. are out of print and cannot be supplied.

Notes and Queries

E. S., of N. Y.—Tanned sheep-skin or oiled silk is the best material to use for the cushions of electrical machines. Dry baked wood coated with shellac will answer for the pillars of such machines, but glass pillars are preferable.

B. and C., of Pa.—You should address the author of the articles on fermentation and distillation for the information you desire.

H. W., of Pa.—It would be a waste of our space to publish articles on the production of photographic pictures by the "spirits."

C. S. 2d, of Mass.—A small quantity of freshly-slaked lime stirred among hard water will make it soft. About a pint is sufficient for 100 gallons. Stir it among the hard water, then allow it to settle for about an hour and use the clear. Water of moderate hardness from a well is not usually unhealthy for domestic use, but soft water from meadows generally contains organic matter in solution and is unhealthy.

T. M., of Mass.—We would advise you to cease the experiment of flying with artificial wings and turn your attention to sublunary affairs. Some more useful invention would be better appreciated by the public.

R. W., of Md.—We shall be happy to illustrate your machine; send a drawing and description. It will be some time before it will appear, as our columns are engaged for weeks in advance.

L. B., of Maine.—We have examined your model and think it a very good one for the purpose. Send $15 (Government fee) and we will proceed with the business immediately.

T. H., of Ohio.—To become expert in the construction of gearing, you must understand the first principles of geometry and mathematics.

E. J., of Mass.—The size of the bore of a common barometer is about one-eight of an inch in diameter. Platinum is the only metal suitable for the mercury cup of a barometer, as it can be soldered to the glass and thus exclude all the air perfectly.

S. G. M., of Pa.—The heat of steam is converted into mechanical power in a steam engine, just as a current of electricity is converted into magnetism by passing through a helix surrounding a piece of soft iron. You propose to economize the heat of exhaust steam from an engine by employing it to warm air with which you design to heat the water and thus perform the work over again. This is now partially accomplished in a more simple manner by heating the feed-water in a special vessel by the exhaust steam.

A. G., of Ill.—We have received your article on boiling water and explosions and will give it due attention.

J. W. M., of Mass.—Inquire for "concentrated lye" in the drug stores. The grocery stores in your city ought to keep it.

J. S. W., of Mass.—The same principle of compensation has been applied to the pendulum in a simpler form than your diagram represents. The compensating rod was arrayed directly behind the pendulum and its lower end attached to a fixed stud and its upper end to the upper end of the pendulum rod. We do not think you could obtain a patent.

O. C. H., of Conn.—We do not know of any such work as "Shaw on Metallurgy." You probably refer to Smee's book published by G. Wiley, 56 Wall street New York.

P. W., of Pa.—We have never seen any description of the vessel in question and cannot give you her dimensions.

D. W., of Vt.—The best tool you can use for turning brass is one not very acutely inclined to the working surface; in cutting gun metal, particularly, the keen edge or sharp angle of an ordinary tool would jump in and destroy the work.

A. F. G., of Pa.—It is very generally believed that the Jonval is the best kind of turbine in use. Wheels by different makers have given as high as 90 per cent of the water-power according to reported statements of their performances. A turbine that gives out 75 per cent of the power of the water, we hold to be a good wheel.

J. W., [illegible]hio.—The electro-magnetic power developed by [illegible]y, is just in proportion to the decomposition of the element[illegible] the battery. The principle is the same as the combustion of coal in a furnace in raising steam in a boiler to operate an engine. In both cases chemical energy is transformed into mechanical power.

S. M. H., of Washington.—The manufacture of rifles at Enfield, England, is carried on in the same manner as at Springfield, Mass. The system has been copied from that of the United States armory in nearly all its details. Each mechanic works upon a special part of a musket.

H. S. D., of Mass.—We do not think it a reliable plan to test your boiler by the expansion of the water from heat. If you are afraid that your boiler has been weakened by acid in the water you should have it examined by a competent person. Some carbonate of soda and mahogany or oak saw-dust fed, occasionally, into the boiler will prevent incrustations by the use of hard water, but we recommend in preference the use of soft feed-water in all cases where it can be obtained.

G. W. M., of Pa.—The meteorological phenomena of mock suns seen at Dubuque, Iowa, on the 16th ult., a sketch of which you have sent us, is similar to others of the same kind described in Professor Brocklesby's meteorology.

W. N., of Mich.—Vol. VI. (new series) of the SCIENTIFIC AMERICAN is out of print, but perhaps you may be able to obtain one by advertising for it.

C. E. R., of N. H.—An oscillating engine, if well made, is as good as any other. Some of the best steamships are provided with such engines.

T. N. M., of Pa.—Paye's trip hammer was published on page 1, Vol. V. (new series) of the SCIENTIFIC AMERICAN.

M. O., of Conn.—There is no such thing as a self-acting cannon, and we cannot imagine why you so style the gun you refer to. The weapon is loaded and fired by manual power, the same as any other and therefore the term is clearly an absurdity.

J. B., of Mass.—When your water gets too low in the boiler draw the fire immediately and you will then run no risk of burning the plates. If you take proper care no such accident is likely to occur.

T. C., of R. I.—We should be very glad to have you forward your experience with turning tools of different shapes. Never mind the phraseing of the matter; we will attend to that portion of the subject. Try and induce your brother-mechanics to communicate with us on this subject. We are always glad to receive information relating to mechanical subjects.

R. L., of Ky.—We do not know where you can procure the kind of rifle you refer to. Inquire of some practical gunmaker and perhaps he will inform you. It is new to us.

J. H., of N. Y.—If you intend to take out an English patent for your invention, we advise you not to delay the matter. We never suppress the publication of patent claims. We publish an official list and intend that it shall be complete and reliable.

J. K. G., of Iowa.—Your method of making shot seems to be valuable in its results, but before passing an opinion upon its novelty, we shall require a more complete description of it, and would also advise you to send us diagrams showing the particular mechanism employed.

H. W., of Ohio.—You can make a most excellent cement for the joints of leaky tin roofs with white lead, linseed oil, some dry white sand and pipe-clay. It will soon become almost as hard as stone and keep out water perfectly. It should be rendered sufficiently thin to be put on with a brush.

H. T., of N. Y.—The benzole, so-called, of petroleum will dissolve india-rubber and gutta-percha. It is a better solvent for drying quickly than turpentine. Two pieces of cloth coated on their inside surfaces with this varnish, then laid upon one another and run between rollers with the unprepared surfaces outside, form what is called "McIntosh's water-proof cloth."

J. McV., of Ind.—Shellac varnish is made from the gum, lac. Shellac proper is prepared from seed lac by melting and straining it through a cloth and then letting it fall on leaves and smooth stems of trees, so as to form thin scales or plates. You can obtain it at almost any drug store in your town; it is very dear at present.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, April 1, to Wednesday, April 8, 1863:—

S. M. S., of Iowa, $20; P. & E., of Maine, $46; J. D., of N. Y., $20; T. R., of N. Y., $54; K. & M., of N. Y., $26; W. C. O., of N. Y., $25; J. M., of Mass., $16; W. K. M., of Wis., $25; J. McL., of Ohio, $12; L. N. L., of Mass., $32; J. C., of Ohio, $10; D. C. W., of Ill., $15; T. W., Mass., $25; C. W., of Mass., $16; W. & C., of N. H., $16; T. E., of R. I., $16; J. A. H., of Pa., $15; A. C., of Ill., $16; M. C. E., of N. Y., $25; W. D., of Ohio, $16; J. F. McK., of Pa., $16; R. R., of Ill., $20; J. A. R., of N. J., $20; A. Y. M., of Iowa, $20; S. F., of N. Y., $20; A. H., of Iowa, $15; L. M., of N. Y., $26; J. B., of Ill., $25; J. E. D., of Mass., $15; G. S. M., of Ill., $55; G. H., of Mass., $25; R. S. C., of Iowa, $25; C. M. S., of Pa., $16; W. D., of N. H., $16; F. B. W., of Ill., $25; C. E. S., of Conn., $25; J. B. T., of N. Y., $25; D. T. H., of Mass., $16; H. & S., of Pa., $15; J. R. B., of Ind., $25; R. McD., of N. J., $25; A. H. P., of Iowa, $25; H. C., of Cal., $20; A. S. M., of Ill., $30; E. T. S., of N. Y., $300; R. W., of N. Y., $45; I. F. J., of N. Y., $146; D. C. G., of Pa., $10; S. J. S., of N. Y., $61; N. S., of N. Y., $34; H. L. B., of N. Y., $25; E. St. J., of N. Y., $25; D. L. M., of N. J., $16; S. F. L., of Wis., $20; F. A., of N. Y., $16; M. & B., of Ohio, $25; L. D. B. and others, of Pa., $16; J. G., of Ill., $16; C S., of Ill., $60; L. C., of Mass., $25; H. & P., of Cal., $20; B. & T. of Vt., $20; W. D. R., of Pa., $12; J. T., of Wis., $25; C. C. W., of Ill., $30; W. F. G., of Ohio, $10.

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

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, April 1, to Wednesday, April 8, 1863:—

P. and E., of Maine; D. C. G., of Pa; J. D., of N. Y.; E. T. S., of N. Y. (6 cases); S. J. S., of N. Y.; T. R., of N. Y.; N. S., of N. Y.; K. and M., of N. Y.; L. M., of N. Y.; H. L. B., of N. Y.; W. C. O., of N. Y.; W. F. G., of Ohio; J. B., of Ill.; L. D. C., of Mich.; S. C. S., of Ill.; R. S. C., of Iowa; T. W., of Mass.; G. H., of Mass.; B. F. S., of Iowa; F. P. F., of N. J.; W. K. M., of Wis.; E. St. J., of N. Y.; J. McL., of Ohio; J. R. B., of Ind.; F. H. C. M., of N. Y.; W. D. R., of Mass; L. C., of Mass.; B. and T. of Vt.; C. W., of Mass.; M. C. E., of N. Y.; R. McD., of N. J.; C. E. S., of Conn.; A. H. P., of Ohio; W. H., of Wis.; J. T., of Wis.; J. B. T., of N. Y.

TO OUR READERS.

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

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

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

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 is required to accompany the petition, specification and oath, except the Government fee.

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

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 shall commence on the expiration of this present volume 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 will be 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, 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 compute the amount they must send in when they wish advertisements inserted, 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.

PAYE'S PATENT FORGE HAMMER.

This hammer is adapted to both heavy and light forgings; the force of the blow being entirely at the will of the operator, and for all forgings under six inches, both round or square, is the best hammer now in use, and requires but one-half the power used by every other hammer to do the same work. For an engraving and description of this hammer see page 1, Vol. V. (new series) of the SCIENTIFIC AMERICAN; some valuable improvements have, however, been since made. All communications should be addressed to H. M. AMES, Box 422, New York, or Ames Iron Works, Oswego, N. Y.

These hammers may be seen in operation at the Allaire, Neptune, Secor, Delamater, Fletcher & Harrison, Duncan & Crampton, Anderson & McLaren, Duhurst & Emerson, Charles T. Porter, Hudson River Railroad Car Shop, all in New York city; Joseph Colwell, Jersey City; Wm. White, Newark, N. J.; Providence (R. I.) Tool Co.; Whiting & Wilcox, Kaighn's Point, Phila.; Mallory & Cottrell, Mystic, Conn.; J. Dillion, Rondout; James Horner & Co., Sing Sing; Henry Esler & Co., Brooklyn; James B. Eads, St. Louis, Mo.; Franklin Iron Works, Central Railroad Shop, Albany; Burlington, Quincy & Chicago Railroad Shop, Ames Iron Works, Oswego; C. P. & A. Railroad Shop, Cleveland, Ohio. 1*

THE INVENTOR OF SEVERAL VALUABLE IMPROVEMENTS in the construction of iron-clad and other men-of-war wishes to connect himself with a man of means, for patenting and making the same. One of these is of the utmost importance at the present time. Address S. BRUNNER, 211 East 13th street, New York. 1*

FOR SALE—A SECOND-HAND ENGINE LATHE IN good running order—swings 6 feet—distance between centers, 15 feet. Address Post-office Box 781, Albany, N. Y. 16 2*

FOR SALE.—STEAM ENGINE, 16-INCH BORE, TWO feet stroke, with Judson governor, boiler of sufficient capacity for same with fire-box, chimney pipes and pump complete, but little used. Also a large gear-cutting engine to cut bevel, spur or spiral gears; one compound planer; one shaping machine, a few engine lathes and planers; one slotting machine, all of excellent quality. Also, stationary engines, 6, 7 and 8-inch bore, 16-inch stroke; 10x20, 12x20, 12x24, 14x24, and 16x36. Portable engines from 3 to 10 horse-power. Shafting, pulleys, &c., made promptly to order. Address CINCINNATI MACHINE WORKS, corner Trout and Lawrence streets, Cincinnati, Ohio. 16 4*

ORDNANCE OFFICE,

WAR DEPARTMENT,
WASHINGTON, March 3, 1863.

PROPOSALS will be received at this office until 4 o'clock P. M. on the 30th of APRIL, 1863, for furnishing six hundred Wrought-iron Beams for Rails of Chassis of Sea-coast Carriages.

These beams are to be made after the following specifications:—

The rail for barbette carriages is a rolled wrought-iron beam, similar in appearance to the "I"-shaped beams used in the construction of fire-proof buildings. It is required to be straight and smooth on its surface, and free from flaws, imperfect welds, blisters and cinder streaks. The outer surfaces of the two flanges are planes, parallel to each other, and at right angles to the web. The web joins the two flanges along their middle line, leaving them to project equally on each side, and must be without bends or corrugations.

DIMENSIONS OF BEAMS.

Length of rail	171	inches.
Depth between outer surfaces of flanges	15	"
Width of flanges	5·375	"
Thickness of flange at outer edge	·75	inch.
Thickness of web	·625	inch.

These beams will be inspected after the following rules:—

They are to be made of good tough well-worked clear iron, the absence of which qualities (generally indicated by roughness of surface, and by checks and more marked roughness along the edges of the flanges), as also flaws, or bad welds, blisters and streaks of cinder will cause their rejection.

1st. They are to be of the required dimensions and square at the ends.

2d. They are to be straight and free from short bends in the flanges and webs.

3d. The outer plane surfaces of the flanges are to be parallel to each other, and in planes perpendicular to that of the web.

4th. The webs are not to be bent or *troughed*, as would result from resting the rails along their whole lengths on the edges of the flanges, while the webs are too hot to bear their weight.

5th. The flanges are to be perfectly equal on each side of the web.

VARIATIONS ALLOWED IN INSPECTING.

In length of rail	·50 inch.
In depth of rail	·10 inch.
In thickness of web	·05 inch.
In warp or wind, in depth of flange at extreme end of rail	·10 inch.
Difference in distance between outer edges of plane surfaces of flanges on different sides of web at any cross section of rail	·10 inch.
A straight edge of equal length with the rail placed on the outer edge of the flange should not depart from it at any point more than	·15 inch.
A plane surface placed on the web should not depart from it any point more than	·10 inch.
A plane surface placed on the plane surface of either flange should not depart from it at any point more than	·10 inch.
Departure from square in depth of rail	·15 inch.

Specimens of the beams, or drawings of them, can be seen at the United States Arsenals at Fortress Monroe, Va., Bridesburg and Pittsburgh, Pa., and Watertown, Mass.

Bidders will state the number of beams they propose to furnish, the time when they will commence the delivery, which should be as early as possible, and the number they can deliver weekly after commencing delivery, place where they will make them, and the price per pound for which they will deliver them at the point of vessel or railroad shipment nearest to their works.

No bids will be entertained except from persons actually engaged in the manufacture of iron, evidence of which must accompany the bid.

Each party obtaining a contract will be required to enter into bonds, with proper sureties for its faithful fulfillment; and the transfer of the contract to another party will cause its entire forfeiture.

The right is reserved to reject all proposals if the prices are deemed too high, or, if for any cause, it is not deemed for the public interest to accept them.

Proposals will be sealed and addressed to "GENERAL J. W. RIPLEY, Chief of Ordnance, Washington, D. C.," and will be indorsed "Proposals for Wrought-iron Beams." JAS. W. RIPLEY,
16 3 Brigadier-General, Chief of Ordnance.

LOWENBERG'S PATENT SOLIDIFIED WOOD.—MANufactured by a simple process, at a very trifling expense, from any kind of SAWDUST, reproducing all the various kinds of wood, including rosewood, mahogany, ebony, &c., with all their original beauty, strength and durability, and in many respects and for most purposes greatly superior to natural wood. Pressed into molds it takes the most accurate impressions, and, having no grain, will take a very fine polish with but little labor, and will not warp or crack in any climate. Address W. J. DEMOREST, 473 Broadway, where specimens may be examined. Manufacturers in wood of any kind, including furniture, pianos, picture frames, tools, buttons, sign or printing letters, toys, &c., are especially invited to call. 1*

HOW TO GET THE NEW YORK DAILY SUN, WITH the postage paid, for one cent! Get your postmaster or storekeeper to receive 20 cents each from 15 persons, and remit it ($3), and we will send him 15 copies of *The Sun*, postage paid, for 20 days. More money will pay for a longer time. MOSES S. BEACH, Proprietor of *The Sun*, corner of Fulton and Nassau streets, New York. N. B.—*The Weekly Sun* is only 50 cents a year. 16 4g

DAMPER REGULATORS.—GUARANTEED TO EFfect a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. Orders promptly attended to, or information given, by addressing CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, 229 Broadway, New York.
Responsible agents wanted. 16 26*

THE "KING MICROSCOPE"—DOUBLE LENS.—Prof. Horsford, of Harvard University, says: "It works very well, and you have got it up very neatly." Magnifies 25 diameters—55 cents in Postal Currency. The "BOWEN MICROSCOPE," 28 cents. The "S. WOODWARD MICROSCOPE," 38 cents. Or one each of the three kinds for $1. All free of postage.
Address T. EDWIN KING, Box 330, Boston, Mass. 15 4*

ONE WHO HAS HAD EXPERIENCE IN DESIGNING and Constructing Machinery, and a Civil Engineer, desires a position as Mechanical Engineer. Address S. W. ROBINSON, Ann Arbor, Mich. 1*

TO LEASE OR FOR SALE—THE FOUNDRY KNOWN as the "Newark Machine Co.'s Foundry," situated on High street, in the city of Newark, N. J.—building 80 feet long by 85 feet deep, 30 feet high, slate roof, with molding pit, three melting stacks, three cranes, &c., all in perfect order to carry on the regular foundry business; also large brass furnaces, &c., arranged especially for casting cannon; also, dwelling house adjoining, 30 feet square, and kitchen; also, barn on Boyden street. The whole, with over an acre of land attached, will be leased or sold, together with a valuable water privilege. Address or apply to THOS. B. NORRIS, No. 2 Washington place, Newark, N. J., or ROBERT VAN ARSDALE, Esq., "Morris Buildings." The foundry building can readily be converted into a three-story factory, and made suitable to other manufacturing business. 16 2*

FORT WAYNE SPOKE, HUB AND BENDING FACTORY.—We wish to correspond with inventors of machines for bending plow handles with a view of purchasing a machine and right. OLDS, HANNA & CO. 16 2*

TO INTRODUCE NEW ARTICLES OR EXTEND YOUR business. A catalogue of the names and address of the dealers in hardware, stoves, tinware and agricultural implements in the United States and British Provinces will be sent by mail (prepaid) on receipt of two dollars. Very important in directing circulars. H. B. LANE, 151 Nassau street, New York. 1*

WANTED—A NEW OR GOOD SECOND-HAND Steam Engine with tubular boiler, about one horse-power, with governor, pump, &c. Also an engine lathe with all modern improvements—track about thirty inches. Any one having either of the above for sale will please address, with full description and price, M. L. BAXTER, Derby Line, Vt. 1*

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect we shall decline to publish.

For further particulars, address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
New York City.

IMPORTANT PRACTICAL BOOKS.

Statistics of Coal; including Mineral Bituminous Substances employed in Arts and Manufactures; with their Geographical, Geological and Commercial Distribution and amount of Production and Consumption on the American Continent. With Incidental Statistics of the Iron Manufacture. By R. C. Taylor. Second edition, revised by S. S. Haldeman. Illustrated by five maps and many wood engravings. 8vo., cloth, $6.

The Coal Trade of British America; with Researches on the Character and Practical Values of American and Foreign Coals. By Walter R. Johnson, Civil and Mining Engineer and Chemist, 8vo., $2. ☞This volume contains the results of the experiments made for the Navy Department, and upon which their coal contracts are now based.

The Manufacture of Iron in all its various branches, including an Essay on the Manufacture of Steel. By F. Overman. Illustrated by 150 engravings. Third edition, 8vo., cloth, $5.

Strength and other Properties of Metals. Reports of Experiments on the Strength and other Properties of Metals for Cannon. With a description of the machines for testing metals, and of the classification of cannon in service. By Officers of the Ordnance Department, U. S. Army. By authority of the Secretary of War. Illustrated by 25 large steel plates. In one vol. quarto, $10. ☞ The best treatise on cast iron extant.

The Practical Metal Worker's Assistant, for Tin-plate Workers, Braziers, Coppersmiths, Zinc-plate Ornamenters and Workers, Wire Workers, Whitesmiths, Blacksmiths, Bell-hangers, Jewellers, Electrotypers, and all other Workers in Metals and Alloys. By Oliver Byrne. Illustrated, 8vo., cloth, $7 50.

The Hand-book for the Artisan, Mechanic and Engineer; containing Instructions in Grinding, Sharpening of Cutting Tools, Figuration of Materials by Abrasion, Lapidary Work, Gem and Glass Engraving, Varnishing and Lackering, Abrasive Processes, &c. By Oliver Byrne. Illustrated with 11 large plates and 185 cuts. 8vo., cloth, $5.

The Practical Model Calculator, for the Engineer, Mechanic, Machinist, Manufacturer of Engine-work, Naval Architect, Miner and Millwright. By Oliver Byrne. Illustrated, 8vo., cloth, $3 50.

The Practical Brass and Iron Founder's Guide; a Concise Treatise on the Art of Brass Founding, Molding, &c., with numerous Practical Rules, Tables and Receipts for Gold, Silver, Tin and Copper Founding; Plumbers, Bronze and Bell Founders, Jewelers, &c. By James Larkin, Conductor of the Brass Foundry Department, at Reaney, Neafie & Co.'s Works, 12o., $1.

☞ The above, or any of my publications, sent by mail free. Catalogues, including important works now in press, sent free of postage on application. HENRY CAREY BAIRD, Publisher of Practical Books, 406 Walnut street, Philadelphia. 1

THE PHRENOLOGICAL JOURNAL FOR APRIL CONTAINS Portraits and Characters of Mr. Chas. W. Stafford—inventor of the projectile—the Rev. Alex. Clark, the Poet and Preacher. Ethnology of the Negro, the Saxon, Norse, and Dane. How to Talk, Language, its functions and cultivation. Memory. A Scotch Miser—Going to Europe. Art and Artists—Hidden Life, Revealed by Microscope. Anatomy of the Brain—Spiritual, Intellectual and Social Organs—Born Again. Physiognomy—the "Chin"—its Language, Love, Economy, &c. Human Perfection, by a Clergyman—How Attained, in the April PHRENOLOGICAL JOURNAL—10c. for $1 a year. FOWLER & WELLS, New York. 2*

BUREAU OF ORDNANCE.

NAVY DEPARTMENT,
Washington City, March 2, 1863.

This Bureau is desirous of ascertaining whether rifled cannon can be made of wrought iron of sufficient and uniform endurance and economy to warrant their being preferred to guns of cast iron only, or of cast iron strengthened with wrought iron.

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The quality of metal, price, and other terms, are to be stated clearly in the proposals forwarded.

The Bureau reserves the right to itself of accepting or rejecting any of the proposals.

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15 8

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

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nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

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The National Gallery.

The grand hall of the Patent Office, which was originally fitted up for the now-defunct National Institute, has been arranged as a depository for the historical relics, the trophies, the art-treasures and the imperial and royal gifts in the possession of the general Government. Among these are the personal effects and sword of Washington, the staff and the printing-press of Franklin, the original Declaration of Independence, treaties with the foreign powers, &c., and now the collection is crowned, as it were, by Power's "Washington." This noble statue, which graced the State-house of Louisiana, and was sent here by General Butler as "spoils of war," has been placed beneath, where the light is perfect, and where its beauties can be seen to its greatest advantage. Mrs. Lincoln has also had placed in the National Gallery a variety of valuable and curious articles, sent as presents to the President by the king of Siam and by the Emperor of Japan. Among the most remarkable of these objects are an entire coat of mail, made of iron, copper, silver and gold, exquisitely wrought; the helmet is not unlike those worn by the Saracens in the days of the Crusaders, save a curious pendent curtain which was worn to defend the neck; the chain-work protecting the arms would have done honor to a Damascus armorer, each link being of the finest-tempered steel, the greaves are of copper, finely lacquered. A vase weighing one hundred pounds, for an orange tree, is of porcelain, enameled in mazarine blue and white—that same delicious Indian blue for which our grandmothers used to sigh in vain, so rare and so expensive was this color. The monogram of the emperor illuminates its sides, while a Grecian border environs the top. A tassa of porcelain, thirty inches in diameter, profusely pictured in colors, with storks, dragons, butterflies, chysanthemums, the rising sun and the peak of Fusymma, render it one of the most unique of gifts. Two enormous elephant's tusks (a staple article, by the way, in Siam) gives one a favorable idea of the strength of the beast that wore them. They are valued at $1,000; this country has never possessed a finer specimen of ivory. The scientific collections made by our exploring expeditions were removed a year or two since to the museum at the Smithsonian Institution; but from present appearance, the space which they occupied in the National Gallery will soon be filled with objects of great interest to every citizen.

Human Remains discovered at Pompeii.

Galignani publishes the following curious story:—

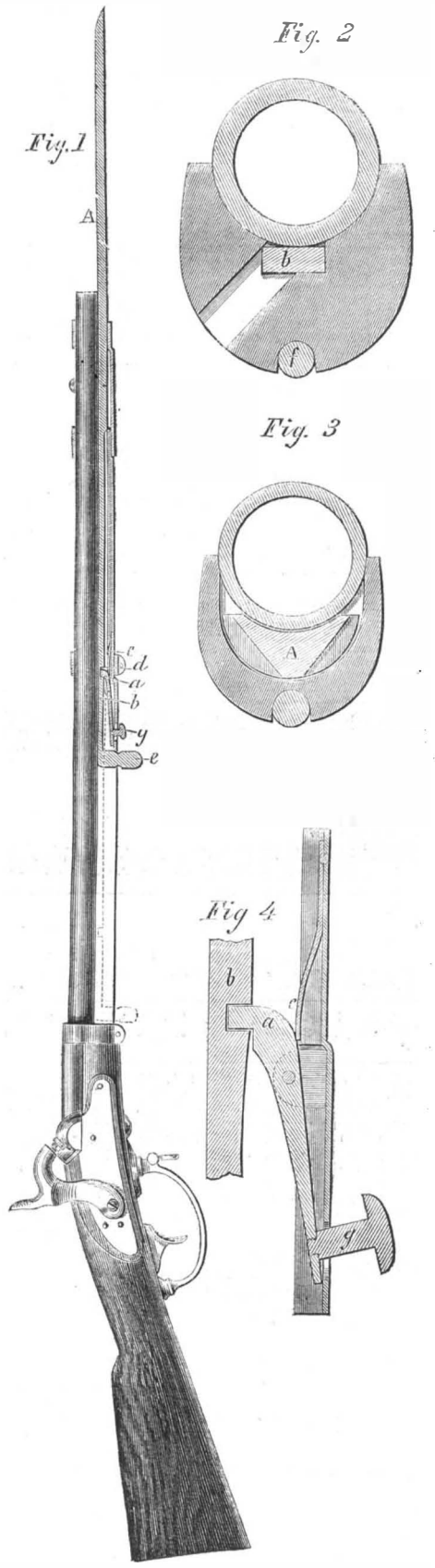
"A very interesting discovery has just been made by M. Florelli, the inspector of excavations at Pompeii. While digging at a depth of from eight to ten feet, the pickaxe struck into a little mass of coins and jewels. M. Florelli then continued the excavation with the greatest care, removing the earth grain by grain, and, after some hours labor, was rewarded by the discovery in the hardened ashes of the perfect mold of a man in a lying posture, the skin of whom had dried up, but the skeleton remained intact. M. Florelli caused plaster-of-paris to be poured into the form of the Pompeiian, and the casting succeeded perfectly with the exception of two fragments of an arm and a leg, where the mold was incomplete. The cast of the man is of the greatest precision; the moustache, the hair, the folds of the dress and the sandals are admirably defined."

How Races die out.—The method in which lower races fuse into or escape from the higher is a mystery in its causes, but well understood in its result. The lower race loses its productiveness, and some dozens of extinct tribes, like the extinct genera of animals, attest this. The Red Indians of America, the native race of Peru and the aborigines of Australia are living examples of this rule. In fourteen years (a living traveller says) the aboriginal inhabitants of Tasmania, although numbering upwards of a thousand, did not give birth to more than fourteen children. We may rest assured that at this any rate class of beings will soon exhaust itself.

The Middlesex Mills, Lowell, Mass., are engaged at present, principally in the manufacture of shawls and ladies' cloths. All the machinery is running to its full capacity, giving employment to about 820 persons, of whom 450 are males and 370 are females.

JENKINSON'S PATENT BAYONET.

The invention herewith illustrated is one intended to secure the bayonet from being accidentally or designedly removed, and to protect it from injury when not in use. In some instances we have seen it stated that the foe has struck the bayonet from the musket by a well-directed blow, and so disarmed his antagonist that he was able to either make him prisoner or despatch him on the spot. No such accident



can occur to muskets fitted with this invention; this the reader will perceive to be the case by perusing our description. The bayonet, A, Fig. 1, projects from the lower side of the barrel, and is confined in a case made by the stock; it is forged in one piece and runs down to about the middle of the barrel; at this point there is a catch, *a*, which engages with the shank, *b*, of the bayonet; a small spring, *c*, serves to keep the catch always in connection with the slot, *d*, formed in the shank previously mentioned. The end of the bayonet shank is turned over, as seen at *e*, and forms a projecting handle which works in a slot in the wooden part of the stock. Fig. 2, is a section of the musket through the shank, *b*, of the bayonet, and shows the form of it, and also the position of the slot in which the handle, *e*, works. The ramrod is seen at *f*. Fig. 3, is a section through the bayonet, and Fig. 4, is an enlarged section of the disengaging apparatus before described; the same letters refer to similar parts. The operation of this apparatus will be apparent to any one by a simple inspection of it. By pressing on the button, *g*, Fig. 4, the other extremity of the lever will be depressed, and the catch thrown out of connection with the recess in the shank; the bayonet may then be slid down in the case by pulling on the handle seen projecting below. The weapon is thus securely protected against any of the casualties enumerated at the head of this article. This bayonet was patented by James Jenkinson, through the Scientific American Patent Agency, on July 1, 1862; further information may be had by addressing the inventor at 111 North First street, Brooklyn, E. D., or Samuel Hirsch, 25 Chamber street, New York.

FROM THE STEAM PRESS OF JOHN A GRAY.