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## Improved Universal Milling Machine.

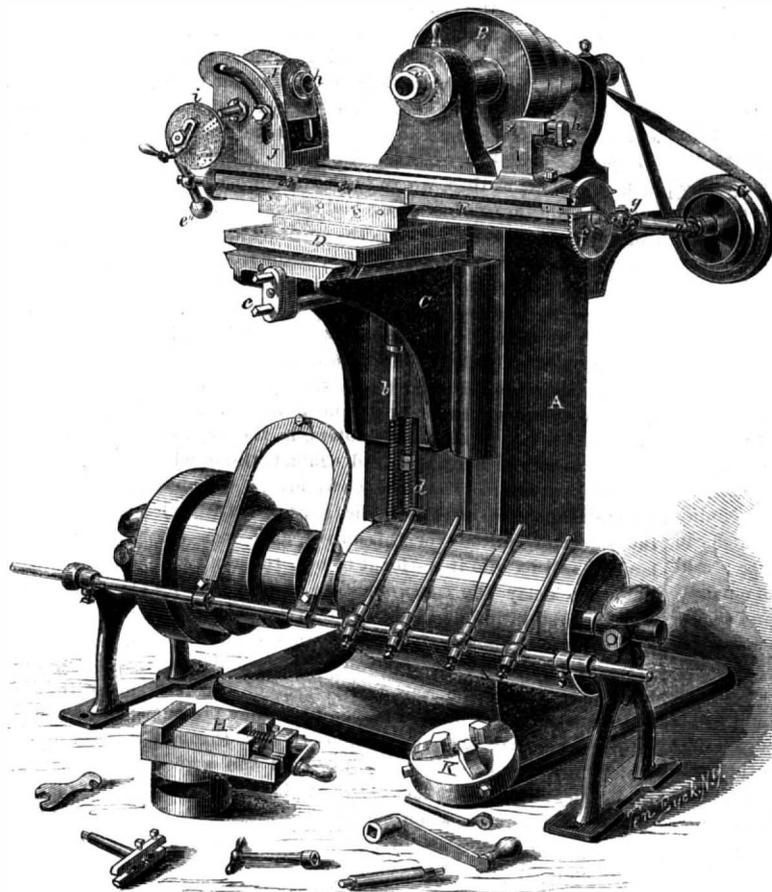
The machine represented in our engraving is adapted to the making of a great variety of tools required by gun-makers and machinists; such as twist drills, mills of all shapes, with straight or spiral teeth, and cutters for gears or other work. It will cut a tapering or conical mill with either right or left hand spiral teeth, and is designed to supply the place of the common index milling machine used by gun-makers, but is adapted to a greater variety of work. The frame A, is cast hollow in one piece and has shelves also cast in it, forming a cupboard to hold tools.

In the upper part of the frame is the main arbor *a*, made of steel, running in a Babbitt-metal box with an anti-friction curve at the front end and in a straight, bronze box at the rear end; it can be closed up to compensate for wear. The front bearing can be tightened by forcing up the pulley, B, with a nut provided for the purpose. Upon the front side of the frame, A, a knee, C, is fitted to slide, which can be moved by a screw, *b*, connecting it with a projection from the frame. This screw is vertical and is connected with a horizontal shaft by beveled gears, being operated by a crank on the squared end of the horizontal shaft, *c*, that projects from the forward part of the knee. Behind this vertical screw, is another rod, *d*, which is attached firmly to the knee, and passes freely through a hole in the same projection in front of the frame which answers as a nut for the first-named screw. This constitutes a stop motion which limits the rise or fall of the knee and through it the depth to which the work is milled. Upon the top of the knee C, a slide, D, is fitted, on a line parallel with the main arbor, to be moved by the screw, *e*. To the upper part of this sliding piece the casting, E, is attached, that moves on its center horizontally only, a graduated arc showing its position. This piece can be clamped very firmly to the one below it. In this also the long carriage, F, shown in the cut, is fitted to slide, and is moved in the usual way by a screw working through a nut in it with a handle, *e'*, on one end. On the opposite end is a bevel gear, *f*, connecting with another on a short shaft projecting from the side of the carriage. A connection is made between this short shaft and that of the feed cone, G, by two Hook's joints, *g*, and a shaft between them, made of two pieces, one sliding into the other with a feather let in to one of them so that their relative positions may not be changed. This feeding arrangement is thrown in or out, by a lever, and can be set to stop it at any point. A vise, H, shown at the foot of the machine, is provided, which can be attached to the carriage, F, thereby rendering the tool equivalent to a plain milling machine with the advantage of being able to feed the carriage at any angle. At one end of the carriage is a stand, I, fitted to slide in a groove, with a center, *h'*, in its top; this stand can be fastened

at any point; opposite to it is a head, J, having a hollow arbor, *h*, in which a centre can be placed to be on a line with the centre *h'*, in the stand described. Between these centres is placed the work to be milled, in which any variation of spiral or its equivalent can be made by means of the index, *i*, on the side of the head that is connected with the arbor by two miter gears, a worm, and worm wheel. The arbor in the head can also be connected with the screw that moves the carriage by spur wheels engaging with the miter gears and worm wheel just mentioned.

the head and substituting the chuck, K; as the arbor which the chuck screws is hollow, a drill of any length, not exceeding 1 1/8 inches in diameter can be made, the end projecting from the chuck being taken by a center in the stand, I. The usual tables, showing the changes of gears for spirals, and the other divisions made by the index plates, accompany the machine. The overhead pulleys are arranged for two belts to reverse the motion of the main arbor.

These machines are in operation at several of the private armories. Further information concerning them can be obtained by addressing the makers, J. R. Brown & Sharpe, 115 South Main street, Providence, R. I.



J. R. BROWN & SHARPE'S UNIVERSAL MILLING MACHINE.

When this is done, the arbor, *h*, revolves as the carriage advances, and thus gives a spiral motion to any piece held between the centres or on an arbor in the head. Changes of spur gears are furnished by which any spiral can be obtained. The machine ordinarily cuts right hand spirals, but by inserting an extra gear a left-hand motion can be given to it. The part, *j*, of the head, J, supporting the arbor, can be raised to any angle and set, by divisions upon the arc through which it moves. This arrangement renders the cutting of tapering spirals as easy as straight ones. It can also be depressed below the line of the centres for the purpose of cutting the teeth in tapering rimers. A small universal chuck, K, is fitted to screw on the arbor, *h*, and is found convenient for cutting face mills, or doing any work on or near the ends of small cylindrical pieces. The jaws in this chuck run through to the backside so as to hold an arbor firmly. A spiral or twist drill, which is too long to go between the centers, may be milled by removing the center in

[This is by no means a new species of food. This is the portable soup described on page 416 of Liebig's "Letters on Chemistry." He states that it is easily soluble in cold water, and when dissolved in about thirty-two parts of hot water with the addition of some salt, it has the taste and peculiarities of excellent soup. The intensity of the flavor of the dry extract of flesh is very great. It does not keep so well, however, as Borden's famous meat-biscuit.

THE PNEUMATIC POST.—We learn from the London Times that the system of conveying parcels in tubes—illustrated on page 209, Vol. V. (new series), SCIENTIFIC AMERICAN, will soon be in operation in London for the public. A pipe, two feet 9 inches in diameter, has been laid from the central station of the London and North-western Railway to the General Post-office—a distance of half a mile—and the mails are to be delivered through this tube between the post-office and the railway.

## Portable Soup.

A new species of food for army uses, called the extract of flesh, is highly commended for invalid soldiers and others. A half ounce represents the whole amount of nutriment in a pound of fresh beef. The method of preparation is thus described:—"The whole process consists in taking lean beef, free of bone and fat, chopping it fine as when used for sausages or mince meat, and mixing it with its own weight of cold water. It is then slowly heated to boiling and allowed to boil briskly for a moment or two, when it is strained through cotton cloth to separate the coagulated albumen and fibrin. The evaporation to dryness of the solution must be conducted at a low temperature by a water bath or a steam heater. The powder is readily soluble in water. When properly dried it will keep for months. Enough can be stored in an ordinary watch-fob to sustain a soldier a week. An ordinary porcelain-lined kettle holding a gallon is sufficient for the preparation of the extract. To dry the solution, put the kettle into a larger vessel containing hot water. With but little trouble on the part of their friends, almost every soldier might be provided with some of this valuable nutriment."—Exchange.

## RECENT AMERICAN INVENTIONS.

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

**Hoisting Apparatus.**—This invention is based on the principle of the differential wheels, and its object is to produce a hoisting apparatus of great power in a small compass. The invention consists in the arrangement of two cog wheels with a different number of teeth; that one with the largest number of teeth being stationary and the other being secured to the axle of the drum of the hoisting apparatus or to the inner surface of said drum, in combination with two other cog wheels having the same number of teeth and attached to a tumbling shaft which is carried round the center of the drum shaft in such a manner that, by the combined action of the two wheels on the tumbling shaft and the differential wheels, a slow rotary motion is imparted to the drum shaft, and that the power applied to the tumbling shaft is multiplied in proportion to the number of teeth of the gear wheel on the drum shaft divided by the difference between the number of teeth of said wheel and that of the stationary wheel. This invention is applicable, with peculiar advantage, to the steering gear of vessels. J. F. Rochow of No. 16 Water street, Brooklyn, N. Y., is the inventor of this improvement, and he has secured his invention by patents in the United States and in England through the Scientific American Patent Agency.

**Skate Fastening.**—This invention relates to a new and improved mode of attaching the back part of the skate to the heel of the boot or shoe, and consists in having a hook at the back part of a heel plate attached to the skate, and a plate provided with two parallel slots attached to the heel of the boot or shoe, the parts being so arranged that the hook on the skate may be passed through the slots in the plate which is attached to the heel of the boot or shoe and a perfect lock obtained. David Maydole, of Norwich, N. Y., is the inventor of this improvement.

**Refining Lard.**—The object of this invention is to reduce the temperature of lard as the same passes from the heating pan to the cooling vat, to such a degree that it requires but little stirring to bring it to the desired consistency. The invention consists in the application or use in an apparatus for refining lard, of a worm inclosed in a cask or tub, which can be wholly or partially filled with cold water; said worm being connected at one end to a pipe emanating from the bottom of the heating pan and at the other end to a spout discharging into the cooling vat in such a manner that the lard, in passing from the heating pan to the cooling vat, is cooled down to such a degree that very little stirring in the cooling pan is needed to bring the lard to the desired consistency fit to be packed in suitable tubs, barrels or other vessels; the invention consists also in the arrangement of a regulating cock inserted into a pipe leading from the bottom of the cask which contains the worm, to the waste-water or over-flow pipe in combination with the water-supply pipe and with the heating pan in such a manner that by opening or closing said cock the quantity of water in the cask and with it the temperature of the lard passing through the worm can be regulated, keeping the same at such a degree of heat that it flows freely from the worm without stopping up its own passage, and at the same time the temperature is reduced so that it requires but very little stirring to bring the lard to the desired consistency. Wm. J. Wilcox, of New York city, is the inventor of this device.

**Elongated Bullets.**—This invention consists in the combination with an elongated expanding bullet of a headed pin and a conical expanding disk, the disk having its concave side against the base of the bullet, and the pin entering the cavity thereof, and operating to produce the flattening of the disk, by which it is caused to expand against the walls of the gun and enter the rifle grooves thereof. It also consists in so fitting the pin to the cavity of the bullet to produce the expansion of the cylindrical portion of the exterior thereof that the forward part of the said portion shall be first expanded, thus causing the friction against the bore of the gun to begin as far forward as the bullet shall bear against the bore, by

which means the bullet will be more quickly and perfectly upset, its friction more evenly distributed and its center of gravity more nearly to coincide with the center of the bore of the gun—all conditions necessary to accuracy. Elijah D. Williams, of Philadelphia, Pa., is the inventor of this improvement.

**Blasting Compound.**—This invention relates to the blasting compound for which the same inventors obtained Letters Patent No. 34,654, dated March 11, 1862. The principal object of this improvement is to prevent the separation of the sulphur from the bark or any other woody or carbonaceous matter that may be used as a substitute therefor, and to this end it consists in the addition to the compound of bark or other woody or carbonaceous matter, nitrate of soda, sulphur and chlorate of potash, of a suitable quantity of starch to prevent such separation. W. R. Thomas and Morgan Emanuel, Jr., of Catsauqua, Pa., are the inventors of this blasting compound.

## THE BATTLE OF FREDERICKSBURG.

Our readers are doubtless familiar with the history of the conflict of the 14th of December, from the reports in the daily papers, and know, ere this reaches them, that another disaster has been visited upon us. Oh that we might write, instead, that victory had perched upon our helmets! The bitter almost insupportable shame of the "accident" is heightened by the stinging, though unintended, sarcasms conveyed through paragraphs in the daily journals. As, for instance, "the rebels are starving," "the rebels are ragged, without powder, ball, or caissons for their guns;" in short, that Falstaff's ragged regiment was the National Guard in comparison to them—the poor, wretched, deluded beings! What are such comments as these worth but to fasten deeper in our sides the thorn of disgrace and shame? Is the country really degenerate? Is the spirit which of old hurled back our foes from these shores and from these mountains and hills—which God never intended to be other than free—quenched and dead? No! a thousand times no! The blood that shed itself in vain, in fronting the quivering lines of certain death that flashed demoniacally before the eyes of those heroes who crossed the Rappahannock in open boats to dislodge the rebel sharpshooters, is the type of that fire which blazed of old against those who sought to overthrow the liberties we love. Of what use are the sacred dead who lie scattered through thousands of miles over this broad, and once fair land? Tell us who it is—for it is not the rank and file—who delay the consummation of our victories and the restoration of the peaceful arts; what clue to this worse than Cretan labyrinth do the telegrams Fitz-John Porter forwarded to McClellan afford, as quoted by the New York Tribune of the 18th of December last? What a spectacle do they present of jealousy, hate and contemptible rivalry, through which means the nation was disgraced and a good soldier degraded in the last battle at Manassas.

Alas! for America when she fell from the hands of honest patriots into those of politicians; when party strife and party weal or woe obtained the reins of power. Not Jehu when he drove the car of Phœbus, and threw the chariot of the sun out of its accustomed course, wreaked half such confusion upon the nether world as exists at this moment among us politically. Oh! if the dead who lie calmly sleeping in their graves upon the bleak hillsides could speak from their narrow houses, what reproaches would they utter against those whose folly, and want of fitness for their places, had brought them thus low. The sire, the man of mature age, youth, infancy even, in one common grave, the bosom of our loved country, sleep calmly forever. Is it strange then, in view of recent events, that we stand to-day with our currency depreciated, and our taxes threatening to overwhelm us, the wonder and contempt of the pettiest nations of the earth? We have not degenerated! In proof of this assertion see the records of the rank and file, how glorious it is! There is no necessity for pricking them into the fight at the point of the sword. The Eighty-eighth Pennsylvania built a pontoon bridge across the river, and would have crossed, or did cross to the enemy in spite of the dangers which threatened them; what a glory should this be, to the old Keystone State; and a little child ten years of age crossed in the first boat with the noble 400 of the

Seventh Michigan, who first advanced on Fredericksburg, and beat his little note of defiance in the face of the foe. Such actions as these almost redeem the disgrace which has fallen upon us. Thirteen thousand five hundred of our bravest men are placed *hors-du-combat*, and for naught; what a holocaust! Men are thrown forward and face blazing batteries on which they are piled like fagotwood, and when the action is found useless, they retire and re-cross the river, as we are gravely told, without loss. What of those who never re-crossed the river, and who lie stark and stiff upon the whitened and frosty fields, an awful reproach to their leaders' want of prudence and consideration for them? With what heavy hearts we read the now stale old repetition, that the rebels are starved and ragged and disheartened. Yes, so they may be, but they slay a whole town in a few hours and still present an unbroken front. There is no use in hiding or higgling over facts; there is no earthly benefit to be derived from representing disasters as victories, or palming off defeats as creditable skirmishes. And those who telegraph such things from the battle-fields forget that this is an age in which truth, apart from them, far outstrips the lightning. We have never faltered in our allegiance to the Government, or been wanting in the most implicit faith in its ability, but when we view such "feats of arms" as the one which we record, not in anger but in grief, we cannot but feel anxious for the future. God grant that the turning point be not far distant!

## VALUABLE RECEIPTS.

**WATER-PROOF POROUS CLOTH.**—Several inquiries have been made of us, lately, respecting the mode of preparing cloth to render it water-proof and yet maintain its porosity. Close water-proof cloth fabrics, such as glazed oil-cloth, india-rubber, and gutta-percha cloth are completely water-proof, but do not permit perspiration and the exhaled gases from the skin to pass through them, because they are air-tight as well as water-tight. Persons who wear air-tight garments soon become faint, if they are undergoing severe exercise, such as that to which soldiers are exposed when on march. A porous water-proof cloth, therefore, is the best for outer garments during wet weather, for those whose duties or labor cause them to perspire freely. The best way for preparing such cloth is by the process adopted for the tunics of the French soldiers, during the Crimean war. It is as follows:—Take 2½ lbs. of alum and dissolve this in 10 gallons of boiling water; then in a separate vessel dissolve the same quantity of sugar of lead in 10 gallons of water, and mix the two solutions. The cloth is now well handled in this liquid until every part of it is penetrated; then it is squeezed and dried in the air or in a warm apartment, then washed in cold water and dried again, when it is fit for use. If necessary, the cloth may be dipped in the liquid and dried twice before being washed. The liquor appears curdled, when the alum and lead solutions are mixed together. This is the result of double decomposition, the sulphate of lead which is an insoluble salt being formed. The sulphate of lead is taken up in the pores of the cloth, and it is unaffected by rains, or moisture, and yet it does not render the cloth air-tight. Such cloth is also partially non-inflammable. A solution of alum, itself, will render cloth, prepared as described, partially water-proof, but it is not so good as the sulphate of lead. Such cloth—cotton or woolen—sheds rain like the feathers on the back of a duck.

**COMPOSITION FOR LEATHER.**—In the receipt given on page 362 of the present volume of the SCIENTIFIC AMERICAN, there is an important typographical omission. The proper quantity of tallow is not given. The receipt should be as follows:—One pound of fresh tallow, one ounce of yellow bees-wax and one eighth of an ounce of shell-lac in powder. We have used this article and can vouch for its good quality.

The series of useful receipts will be continued in next volume.

**MESSRS. JONES AND QUIGGIN,** of Liverpool, will shortly launch a steamer of 250 tons burthen, built of steel plates only  $\frac{3}{16}$ ths of an inch in thickness. The Liverpool Journal of Commerce states that she is intended for a "peculiar trade," and that she will steam 20 knots an hour. This "peculiar trade" is no doubt Confederate smuggling.

## Repairing the "Great Eastern."

Through the courtesy of Messrs. Howland & Aspinwall and the personal attention of Capt. Walter Paton, of the *Great Eastern*, we are enabled to lay before our readers a full and succinct account of the disaster which befell this celebrated ship, and also details of the plans which were employed to repair her, together with the trials and delays which took place during the progress of this extraordinary feat of hydraulic and mechanical engineering. After the occurrence of the accident (with the history of which our readers are already familiar from a recent article in the *SCIENTIFIC AMERICAN*), a preliminary survey was held in order to estimate the precise locality and extent of the breakage. This was accomplished by divers, who went under the bottom of the *Great Eastern*, and, on returning, reported their observations. They announced that the plates upon the port side were badly damaged, and that the fracture extended a distance of some twelve or fifteen feet. Subsequent investigation disclosed the fact that these figures fell short of the actual injury by some feet.

The primary object of the survey being accomplished in ascertaining the nature of the injury, it only remained to invent some method by which it could be remedied. This was not imperatively necessary by any means, as from the peculiar construction of the ship, eminent engineers declared that, even with this enormous hole in her bottom, she might ride the sea with perfect safety. The anxiety and care of the officers, however, as well as the increased labor to the crew, attendant upon this huge tear in the ship's plating, decided the question; and the work was immediately prosecuted with vigor.

Owing to the huge dimensions of the *Great Eastern*, and the fact that there is not a dry dock in the world which will admit her or sustain her immense weight, it will be seen that to repair a damage of this nature, some twenty-five feet below the water-line, was an undertaking of no small magnitude. By referring to the section of the vessel, drawn for us by Capt. Paton, which we have had engraved (not however to scale), the precise locality of the fracture can be seen, as well also the construction of the vessel itself. The character of the damage, and the bearing it has upon the seaworthiness of the *Great Eastern*, will be understood by referring to our engraving. The hull is formed of two distinct vessels, as it were, one inside of the other. These skins are stayed to each other by a number of webs or partitions, that divide the vessel transversely into thirty-four spaces; they run the whole length from stem to stern. The webs are further crossed at right angles by thirteen separations which constitute a system of water-tight cells, each of which is entirely independent of the other, access being had to each cell through man-holes, provided with plates, that open into them. It must be borne in mind, also, that there are, inside of the ship proper, two upright iron bulkheads that divide the hull into three long rooms; now the man-hole plates previously mentioned communicate with each other from the upper series of cells in the ship's broadside down to the foot of the bulkhead before-mentioned. There they stop. The arrangement on the other side is of course similar. The inner room has two man-hole plates on the inner skin, which allow access to the cellular divisions situated beneath it. These are connected through one another by the same plan as the others. In brief, the *Great Eastern* is a ship built up of a series of rectangular pipes, independent of each other, yet capable of being connected together.

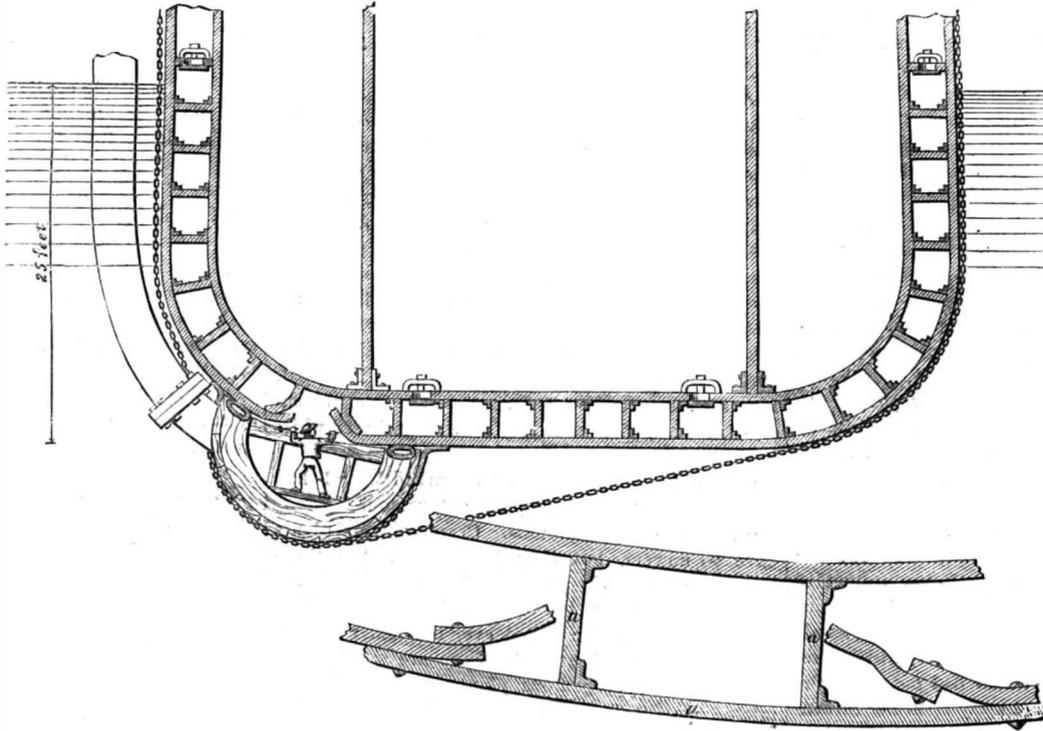
Let us now return to the subject of the disaster. The fracture was entirely through the outer plating of the ship, extending over three of the longitudinal cells, and running fore-and-aft for a distance of 86 feet. To close up the sides by any other means than with new plates was simply impossible, and these had to be put on while the vessel was in the water at her anchorage. The stubborn broken plates with their ragged edges, afforded not the slightest hint that could be seized upon to accomplish the work short of much time and labor. Preliminary consultations resulted in deciding the authorities to adopt the expedient of a dam which should inclose the point of rupture on all sides, and which, by means of pumps, could be freed from water and rendered habitable while the operations were in progress.

It may be inserted here, not inaptly, that the idea of employing such a dam was suggested to Capt. Paton, some time since, by an accident which previous-

suggested for the purpose, but not being available, a plan of the Messrs. Renwick Brothers was put in force.

It occurred to the Brothers Renwick that a water-hose would be just the thing. After the details of its construction, for which we have no room, had been worked up, it was soon applied, and fulfilled all the expectations formed of it. No sooner was the means discovered for obviating one trouble, however, than another appeared. This latter vexation was caused by the difficulty of overcoming the tendency which the hose had to draw in under the compartment. In order to secure it, strips of canvas were attached to one of two battens, which armed the gunwale dam; these were carried under and over the hose at intervals, in such a manner that the latter lay in the tight of the former; the flying end was then fixed to the batten again. Upon the outside of the case, or dam, a lappet of Brussels carpet was secured, which the

water kept up against the *Great Eastern's* bottom, aiding materially in keeping the sea out; weeds were also thrown into whatever crevices might remain, and the projectors of this ingenious method were rewarded for all their time and trouble by its complete success. To all the unequal surfaces the water-hose opposed its soft and elastic surface, filling up cavities which could not be effectually closed by any other means. The pumps were again tried, and the crib was pumped dry. No sooner was this consummation attained than Capt. Paton descended the chute to the scene of the fracture. Here an extraordinary sight was presented. The vessel was covered with long weeds, and from the cavity in the plates there rushed a waterfall on a



MODE OF REPAIRING THE "GREAT EASTERN."

ly occurred to the *Great Eastern*, when going on to the "gridiron" at Milford Haven, England. The accident referred to was the springing-in of one of the plates of the ship's bottom, caused by coming in contact with a log upon which the vessel's weight came when taking her position. Capt. Paton mentioned his plan to the Messrs. Renwick Brothers, the well-known engineers of this city; it was approved of as practical by them, and they then devised the crib herewith described.

The coffer-dam was built of heavy oak timber, semi-circular in form, and planked outside four inches thick. It was ascertained that 32 tons of iron would be required to sink the scow, and it was forthwith partially submerged, while two chutes, hereafter mentioned, were affixed. Previously, however, two heavy chains had been attached to each side of it, in such a manner that the cable, fastened on to the larboard side of the dam, was carried under its bottom and rendered up on to the starboard side of the main deck, and *vice versa* in respect to the other cable. From the ends representing the bow and stern of the dam, there also ran large hawsers which kept it from going adrift in either of those directions. Power was then applied, and the wooden crib hove up against the ship's bottom. Around the parasitic structure were then carried other hawsers and cables, until it was firmly secured in place. Thus far, matters progressed favorably—the dam was in its place, but it was full of water. Two huge chutes, or funnels, which pierced the sub-aqueous box on one side, ten feet from the ends, ran up a short distance above the water-line, and furnished the means of reaching the fracture. The edges, or gunwale of the dam, must, as will be apparent, be made water-tight, else the pumping might be continued indefinitely, without any result. This it was proposed to accomplish by means of some elastic material; hence india-rubber, flock mattress, or substances of a like nature, were

small scale; this was perplexing, and was supposed to arise from the fact of some of the valves which communicated with the ship's bottom being open. It was found to proceed from other causes, which were soon remedied. Some water yet remained at the bottom of the box, through which Captain Paton, followed by Peter Falcon, an experienced diver, forced his way, finally emerging at daylight through the other chute. His arrival afforded the best possible assurance of safety to the mechanics who, not unreasonably, hesitated to venture into such an "uncanny" affair. The moral support given to the cause by Capt. Paton's conduct re-assured the doubters, and they prepared to fall in with vigor. It might be expected that here the Fates adverse to this scheme would have been appeased with their former interference; but such is not the case. During the last month, on the occurrence of the violent snow-storm, the great ship dragged her anchors, and parted one of the cables which kept the dam in place. This line immediately, as a matter of course, got about the pump-shaft, which was at that time operated in the sea, and tore it away from its connection, filling the whole dam full again. The pump was then rigged so as to prevent the occurrence of a like disaster.

Supposing free access to be had to the fissure, let us examine the nature and character of it. It extended for a distance of 86 feet in length, by 9 feet 6 inches at the widest part, narrowing to a point at either end, and was a ghastly wound in the ferruginous cuticle of the monstrous vessel, which, while it did not impair the sea-worthiness of the ship, was of sufficient importance to warrant attention. Three of the cells were broken into, and two of the longitudinal webs upset and sprung out of place for a distance of ten feet. As it was impossible to add anything to these last-named parts, a plan was put in force whereby the wounded and disunited plates were

made one and indivisible again. The diagram will convey an accurate idea of this method. The new plates, *a*, are laid athwart-ship over the fissure, and fastened with hot rivets to the old ones; braces are also annexed, which represent the vertical divisions of the cells. The plates in the vessel's bottom are seven-eighths of an inch thick, but the patch is only five-eighths; it is, however, of the best charcoal-boiler iron, and is deemed equivalent in strength to the original structure. Great delay has occurred in getting the new plates in place, for the reason that they could not be supplied by the manufacturers as fast as they were wanted. This trouble has been remedied, like all the others; and we have the satisfaction of announcing, from a personal inspection of the job, that it is completed in a substantial and workmanlike manner. The inside of the dam is very comfortable, indeed, and the workmen, we are assured, made no complaints in this respect. They were at work continually, and inasmuch as their labors would have been materially retarded by visitors, no one beside the workmen, not even the ship's officers, were allowed to descend the chute.

The ingenuity and perseverance evinced in adopting this novel apparatus, and making it work practically, is something remarkable; and its projectors, Capt. Paton and the Renwick Brothers, have reason to feel satisfied with it.

Since the above article was written, we have visited the *Great Eastern*, and descended into the scow just described. We went through the whole affair without any protection to our garments, and came out unharmed by wet or grease. We must, however—compelled by the inexorable laws of column-rules—omit further details. On this occasion, which was one devised to give the press and the reporting engineers an opportunity of satisfying themselves by ocular evidence that the ship was all sound again, Capt. Paton entertained his guests in a hearty and hospitable manner, placing before them on his board the finest viands and wines. At the conclusion of the festivities, a gentleman having proposed the health of Queen Victoria, Capt. Paton responded modestly, and returned, "The President." Various other toasts were given, and the guests dispersed, highly pleased with their cordial, truly British reception. As the steamer which had conveyed the visitors to the vessel steamed away upon her return-trip to the city, the band of the ship, stationed on the wheelhouse, delicately complimented the disappearing boat with national airs, to which, also, the crew added force, by giving lusty cheers for the Union. Long after the responses which followed these demonstrations had died away in echoes, "the martial strains of the inspiring brass" sent forth "Hail Columbia" and "Yankee Doodle" with a vigor that excited the most lively enthusiasm for not only the compliment which was conveyed, but also the hospitable entertainer, Capt. Paton.

A series of resolutions highly complimentary to Capt. Paton and the Messrs. Renwick Brothers, were passed by the guests on their return to the city, which we are compelled to omit.

#### The "Alabama."

The Confederate pirate, the *Alabama*, seems to be re-enacting the rôle of the *Sumter*. She was recently surprised at the island of Martinique by the United States steamer *San Jacinto*; the latter being obliged to conform to the port rules and lie outside of the harbor, the *Alabama*, of course, escaped in the night. We predict that Semmes will be caught yet: "its a long lane that has no turning," the old proverb says, and he will prove no exception to it. It would be a good idea, when the corsair is taken, to try the captain of her by a jury composed of the commanders of the several ships he has destroyed. "A long rope and a short shrift" would doubtless be a popular verdict.

A MICROSCOPIC vertebrate would certainly be a curiosity in zoology. Mr. G. C. Wallich figures and describes, in the October number of the *Magazine of Natural History*, a perfect lower jaw with fully developed teeth, found by him in mud dredged up at St. Helena. This jaw is only the hundredth of an inch in length, which in proportion would make the animal to which it was attached not longer probably than one-twentieth of an inch.

#### OUR SPECIAL CORRESPONDENCE.

*The man that knows the names of 100,000 plants—The folly of scraping trees or of girdling them with troughs to keep off certain worms—The utility of picking up butterflies—Plants that grow in the mouths of fever patients—Animals that live in nitric acid.*

MESSRS. EDITORS:—I have made a notable discovery. After sweeping the whole country from New England to Texas at your expense in search of subjects to interest the readers of the SCIENTIFIC AMERICAN, I have found that the best place to look for these subjects is in the varied and multitudinous life of this great city. This is the center of intellectual activity of the whole country. In an hour's walk along our flagstones a man may meet more skill, novelty, enterprise, thought, intelligence and emotion than he can in days of travel across the solitary prairies of the West or through the interminable wilderness of pine forests at the South. As an easy illustration of this truth let me give you an account of my voyage across the East River to visit the city of Brooklyn, which is essentially a part of New York.

A few evenings since a small party of gentlemen accepted an invitation from Colonel Pike to examine his specimens of natural history. After looking at a few cuttings through the microscope, we addressed ourselves to the pleasing task of turning over the leaves of a ponderous portfolio which was filled with specimens of ferns. The leaf of the fern is peculiarly adapted to preservation, as its beauty consists in its form, and certainly there are no forms in all the works of nature that are more beautiful. Mr. Pike has between two and three hundred species, among them every species that grows in Portugal, for which country he was for a time the Consul General. He remarked that they were all gathered while in the seed.

"They have seeds then?" remarked I. "I had an impression that ferns were cryptogamous."

"They are cryptogamous. Cryptogamous plants have no flowers, but they have seeds. See these little bunches all along the edges of the leaf. These are groups of seeds, the individual seeds themselves are not visible to the naked eye, but under the microscope they are beautiful. Here are some of my drawings of cryptogamous plants, made under the microscope. This is the green that grows on cellar walls."

"How do the plants of these low orders propagate, Mr. Pike?"

"In different ways. This one now is a single filament as you see. This folds right over upon itself, when the endochrome in one fold approaches that in the other till the two touch, when one is made fruitful by the other."

"It may be called the lowest form of marriage."

The colonel continued: "I am very frequently asked what is the use of this study of natural history. Some of our very intelligent citizens say to me, 'How are you going to make anything out of this?—what good does it do to catch butterflies?' I saw one of the wealthiest men in Brooklyn at work on the trees in front of his house. He had had them all scraped and whitewashed at an expense of \$80. Says I, 'Mr. Hunt what are you doing that for?' 'To keep off the worms,' he said. 'That is no use,' I remarked. 'Oh,' said he, 'I think it is.' Well now, the insect was a *geometra*; the butterfly lays its eggs on the ends of the branches, and it is almost impossible to kill the eggs. The strongest north-west winds have no effect on them; I have seen them in Maine, and it is difficult to crush them with your nail. When they hatch in the spring, the young worm eats off the tender leaves. You can judge what good the scraping of the trunk will do. I went by, some months afterward, and Mr. Hunt was in front of his house looking up at his trees which had not a leaf on them, and I remarked, 'Your trees are looking finely Mr. H.; the scraping was more profitable than hunting butterflies.'"

"From the name of that worm, the *geometra*, or earthmeasurer, I suppose it is what boys call an inch-worm—one of those that travel by drawing up its hind legs so as to fold its body into the form of an inverted U, and then pushing forward its fore legs to straighten itself?"

"Yes, all worms that travel in that manner are called *geometra*."

"Have you ever, colonel, examined any of the plants that grow in our bodies?"

"Oh, yes, Dr. Jones gave me some matter from the mouth of one of his fever patients, and on placing it under the microscope, I found that it was a perfect specimen of *conferva*. There is a large variety of these plants you know. By the way I must show you some of the *acari* in my nitrate of silver bath. I have some set away in a vial and I will go and get it. There, this scum on the top you see; let us take out a little. There, I believe I have some on the point of this needle; now give me one of the glass slides. Now, Mr. Johnson, see if you can find him."

"Here he is, but he is dead."

"What did you take him out with?" asks the professor.

"With a needle."

"That would kill him, of course. Let me see him, for when Crosse first published his account of finding *acari* in nitric acid, I supposed of course it was a mistake, and have always supposed so. That is an animal sure enough, but he is dead. Will you give me a little salt, Mr. Pike, I should like to be certain that this is nitrate of silver."

The salt is brought, the professor tastes it and drops a little into the liquid on the slide, a white precipitate is formed, and the liquid is pronounced nitrate of silver.

"I would like to see some of those alive," remarks the professor, "for I consider the fact of animals actually living in nitric acid or nitrate of silver—substances which are so destructive to all known animal organisms—one of the most remarkable discoveries in physiology that has been made in this century."

As it is getting late, the colonel offers to take some of the liquid to the professor's office and allow him to examine the animals at leisure. B.

#### THE NEW YORK SANITARY ASSOCIATION—THE VENTILATION OF BUILDINGS.

At a recent meeting of the New York Sanitary Association held at Cooper Institute, Mr. J. Hyslop delivered a brief lecture on ventilation, in which he explained McKinnell's concentric double-current ventilator, with a model. He said that statistics afforded abundant evidence to prove that workshops and dwellings which were not well ventilated were defective in one of the first conditions requisite to health. Statistics had recently been collected in Lancashire, Manchester, Boston and other cotton districts, by which it appeared that among those in the districts which had suffered most from the cotton famine there were fewer deaths than among those who had been in constant employment. Reliable data afforded evidence that tailors, shoemakers, clerks and printers engaged at night-work suffered greatly from being confined in rooms that were generally ill-ventilated. The ventilator consists of a double pipe which is placed on the top of a building, and communicates with the apartments below. The warm foul air passes up through the central tube of the ventilator, and the fresh cold air is admitted into the annular space around the central tube; it is then deflected by a flange while passing down and diffused over the whole of the apartment below. The exit tube is longer than the passage for the cold air, and the ventilator acts like an inverted syphon, upon the expansive principle. It differs from the Ruttan system of ventilation inasmuch as the warm air passes out above, and the fresh air also comes in from above, whereas, by the Ruttan system, the warm air is carried downwards. This new system is capable of easy application to any building, and it has been applied to several here and many in England where it originated and where of late years so much attention has been paid to sanitary subjects. Dr. Griscom and many others who were present at the meeting of the Sanitary Association expressed themselves highly gratified with the lecture, as it was thoroughly practical; the model used having demonstrated the statements of the lecturer with regard to its successful operation.

M. T. P. Desmartin states in the *Comptes Rendus* that an ointment made of equal parts of lard and the extract of logwood "cures hospital gangrene like magic." It also removes fetid odors from the sores of wounds.

**Extensive Manufacture of Army Cloth.**

The Philadelphia *Ledger* states that several cotton and carpet mills in and near the city of Philadelphia have been converted into establishments for the manufacture of blankets and kerseys, and they are now doing an enormous business.

One Philadelphia firm alone—Benjamin Bullock & Sons—have in operation, running day and night, twelve mills, all within ten or twelve miles of the city proper; in these, blankets and sky blue and dark blue cloth are made, and upon the extensive operations of the several establishments about 8,000 persons are dependent for their daily bread. Many of the mills, as before stated, had been used for other purposes before the rebellion commenced, but Messrs. Bullock & Sons have of late turned their attention to the erection of works especially designed for the manufacture of cloth. Machinery of an improved order has been set up, and at present one of the mills and its fixtures, located near the Conshohocken station, on the Norristown Railroad, is a model of its kind, alike creditable to the firm and the mechanics employed in its construction. A one-story stone building, 285 feet by 85, contains ten full sets of machinery for the making of cloth. Attached to this main building are the dye-houses, wool-house, fulling room, engine room, and building containing the gas apparatus. Gas made from the crude petroleum is introduced not only in the factory but into the dwelling houses in the neighborhood, belonging to the firm and occupied by the operatives, 200 of whom are employed in this mill. A village, peopled by those interested in the work, is springing up around the mill, and the firm has erected a neat church in the midst of the settlement.

The ten sets of machines are driven by an engine of 100-horse power is also derived from the stream upon which the mill is located. The machinery used is of the most delicate and intricate construction, and the process of manufacturing cloth from the raw wool is a curious one, and well worth a visit to witness. The raw American wool, than which there is none better for the purpose in the world, first requires to be sorted, the burrs and other foreign substances removed, and then it is ready for "scouring." In order to fit the wool to take the dye, all the grease must be removed, and this process is the scouring. The room in which this is done is decidedly damp, as the use of steam enters largely into the process. The wool thus sorted and scoured is then ready for the dye-vats, where a day is sufficient to give the required color; after which the wool is taken to the picking and carding room, where it is separated and prepared for the machine, known as the "Spinning Jenny." The looms next receive the bobbins of spun woolen yarn, which is woven into coarse-looking stuff eighty inches in width. After this it is carried to the "fulling" machine where, under the action of a vapor bath, the eighty inches are contracted to fifty-five inches, with a corresponding filling-up of the sieve-like interstices. This process also gives what the trade call the "felt," and the cloth now appears to be about three or four times the thickness it had been when in the weaving machine. After this the cloth is washed and dried on stenters, and is fit for the napping machines; then shorn and pressed. The cloth is folded with sheets of stout paper between each fold, and is then subject to the action of a powerful hydraulic press containing hot plates. Leaving this, the cloth has the requisite gloss and finish, and is ready for packing and market.

The materials used in the manufacture of the cloth require about eight weeks of manipulation before they appear as cloth, and for this it will be understood that a large stock must always be on hand in all stages of manufacture. Two hundred hands working night and day (half in the day and half in the night) turn out from 8,000 to 9,000 yards in each week.

From the operations of this one mill it will be readily seen that the manufacture of cloth has come to be an important feature in the list of Philadelphia enterprises. Several millions of dollars are invested as capital, and hundreds of thousands of persons, directly and indirectly, are interested in wages and daily subsistence.

THE losses of petroleum at Oil Creek, Pa., by recent freshets, are valued at \$500,000.

**The Manufacture of American Iron Plates.**

The iron plates which are employed in the construction of the turrets and the hulls of the *Monitor* class of vessels are very broad and one inch in thickness. The Baltimore *American* states that most of these are manufactured by Messrs. Abbott & Son, in the eastern district of Baltimore. Their rolling mill is a very extensive establishment, and the machinery is driven by steam power. In the manufacture of these plates, Maryland puddled iron is used, and is first piled in faggots weighing about a tun each. These are raised to a white heat, and each then rolled into a plate forty inches wide, nine feet long and one inch thick, weighing about 1,750 lbs. After being cooled it is beaten flat with great wooden mallets. The edges are trimmed with huge shears, and when finished the plate weighs about 1,300 lbs. It takes twenty of these nine-foot plates, varying in width from forty to forty-three inches, to go around a 21-foot turret. Plates four feet square, for the armor of the hulls of vessels, are also manufactured in the same establishment.

**Boiler Explosion.**

A locomotive attached to a freight train on the Hudson River Railroad burst its boiler on the 10th ult., killing the engineer and fireman. The *debris* were scattered over the track; a train which was coming in the opposite direction run into this rubbish before it could be checked, and was partly precipitated down an embankment. The disabled locomotive was drawn back to the depot where an examination of it was made, which revealed the fact that there was, apparently, a sufficiency of water at the time of the disaster; the flues were in good condition, and the general appearance of the boiler was satisfactory. The deceased engineer, Mr. Edward Harris, was a faithful man in the discharge of his duties. This seems to be one of those mysterious circumstances which frequently occur in connection with steam boilers. We hope subsequent examination will reveal some cause for this disaster.

**Use of Tea and Coffee.**

One of the most remarkable facts in the diet of mankind is the enormous consumption of tea and coffee. The slightly stimulating and narcotic properties of these substances do not seem sufficient to account for the fact that upwards of 2,000,000,000 of pounds of these articles are annually consumed by the inhabitants of the world. It has, however, been found that they contain an active principle, which, though small in quantity, is yet supposed to form an important part in the human economy. The principle is called *theine* in tea, and *caffeine* in coffee, which are identical in composition; and, what is very remarkable, this same principle has been discovered in the Paraguay tea, a species of holly used for infusion by the natives of South America; and a principle very similar, called *theobromine*, is found in the nuts from which cocoa and chocolate are prepared. According to Liebig, there is found in the blood a principle called by him *taurine*, resulting from the destruction of the tissues of the body, and having a composition so closely resembling *theine*, that the one may easily be converted into the other. *Taurine* performs an important office in the economy of respiration; and Liebig suggests that the introduction of *theine* into the system prevents the destruction of the tissues for the purpose of forming *taurine*, and thus, though not nutritive itself, it becomes indirectly nutritious to the body in saving its tissues from destruction.

**Absorbing Power of the Human Skin.**

Dr. Murray Thomson, lecturer on chemistry at the Edinburgh School of Medicine, relates some experiments which he tried on his own person to ascertain the truth of the statements made as to the curative power of mineral water baths, depending on the absorption by the skin of certain salts and other substances which they hold in solution; and further, to ascertain whether certain substances applied in the form of ointments, &c., pass through the skin and reach the blood before they produce any beneficial effect. His conclusions are:—"Not only has absorption by the skin been greatly exaggerated, but in the case of substances in aqueous solution, it seems to be the exception, not the rule, for absorption to take

place; and, in the case of ointments, etc., some substances so applied seem to be absorbed and others not." Mercury is absorbed by the skin, but Dr. Thomson's experiments have led him to conclude that the iodide of potassium, which is in very common use by doctors, is not absorbed, and its applications may be abandoned.

**Steam Fire-engines Abroad.**

We take from the London *Engineer*, of November 28th, the following account:—

At a trial of steam fire-engines lately had in London, England, one built by Mr. Lee, of the firm of Lee & Larned, of this city, played with an English steamer constructed by Messrs. Merriweather & Son. This latter engine weighed, it is understood, 3½ tons, empty. It has one 9½-inch steam cylinder, by 9½-inch stroke. Mr. Lee's engine weighed rather less than this, and has two steam cylinders of the same dimensions working two water cylinders of 5½-inch bore. The Merriweather engine being fired, with water at 44°, the index of the steam gage moved in 7½ minutes. At 9 minutes 50 seconds the engine began playing, with a steam pressure of 50 lbs., through a 1¼-inch nozzle; with 120 lbs. steam and 80 lbs. water pressure, working through a 1½-inch nozzle, the engine threw to a distance of 150 feet vertically. A 1½-inch jet was thrown 150 feet high. In trying Mr. Lee's engine, with the water at the same initial temperature, the steam started in 6½ minutes, and the engine began to work with 20 lbs. pressure in 9 minutes. With a 1¼-inch nozzle a stream was thrown to a height of 165 feet; with a 1½-inch nozzle, and a pressure of 140 lbs. in the boiler and air-chamber, a stream was thrown vertically 160 feet; a 1½-inch stream was also thrown to the same height. This engine gave a good jet, but the hose having burst soon after, the judges were prevented from taking any accurate observations. A great amount of fire (cinders) was thrown out of the chimney to a height of 60 feet and the speed of the pistons was very great. [When the fire flies Mr. Lee is in his glory.—Eps.]

**A Double-screw Steamship.**

A steamship of 400 tons capacity, length 160 feet, breadth 22½ feet, and propelled with two screws and engines of 120 horse power, lately made a trial trip down the Thames river, and around part of the English coast. Her speed was 14.16 knots per hour. The two screws, with an engine for each, work independently. An experiment was made with both engines, going ahead at full speed, and the helm hard over, when the first circle was made in 3 minutes 14 seconds; the second in 3 minutes 13 seconds; and the third in 3 minutes 16 seconds; the diameter of the circles being about three lengths of the ship, and lessening each time. In the second experiment one engine and screw worked ahead, with the other going astern, and one circle was made in 3 minutes 39 seconds, and another in 3 minutes 49 seconds. In making these circles the action of the ship's hull was extraordinary, the central part being stationary, and both ends moving round equally; the circle was made as if on a pivot from the ship's middle section.

**Destruction of Oil Boats.**

Artificial freshets are employed to float the flat boats laden with petroleum down Oil Creek to the Alleghany river. The water is collected at different points in large ponds, and at a given time the sluices are opened, and through the freshet thus produced immense quantities of oil are floated down, which, but for this contrivance, could not, without great expense, be got to market. The stream being very narrow, and the water necessarily shallow, it requires great care to navigate it with safety; and at nearly every freshet, large quantities of oil are lost. We learn from the Pittsburgh *Chronicle*, that during one of these freshets, two weeks ago, petroleum to the value of \$100,000 was lost. When the first rush of water came, twenty boats broke loose, and these swept a large number of others from their moorings, and fifty-six were wrecked. About 10,000 barrels were lost and all the cargoes that were in bulk.

By reports from all the wine-growing districts of France, it is ascertained that the cost for renewing the timber supports of the vines amounts to \$25,000,000 annually. From this we obtain an idea of the vast extent of the French wine trade.

**An Improved Skate.**

The ingenuity of our inventors seems to have branched out in every direction and explored every avenue in search of some neat device which would combine all the desirable qualities of a skate in one. In this gyrating age we have had all kinds of instruments of this class illustrated in these columns, and we herewith add still another to the list, entirely different in its construction from any before illustrated. This skate is designed for those persons who have neglected their skating education, and whose muscles are, in consequence, incapable of the strain which the sport subjects them to. It consists, as will be seen by referring to our engraving, of a steel runner, A, whose width is equal to that of an ordinary human foot. This is grooved from end to end with a number of sharp gutters, B, so that it matters not in what direction the foot or body is inclined toward the ice, a firm hold is always obtained laterally, and the performer, much to his own satisfaction, maintains his equilibrium and personal dignity uncompromised. A brass band, *a*, at the heel prevents the foot from slipping backward, and straps of a peculiar construction, which the illustration makes perfectly intelligible, retain the whole in position. Fig. 1 represents a view of the skate attached to the foot, and Figs. 2 and 3 show, respectively, the formation of the several grooves, B, and also an end view of the runner and straps.

This skate is the invention of Mr. Wm. H. Dutton, of Utica, N. Y., and the patent for it was procured through the Scientific American Patent Agency, April 15, 1862. These skates are on sale in this city at Tiffany's extensive jewelry establishment, 550 Broadway, this city; and further information can be obtained by addressing the inventor as above.

**Postage-stamp Cancellor.**

A correspondent having seen a notice in our paper that a new postage-stamp canceller was required, has sent us a sample of a plan proposed by him to effect this object; it consists in perforating the stamp across its middle, and attaching it to the letter by its lower half alone, the upper part not being gummed. When the clerk at the office receives the letter he tears off the upper half of the post mark, and leaves the lower part on to show that the matter has been pre-paid. Our correspondent thinks that this will effectually prevent any illegitimate use of the stamp. We think this plan a very good one if it was not for one or two objections which might prove hypothetical in practice, and these are, that the loose end of the stamp might be detached prematurely; secondly, that if only one half of the stamp is gummed, the present machinery for that purpose will be useless, and new would have to be obtained.

We have also received another plan for the same purpose, which consists of attaching a double stamp to the letter, one of them gummed fast in the ordinary way, and the other projecting on one side like the leaf of a book. This the inventor proposes to have torn off by the department and retained, as we understand him, though how it will provide any facilities for detecting fraud is more than we can discover; on the contrary, it offers a premium for it. Rogues are not apt to lose a chance to steal, and what is to prevent any one from tearing off the stamp and appropriating it to his own use? The above methods are all impracticable.

There is no necessity for perforating the stamp, as the sharp edge of the letter will readily divide it. The uncouth appearance of these methods is also against them. What is required is a punch, or its

equivalent; post office clerks are used to that routine, and to introduce any other kind of manual labor would cause a revolution in the operations at the mailing office, which would result in much delay, and consequently be a nuisance. Some simple device must be adopted; who will be the first to introduce it?

**Lighting Conductors.**

A paper on lighting conductors was lately read before the Academy of Sciences in Paris by Mr. Callaud, in which he stated that many lighting conductors are

joint, B, depressing that portion of the eye, under the lap, admits the thread into A.

The advantages derived from this improvement are various, among which are that the blind can use them as readily as those who can see; that worsted needles, generally so tedious to thread, are readily put through that operation; and also, that surgeons will find these needles convenient, as they will readily pass through the flesh, obviating any delay formerly incurred by threading.

This useful invention was patented Jan. 22, 1861, by George Cooper, of Thompsonville, Conn., to whom all letters must be addressed.

**Warming Tents.**

Mr. E. H. Beebe, of Galena, Ill., sends us a sketch of a plan for warming hospital tents for sick soldiers. It is merely a brick furnace constructed underneath the ground floor, and roofed with T-rails; three of them, laid side by side, are used and the interstices between filled in with clay. The heat is conveyed into seven tents by a flue 100 feet in length, supplied at the end remote from the fire with a wooden chimney. Dr. E. D. Kittoe, of the Forty-fifth Illinois Volunteers, is the originator of this subterranean furnace, and says that it is a very useful thing. The iron radiator

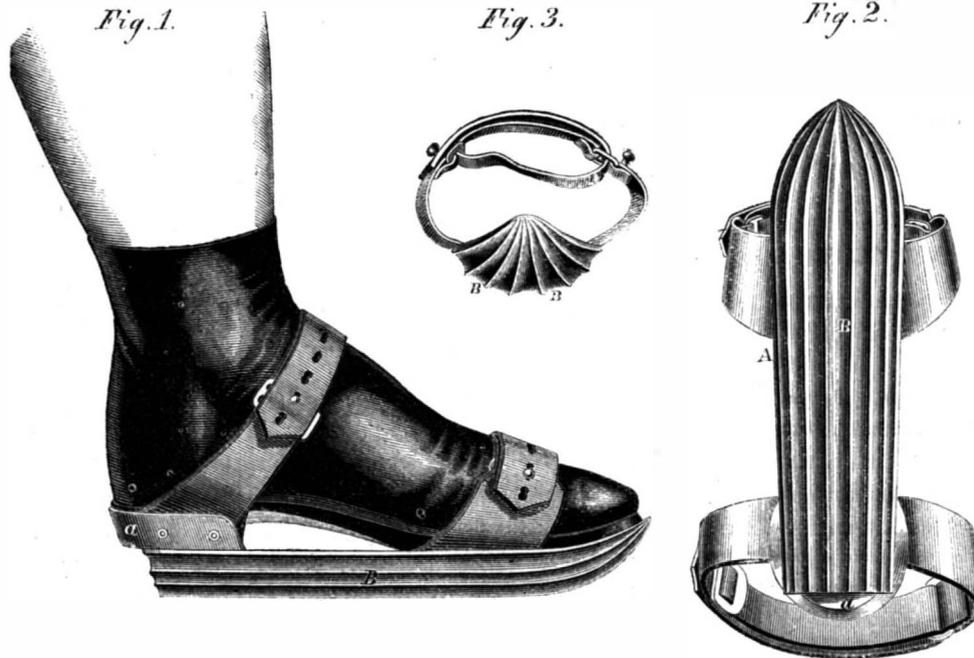
at the top is a good feature, as it equalizes the temperature and retains the heat for a long time. We presume it must be erected in the neighborhood of some rebel railroad, so that the supply of iron may be drawn from that source.

**Iron-clad Men.**

It has been suggested to us, in view of the improvements which are daily carried out in iron-clad ships and batteries, that the same principle might be applied to their crews, or to infantry in the field. Some steps have already been made in this direction, and life-preserving vests have been sold, we believe, in great numbers; why, then, can we not sheath the human body so that it will be perfectly protected against rifle balls at least, and yet, at the same time, preserve its elasticity and activity unimpaired? The force of a bullet, stopped in mid career, would doubtless make the iron or steel-clad recipient wink, if it did not entirely destroy his center of gravity, but we think most of all our sharpshooters would gladly exchange the possibility of being stunned or even stricken senseless for a time, for the certainty of being killed outright without such protection. The ancient men-at-arms and Knight Templars wore suits of mail, but they weighed down both horse and rider and had to be abandoned. Let some ingenious person invent a complete personal protection, and he will assuredly reap his reward.

**PUT UP YOUR OLD RAGS—NO MORE LINT WANTED.**—The Secretary of the U. S. Sanitary Commission at Washington writes to the Superintendent of the Philadelphia depository, on October 7th as follows:—"Lint, bandages and old linen have reached us in such enormous quantities that we have been obliged to hire a store room for no other purpose than to store away the surplus 500 barrels. Please, therefore, discourage their further manufacture in your district, and endeavor to turn the energies of the people toward the making of under-clothes and the knitting of socks instead."

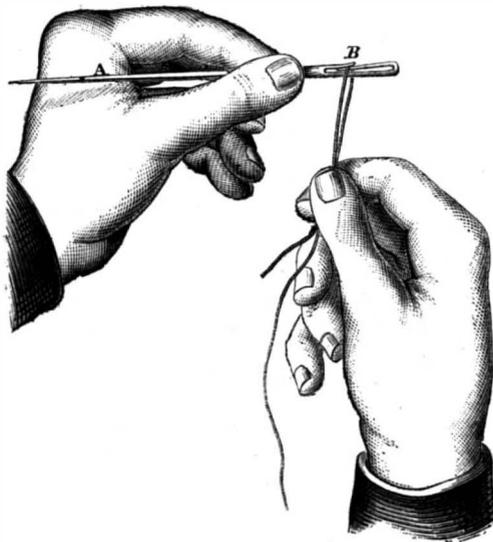
**THE MONTAUK.**—The Ericsson battery *Montauk* made a trial trip from the Navy Yard on the 16th ult., which was said to be a perfect success. We presume it was, but not being present on the occasion, we are unable to furnish our readers with any reliable report.

**DUTTON'S SHELL-GROOVE SKATE.**

made in France of thin brass wires twisted together. Their power of conduction is about twenty-five per cent. superior to iron, but they are more fusible than iron, and in this respect are defective. Copper wire, he stated, afforded the best and cheapest material for electric conductors, as it was—next to silver and gold—the best conducting metal. A conductor made of several small copper wires twisted together, he considered, was about the best and most convenient which could be used.

**COOPER'S PATENT NEEDLE.**

The nature of this improvement in sewing needles consists in constructing the eye by turning over the



end and forming what is called a lap joint, through which the thread may be drawn without the necessity of inserting the end of it in the ordinary way. The accompanying engraving shows the manner in which the needle is made.

A is the needle; B is the lap joint, so that by holding the former between the thumb and finger, laying the thread over and bringing the two ends together in the other hand, drawing it down to the

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## TO OUR FRIENDS.

### NOW IS THE TIME TO FORM CLUBS.

With the present number another volume of this journal closes. We appeal to its friends in all sections of the country where mail facilities exist to endeavor to form clubs for the coming year. We feel justified in asserting that no other journal in this country furnishes the same amount of useful reading, and especially at the extraordinarily low price at which it is furnished. The present high price of paper has rendered it necessary that we should somewhat increase the subscription price of the SCIENTIFIC AMERICAN, but by availing themselves of our clubbing rates persons may obtain the journal on very reasonable terms even now. We are obliged to pay more than double the price we did one year ago for the same quality of white paper that the SCIENTIFIC AMERICAN is printed on, while the subscription price to clubs is only a fraction more than formerly.

The long winter evening must be relieved of its dullness, and we must keep reading and thinking, and thus be prepared to overcome temporary difficulties and open new channels of wealth and prosperity. Friends, send in your clubs; at least renew your own subscriptions promptly.

### TO OUR SUBSCRIBERS.

The publishers of no other paper in this country have maintained such a friendly relationship with their subscribers, as those of the SCIENTIFIC AMERICAN. Our suggestions and requests have uniformly met with a kindly and hearty response, and we have never forgotten that "one good turn deserves another." The subscription term of several thousands of our readers will expire with this number, and we urgently solicit a renewal of your patronage. On a previous occasion we presented the reasons which compelled us to raise the rate of subscription. We would have preferred to have continued our paper at the former price, but this is impossible under the circumstances. We hope none of our old subscribers will fall off on this account, as our course has been dictated by events over which we had no control. And yet with all the increased price of the SCIENTIFIC AMERICAN, it is still "the cheapest and best mechanics' paper in the world." Taking into consideration its size, the fine quality of its paper, its beautiful illustrations, the peculiarity of its information, and the immense amount of thought and labor bestowed upon it, unquestionably it is the cheapest weekly paper on this continent.

### THE PAST AND PRESENT.

This number closes another volume and another year of the SCIENTIFIC AMERICAN. The past year of its existence has been chequered beyond all precedent. The greatest civil war on record has been raging in our country, and the painfully conflicting events of its outgrowth have affected deeply all

classes of our people. Fathers, husbands and brothers have perished in tens of thousands from the bullet and the bayonet, the malaria of the swamp and the exhausting toil of terrible marches. Tens of thousands are also now pining in hospitals from fever and wounds; and tens of thousands of the stalwart and brave have come back from the conflict maimed objects for life. Our land is clothed with mourning; our tears are for the dead; our sympathies for the suffering and bereaved living. And with these dreadful realities of civil war, great changes and vicissitudes in social and business relations have been experienced. Necessarily increased taxation, a depreciated currency and a great advance in the cost of many materials and manufactures have completely changed the condition of both the general and common affairs of life. There is scarcely a family in the land that has not had cause for grief; and yet with all our afflictions, as a people, Providence has been also kind. Never before have our harvest-fields yielded in greater profusion, and we have been enabled to feed the starving thousands of England's toil-worn operatives—a million of whom are said to be subsisting on charity.

In consideration of all our national, commercial and financial troubles, the progress of invention has not been unsatisfactory. Up to the present date, from a similar period last year 3,220 patents have been issued—three hundred more than in the same space last year. Many persons suppose that the inventive genius of the country has been exclusively devoted to implements and vessels of war, but this is not the case. Many very useful improvements have been made in almost every department of art, and a large number of these have been illustrated in our columns. They are various in their nature and character, but the greatest number relate to agriculture, and this is very gratifying, as husbandry is the mother of all the other arts.

We close this year under impending circumstances upon the issue of which are suspended the hopes and fears of millions. Public affairs may now look dark and gloomy, but let us not despond. This is not the time for despair, but determined and patient effort. We know not what a day or a week or a year may bring forth; therefore let us hope for the best, and labor to secure success. It is to our virtuous and industrious yeomanry and mechanics that we look for the salvation of our country.

"A voice speaks within us we cannot control,  
Which tells of a time when these ills shall depart,  
When knowledge shall win its bright way to the soul,  
And virtue, like music, shall soften each heart."

### THE MERITS OF VARIOUS KINDS OF ENGINES.

Before employing steam power as a motor, the kind of work it is desired to perform as well as the quality and quantity of it should be taken into account. If it is proposed to erect a flour mill, we must project an engine which will transmit a regular and steady motion without cessation; or, in the case of a mill for rolling iron, the automatic apparatus which governs the engine must act instantaneously, so as to prevent the machinery from running away with itself when the strain is removed.

Prejudices in favor of certain patterns of engines will always exist to a greater or less extent. One person may prefer a beam engine, another an oscillator, and another a horizontal one. We propose to show, briefly, the merits of each plan, and then individuals can exercise their own predilections in favor of this or that particular one.

The horizontal cylinder engine has always been in favor with a large class of the manufacturing community from its lessened first cost, as also from the simplicity of its design, and the ease with which it is managed. There are, however, some objections to it, which increase with its size until they become positive evils. These are the position of the cylinder and the space occupied by the parts generally. As to the cylinder the fault is ineradicable; not only is it liable to be scored by the weight of the piston resting upon its bottom, and the accumulation of sediment or scale from the boiler which may be carried over with the steam, but it is exposed to much injury from the waste water which, in nearly all cases, collects at the bottom and sooner or later destroys its integrity. As a means, however, of converting a reciprocating motion into a rotary motion, it is undoubtedly capable of the greatest simplifica-

tion. For light work its value is inestimable, and there are probably more of them built than of any other one kind.

The oscillating engine is very little used in manufacturing; what the reasons are we cannot say; one may be that it is not so economical as other plans from the difficulty which exists of attaching expansion valve gear to it without making it complicated and cumbrous. Of this kind of engine there are a great many in which the piston depends for its impetus upon steam admitted to its alternate sides by the vibration of the cylinder. This prevents any attempt to cause "lead" on the inducted steam, as in order to carry the cranks past their centers, the vapor must come in as soon as practicable after the completion of the previous stroke. The oscillating cylinder engine is used in most cases for navigation, and is in great favor with screw-propeller builders on account of their direct-action and economy of space.

The working-beam engine, or, in fact, all engines with upright cylinders, are the best where they can be employed. The reasons for this statement are the facts that the seat of the power is preserved from injury, from those causes which were represented as operating unfavorably in the case of the horizontal machine, also for the facility with which any modification of the apparatus for working the valves can be applied. We confess to a personal bias in favor of this class of engine; we think that the advantages which result from the ease with which all the reciprocating parts can be balanced, got at and seen at a glance when working, that is, in engines of a moderate size, more than compensate for the number of journals which are a necessary feature of them. Very little criticism can be brought to bear upon the beam engine that will stand when viewed in the light of common sense. The relative value of the three plans is based wholly upon the application of them to the work they are to perform; but we assert that if one individual was to try each separately, he would declare in favor of the vertical cylinder over all others.

Late English papers declare that the horizontal engines in the Great Exhibition recently held in London received the most attention and were the most popular, which we think a little singular in view of the facts above mentioned.

Beam engines may be regarded as the national idea of the proper way to apply steam power. Every nation has its own notions in regard to this subject. The English engineers went to great lengths in the construction of side-lever engines, which are nothing more than the principle of the working beam inverted. There may be a few more journals in the English plan than in ours, but they do not differ essentially. Until very recently these were regarded as the best possible system of propelling ocean ships, and all of their large sea-going steamers were supplied with them, as indeed were many of our own, built upon English plans somewhat modified to suit our peculiar valve gearing. Of late years screw propulsion has so much attracted the attention of foreign engineers that the side wheels have not been materially changed as to their propelling machinery. With us, however, the case has been essentially different; beyond the comparatively few side-lever engines built in this country, the national mechanical expression on the subject in question has almost always declared in favor of the over-head beam. All of our river and Sound steamboats are fitted with them, and are celebrated for their speed and economical qualities.

When it was proposed, in view of these facts, to fit out an ocean steamer with the previously specified plan of engine, the projectors were derided both at home and abroad. More particularly were we sneered and scoffed at upon the other side of the water as a nation who knew so little of engineering precedents as not to be perfectly aware that the beam engine was unfitted for sea service. The weight and top hamper would throw the ship on her beam-ends when she labored in the first strong gale of wind; she would part all her holding-down bolts, and that would be the last of the beam engine; besides which all sorts of accidents were predicted, but happily not generally verified. At the first glance it did indeed seem plausible that some of these inconveniences would be felt, and in order to demonstrate it practically the *North Star* (once Vanderbilt's yacht) was fitted out

with twin engines of the above description, and not only went to Europe, but all through the Mediterranean, returning home without any disaster. The steamship *Golden Age*, having a beam engine of 83 inches diameter and twelve feet stroke, crossed the Atlantic and also circled the globe, completing her achievement without, as the captain tersely remarked, "knocking a chip off her sides."

Enough, however, has been said; the beam engines are not in the minority at sea, by any means; they are to be found in all our waters. A great many of the blockading vessels are fitted with them, and these have proved the fastest in the squadron, and we have never heard complaints from them on account of their engines of any kind. We have been to sea in many different ships; and the beam engines have always been highly popular with engineers, and will, we think, continue to be so for a long time to come.

#### THE LANCASHIRE DISTRESS—THE PROSPECTS OF THE PEOPLE.

The information which has been published respecting the sufferings of the operatives in Lancashire, England, has excited the generous sympathies of our people, many of whom have made large contributions to relieve the distressed. This is a noble movement. It is the duty of every man, who is able, to assist his fellow man in distress, no matter who he is, or where he may reside. In a question of humanity, all men are brethren. But charity goes further than mere almsgiving. It takes cognizance of present relief with reference to future welfare. The "Good Samaritan" lifted up the wounded man whom he found lying by the wayside, and not only poured oil and wine into his wounds, but carried him to an inn and made arrangements with the landlord for his care until he recovered. Such is the example all men are commanded to follow, and it is to this point we wish to direct public attention for a brief space.

The aged and permanently-disabled poor must and should be objects of charity for life; but the able-bodied poor, who are suffering for want of labor, should be assisted for the present, to overcome a temporary evil in order to secure some mode of helping themselves for the future. It is indeed remarkable that men and women, not only in hundreds and thousands, but hundreds of thousands should be in want of food from lack of employment, when there is so much space in the world for their occupation. Over this the working people of Lancashire have no present control. Their occupation, which was their only estate, has been swept from them by events in which they had no voice and no part. This should not be overlooked, but as it respects the future, the people of England must be held responsible if they suffer without some efficient means being taken to secure them against the recurrence of such calamities. The distress in England has been caused by the war in America. About four millions of people in Great Britain were dependent upon the cotton manufacture when our Southern ports were blockaded; and in 1860, out of 3,366,680 bales of cotton imported from all countries, no less than 2,580,843 were furnished by America. As the cotton manufacture cannot be carried on without the raw material, we can easily conceive how many persons must be out of employment, when about eighty per cent of the raw material furnished annually by the Southern States has been cut off for a whole year. Lancashire is the chief seat of the cotton manufacture for the world. It has a population of about 2,500,000, and Manchester—the cotton metropolis—has a population of about 500,000, mostly engaged in the cotton business. The calamities of our war have reflected in a terrible manner upon these people, and we cannot but feel for them. Lanarkshire, in Scotland, also contains a large population devoted to the cotton manufacture, who are suffering, and though not to the same extent as those in England, still their condition is lamentable. But the important question arises—how long will this distress continue? It is very evident to us that if our civil war continues one, two or several years longer, with the Southern ports blockaded, the people of England will not be able to obtain from other countries one-half of the cotton necessary to keep their spindles in motion. Must hundreds of

thousands of people in that country, then, be supported by charity, perhaps for years? It is unwise, yea the worst sort of charity, to sustain able-bodied men and women as paupers, when new avenues of business or labor may be opened up to them, whereby they may be enabled to provide for themselves. It is long since we formed the opinion that any country which does not raise sufficient food for its people, in ordinary seasons, is in an unfavorable condition for developing the best interests of its inhabitants. Great Britain has been in such a condition for many years, and our war has uncovered to the people the evils of her great manufacturing system. In our opinion, the only true and sure remedy for the English and Scottish working people, who are so dependent upon cotton manufactures, is to emigrate to other lands. There are several British colonies to which they may emigrate and better their condition; but above all, the great Western States and Territories of America offer the most favorable inducements for them. The climate is salubrious and the soil yields in profusion; there they will never be out of work and never suffer from want of food.

Any remedy which does not look to securing such results is futile. Norwegians, Swiss, Danes and Germans have emigrated in colonies to our Western States; they have founded thrifty villages and all have prospered. English operatives should do the same; speaking the same language they will become a homogeneous population with ourselves in a few years. It may be thought that persons brought up to factory life will never become successful farmers; this depends entirely upon themselves. If they are sober, moral and industrious, they will succeed. Several townships in Canada, which were settled by Scottish weavers, have become flourishing agricultural communities; the Lancashire operatives may secure equal success.

It is the duty of the wealthy people of England to assist these people to emigrate and to furnish them with means to overcome the difficulties of getting through the first year. After this they will need no assistance, but will be gradually gaining in ability to pay old debts. Let them come in thousands and tens of thousands. Here they can have free lands and homes for life—

"For Uncle Sam is rich enough to give them all a farm."

#### OUR USEFUL RECEIPTS.

Much satisfaction has been expressed with the series of useful receipts which has been published weekly in our present volume. It is our intention to continue the practice of furnishing similar information; and, as has been our custom, we shall select from the treasury of practical art only those receipts which are reliable, interesting and of general application. Having access to enlarged sources of information, and being in possession of much practical knowledge, we are enabled to cull and arrange such receipts as are trustworthy. Many receipts which have appeared in our columns have been worth more to thousands of our readers than the price of subscription to the *SCIENTIFIC AMERICAN*. Some of them have cost much labor to secure, and in many instances the substance of whole pages from printed works on chemistry has been condensed into a few lines. We have not merely given that which was old and good, but have searched the most recently-published works on science and the arts, to present the latest discoveries that were applicable to general purposes. As it has been in the past, so shall it be with us in the future; therefore our next volume will contain, in its columns of receipts, all the latest and best information that it is possible to present in relation to the practical arts.

#### DISABLING GUNS.

The object in spiking a gun is very generally misapprehended by persons unconnected with, and ignorant of, military details. It is not intended to utterly destroy the piece, but to render it useless for the time being, in case the gunners are forced to abandon it. To this end rat-tail files, patent spikes and a variety of different articles are used; these are, in nearly every instance, removed when the danger is past, either by the enemy if they have carried the battery by storm, or by the defenders of the post

themselves if they have spiked the guns on the approach of danger.

It has also been proposed, and indeed practiced in a number of cases, to knock off the trunnions of the cannon either with a sledge or by firing solid shot at them from another gun at close range. Even this does not effectually ruin the ordnance unless the fracture should extend some distance into the re-inforce, as trunnions can be forged upon a hoop and shrunk over the piece, making it as strong as ever. A correspondent suggests that nitric acid be employed to eat away the vent, but as the presence of a bottle of this fluid would be slightly undesirable in an engineer's caisson, and moreover as it is quite useless for the purpose, being very slow in its action upon cast iron, we hardly think it could be satisfactorily used. What is required is an instrument that shall lock up the vent beyond the possibility of removal on the field, and we think this can be done as well by a spike properly made as by any other. Who will invent the best article for the purpose?

#### THE FORM AND CHARACTER OF PENETRATING PROJECTILES.

It is now a settled fact that it is as necessary to use a specific material for perforating iron plates as it is to give the projectiles a high velocity. A cast-iron shot is so brittle that it breaks into fragments when it strikes a thick iron plate. On the other hand, steel shot when moving at a less velocity than cast-iron shot, pierces thick iron plates without much difficulty. This is one important point settled for the new condition of things in maritime warfare, when ships are clothed with mail.

Another important point is the shape of the projectile. A few months ago only, it was held that smooth-bored guns firing round shot were more destructive to iron-clad vessels than rifled guns, because the velocity of the shot fired by the former is greater than that from the latter. In this case experiments have demonstrated, that rifled guns firing flat-fronted steel bolts exhibit greater penetrating power than round shot. These are important facts.

It is generally understood that Mr. Joseph Whitworth, of Manchester, England, is the inventor of flat-fronted, solid and hollow projectiles, and that he first practically applied them. This turns out to be a popular error. In a letter to the *London Engineer*, Captain Blakely states that the veteran inventor, Captain John Norton, so well known by repute and his communications to the readers of the *SCIENTIFIC AMERICAN*, is the real inventor of this kind of shot, and that he first practically applied it in 1832. While examining one of the old-fashioned arrow heads that were employed by the strong-armed archers of the days of chivalry, he noticed that it was flat-headed, and the idea crossed his mind that this form was adopted for piercing through the coats of mail worn by the warriors of the olden time. Acting upon this idea, he had a hollow steel bolt turned with a flat front, and he charged it like a shell. This was fired with an air-gun against a steel cuirass stuffed with sawdust and powder, at a distance of twenty yards, and it penetrated the cuirass and blew up the gunpowder behind it. This was done in 1832, in the presence of a number of officers at the Life Guards Barracks, Windsor.

#### The Polytechnic Association—Our Index.

The report of the Polytechnic Association with much other valuable matter is deferred until our next number, owing to the want of space; our columns being largely occupied by the extensive and elaborately-compiled "Index," which will be found to be more ample and comprehensive than any we ever previously published, and will doubtless be highly valued by thousands of our readers who have preserved their numbers for binding.

Mr. WILLIAM S. HADLEY, the inventor of the Tap Guide, illustrated in our columns recently, has removed from Philadelphia to Norwalk, Huron county, Ohio. All letters should be addressed to him at that place.

In our next number we intend to illustrate the model sewing-machine manufactory of the Wheeler & Wilson Manufacturing Co., at Bridgeport, Conn.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING DECEMBER 9, 1862.

Reported Officially for the Scientific American.

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

**37,082.—J. B. Barcolo, of Mount Morris, N. Y., for an Improvement in Grain Separators :**

I claim the arrangement, in grain separators, of the oat board, B, having a longitudinal adjustment, in combination with the sieve, C, having an adjustable inclination, as described, and both operating conjointly with the blast, in the manner and for the purpose specified.

**37,083.—Jacob Bickhart, of Harlan, Ind., for an Improvement in Gates :**

I claim, first, The levers, F F, connected to the gate, A, through the medium of the arms, E E, the latter being connected to the gate and to the levers by means of hinges, and all arranged as shown for the purpose of opening and closing the gate, as set forth.

Second, The sliding bar, G, provided with a recess, K, at its under side in combination with the slot, I, in the top bar, D, of the gate for the purpose of serving as a fastening for the latter, as set forth.

Third, The combination of the sliding bar, G, levers, F F, arms, E E, and gate, A, all arranged as and for the purpose specified.

[This invention relates to an improvement in that class of gates which are designed to be opened by a person from a carriage or on horseback, so as to avoid the trouble and loss of time in alighting. The object of the invention is to obtain a gate of the kind specified, which may be secured in a closed state and effectually prevented from being deranged or thrown out of proper position by cattle or swine.]

**37,084.—Henry A. Burr and L. E. Rockwell, of New York City, for an Improvement in Lubricators :**

We claim the rotating cup or hollow wheel, substantially as herein described, in combination with a shaft and journal box, and placed with its open end next to and extending over the end of the journal box, substantially as and for the purpose specified.

And we also claim, in combination with the rotating cup or hollow wheel on the shaft, and extending over the end of the journal box, the projecting flange on the end of the journal box, substantially as and for the purpose specified.

**37,085.—G. T. Comins, of Lowell, Mass., for an Improved Bed Bottom :**

I claim the longitudinal elastic wooden slats, B, provided at their ends with oblong slots, A, fitted on pins, b, in the cross rails, c, c, of the bedstead, substantially as and for the purpose herein set forth.

[This invention consists in forming the bed bottom of a series of longitudinal wooden slats provided with slots at their ends and fitted on pins in the cross rails of the bedstead, whereby a very elastic, strong and durable bed bottom is obtained, and one which may be readily applied to and detached from the bedstead and capable of having its slats inverted, so that when they become sprung and set at one side they may be turned and brought by use into their proper form or shape.]

**37,086.—Robert Cornelius, of Philadelphia, Pa., for an Improvement in Lamps :**

I claim, first, The hook, s, t, for securing the shade to the deflector and the deflector to the lamp, substantially as above described, or for the purpose of a handle merely to the deflector.

Second, The auxiliary vertical end guide pieces, f, f, for directing the air at the ends of the flame and preventing it from expanding or burning irregularly.

**37,087.—Edward Cotty, of Washington, D. C., for an Improvement in Artificial Knee Joints :**

I claim the eccentric hinge formed of two parts representing the lower parts of the femur and the tibia, in connection with the adjustable spring, u, or any other substantially the same, representing the fibers of the exterior tendons, as set forth and described.

**37,088.—S. R. Dimock, of Pittsfield, Mass., for an Improvement in Brakes for Railroad Cars :**

I claim the arrangement of the oscillating frame, E, carrying the pinion, H, with its screw shaft, e, and spring, K, and the pinion, I, with the longitudinally sliding arbor, f, in combination with the cog wheel, J, on the axle, C, of the wheels of a railroad car, all constructed and operating substantially as and for the purpose herein shown and described.

And I also claim the arrangement of the dog, p, projecting from the pin, i, on the screw shaft, e, in combination with the pinion, H, and spring, K, as described, for the purpose of preventing the spring from unwinding any further than desirable.

[The object of this invention is to accumulate the power which is exerted in stopping a car and use such power for the purpose of facilitating the operation of starting the same.]

**37,089.—L. H. Doyle, of Waterloo, Iowa, for an Improvement in Cultivators :**

I claim the combination with the beam bar, A, and standards, E E of the adjusting bars, b, d, in the manner herein shown and described.

[The object of this invention is to obtain a strong and durable cultivator of iron which will be light and capable of being readily adjusted or expanded and contracted laterally to suit the width of the rows of plants under cultivation.]

**37,090.—A. G. Eddy, of Ashfield, Mass., for an Improvement in Churns :**

I claim a rotary churn dasher composed of two beaters, G G, fixed in radial arms, d, attached to the dasher shaft, B, and parallel therewith, in combination with the beaters, K K, arranged to operate conjointly with the beaters, G G, as and for the purpose herein set forth.

[This invention relates to an improvement in the dasher of th churn which is of thero tary kind and consists in having radial arms at tache to the upper and lower part of the shaft, between which arm the beaters are fitted, there being four in all, two being stationary and having a radial position with the shaft, while the other two are arranged in such a manner as to have a rotary motion on their axis independent of that caused by the rotation of the dasher shaft, but produced by the rotation of the latter.]

**37,091.—A. T. Freeman, of Binghampton, N. Y., for an Improvement in Revolving Fire-arms :**

I claim the cylinder axis pin constructed of two pieces, C C', with a shoulder, c, a D-head, b, and a tongue, b', and applied in combination with the cylinder and the frame of the fire-arm, substantially as herein specified.

[This invention consists in a certain novel construction of and mode of applying the cylinder axis pin, whereby facility is afforded for r

moving and replacing the cylinder without any danger of losing the pin.]

**37,092.—William Fulton, of Elizabeth, N. J., for an Improvement in Cooking Apparatus :**

I claim, first, The construction of the valves in extinguisher, C, or their equivalent, as shown at S and V, in Fig. 6, for producing a gas-light, and regulating the action of the flame, either partially or wholly extinguishing it.

Second, I claim the construction of cones, D, or their equivalent, as shown in Fig. 3, for spreading the flame and admitting the air thereto, in combination with the extinguisher, C, shown, in Fig. 6.

Third, I claim the cone, F, or its equivalent, as shown in Fig. 8, for producing a gas-light from the fuel when placed over cone, D, and fuel chambers, h.

Fourth, I claim the fuel chambers, h, or their equivalent, as shown in Fig. 3, in combination with pipes, g, in Fig. 4, for heating the water in reservoir, A, the whole being arranged substantially as and for the purpose herein set forth.

**37,093.—Smith, Gardner & A. B. Howe, of New York City, for an Improvement in Cleaning Rice :**

I claim one or a series of screws revolving in a cylinder and operating in conjunction with the disk or disks, substantially in the manner described and for the purposes set forth.

**37,094.—William Gardner, of New York City, for an Improved Folding Metallic Bedstead :**

I claim the folding mosquito frames, d, d, in combination with the bedstead frame, a, in the manner shown, so that said frames, d, d, fold clear of each other, as set forth.

I claim the variable braces, fitted as specified, in combination with the folding head or foot guards and bottom or frame, a, as set forth, whereby the inclination of said head or foot guards can be varied, as specified.

**37,095.—Valentine Haefner, of Dobb's Ferry, N. Y., for an Improved Artificial Cellar :**

I claim the arrangement of two ice-boxes, C F, one on the top and one in the interior of a cellar or inclosed space, A, in combination with the tubes, D and E, all constructed and operating substantially as and for the purpose shown and described.

[The object of this invention is to lower, by artificial means, the temperature in a cellar or other inclosed space to such a degree that beer and other fermentable liquors can be preserved in the same with perfect safety, and also that the operation of brewing beer can be carried on throughout the whole year in the hot as well as in the cold season.]

**37,096.—E. P. Haskell, of Harlan, Ind., for an Improved Machine for Bending Wood :**

I claim the combination of the sliding pressure roller, D, slide, B, screw, C, plate, F, and guide, J, with the rotary pattern, G, in the manner herein shown and described.

[This invention consists in the employment of an adjustable pressure roller in connection with a pivoted pattern of semi-circular form and guides and clamps, all arranged in such a manner as to admit of the desired work being performed very expeditiously and with but little labor.]

**37,097.—Z. G. Hurd, of Eldorado, Iowa, for an Improved Mill-stone Dresser :**

I claim, first, The arrangement of the hinged holder, H, in combination with the trip lever, A, and pick, B, constructed and operating substantially as and for the purpose specified.

Second, The arrangement of the V-shaped seat, p, and triangular wedge, p', in combination with the holder, H, and pick, B, as set forth.

Third, The arrangement of the spring lever, I, in combination with the trip lever, A, as and for the purpose described.

[This invention consists in the employment of a pick arranged in a trip lever, which is fulcrated on a laterally sliding arm and to which an oscillating motion is imparted by a trip wheel which is connected by a forked rod with said laterally sliding arm, and partakes of its motion in combination with a longitudinally sliding frame, in such a manner that the pick can be made to act on the entire surface of a mill-stone, and the latter can be dressed with little trouble and exertion and in a much shorter time and more uniform than by hand.]

**37,098.—E. M. Judd, of New Britain, Conn., for an Improvement in Railroad Car Brakes :**

I claim the barrel, f, and ratchet wheel, g, in combination with the lever, h, and pawls, i k, substantially as and for the purposes specified.

**37,099.—E. M. Judd, of New Britain, Conn., for an Improvement in Trucks for Railroad Cars :**

I claim arranging a series of axles, in a truck for cars, parallel to each other and fitted with the wheels at opposite ends of the alternate shafts, substantially as and for the purposes specified.

**37,100.—Thomas Lane, of San Francisco, Cal., for an Improvement in Potato-diggers :**

I claim, first, The arrangement of the shovel, O, screw bolts, R R, pinions, K k, m, crank, o, and axle, P, for raising and lowering the shovel, in combination with the frame, A, and revolving buckets, b D, operating in the manner and for the purpose described.

Second, The shaking shoe, K, chute board, e, and revolving buckets, b D, in combination with the shovel, O, and hoppers, M, provided with tilting bottoms, q, when arranged and operating in the manner and for the purpose described.

[This invention relates to certain improvements in machines for digging potatoes and onions and putting the same into racks, and it consists in the manner of arranging the scoop or shovel so that it can be adjusted to enter the ground at a greater or less depth ; also in the peculiar arrangement of the shaking shoe and hoppers.]

**37,101.—Mark Levy, of New York City, for an Improvement in the Manufacture of Illuminating Gas :**

I claim the arrangement of mixing the gases, generated in separate retorts, K k, m, n, from wood or from oil, or its equivalent, and then re-heating the thus-mixed gases before the same are allowed to pass into the purifier and gasometer, in the manner and for the purpose substantially as described.

**37,102.—Dioclesian Lewis, of Boston, Mass., for an Improved Book Rack :**

I claim, first, The combination of the rack, 1, 2, brace 3, and strap, 5, as hereinbefore set forth.

Second, The combination with the rack, 1, 2, of the bar, 7, as described.

Third, The combination with the rack, 1, 2, and bar, 7, of the fingers, 9, 9, for the purpose and in the manner set forth.

**37,103.—D. G. Littlefield, of Albany, N. Y., for an Improvement in Stoves. Ante-dated Nov. 26, 1862 :**

I claim the mill gate, A, B, constructed and operating substantially as and for the purposes herein specified.

I also claim the construction of the fire-pot, D, with outwardly projecting combustion mouths or outlets, d, d, opening immediately into and in combination with the chamber, E, for the purpose herein specified.

I also claim the form and arrangement of the case, M, in relation to and in combination with the fire-pot, D, and chamber, E, substantially as and for the purposes herein set forth.

I also claim compelling the draught to pass upward through the supplying cylinder, H, while kindling the fire in the stove, and immediately previous to as well as during the act of replenishing the cylinder with coal, for the purpose specified, and this irrespective of the special construction by which the same is effected.

I also claim the central chamber above the supplying cylinder, H, communicating with the exit flue, p, whereby any air that passes into said chamber by the cover, R, is conveyed to the exit flue, as specified.

I also claim the divided flue, M, around the chamber, I, and forming the communication between the front of the chamber, E, and the exit flue, p, whereby the products of combustion are conveyed to the chimney without interfering with the action of the said chamber, and the radiation of heat from the stove is properly distributed, as herein set forth.

I also claim the sliding plate or valve, N, so arranged that it necessarily closes the opening, o, from the chamber, E, to the flue, K, when

the aperture, n, from the supply cylinder, H, to the central chamber I, is opened, and vice versa, whereby the draught is directed at pleas ure, either up through the chamber, E, or the supply cylinder, H, for the purposes herein set forth.

**37,104.—David Maydole, of Norwich, N. Y., for an Improvement in Skates :**

I claim the hook, F, attached to or formed on the plate, E, at the back part of the skate, in combination with the plate, G, attached to the heel of the boot or shoe and provided with parallel slots, c, c, or any equivalent staple to receive the hook, F, when used in connection with any suitable fastening for holding the front of the skate against the sole of the boot or shoe, substantially as and for the purpose specified.

**37,105.—O. W. Morley, of Ellisburgh, N. Y., for an Improved Buckle :**

I claim the combination of the hinged plate, B, and crossbar, b, with the frame, A, and pin, C, in the manner herein shown and described.

**37,106.—Morgan Payne, of Cardington, Ohio, for an Improvement in Churns :**

I claim the shaft, A, in connection with the rod, B, and dashers, e e, and the arm, C, with the dashers, d, d, the whole arranged in the manner and for the purpose herein specified.

**37,107.—S. S. Putnam, of Dorchester, Mass., for an Improvement in Machines for making Nails for Horse-shoes :**

I claim, first, In combination with a revolving cam for operating four hammers in pairs of two, the arranging of said cam behind the pivots of the hammer helves, for the purpose of protecting said cam and its cooperative parts from the scales and heat of the nail-rods and hammers, and thus protecting them from cutting, wearing and undue friction, by the drying or burning of the oil, substantially as described.

Second, I claim the method substantially as herein described of operating the cutter, n, viz., by the lever, M, and slotted lever, O.

Third, I claim the block, T, and its connections for stopping and holding the hammers, substantially as specified.

Fourth, I claim regulating the throw of a pair of hammers by applying thereto the power of a supplementary spring, substantially in the manner set forth.

Fifth, I claim operating the gage lever, V, by the lever U, which forms part of the device for arresting the hammers.

**37,108.—S. J. Reeves, of Philadelphia, Pa., for an Improvement in Pagots for Wrought Metal Cannons, Hydraulic Pumps, &c. :**

I claim the making of the bore on which the sheets are wound and welded of sufficient size to margin the bore of the gun when finished, substantially as and for the purpose described.

**37,109.—James Robinson, of Barnegat, N. J., for an Improved Cable Stopper :**

I claim the arrangement of the hinged claw, A, in combination with the rod or stem, B, dog, C, and foot lever, D, all constructed and operating substantially as and for the purpose shown and described.

[This invention consists in the arrangement of a hinged forked claw, the shank of which catches under a hinged dog, which is connected to and operated by a foot lever, in such a manner that the claw when brought to catch over a link of the cable retains the same firmly and prevents it running out, and that, by depressing the foot lever, the shank of the claw is released and the cable freed.]

**37,110.—J. F. Rochow, of New York City, for an Improvement in Hoisting Apparatus :**

I claim the arrangement of the differential wheels, a, b, in combination with the box, C, main shaft, B, tumbling shaft, D, with pinions, c, d, and drum, E, all constructed and operating substantially as and for the purpose herein shown and described.

And I also claim the tumbling shaft, D, when the same is arranged with two wheels or pinions, c, d, to operate in combination with the wheels, a, b, substantially in the manner and for the purpose set forth.

**37,111.—Anson Rowe, of Atalissa, Iowa, for an Improvement in Grain Separators :**

I claim, first, The plate, K, placed on or over the upper riddle, H, and in relation with the feed-board, D, and fan, L, as and for the purpose specified.

Second, The combination of the sieve, M, riddles, H H, plate, K, feed-board, D, and fan, L, arranged for joint operation as and for the purpose herein set forth.

[The object of this invention is to obtain a grain separator of simple construction, which will operate more efficiently than those previously constructed, and be not liable to get out of repair. Devices of this kind as hitherto constructed have generally required considerable power to operate them, and have been quite liable to become deranged by use, the screens liable to choke or clog, and many impurities allowed to pass off with the grain—difficulties which it is believed are fully obviated by this invention.]

**37,112.—Thomas Sault, of Seymour, Conn., for an Improved Machine for covering Wire with Gutta-Percha, Rubber, &c. :**

I claim, first, The combination of a cylinder, A, a hollow screw, B, and a central mandrel, C, passing through the hollow screw, substantially as herein specified.

Second, The construction of the cylinder, A, containing the screw, B, with a throat, c, and internal cavity, b, arranged substantially as and for the purpose specified.

Third, Feeding the wire to be covered with the gum by the movement of the gum itself produced by the screw, B, or other device for forcing it through the forming die, substantially as herein specified.

[The main object of these improvements is to effect the covering of wire of any length with caoutchouc, gutta-percha, or the allied gums or compounds thereof, or the manufacture of tubing of any length o such gums or compounds by an uninterrupted operation. The principal portion of the machinery to which the improvements relate, consists of a screw working in the bore of a cylinder into which the gum is fed, and from which it is forced by the screw through or into a die of the necessary size and form to produce the exterior of the covering tube or other article to be manufactured. For the covering of wire or the manufacture of tubing, the screw is made hollow for the reception of a mandrel through which the wire to be covered passes, or upon which the interior of the tubing is formed, and it is in the combination of the mandrel with the so-applied screw and cylinder that one part of the invention consists. Another improvement consists in a peculiar construction of the cylinder, whereby it is enabled to be supplied with gum without stopping the operation of the screw, and thereby enabled to operate continuously to make a tube or cover or wire of any length, or to fill a mold of any size. A further improvement consists in feeding the wire to be covered with the gum, by the action of the aforesaid screw or other forcing apparatus upon the gum itself.]

**37,113.—George Sherwood and H. M. Sherwood, of Chicago, Ill., for an Improvement in fastening the Covers of Ink-wells :**

We claim fastening the covers of ink-wells thereto by means of pins, a, a, with enlarged heads acting against the inclined edges of concentric slots, f, f, in the raised flange, E, of the well, substantially as and for the purpose herein specified.

**37,114.—W. C. Shipherd, of Saratoga Springs, N. Y., for an Improvement in Lasts :**

I claim the spring catch, E, in combination with the polygonal plate, E', said parts being constructed and arranged substantially as and for the purpose specified.

[This invention relates to a new and improved mode of attaching the removable block of the last to the latter, in such a manner that it

may be detached from the last by the hook which is usually employed for drawing the last from the boot or shoe, thereby avoiding the trouble and delay hitherto attending the loosening or detaching of the block from the last, previous to the withdrawing of the latter from the boot or shoe.]

37,115.—Edward Stern, of Dorchester, and J. S. Newell, of Newton, Mass., for an Improvement in Button-hole Cutters:

We claim a button-hole cutter as made with a triangular or trapezoidal bed, B, so arranged and applied with respect to the cutter, A, as to be capable of being moved in one plane and transversely of such cutter, substantially as described.

We also claim the adjustable gage, K, in combination with the bed, B, and the cutter, A, arranged in manner and so as to operate together substantially as specified.

We also claim the auxiliary or secondary gage, L, in combination with the cutter, A, and the bed, B, the latter being constructed and arranged so as to operate substantially as specified.

37,116.—Le Roy Sunderland, of Boston, Mass., for an Improvement in Spermatorrhoea Rings:

I claim, first, The use of an adjustable elastic spring lever, or levers armed with sharp points or teeth, and arranged substantially as herein described and for the purpose set forth.

Second, The combination of the ring, a, and spring lever or levers, b, arranged together substantially as herein described, and forming a seminal guard to be used for the prevention and cure of spermatorrhoea.

37,117.—W. R. Thomas and M. Emanuel, Jr., of Catsauqua, Pa., for an Improved Composition for Blasting Powder:

I claim the blasting compound made of nitrate of soda, sulphur, chlorate of potash, starch and ground bark, or other absorbent carbonaceous material, substantially in the manner and in about the proportions herein specified.

37,118.—Joel Webster, of Brooklyn, N. Y., for an Improved Sad-iron:

I claim the thumb-lever, M, in combination with the uprights, E and E', and main portion, A, substantially as described.

37,119.—L. C. White, of Waterbury, Conn., for an Improved Fastening for Lamp Chimneys:

I claim, first, The peculiar construction of hawks-bill, B, or its equivalent, as shown in Fig. 1, Fig. 2, Fig. 3 and Fig. 4, and the mode of throwing it either backward or forward, and holding it in either position by means of the wire-lever, J, or its equivalent, the ends of said lever being loose in perforations, h and k.

Second, I claim the middle projectile or tooth, f, or its equivalent, as shown in Fig. 1, Fig. 2 and Fig. 4, which throws the hawks-bill forward by gently pressing the base of the chimney upon it, independently of the upper projectile, e, which secures the chimney to the burner.

Third, I claim the position and the peculiar construction of the lever, J, or its equivalent as shown in Fig. 1 and Fig. 2, which throws the hawks-bill either backward or forward.

Fourth, I claim the hawks-bill, B, or its equivalent, in combination with the mode of attaching it to the burner without solder, by means of the bolt supports, d, formed in the shell of the burner as shown in Fig. 5, the whole being arranged substantially as and for the purpose herein described.

37,120.—W. J. Wilcox, of New York City, for an Improved Apparatus for Cooling Lard:

I claim, first, The application or use, in combination with an apparatus for refining lard, of a worm, C, enclosed in a case, D, constructed and operating substantially as and for the purpose herein described.

Second, The arrangement of the regulating cock, g, in combination with the worm, C, case, D, overflow pipe, e, heating pan, A, and cooling vat, E, all constructed and operating as and for the purpose specified.

37,121.—F. R. Wilson, of Auburn, Cal., for an Improvement in Machines for Upsetting Tires:

I claim the jointed levers, B B, in combination with the adjustable guides, J J, the levers, B B, being connected to a pivoted bar, D, having a lever, E, attached and all arranged to operate as and for the purpose herein set forth.

This invention consists in a novel and improved arrangement of levers and adjustable guides, whereby tires for wheels may be very expeditiously upset or shrunk to the proper size without cutting and rewedding, and the machine readily adapted for operating upon tires of different sizes or diameters.]

37,122.—W. W. Wright, of Killingly, Conn., for an Improved Shoe Knife:

I claim combining with the blade of the knife, a guard and wheel or tumbler, in the manner set forth, viz., by forming the guard as described, and screwing it to the blade of the knife with the dent in the flat end thereof, on the point of the knife and the bar at the other end thereof, resting on the wheel or tumbler, as described.

37,123.—W. P. Barker (assignor to himself, James Van Buren and Nelson Burchard), of Grand Rapids, Mich., for an Improvement in Grain-binders:

I claim, first, The traveling or reciprocating hooks, H H, attached to the endless belts, E E', in combination with the arm, J', provided with the nippers, m m', and the elastic band, C\*, attached to the bar, A', and arm, J', all arranged to operate as and for the purpose set forth.

Second, The shafts, V W, the former being provided with the screw, x, fork, h', and the latter provided with the hook, Y, knife or cutter, X, and the fork, w, said shafts being operated as shown, and in connection with the arm, J', and the cord or rope, K, for the purpose specified.

Third, The combination of the hooks, H H, arm, J', provided with the nippers, m m', elastic band, C\*, shafts, V W, the cord or rope, K, all combined and arranged to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a device for binding grain, which may be connected to and arranged to operate in conjunction with an ordinary reaper, so that the grain as cut by the reaper may be gathered into gavels and bound into sheaves; the latter being discharged from the machine, and the whole work performed automatically and operated by the draught movement of the machine.]

37,124.—J. H. Baird, of Waterbury, Conn., assignor to Jedediah Wilcox, of New York City, for an Improvement in Apparatus for Applying Clasps to Skirts:

I claim the combination of a hoop-rest, a clasp-feeder, a clasp-supplier, and a moving clasp-carrier, the combination as a whole operating substantially as set forth.

I also claim the combination of a clasp-carrier with the clasp-supplier, in such manner that the clasp-carrier forms a gate or stop, to prevent the escape of clasps, the combination as a whole operating substantially as set forth.

I also claim the combination of a clasp-carrier with the hoop-rest, in such manner that the clasp-carrier forms one of the members by which the clasp is clinched upon the hoop.

37,125.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, Mounting the fans directly upon the cross-shaft or counter-shaft, from which the remainder of the mechanism is driven, substantially in the manner described for the purposes set forth.

Second, The combination of the line-shaft, counter-shaft and fans, substantially as and for the purpose described.

Third, Driving the threshing-cylinder directly from the fan-shaft, substantially in the manner described.

37,126.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, The combination of the grain-belt, straw-carrier and picker-shaft, when arranged and operated in the manner and for the purpose set forth.

Second, A supplementary threshing-cylinder, located beneath the grain-belt for the purpose of threshing out any heads which may es-

cape the threshing-cylinder, when arranged and operating as herein described.

Third, The combination of the supplementary cylinder and the fans with the inclined boards, J J', substantially in the manner described for the purpose set forth.

Fourth, The combination of the inclined boards, J J', and regulating-valve, K, with the fans, D, as described for the purpose of regulating the blast, as set forth.

37,127.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, Mounting the blades of the fans directly upon the counter-shaft and inside the driving pulleys, substantially in the manner described for the purpose set forth.

Second, Driving the threshing cylinder directly from the fan-pulleys, substantially as and for the purposes set forth.

Third, Enclosing the main portion of the driving mechanism within the fan-case, for the purpose described.

Fourth, Making a portion of the fan case removable, as described, for the purpose of affording access to the driving mechanism.

37,128.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, Mounting the line-shaft, through which motion is communicated to the mechanism from the prime mover, in or upon a swinging bracket pivoted to the countershaft, and capable of twining freely round it in a vertical plane, substantially in the manner described.

Second, Inclosing the swinging bracket within the fan case, substantially in the manner and for the purposes described.

Third, The use of a diagonal brace on the front end of the frame, in combination with a line-shaft having vertical play, substantially as described and for the purpose set forth.

37,129.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, The combination of the diagonal braces, b2, and screw rods, b3 b4, with the longitudinal beams, b, in the manner and for the purpose described.

Second, The combination of the dispersing boards and supplementary cylinder, substantially as described and for the purpose specified.

Third, Mounting the shafts and gearing by which the straw-carrier and picker-shaft are driven in a solid metallic frame on each side of the grain-belt frame, as and for the purpose described.

37,130.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers:

I claim, first, Mounting the fans directly upon the cylinder shaft, and inside the threshing cylinder, substantially in the manner described, for the purposes set forth.

Second, The combination of an open-barreled cylinder having fans in its ends, with the blast spouts, when arranged and operating substantially in the manner herein described, for the purpose specified.

37,131.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, Constructing an independent frame or trough inside the grain-belt frame, substantially in the manner described, so as to form a space in which to locate the driving pulleys, &c.

Second, In combination with an independent frame, I claim driving the grain-belt, straw-carrier, heater and picker from the conveyer-shaft, substantially in the manner and for the purpose described.

37,132.—W. F. Cochrane (assignor to himself and Warder & Child), of Springfield, Ohio, for an Improvement in Grain Threshers and Separators:

I claim, first, The combination of the counter shaft and swinging jack, when arranged and operating substantially as and for the purpose set forth.

Second, The combination with a swinging jack of both a horizontal and a vertical driving-shaft, substantially in the manner and for the purposes described.

Third, The combination of the pipe-boxes in which the counter-shaft turns, with the side branches of the swinging jack, substantially in the manner described, for the purpose of relieving the shaft from the weight of the jack, as set forth.

37,133.—J. H. Harnly (assignor to himself, Jacob Harnly, G. R. Hendrickson and H. B. Dunlap), of Penn Township, Pa., for an Improvement in Rakes for Harvesters:

I claim, first, The combined action of the crank arm and its clutch, C, by means of the spring, c, pressing it against the lug on the axle, a, and the terminus of the rod, E, connected with the ratchet lever, D, g, pressing the clutch out, thereby jointly controlling the crank motion.

Second, I claim the combined foot lever, G, with its rod, F, operating against the jointed ratchet lever, E, D, g, for regulating the speed of the rake at will, applied in the manner specified.

Third, I claim the rack bar, B, with its hook at one end and eccentric attachment to the axle at the other, in combination with the ratchet lever, D, g, click rod, O, and connecting rod, M, arranged in the manner and for the purpose specified.

Fourth, I claim the rock-shaft, U, with its curved rake support, W, in combination with the tripper rod, F, rods, O M, and notched post, t, operating in the manner and for the purpose specified.

Fifth, I claim the arrangement and combination of the crank arm, C, with the connecting rods, K L, vibrating bar, I, and notched spring rod or holder, z, all operating in unison with the rack bar, B, by the revolution of the driving wheel on its axle, A, in the manner set forth.

37,134.—G. H. Johnson (assignor to himself and W. S. Sampson), of New York City, for an Improvement in Grain Bins:

I claim, first, The combined arrangement of the smaller cylinders, B, with the larger ones, A, for the purposes of utilizing the space between the larger ones for storage purposes, and rendering the whole structure more capable of sustaining the pressure of the contents of the cylinders, substantially as described.

Second, I claim the method of interlocking the layers of horizontal board plates, a, b, c, in the manner and for the purposes described.

Third, I claim the employment of ventilating flues, C, in combination with the grain bins, substantially as described.

37,135.—S. N. Long (assignor to the Chatham Lock Company), of South Chatham, Mass., for an Improvement in Locks:

I claim the bolt, C, formed of a series of tumblers a, in combination with a key provided with an extension bit, F, and a cam-shaped pin or pinite, e, or its equivalent, all arranged as and for the purpose herein set forth.

37,136.—Moses Marshall, of Lowell, Mass., assignor to S. S. Bucklin, of Brookline, Mass., for an Improved Machine for Pegging Boots and Shoes:

I claim the combination of the sleeve, G, with the plunger, B, and spring, C, operating in the manner substantially as described.

37,137.—John McCall, of London (Houndsditch), and B. G. Sloper, of Walthamstow, England, assignors to C. J. Underwood and W. J. Underwood, of Boston, Mass., for an Improvement in Preserving Articles of Food. Patented in England Oct. 24, 1861.

We claim the method of preserving articles of food by the introduction of sulphite of soda or its equivalent into the cans in which the articles are preserved, in the manner and for the purpose herein described.

37,138.—Franklin Perrin, of Cambridge, Mass., assignor to himself and D. C. Perrin, of Roxbury, Mass., for an Improved Manufacture of Palm-leaf Fabric:

I claim the new or improved fabric or manufacture, as made with warps of spun thread in pairs, and its weft of strips of palm leaf arranged together, substantially as described.

37,139.—W. S. Sampson (assignor to himself and J. H. Johnson), of New York City, for an Improvement in Grain Bins:

I claim forming the bricks, or block of composition with tongues and grooves, or their equivalents, substantially as described, in combination with the plates, B, and rods, a, as and for the purposes hereinbefore fully described.

37,140.—A. C. Ainger and S. W. Webster (assignors S. W. Webster, aforesaid), of Stockholm, N. Y., for an Improvement in Cheese Frames:

We claim the removable back, h, constructed as described, and employed in connection with the pivoted frame, d e f, in manner substantially as and for the purposes set forth.

[The subject of this invention is a pivoted frame of shelves, adapted for the storing of cheeses in such a manner that they may be exposed to a free circulation of air, and may be turned, rubbed, greased and receive all other necessary attention without the necessity of lifting them by hand from the time they are made until ready for market.]

37,141.—E. S. Maynard, of Hancock, N. Y., for an Improvement in Sleigh Brakes:

I claim the combined arrangement of the brake, A, with lever, B B, and jointed bars, P T, when connected with the cogged wheel, Q, and roller moving in the slot, D, the whole operating and constructed in the manner described.

37,142.—L. F. Smith, of Stonington, Conn., for an Improvement in Tools for forming the Necks of Bottles:

I claim, first, The lever, E, constructed, used and operated substantially as and for the purpose specified.

Second, The combination of the lever, E, with the center piece, D, the several parts being arranged as specified for forming shoulders in bottle necks, as set forth.

37,143.—G. G. Evans, of Philadelphia, Pa., for an Improvement in Shoulder Straps for Officers:

I claim, first, The combination of the border plate, A, the detachable back plate, B, the studs, c, and eyelets, e, arranged and operating substantially as described.

Second, In combination with the above, the stud composed of the slotted link, L, tube, m, spring, n, collar, P, and screw, R, substantially as described.

37,144.—Joseph Ridge, of Richmond, Ind., for an Improvement in Kerosene or Coal-oil Lamps:

I claim, first, The diaphragm, D, and cylinder, M, united in one piece of glass, substantially as represented, and constructed in the manner and for the purpose herein set forth.

Second, I claim the said diaphragm and cylinder, in combination with the base and metallic frame, support and guard, and short chimney, C, substantially in the manner and for the purpose represented by the drawing and model, and set forth in this specification.

37,145.—E. D. Williams of Philadelphia, Pa., for an Improvement in Elongated Bullets:

I claim, first, The combination with elongated expanding bullets of a pin, C, and expanding disk, B, applied and substantially as herein specified.

Second, Fitting the pin to the cavity of the bullet in the manner substantially as herein specified, whereby the expansion of the bullet is caused to commence in the front part of its expanding portion and to be gradually continued toward the rear, as herein set forth.

## RE-ISSUES.

1,358.—Joseph Renard, of Lyons, France, for an Improvement in Treating Aniline to produce a Red Coloring Matter or Dye. Patented April 8, 1859:

I claim the treatment of aniline, in combination with a metallic salt, or the equivalent thereof, with heat, substantially as described, to produce a red, in contradistinction to a purple or bluish coloring matter or dye, as set forth.

1,359.—Joseph Renard, of Lyons, France, for an Improved Red Dye from Aniline. Patented April 8, 1859:

I claim the new substance or red dyeing matter produced by subjecting aniline and a metallic salt, or the equivalent thereof, to a high temperature, substantially as described.

1,360.—N. A. Rhoads, of Waterbury, Vt., for an Improved Clothes-wringer. Patented March 11, 1862:

I claim in a clothes-wringing machine provided with elastic rollers, the construction of either or both of such rollers, or in other words, the arrangement of their operating surfaces, so that they may be at a greater distance asunder at their middle than at their ends, the whole being substantially in the manner and for the purpose as herein described.

I also claim the arrangement and combination of the connection and bearing bar, G, with the rubber springs, g, g, the shaft, H, and its cams, h, h, the whole being applied to the frame, A, and its rollers, D D', substantially as described.

I also claim the arrangement of the shaft, L, and its arms, l, l, with reference to the rollers, D D', the frame, A, and the two bars, J J, or their equivalents, affixed to the said frame.

1,361.—N. A. Rhoads, of Waterbury, Vt., for an Improved Clothes-wringer. Patented March 11, 1862:

I claim the connection of each of the bars, J J, with the frame, A, A, by means of the adjustable screw, M, whereby the distance of the bar, J, from the frame, A, may be increased or diminished as circumstances may require, substantially as herein set forth.

1,362.—C. A. Miller, of Philadelphia, Pa., assignee of W. S. Kirkham, of Branford, Conn., for an Improvement in Locks and Latches. Patented March 15, 1859:

I claim the keeper, D, having two inclined planes in combination with a latch, so pivoted to a janus-faced lock, and so arranged in respect to the inclination of the keeper, that whether the latter be applied to a left or right-handed door casing, one or other of the said inclined planes shall, on closing the door, cause the latch to move on its pivot, and direct the outer end into or behind the keeper, as described.

## DESIGNS.

1,675.—J. W. Burt, of New York City, for a Design for an Ankle.

1,676.—J. B. Chargois, of New York City, for a Design for a Trade-mark.

1,677.—David Foyer, of Dover, N. H., assignor to Abraham Folsom & Son, of Boston, for a Design for a Floor-cloth Pattern.

1,678.—H. S. and A. S. Hubbell, of Buffalo, N. Y., for a Design for a Cook's Stove.

1,679.—H. S. and A. S. Hubbell, of Buffalo, N. Y., for a Design for a Cook's Stove.

1,680.—H. S. and A. S. Hubbell, of Buffalo, N. Y., for a Design for a Cook's Stove.

1,681.—N. E. Russell, of New York City, for a Design for the Handles of Table Cutlery.

1,682.—J. W. Schreiber, of New York City, for a Design for a Lamp Chimney.

1,683 to 1,694.—H. G. Thompson, of New York City, assignor to the Hartford Carpet Company, for 12 patents for Designs for Carpet Patterns.

## 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.



**J. H. D., of N. Y.**—Finely-powdered plaster-of-paris made into a thin cement with water, we have been told, answers well for uniting broken pieces of meerscham. Liquid quartz will answer the same purpose.

**S. W. T., of N. J.**—In a general sense, combustible substances are those which burn freely in the atmosphere, but in a chemical sense, this definition is too restricted. Iron and zinc burn freely in pure oxygen gas.

**W. F. W., of Pa.**—It depends altogether on the terms of the patent whether the patentee can substitute a different material, and still claim to work under the patent.

**P. D. of Vt.**—The benefit of a re-issue will extend to past assignees. They can however, if they prefer it, adhere to the original patent. It is not necessary that all should join in the application for re-issue, though it is usually better for them to do so.

**F. A. M., of N. Y.**—The *Monitor* class of vessels were not designed for speed, but merely for floating batteries. It would be wrong to blame them for want of speed, when they were not designed with respect to this quality. We shall give your article on storms attention. The theory appears to be similar to that of Mr. Redfield, who believed that most of our storms were rotary.

**Money Received**

At the Scientific American Office on account of Patent Office business, from Wednesday, December 10, to Wednesday, December 17, 1862:—

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**ILLUSTRATIONS.**

- A**
- Air-heater (Shotwell) 232
- Anchor-tripper (Baylies) 49
- B**
- Balance for safety valves, spring (Graham) 248
- Balance for safety valves, spring (Hughes) 136
- Battery, double turret steam (Denny) 88
- Bayonet-guard (Ernst) 206
- Belt, polishing (Van derbilt) 8
- Boilers, exploded locomotive 241, 353
- Bridge, iron truss (Heath) 129
- Bridge, self-closing (Selser) 257
- Burner, lamp (Rebeck & Davies) 232
- C**
- Cap, chimney (Elberg) 384
- Cap, ventilating (Blythe) 192
- Carder-feeder, self-acting (Appery) 273
- Chimney-fastener and holder (Hodgson) 263
- Chimney, lamp (Brown) 240
- Clothes-dryer (McNeil) 52
- Cloth, machine for drying and dressing (Henderson) 104
- Coal-sifter (Frat) 112
- Coupling for carriages, shaft (Rice) 168
- Cultivator, patent (Cornick) 305
- Culvert, suspension (McIntyre) 280
- Cup attachment for hydrants (Ingils) 32
- D**
- Distilling, improvement in (Howlett) 289, 290
- E**
- Envelope, postmark-preserving (Morri-son) 32
- Evaporator, cane-juice (Cory) 80
- Evaporator, cane-juice (Low) 120
- Extractor, patent stump (Godfrey) 368
- F**
- Fence, patent farm (Gibson) 288
- Fire-engines with locomotives, combina-tion of (Williams) 33
- Foundrinier machine, modification of the (Harper) 145
- Freezer, ice-cream (Hamilton & Ashton) 384
- G**
- Grain-binder (Powers & Lancaster) 256
- Great Eastern, mode of repairing the 403
- Gutter, patent (Yapp) 400
- H**
- Hammer, trip (Kinsley) 376
- Harrow, self-cleaning (Cook) 56
- Hoisting machine, patent (Otis) 369
- J**
- Jack, lifting (Fasig) 176
- L**
- Lamp and lantern (Irwin) 40
- Lamp-heating attachment (Fish) 64
- Lamp, kerosene (Meucci) 184
- Lamp, rock-oil (Vidal) 248
- Lathe for turning projectiles (Whitworth) 323
- Leg, artificial (Jewett) 224
- Leg, artificial (White) 120
- Letter-box, patent automatic (Brown) 336
- M**
- Mattress, endless revolving (Bassett) 16
- Mill, cider and wine (Gates) 43
- Mill, family cider (Hutchinson) 360
- Mill, gig (Gessner) 17
- Milling machine, universal (Browne & Sharpe) 401
- N**
- Needle, patent (Cooper) 406
- P**
- Packing, piston (Smith) 72
- Pen-scraper (Fulton) 296
- Pile for rolling T-rails (Price & Lewis) 280
- Pin, ladies sewing (McNamee) 176

- Pipe, patent tobacco (Andrews) 344
- Planer for armor and turret plates, double (Rowland) 264
- Planter, seed (VanBrun) 72
- Plate for piano-fortes, hinged (Worcester) 8
- Plates, mode of securing armor (Shaw) 36
- Plow and cultivator, double (Owen) 352
- Flow, gang (Black) 56
- Press, baling (Robert) 96
- Preserver, corpse (Bunn) 360
- Projectile, non-glancing (Warburton) 136
- Pulley, patent clutch (Shinn) 392
- Pump, force (Hunt & Devin) 216
- Pump, patent steam (Sewell) 337, 338
- Pump, removable valve (Hayes) 65
- Pump, rotary (Perry & Boley) 312
- Pyrometer, coal-oil (Tagliabue) 184
- R**
- Rake for reaping machines, automatic (Twining) 1
- Rake, patent horse (Brown) 321
- Register, bid (McNamee) 2
- Rifle, patent (General Burnside) 385
- Rod metallic (Reed) 113
- Rudder, jury (Raymond) 168
- S**
- Salt, apparatus for making (Chapin) 97
- Salt block (Garrison) 193
- Sawing, boring, molding and planing ma-chine, combined (Post) 177
- Sawing machine (Muzzy) 81
- Saw, scroll (Richards) 144
- Scales, index (Platt & Rosecrans) 152
- Sieve, coal (Wadman) 16
- Silver from waste solutions, apparatus for saving (Shaw) 112
- Siphon, steam (Marsh) 304
- Skate, ankle-supporting (Jebb & Cutter) 24
- Skate, patent (Brady) 320
- Skates, shell-groove (Dutton) 406
- Sod-cutter, seeding machine and harrow, combined (Steller) 209
- T**
- Tap guide, patent (Hadley) 392
- Tomstones, mode of setting (Smith) 192
- Truck, store (Douglas) 161
- V**
- Valve for canal locks, patent (Heath) 296
- W**
- Well-curb and bucket (McGregor) 160
- Wheel, iron-hub carriage (Leavitt) 5
- Windlasses, capstan and anchor-gearing, ship's (Brown & Harfield) 225, 226
- Wood-working machine, universal (Whit-tesey) 344

**MISCELLANY.**

- \* Figures followed by stars (\*) refer to illustrated articles.
- A**
- Absinthe in France, a heavy tax on 310
- Acid, a new use for carbolic 103
- Acid by electricity, re-discovery of the formation of nitric 6
- Acid fumes, nitric 90
- Acid stains, nitric 184
- Accidents, balloon 69
- Action and reaction 182
- Adriatic, steamer 170
- Advertisements 15, 31, 47, 63, 79, 95, 111, 127, 143, 159, 175, 191, 207, 223, 238, 255, 271, 287, 303, 319, 335, 351, 367, 382, 398
- Agassiz, extracts from 26
- Age, the innovations of the 378
- Agriculture in aid of war, new helps of 274
- Ague, brass-founders' 118
- Alabama, the 404
- Aluminate of iron and soda as a thera-peutic agent 231
- Alcohol, cheap 176
- Alcohol from coal gas, manufacture of 200
- Alombic or still, the 57
- Almanac forthcoming, a great national 265
- American, foreign honors to an 330

- America—the granary of the world 290
- Amusements, home 118
- Anvil for a steam hammer, a large 204
- Apple-sauce, substitute for 290
- Apples for cattle, &c., nutriment of sweet 267
- Arctic expedition, Hall's 154, 195
- Argument, a railroad 295
- Argyle, a new mineral 392
- Armas, the ram 133\*
- Armory, Colt's 5, 97
- Arms manufacturing at Richmond, the Robinson 391
- Arms, valuable 188
- Arsenic and other poisons on plants and animals, effect of 149
- Arts, progress of the mechanic 377
- Asteroid, another 231
- Astronomer, an able 161
- Atom, the story of an 304
- Axes, setting carriage 358\*
- B**
- Bakery, fall of a 326
- Baroon ascension, an extraordinary 353
- Ballooning, scientific 113, 170, 267
- Barley in Washington Territory, great growth of 117
- Barn in the country, the largest 211
- Barometer, how to use a 176
- Batteries, to amalgamate the zinc of elec-tric 165
- Batteries, turret 246
- Battery, a land 39
- Battery, an ancient iron-clad 326
- Battery, railroad iron-clad 235
- Battery, the Stevens 67, 90
- Battle, how they fire in 279
- Beasturage 55
- Bedroom? what is in the 355
- Bells, cast-steel 193
- Bells, hanging 179
- Belt, setting a quarter twist 7
- Belt works from off its pulleys, why a 132\*
- Benzine, distilling 375
- Benzole 149
- Bins, preservation of grain in air-tight 5
- Black Prince, trial trip of the 203
- Blockade, results of running the 195
- Boat-building at Pittsburgh, Pa. 305
- Boats at Pittsburgh, iron-clad river 215
- Boats, destruction of oil 406
- Bobbins, chalk your 348
- Bodies are embalmed, how 209
- Boilers, incrustations on 371
- Boilers on the lakes, the largest 71
- Boilers, steam 235, 342
- Boilers, the control of steam 313
- Bolling in liquids, cause of 92
- Bolts, new method of drawing taper 376\*
- Bone, a Parisian prize for the regenera-tion of 230
- Books and publications received 29, 110, 126, 190, 228, 381
- Boulder, discovery of a great copper 327
- Bread, fresh 121
- Bread in California, aerated 186
- Bread, a remedy for fetid 231
- Breach loaders versus muzzle-loaders 355
- Bricks, all in silver 355
- Brickwork, exclusion of damp from 310
- Brickwork, the salting of 65
- Bridge, a steel suspension 296
- Bridge at Harlem, new iron 73
- Bridge in Portugal, new iron 63
- Bridge in Switzerland, a new large tubu-lar 153
- Bridge, an American iron 2
- British Association for the Advancement of Science, the 311, 338
- Broom business, the 321
- Brooms, California 352
- Brunel's mishaps 119
- Buildings, warming and ventilation of 372
- Bullet, explosive 131, 247
- Bullion per month, three millions of 331
- Bushes, raspberry 177
- Business in Lynn 24
- Business in war times 277
- Butter, testing 203

- Cables between England and Holland, a new submarine telegraph 135
- California, a new line to 129
- Camera, a kaleidoscopic 262
- Canada, our disposition toward 122
- Canals in India, gigantic 33
- Candles, manufacture of stearine and paraffine 354
- Cannon at Providence, R. I., casting 101
- Cannon by electricity in France, firing 198
- Cannon, experiments with a submarine 9
- Cannon, government contracts for 243
- Cannon of large caliber 199
- Capitol at Washington, dome of the 373
- Car built in one day, a railroad 20
- Cars for petroleum, Canadian iron-tank 280
- Carpets, how to clean soiled 370
- Cars, ventilated railroad 40
- Carte-de-visite, the 103
- Cartridges, patents for solid water-proof 339
- Castings, Berlin 92
- Castings, Krupp's steel 168
- Castings, the tax upon 231, 326
- Cattle by measurement, weight of 231
- Cattle-feeding, systematized 202
- Central Park, visitors at the 230
- Cents 306
- Cents selling at a premium, nickel 36
- Cents? what becomes of all the 278
- Cement, asphaltum water-proof 74
- Cement for joints of petroleum stills 810
- Chairs, shorten the back legs of your 372
- Chambers, temperature of 83
- Change, the true remedy for the scarcity of 57
- Charges, bayonet 315
- Cheese, to make Stilton 19
- Chlorate of potash, the way to make 182
- Chromometers 279
- Cher at blackberry wine, crab-apple 310
- Cider mill, wanted—a domestic 323
- Cinnabar in Nevada Territory 11
- Cisterns for houses in cities, constructing water 228
- Cisterns, Venetian water 43
- Claims, patent 11, 27, 44, 60, 76, 92, 108, 124, 140, 156, 172, 188, 204, 220, 236, 253, 269, 284, 300, 316, 332, 348, 364, 380, 396, 409, 410
- Cloaks for Pennsylvania troops, Spanish water-proof 342
- Cloth, extensive manufacture of army 405
- Cloth, porous water-proof 153
- Coal and burning of fuel, the price of 266
- Coal, how to burn 282
- Coal—its cost and supply 153
- Coal on the Reading Railroad 358
- Coal, the color products of 180, 196, 212
- Coffee and pepper, Java 181
- Coffee, Illinois 363
- Coke for the poor in Albany, a gift of \$23
- College of Pennsylvania, Polytechnic 35
- Color for ships of war, change of 315
- Compound, a new explosive 193
- Comet, the new 122
- Comet, the Tuttle 173
- Commission, the sanitary 98
- Complimentary, quite 847
- Compliment, left-handed 295
- Compound, a new explosive 176
- Conductors, lightning 406
- Congressmen, tax on salaries of 317
- Constellation, the ship 74
- Contest in California, a washing machine 359
- Contribution from San Francisco, mu-nificent 219
- Cork, production of 163
- Corn for England, Indian 137
- Corporation, a poor 389
- Correspondence, our special 37, 404
- Copper and niter in California, discover-ers of 22, 43
- Copper in Michigan, discovery of 344
- Copper-smelting works in Michigan, new 352
- Copper, tinning metallic 360
- Cotton and its substitutes, more about 265
- Cotton and other crops in Algeria, the cultivation of 193
- Cotton and tobacco in Southern Illinois, cultivation of 141
- Cotton by the Mormons, cultivation of 385
- Cotton crop in India, the 262
- Cotton famine, the 238
- Cotton for Europe, shipment of Ameri-can 144
- Cotton-growing at the South, suspension of 8
- Cotton in Algeria 247
- Cotton in Brooklyn, ginning Sea Island 26

- Cotton in Virginia 359
- Cotton, length of fibers of Sea Island 180
- Cotton manufacture, prosperity of the 314
- Cotton manufactures, British 97
- Cotton market, condition of the 69
- Cotton, Pennsylvania 330
- Cotton, Sandwich Island 2
- Cotton-spinning in Russia 306
- Cotton, Utah 11
- Cow-milkers in England, American 274
- Crops in America and Europe, the 115
- Crusoe's island, a visit to Robinson 332
- Cucumbers in San Francisco, pickled 36
- Culverin, the range of an ancient 104
- Currency, the postage-stamp 112
- Cyclopedias, Appleton's new American 240
- Cyclopedias for 1861, American annual 100
- Cylinders, steam 294
- D**
- "Dander up" 219
- Debt, public 308
- Department, Agricultural 50
- Diamond, a large American 369
- Difference, a 366
- Digestion assisted 368
- Digestion, the chemistry of 83
- Dinners for rich and poor men 101
- Discoveries in ancient Africa 343
- Discovery, an opening for a great 89
- Discovery near Corinth, Miss., a 55
- Disgrace, a national 218
- Dish, how to make a boiled 2
- Dispatch, a wonderful telegraphic 387
- Distress, the Lancashire 408
- Docks, what may be seen at the Atlantic 324
- Doctrine, sound 214
- Dollar, queer change for a 376
- Draining in England, land 114
- Drawings, varnish 3
- Drowning, to prevent accidental 327
- Duck, cotton 331
- E**
- Eagle, new steamship 247
- Economy, domestic 373
- Editor made ten dollars, how a western 363
- Eggs, how to detect bad 256
- Eggs in Paris, Easter 50
- Elephant found in Pennsylvania, remains of an 54
- Ellet, Jr., death of Charles 2
- Emigration movement, Nicaragua 5
- Emigration to America 267
- Engine, a large Turkish rotary steam 209
- Engines, in Nebraska, the first locomot-ive 81
- Engine, Paine's spray superheated steam 185
- Engine-room, order in the 394
- Engines, confusion about horse-power of 183
- Engines, duties of Cornish and locomot-ive 345
- Engines for canal boats, locomotive 23
- Engines, information wanted respecting hydraulic 230
- Engines, the merits of various kinds of 407
- Engineer gone, distinguished 165
- Engineer, heroism of an 250
- Engineering examples—the Brunels 251
- Engineering, the science of steam 325
- Engineers are educated in France the way military 183
- Engineers, attention! 355
- Engineers, Egyptian 278
- Engineers in the navy are appointed, how 187
- Engineers, licensing 385
- Engineers, where and how Austria makes her military 214
- Engraving by electricity 242
- Engraving, mezzotint to 167
- Envelope, a novel 371
- Erazer, postage-stamp 374, 406
- Esquimaux, appetite and food of 199
- Essar, the gunboat 51
- Evergreens, pruning 147
- Example, a noble 315
- Exhibition and what may be there seen, the great 156
- Exhibition as seen by a votary of science, the great 163

Exhibition, Danish engineers and artists at the London 5  
 Exhibition, excellent locomotive tires at the London 19  
 Exhibition, fine typography at the London 19  
 Exhibition, 1863, Hamburg international agricultural 400  
 Exhibition in Canada, agricultural 87  
 Exhibition in London, financial failure of the 364  
 Exhibition in Paris, permanent industrial 65  
 Exhibition, interesting objects in the 49  
 Exhibition, rural visitors at the International 154  
 Exhibition, the London, 3, 42, 58, 74, 89, 151, 155, 186, 201, 220, 245, 268, 279, 357, 374  
 Exhibition, the medals at the London 87  
 Exhibitors, the London Times and American 21, 25  
 Experts, caution to 51  
 Explosions, a fatal boiler 38, 405  
 Explosion, a terrible boiler 283  
 Explosion in Philadelphia, boiler 86  
 Explosion of an arsenal 219, 230  
 Explosion of a barrel, singular 136  
 Explosion of a boiler and its cause 177  
 Explosion of a land tank 394  
 Explosion of a locomotive 294  
 Explosion of a shell—death of General Charles T. James 283  
 Explosions of boilers 137, 249  
 Explosions, remarkable locomotive boiler 241-253  
 Explosions, questions about boiler 278  
 Exports, American 170  
 Exterminator, a rat 294  
 Extracts for young men 163

**F**  
 Fair postponed, Illinois State 163  
 Fair, the World's 85  
 Fairs for 1862, agricultural State 149  
 Fairs, selling articles at industrial 32  
 Fans and pumps, a new principle for 272  
 Feathers, a curious property of 262  
 Feet, take care of the 87, 163  
 Fighting 339  
 Figures on dress parade 3  
 Fire-arms, breech-loading 171  
 Fire-bricks are manufactured, how 217  
 Fire-engine ever built, the handsomest 51  
 Fire-engine for New Brunswick, a steam 310  
 Fire-engine for South America, a new steam 52  
 Fire-engines abroad, steam 405  
 Fire-engines, experience with steam 160  
 Fire-engines, mismanagement of steam 361  
 Fires and steam fire-engines 107, 115  
 Fish, culture of 71  
 Fishing by steam 187  
 Fits, hysterical 295  
 Flames, the colors of 387  
 Flax in Ireland 263  
 Flax, pulling 35  
 Flaxseed crop, the 170  
 Fleet, our iron-clad 137  
 Fleet, the Mississippi 220  
 Flowers, cultivation of window 215  
 Flowers in water, fresh bloom 321  
 Flying-machine, a practical 198, 246  
 Food for cattle, nourishing 235  
 Food in Paris 325  
 Food, nature's guide in taking 233  
 Food, natural shape of the 266  
 Force, on the 117, 152, 150  
 Force, on the cultivation of 150  
 Forces, natural 278  
 Forests in Australia 92  
 Forging—steam and oil hammers 25  
 Forts, the worthlessness of our 153  
 Fountain, the Wakulla 355  
 Fowls, diseases and treatment of 327  
 Fredericksburg, the battle of 402  
 Frigate, English cupola 203  
 Frigate, launch of a new steam 122  
 Frigates, an American shipbuilder on iron-clad 291  
 Frigates, iron-clad 57  
 Frog-hunting 35  
 Frost in Canada West, a severe summer 4  
 Fruits for long distances, packing 20  
 Fly-wheel, bursting of a 360  
 Fuel, the proper use of 363  
 Furnaces for glass 148

**G**  
 Gas, cheap oxygen 386  
 Gas, experiments with coal 39  
 Gas from crude Petroleum, Canadian 306  
 Gas, government tax on 163  
 Gas in Illinois, reduction in the price of 298  
 Gas in Paris, manufacture of portable 42  
 Gearing, grooved frictional 70, 102, 150, 203, 334  
 Genius and industry, honors to engineering 165  
 Genius of California, the inventive 375  
 Genius of our people, the 187  
 Gin, Emery's cotton 74  
 Glass, ancient 119  
 Glass, an examination of Pompeian 164  
 Glass, coal-oil in drilling 230  
 Glass, tint 21  
 Glass in Pittsburgh, manufacture of 121, 155  
 Glazes used for cooking utensils, different 208  
 Golden Gate, loss of the California steamer 122  
 Gold in Denver City 88  
 Gold in Nova Scotia 51  
 Gold, the flow of 249  
 Goods in New York, wholesale prices of domestic 187  
 Graduates and loyalty to the Union, West Point 323  
 Grain and flour for Europe, exportation of American 246  
 Grain, a "quarter" of 248  
 Grape culture 66  
 Grape cure, the 389  
 Graves, headboards for soldiers' 327  
 Great Britain, wealth of 186  
 Great Eastern, arrival of the steamship 54  
 Great Eastern, condition of the 219, 371  
 Great Eastern, repairing the 403  
 Gum shellac, how to dissolve 371  
 Gun, an old large-hooped 40  
 Gun broken, Armstrong's great 116  
 Gun cast, another monster 216  
 Gun, experiments with a new 342  
 Gun, proving a Monitor 15-inch 216  
 Gun, the Horsfall 360  
 Guns and armor targets, other experiments with 288  
 Guns and how to cast them, strength of 307  
 Guns and iron-clad ships again, Armstrong 2  
 Guns and iron-plated targets, American experiments with 310  
 Guns and targets, new experiments with 335  
 Guns, big 166, 186  
 Guns, concussion of large 311  
 Guns, Dahlgren and Rodman 360  
 Guns, disabling 408  
 Guns in Portland, Maine, casting of large Dahlgren 130

Guns, proposed alteration of Armstrong 51  
 Guns, the "dailies" on big 312  
 Gunboats, the proposed new 50  
 Gun-cotton and gun-powder 390  
 Gun-cotton as a filter for concentrated acids, &c., 145  
 Gun-cotton, fatal explosion of 3  
 Gunny at Verona, experiments in 288  
 Gunny-hag plant in India, cultivation of the 327

**H**  
 Hair and sea-grass for upholstery 278  
 Hammers, steam 41  
 Harvest, the California 65  
 Harvests, the European 215  
 Hats and seamless garments, manufacture of felt 346  
 Health, soldier 215  
 Heat at night, radiation of 43  
 Heat, dynamical theory of 169  
 Heat-lighting? what is it 23  
 Heat of the human body 231  
 Heater, Boynton's 363  
 Hearty by his own will, a man stopping his 55  
 Hemp and flax, rotting 245  
 Hop in England and America, the 276  
 Horses, a large cargo 283  
 Horses, feeding oats to 80  
 Horses, how to treat nervous 214  
 Horses, on shoeing 336, 375  
 Horses, to relieve muscular pain in 275  
 Hospitals, English, American and French 87  
 Housekeeping, improvements in the art of 242  
 Houses, musk-rat 394  
 Howitzer, a new model 88  
 Hydraulic, a powerful 5  
 Hydrophobia and muzzling dogs 36

**I**  
 Ice-house, a successful 72  
 Ice machine wanted 310  
 Ice machines, artificial 342  
 Idea, brilliant 226  
 Imports and exports of New Zealand 115  
 Index 411  
 India-rubber, solvents of 371  
 Industry, effects of 247  
 Ingenuity, Yankee 235  
 Insects, destruction of grain by 161  
 Institute, Franklin 73  
 Instrument, new musical 247  
 Invention, a wonderful 264  
 Invention, French 120  
 Invention of the Empress of France, an 160  
 Inventions in Europe and the SCIENTIFIC AMERICAN, American 217  
 Inventions in Europe, continued progress of American 234  
 Inventions of the day 74  
 Inventions, recent American 11, 27, 43, 60, 76, 91, 107, 124, 133, 156, 172, 188, 204, 220, 236, 252, 268, 284, 299, 315, 331, 347, 364, 380, 396  
 Inventions, recent foreign 54, 91, 139, 155, 235, 252, 268, 331, 395  
 Inventions, value of railway 10  
 Inventions wanted, labor-saving 280  
 Inventor, death of an 51  
 Inventor, a noble 178  
 Inventor, a successful 323  
 Inventor of flax cotton a lunatic, the 275  
 Inventor of the sewing machine officiating as a regimental letter-carrier, 359  
 Inventors active 74  
 Inventors and patentees, items of importance to 219  
 Inventors in New Orleans thawing out 233  
 Inventors, women 216  
 Iodine, improvement in the manufacture of 123  
 Iron and its resistance to projectiles at high velocities, the properties of 244, 260  
 Iron business, credits in the 68  
 Iron, enameling on 392  
 Iron, formed by animals, 243  
 Iron, imports of foreign 312  
 Iron in Great Britain, manufacture of 136  
 Iron in Maine, manufacture of 309  
 Iron, manufacture and qualities of English pig 53  
 Iron ore from the Lake Superior region, annual shipment of 216  
 Iron, removing sulphur and phosphorus from molten 195  
 Irrigation and cultivation, Egyptian steam 19  
 Irrigation in the Madras Presidency, extensive works of 208  
 Iron-clads at sea, the European 358  
 Iron-clads for the Mississippi, three new 115  
 Iron-clads from a foreign point of view our 179  
 Iron-clads in New York, construction of 296  
 Iron-clads of the British navy 114  
 Iron-clads, progress of our 234  
 Ironmaster thinks of us, what an English 358, 374  
 Ironmolds, the 154, 187, 211, 243  
 Items, California industrial 343  
 Items, foreign scientific 362, 379  
 Ivory from elephants imbedded in ice, Siberian 5

**J**  
 Jam in San Francisco, sale of 49  
 Jars, closing fruit 55  
 Jones, the Irish orator, Mason 363  
 Judge-advocate-general, new 181

**K**  
 Kearney, General 184  
 Keokuk, launch of the iron battery 386  
 Knife, Gais's budding 1  
 Knitting machine, W. L. son's 161

**L**  
 Labor and machinery, combined 104  
 Labor, scientific division of 380  
 Labor, the drain of 395  
 Labor versus grain elevators, muscular 34  
 Lake, the walled 327, 390  
 Lakes, measurement of the great 256  
 Law of nature, a great 186  
 Law, the tax 299  
 Laws, physical 121  
 Lead, new mode of preparing black 282  
 Leather-cloth, the manufacture of 90  
 Leather, hemlock-tanned 171  
 Letter, Mr. Wilkins's 56  
 Letters, brief extracts from 295  
 Letters from the people 266  
 Life, the turn of 372  
 Lifetime, what may be seen in a 7  
 Light, heat and motion 380  
 Light wanted 344  
 Lime, to make superphosphate of 51  
 Line-of-battle, a 3

Liniment, Mexican mustang 179  
 Lint, to make superior hospital 200  
 Loan, Government 347  
 Lock merchants at Wolverhampton, the 51  
 Locomotive business in Paterson 9  
 Locomotives, American 145  
 Locomotives in Brazil, American 51  
 Locomotives, large French 107  
 Locomotives, light 182  
 Locomotives, proportions of 181  
 Locomotives, spring platforms for engineers of 144  
 Lotion for the hair, castor-oil 370  
 Lumber in the valley of Saginaw 364  
 Lupine and crooked-beam plows 265  
 Lupine, character, cultivation and use of the 261

**M**  
 Machinery, a good demand for 233  
 Machinery exported from England, annual value of 90  
 Machinery in harvest fields, the value of labor-saving 68  
 Machine-shops and the war 299  
 Machine-shops, visits to our 313  
 Madras as a substitute for cotton, Indian 160  
 Malachite and works of art 265  
 Maladies, wonderful increase of human 100  
 Males and females in the United States, proportion of 250  
 Manufacturers, important to 102  
 Manufacturers, American 168  
 Manufacturers at the World's Fair, New Hampshire 87  
 Manufactures, New Hampshire 40  
 Markets, our city 283  
 Market, the money 281  
 Marriage, with blood relations, the effects of 123  
 Match, a great prize shooting 83  
 Matches in Austria, manufacture of lucifer 266  
 Matters, a word about military 360  
 Meals, drink less with your 376  
 Meats, on the preservation of 134  
 Medicines, patent 232  
 Mechanic, a military 150  
 Mechanic, Lord Byron's grandson a 227  
 Mechanics aiding farmers 232  
 Mechanics, education of 217  
 Mechanics, soldier 282  
 Men, iron-clad 406  
 Message, the President's 370  
 Metal for sheathing ships' bottoms, Muntz's patent 73  
 Metal, new gun 213  
 Metals and other substances, the effect of an infinite division of 161  
 Metals, drawing and rolling 389  
 Meteor, large 284  
 Mica, ornamental uses of transparent 91  
 Military department, our 154  
 Milk foams, why boiling 218  
 Milk, the way to keep 228  
 Mill, a family 99  
 Mill at Woonsocket, R. I., a new woolen 32  
 Mill, fall of part of a woolen 71  
 Mills and machinery in Parowan 37  
 Mills in Chicago, iron-rolling 10, 38  
 Mills, new copper-stamping 54  
 Mills of Maine, stoppage of the paper 359  
 Millers, white 55  
 Milling, information about 6, 7, 22, 102  
 Mine, a barya 96  
 Mine, a Girard's injector at the Pawebac 119  
 Mine at Ontonagon, the National copper 37, 88  
 Mine, daily shipment of iron ore at the Jackson 32  
 Mine near Duquesne, the Durango lead 35  
 Mines in England, depths of 243  
 Mines in Maine, iron 390  
 Mines of California of no value to the world, the gold 297, 359  
 Mines of California, the quicksilver 150  
 Mines of Lake Superior, annual yield of copper 50  
 Mines of Washoe, the silver 33  
 Mines, our copper 85  
 Mining in California, gold 130  
 Mint, the Philadelphia 98  
 Mississippi fly up hill? does the 133  
 Mississippi scheme, the great 341  
 Mississippi, trade of the 108  
 Mist is generated, how 306  
 Mitchell, General 329  
 Molding in brass 148  
 Money as a government resource, paper 265  
 Money is worth only five per cent, why 313  
 Money, lots of 310  
 Money received 14, 30, 46, 62, 78, 94, 110, 126, 142, 158, 174, 190, 206, 222, 238, 254, 270, 286, 302, 318, 334, 350, 366, 382, 398, 411

**M**  
 Monitor, a land 312  
 Monitor and Galena, defects in the 36  
 Monitor as a sea-boat, the 106  
 Monitor in action, temperature of the interior of the 298  
 Monitor, inscription upon the turret of the 247  
 Monitor, stoppers or shields for a new 346  
 Monitor? who originated the 128  
 Monitors, the two great 105  
 Montauk, the 406  
 Mortars, effective use of 152  
 Motor, the Lenoir 82  
 Motor, probable invention of a novel and great 70  
 Mountains, the sonorous qualities of 216  
 Music, electrical 40  
 Mustard, making 118, 387  
 Mutes, intermarriage of deaf 387

**N**  
 Nail-making machine, a new 390  
 Nails, spiral fluted 120, 199  
 Names, careful in writing proper 151  
 National defense and economy, a suggestion for 147  
 Naugatuck, the gunboat 347  
 Naval construction and harbor defense 339  
 Navy department, propositions to the 322  
 Navy expenditure for the British 231  
 Navy, increase and condition of the 370  
 Navy of France, steam iron-clad frigates and other vessels of the 87, 322  
 Navy, the Prussian, the 277  
 Navy, the British commercial steam 130  
 Navy, the French merchant 19  
 Navy, our new iron-clad 3  
 Navy-yard, the Brooklyn 232  
 Nellie, the child-dress and publisher, little 106  
 Neutrality, strict 119  
 Never too old to learn 183  
 News, Connecticut manufacturing 247  
 News, Massachusetts manufacturing 101, 115  
 Newspaper crisis—a welcome letter, the 342  
 Newspaper-publishing, an important position in the history of 329  
 Nickel in Connecticut, the mining of 106  
 Norwalk invaded, the 187

Normandie, the French iron-clad frigate 54  
 Note-splitting, bank 192  
 Notes and queries 14, 30, 46, 62, 78, 94, 110, 126, 142, 158, 174, 190, 206, 222, 238, 254, 270, 286, 302, 318, 334, 350, 366, 382, 398, 411  
 Notes, forgery of Bank of England 359  
 Notes in war time, the Bank of England 325  
 Notes on military and naval affairs 18, 34, 50, 66, 82, 98, 114, 130, 146, 162, 178, 194, 210, 227, 242, 258, 274

**O**  
 Oakum—a substitute for lint in wounds 149  
 Oil as a lubricator, coal 38  
 Oil as food for cattle, cod-liver 389  
 Oil for chronometers 332  
 Oil, great advance in the price of coal 347  
 Oil is made, the way Menhaden 198  
 Oil, mineral 262  
 Oil-of-turpentine and camphor-179  
 Oil trade, review of the 103, 179  
 Omelet, the way to make an 218  
 Omnibuses wanted, improvements in 280  
 Ointment for hospital gangrene 404  
 Operatives, relief for English 393  
 Ordnance at the World's Fair, rifled 82  
 Ordnance contracts, report of the commissary department—guns and iron-clads 370  
 Ores, discovery of rich lead 373  
 Oyster-eaters, a hint to 392  
 Ox teams and horse teams 263

**P**  
 Paper and bread from the husks and stalks of Indian corn 230, 275  
 Paper for consumers to do? what are 294  
 Paper, consumption of 384  
 Paper for traveling artists, photographic 360  
 Paper from "cat-tails," a manufacture of 37  
 Paper from sorghum, manufacture of 371  
 Paper, how to make parchment 103  
 Paper stock! bring on the 394  
 Paper, the manufacture of printing 893  
 Papier-mache 248  
 Paraffine as an engine lubricator 8  
 Parliament, patronage of science and art by the British 54  
 Parliament, the members of the British 101  
 Passaic, a formidable vessel, the 284  
 Passaic, Ericsson's iron-clad 347  
 Passaic, experimental firing of the big gun upon 334  
 Passaic on trial, the 377  
 Past and present, the 407  
 Pastime, parlor 5  
 Patent Office, business at the 214  
 Patent Office, Canadian 27  
 Patent Office examiner, death of a 233  
 Patent Office, slackness at the 329  
 Patent, a floral 1294  
 Patent, a profitable 91  
 Patent business in 1860 and 1862. 331  
 Patent laws, an address on the 388  
 Patent laws, Sir David Brewster on the 329  
 Patent laws, the British 4  
 Patent laws, the new amendments to the 9, 10  
 Patent, revival of an expired British 76  
 Patent, specification of an ancient 243  
 Patent in England, a fine 239  
 Patents secured through our agency, seventeen thousand 284  
 Patents, the sale of English 342  
 Patents, value of little 296  
 Patented articles, stamping 281  
 Peacemaker, a fine 239  
 Peaches, to preserve 166  
 Pears in San Francisco, large 340  
 Pelican, a large 16  
 Penetration, power of 104  
 Pensacola and the navy yard 294  
 Pensons at Washington, applications for 402  
 Pensions for scientific labors 115  
 Petrification, curious 323  
 Petroleum 20, 37, 52, 68  
 Petroleum as a lubricator 342  
 Petroleum as fuel, experiments with 310, 329  
 Petroleum at Liverpool, experiments with 168  
 Petroleum at Oil City, the price of 343  
 Petroleum business, activity in the 76  
 Petroleum, Canadian 27  
 Petroleum for oil-stones 300  
 Petroleum injurious to health? is 38  
 Petroleum is not coal-oil 185  
 Petroleum, refining 164  
 Petroleum, the exports of 147  
 Petroleum trade of Canada, the 304  
 Petroleum trade, the 84  
 Phosphorus for mice 192  
 Phosphorus is made, how 151  
 Phosphorus, new method of preparing 263  
 Photographic art a blessing to the world, the 89  
 Photographs of the organ of voice in action, stereoscopic 179  
 Photographs, the oldest existing 82  
 Photography and forgery 263  
 Photography, a new application of 101  
 Photography at the seat of war 247  
 Photography in the catacombs of Paris 5  
 Photography on Mount Blanc 213  
 Photography, rapid dry collodion 388  
 Photography, silver in 389  
 Pianos, Worcester's improvement in 36  
 Pickles, preparing winter 314  
 Pictures in natural colors, photographic 235  
 Pier at Hilton Head, S. C., the great 19  
 Pins 7  
 Pipes, mending water pipes 374  
 Pipes, tin 167  
 Pitch, petroleum 216  
 Plants consecrated to the heathen gods 87  
 Plants through their leaves, manuring 154  
 Plate, a great iron 171  
 Plate question in California, the armor 6  
 Plates and projectiles, science of iron 248  
 Plates and punching iron, penetrating armor 24, 70  
 Plates, another shooting trial at armor 66  
 Plates, extraordinary penetration of armor 201  
 Plates for ships' armor, English method of bending 277  
 Plates, most sensitive photographic 390  
 Plates, report on testing iron armor 177  
 Plates smashed with shells, armor 249  
 Plates, the manufacture of American iron 405  
 Plates, the resistance of swinging 182  
 Plates, the quality of iron 153  
 Plates, trial of Stafford's shot on armor 247  
 Plates, use of Bessemer metal for armor 247  
 Plowing in England, steam 391  
 Plows, trial of steam 202  
 Pneumatic Dispatch Company 168, 347  
 Poles, telegraph 198  
 Politicians and the war, the 282  
 Political and economic association of the American Institute 4, 53, 145, 213, 229, 259, 276, 293, 296, 309, 340, 356

Pores in the human body, the 208  
 Porthole, an impregnable 299, 305,  
 Post-office, the 137  
 Post-office department, the 870  
 Post-offices in Great Britain, transactions at 43  
 Post, the pneumatic 401  
 Potatoes and preserve them from rot, how to store 246  
 Potatoes, to keep sweet 118  
 Potatoes, what to do with diseased 211  
 Powder, the latest explosive 131  
 Power, compressed air 377  
 Power for shipping ports, water 88  
 Power, horse 276  
 Propellers, iron iron 138  
 Praying machine, a 202  
 Premiums of the American Institute 252  
 Preparations, naval 328  
 Prize-money is distributed, how 155  
 Problem, a scientific 3311  
 Projectiles, speculations on 230  
 Projectiles, the form and character of penetrating 408  
 Provision trade, Chicago 373  
 Pulu for mattresses, the 118  
 Pumpkins, some 347  
 Pumps, rotary 134, 166  
 Punched and dies, cast iron 248  
 Putty and paint, solvent for old 280

**Q**  
 Quarry, a Vermont marble 290  
 Quarries, ignorance of Welsh 330  
 Quartz-crushing and amalgamating gold 34  
 Quinces, sweet pickled 275

**R**  
 Rack, an india-rubber pen 295  
 Rags, put up your old 406  
 Rags, uses of woolen 113  
 Railroad, a safe 8  
 Railroad, Baltimore and Ohio 114  
 Railroad-building in Pennsylvania 19  
 Railroad in London, subterranean 147, 325  
 Railroad, New York and Erie 101  
 Railroad, oil region 356  
 Railroad, the Algiers and Bidah 165  
 Railroad, the Northern Pacific 36  
 Railroads, city 107  
 Railroads in England, street 330  
 Railroads in Michigan 290  
 Railroads, steam on city 122  
 Railroads, use of steam for city passenger 40  
 Railway in New Zealand, a remarkably steep 161, 310  
 Railways and crops, our 171  
 Rain in California, great fall of 113  
 Ram building in England, a Confederate 283  
 Ram, curious submarine 235  
 Read 377  
 Reaping machines and inventive genius, tribute to American 199  
 Reaping, mowing and thrashing machines, sales of 118  
 Rebellions in the United States, eleven 274  
 Receipts, valuable 20, 37, 53, 68, 85, 101, 123, 135, 154, 170, 181, 202, 218, 234, 251, 272, 277, 291, 306, 323, 346, 362, 378, 387, 402  
 Recruiting, cost of 322  
 Reforms in France, commercial 216  
 Reminiscences, interesting 59, 75  
 Remuneration of Captain Coles, the liberal 214  
 Report of the Commissioner of Patents, agricultural 211  
 Reservoir, filling of the great 137  
 Restlessness at night 327  
 Revenue of Great Britain, the annual 106  
 Revolvers for the King of Denmark, a pair of Colt's 227  
 Rice 371  
 Riches of India, mineral and jewel 68  
 Riches, our mineral 379  
 Rifle carry? how do you 315  
 Rifle, how to choose and keep a 298  
 Rifle manufactory, a new 148  
 Rifle sights, dead black for 150, 182  
 Roads, English common 59  
 Roanoke, defense of New York harbor by the rigate 347  
 Roanoke, present condition of the 362  
 Rudder, Raymond's jury 178

**S**  
 Safes, fire-proof 35  
 Salad, lobster 117  
 Sal-ammoniac, how to make 380  
 Salt and its offices 183  
 Salt basins of Nebraska, the 262  
 Salt, great shipments of 35  
 Salt-making—a successful invention  
 Salt manufacture of New York, the 83  
 Salts-of-silver, photography, and indelible ink 135  
 Salt-works, the Michigan 197  
 Salt-peter, manufacture of 138  
 Sandwich Islands, from the 74  
 San Francisco 187  
 Sanitary Association, the New York 404  
 Saturn, re-appearance of the rings of 122  
 Saw frames, balancing 22  
 Sawmills, fly-wheels of 7  
 Saxony—its mining schools and metallurgy 198  
 Scale-preventer, Schaul's boiler 136  
 Scales, enormous and wonderfully-accurate 184  
 School-books, the most common fault in 27  
 School in Russia 247  
 SCIENTIFIC AMERICAN Office, successful recruiting at the 122  
 SCIENTIFIC AMERICAN, six good reasons why every manufacturer, mechanic, inventor and artisan should become a patron of the 99  
 SCIENTIFIC AMERICAN to inventors and manufacturers, value of the 131  
 Screws, the pitch of machine 376  
 Sculptor, an American 266  
 Seaboard harbor, population and products of 154  
 Sea-sickness 332  
 Sea-water by the electric current, potabilisation of 43, 290  
 Seaweed in place of hair 252  
 Seeds, germinating powers of various 82  
 Sewage of cities, the 35  
 Sermon-extinguisher, patent 11  
 Sermons, money value of 171  
 Serpent caught at last, the sea 327  
 Sewing, hand and machine 21  
 Sewing machine business, the 105  
 Sewing machines in England 120  
 Sharpshooters 330  
 Sheep in England, a profitable sale of 151  
 Sheep, ravages of smallpox upon English 262  
 Sheep-shearing machinery 344  
 Shell, an efficient English 199  
 Shells, some curious facts about 99  
 Shields for guns, revolving 196  
 Shipping in British ports, annual amount of 147  
 Ships, a plain history of iron-plated 138

Ships, coating the hulls of iron 57  
 Ships for modern service, the proportions, form and dimensions of the several classes of war 292, 308  
 Ships for the South 259  
 Ships have done, what iron-clad 226  
 Ships, iron 115  
 Ships, new discovery on iron-clad 154  
 Ships-of-war, raising sunken 335  
 Ships, opinions about armor-clad war 169  
 Ships, John Scott Russell on iron-clad 134  
 Ships, shot-proof 104  
 Ships, the deviation of the compass in iron 107  
 Ships, trials of English iron-clad 281  
 Ships versus batteries, iron-clad 309  
 Ships? which are the best war 297  
 Ship-building, iron in 167  
 Ship-yards, our 376  
 Shoe factory at Beverly, steam 102  
 Shoes, machinery useful in making 243  
 Shop, do not despise the 258  
 Shootings, Irish 131  
 Shot, a singular 386  
 Shot-making, the discovery of 320  
 Shot, manufacture of 230  
 Shot, velocity of the Whitworth 51  
 Silver, a turnip-seed substitute for 304  
 Sirup, manufacture, sorghum 327  
 Skin, absorbing power of the human 405  
 Sleepers, iron 19  
 Smallpox 231  
 Societies, debating 298  
 Society, California State Agricultural 9  
 Soldiers, selection of 379  
 Soldier, the American 322  
 Soldiers, what to send to 288  
 Soles, water-proof 352  
 Sorghum and imphee culture 229  
 Sounds produced by electricity, musical 5  
 Soup, portable 401  
 Sponges 208  
 Springs, rise in the price of metallic 312  
 Stables, ventilation in 275  
 Stamps, postage 308  
 Stamp tax—important to inventors 284  
 Starch, how to make potato 325  
 Starch in England, manufacture of rice 69  
 Stars, the revolutions of the 387  
 Statistics, California 70, 115  
 Statistics, curious railway 378  
 Statistics of 1890, census 84, 101, 123, 131  
 Statue of Christopher Columbus at Genoa, the 123  
 Steamboat inspectors, annual convention of 295  
 Steamboat-propelling experiments 38  
 Steam expensively and with condensers, experiments with working 58  
 Steamer for the Italian Government, a large cupola war 355  
 Steamer sunk, a Confederate Scottish 274  
 Steamer, the Winans's cigar 342  
 Steamers on a Chinese river, English and American 232, 306  
 Steamship, double-screw 405  
 Steamship-building, new system of iron 19  
 Steamships of the Havre and New York line, new 375  
 Steamships, new plan for propelling 375  
 Steamers, new 74, 99  
 Steamers, new method of propelling 123  
 Steel, a French *savant* on the manufacture of 250  
 Steel, American 356  
 Steppes, the great Russian 307  
 Stockings for soldiers, a large contract for 214  
 Stone, how to harden soft 199  
 Stone, preservation of building 279  
 Stones, artificial precious 23  
 Stones instantaneous without burning, manufacture of artificial 345  
 Storehouse for petroleum in Liverpool, a fireproof 285  
 Stores, military 299  
 Storms, foretelling and telegraphing 104  
 Streets in London, the number of 204  
 Students at military drill 219  
 Subscribers say, what our old 375  
 Subscribers, to our 407  
 Sugar-cane trash as a material for paper 5  
 Sulfur, separating gold from 86  
 Sulfur, treatment of gold and silver 179  
 Sulphur in coal gas 391  
 Summary, miscellaneous 69, 85, 107, 122, 155, 171, 178, 218, 234, 290, 299, 274, 306, 353, 379  
 Sumner, Major-General 185  
 Supply and demand 361  
 Susquehanna, bridging the 213  
 Swords, manufacture of Damascus 41

**T**

Table for the conversion of avoirdupois ounces into Troy ounces, a 322  
 Tailors and the sewing machine, the Wick 119  
 Talents 301  
 Tanning, American improvements in 144  
 Target, running deer 69  
 Targets, curious results of experiments with shot on iron 3  
 Taxation in Dixie 242  
 Tax, rich monopolists shirking their 186  
 Tea and coffee, use of 405  
 Tea brands and their meaning 32  
 Tea into Russia, importation of 395  
 Teeth, our 230  
 Teeth set on edge 96  
 Telegram, a 71  
 Telegraphing in the Old World 64  
 Telegraphs, on the management of 235  
 Telegraph in Montreal, a fire-alarm 211  
 Telegraph, the Continental 329  
 Telegraph, the English needle 67  
 Telegraph, the London and Pekin 315  
 Telegraph, the new Atlantic 323  
 Telegraph, utility of the Morse magnetic 7  
 Temperature in various countries, extremes of 193  
 Tents, warming 406  
 Thallium, the new metal 256, 390  
 Thanks to our friends 74  
 Thebes, the city of 129  
 Thought, the value of a little 54  
 Tigers in Cochinchina, catching 80  
 Time at San Francisco and Boston, variation of 325  
 Times, impudence of the London 87  
 Times, what it costs to "read" the London 252  
 Time is money—recollect that! 342  
 Tin 106  
 Tinware, soldering 326  
 Tools, improved 350  
 Tools with which great men work, the 315  
 Toys, manufacture of elastic 323  
 Traction, a novel system of tug-boat 208  
 Trade, the importance of South American 218  
 Transit instrument in San Francisco, a new 311  
 Trap for killing rats, a novel 328, 400\*  
 Trees, transplanting 181  
 Troops, reduction of the term of service for the new Federal 53  
 Trout, new mode of catching 247  
 Truffle in France, disappearance of the

*Trusty*, the British floating battery 304  
 Tunnels, various 292, 295  
 Tunnel at Mount Cenis, the 216  
 Tunnel beneath the river Indus, a railroad 279  
 Type-setting machine, Alden's 121

**U**

Union, trial trip of the steamer 326  
 United States, facts proved by the war in the 3  
 United States in 1860, the industrial condition of the 89  
 United States, population of the 103

**V**

Valve, the safety 323  
 Varnish and whitewash 327  
 Varnish for zinc, on a black 21  
 Varnishes and cements, water-proof photographic 160  
 Varnishing picture frames 38  
 Vessel, a mammoth international steam ferry 306  
 Vessels, a contract to raise sunken 38  
 Vessels in the Charlestown navy yard, construction of 48  
 Vessels building at New York, iron-clad 279  
 Vegetables in Norway, rapid growth of 279  
 Vegetarians, facts for 310  
 Velocity of cannon balls in small-pore, the way the 201  
 Velocity of steam and air, under pressure, the 314  
 Vertebrate, a microscopic 404  
 Vessels for containing milk 220  
 Vessels-of-war, the destruction of iron-clad 391  
 Vessels, the condition of our iron-clad 298  
 Volcanos, choice 89  
 Volcano do, what a 368  
 Volcano in Iceland, a new 359  
 Volume, a few words to our subscribers on the closing 393  
 Volunteers and regulars 215  
 Volunteers, the number of New York 331

**W**

Wages in Great Britain and Ireland, agriculturalists' 34  
 Wagon for western prairies, the steam 54, 121, 132  
 War, relics of the 310  
 War upon England, effect of the American 231  
*Warrior*, the British iron-clad frigate 19  
 Waste in the army, shameful 290  
 Waste of cities 387  
 Waste, photographers' silver 273  
 Watches, the fuses of 70  
 Watchmakers, English and Swiss 310  
 Water, a ball resting on a jet of 54, 86, 150, 150  
 Water, boiling for 380  
 Water, congelation of 200  
 Water manufacture, fresh 294  
 Water, how San Francisco is provided with 342  
 Water in Brooklyn, daily supply of 230  
 Water in the Ohio river, depth of 219, 243  
 Waters of Lake Superior, clearness of the 234, 342  
 Water-works, Philadelphia 323  
 Websters, the last of the 295  
 Well, a whistling oil 144  
 Wells of Michigan, the salt 147  
 Wheels, turbine water 155  
 Wheeler, warren 280, 326  
 Whirlpool, the formation of the 134, 182  
 Whisky and newspapers 323  
 Whitewash, brilliant 67  
 Who to write to 364  
 Wick does not burn, why a lamp 360  
 Windage of balls, the 107  
 Wind—the vital current of the world 55  
 Wind, the woven 208  
 Winds and the late snow storm 345  
 Wine, American 343  
 Wine, a new method of manufacturing 53  
 Wine, how to make native 215  
 Wine, rules for making good grape 275  
 Wine, sorghum 371  
 Wine trade, the French 405  
 Wire, aluminum 196  
 Wire-cloth, manufacture of steel and brass 105  
 Wire-works, confagurations of 372  
 Women in London, condition of sewing 354  
 Workshops, a visit to our 297  
 Workshops have saved the army, our 40  
 Workshops, national 393  
 World in miniature, the 343  
 Wound, how to stop bleeding from a 338  
 Wrappers, self-sealing stamped newspaper 81  
 Writing machine? who will invent a new-

**Z**

Zoological 117

**PATENT CLAIMS.**

**A**

Action, pianoforte 300  
 Advertising, apparatus for panoramic 364  
 Album, photographic 108  
 Amalgamators for collecting gold and silver 108, 365  
 Angulometers, plane 173, 317  
 Ankle-support for skaters 140  
 Apple-parer 396  
 Armament of vessels, submarine 93  
 Armor for ships, metallic defensive 27, 71, 140, 205, 237  
 Asparagus plant, utilizing the products of the 269  
 Axle and reach for vehicles 349  
 Axles, attaching thills to 45  
 Axle-box for railroad cars 109  
 Axle for vehicles 76  
 Axle, warren 280, 326  
 Axles for wagons, machine for punching linchpin-holes and cutting off the journals of 173  
 Auger 237  
 Auger handle 157  
 Awning 157

**B**

Bags, machines for holding and filling 188, 205, 316  
 Balances, spring 76, 333  
 Band and skirt-hoop attachment 157  
 Band, elbow-joint 349  
 Band for machinery, driving 125  
 Barometer, mercurial 333  
 Barrel-head circling and beveling machine 28  
 Barrels of beer and other liquids, apparatus for giving vent to 140

Basket and crate, fruit 300  
 Bats, various 300, 333  
 Battery, platoon 220  
 Batteries, apparatus for operating submarine 285  
 Batteries, mode of operating submarine or floating 332  
 Bayonet-guard, removable 124  
 Bayonet, sliding 44  
 Bed and knapsack, atmospheric air (combined) 270  
 Bed, camp 316  
 Bed, spring 348  
 Bed-bottoms 44, 205, 409  
 Bedstead 237  
 Bedstead, folding metallic 410  
 Bedsteads, hospital 45, 188, 253  
 Bedstead, lounge and chair (combined) 205  
 Beehives 45, 77, 124, 125, 141, 188, 301, 364, 396  
 Bells and burglar's alarm, door (combined) 12  
 Bell for doors, alarm 205  
 Belt-shipper 300  
 Bins, grain 411 (2)  
 Bit for taming horses 45  
 Bits or augers in their stocks or handles, method of fastening 381  
 Blacking or polish, stove 333  
 Blasting by electrical currents 317  
 Blind and shutter fastening 269  
 Blind fastening, window 269  
 Blocks, building 140  
 Blocks, bush for the sheaves of tackle 12  
 Boards, machine for edging and slitting 140  
 Boat, shallow-water 125  
 Bobbin 316  
 Bobbins of throstles for spinning machines 141  
 Boiler-leader 173  
 Boiler 236  
 Boilers, covering steam 173  
 Boilers, feed regulator for steam 11  
 Boiler for culinary purposes 253  
 Boilers, device for removing incrustations from steam 28  
 Boilers of cinders, relieving steam 61  
 Boilers, self-regulating apparatus for feeding steam 172  
 Boilers, steam 44, 93, 109, 172 (2)  
 Bolster for spinning frames 380  
 Bolts 108  
 Bolts, four 93, 173  
 Boot-jack 332  
 Boots 189  
 Boots, fastening for gaiter 189, 222  
 Boots and shoes 12  
 Boots and shoes and polishing the same, machine for attaching heels to 269  
 Boots and shoes, apparatus for cleaning and polishing 204  
 Boots and shoes, coating guard for 125  
 Boots and shoes, device for protecting the soles of 189  
 Boots and shoes, machine for forming, smoothing and polishing the heels of 108  
 Boots and shoes, machine for preparing heels for 253  
 Boots and shoes, machine for sewing soles to 204  
 Boots and shoes, machine for nailing on the soles of 221  
 Boots and shoes, machine for pegging 172, 411  
 Boots and shoes, metallic heels for 44  
 Boots and shoes, wooden soles for 300  
 Books for a continuous sheet of paper, machine for making the leaves of 300  
 Books in the round, machine for cutting 13  
 Bottles, attaching labels to 237  
 Bottle-stoppers 125, 172  
 Boxes for attaching cases 285  
 Boxes, draught attachment for lamp 188  
 Boxes for axles, shafts, &c., coating the bearings of 93  
 Boxes, journal 285  
 Boxes to wheel hubs, &c., securing 205  
 Brace-jaws for steam boilers, machine for making 333  
 Braces, securing bits in 12, 237  
 Braiding machine 157  
 Brake for wind wheels 156  
 Brake, hemp 265  
 Brake, self-acting wagon 317  
 Brake, sleigh 411  
 Brakes, railroad car 13, 29, 93, 108, 221, 409 (2)  
 Bread, manufacture of aerated 140  
 Breech (iron) randa, elastic 396  
 Breeding when Indian corn is used 44  
 Brick and tile machine (combined) 61  
 Brick, machinery for pressing 13  
 Brick machines 11, 286, 300  
 Brick, manufacture of fire 141  
 Bridges, mode of constructing, setting and removing 269  
 Brooms 44  
 Brush, hair 157  
 Brush, paint 365  
 Brush, scrubbing 173  
 Brush, whisk 253  
 Bucket and measure (combined) 269  
 Bucket, chamber 61  
 Buckle 410  
 Buckle, harness 157  
 Bullets, elongated 411  
 Bullet for small arms, compound 141  
 Bullets, machine for making elongated 13  
 Bung-cutter 29  
 Bung for oil casks 221  
 Burners for coal-oil lamps 45, 92  
 Burner, kerosene lamp 27  
 Burners, lamp 61, 77, 157, 189 (2), 205, 300 (2), 396  
 Burners, self-generating vapor 204  
 Burners, vapor 220  
 Bustles, fastening hoop ends in tabs of 226  
 Buttonhole-cutter 411  
 Buttonholes, apparatus for piercing cloth for 254

**C**

Cable-stopper 410  
 Cable, telegraph 270  
 Cables, apparatus for working and stopping chain 125 (2)  
 Camel, marine 301  
 Camera, multiplying 13  
 Camera, lens for photographic 12  
 Candle-molding machine 317  
 Can for fluids 141  
 Can or tank for coal oil 221  
 Cans for oils, varnishes, &c., 141, 189  
 Cans for preserving fruits, &c., 92, 157, 349  
 Cans, preserving vegetables in hermetically-sealed 173  
 Cannon, device for firing 351  
 Canteens 284, 332  
 Cap 237  
 Caps, army and navy 173  
 Cap for collar screws 284  
 Card-holder 172  
 Card, reading 157  
 Carpets, machinery for sizing the backs of 301  
 Carpet-stretcher 141  
 Carriage on malleable bed for forming and planing machines 348

Carriage, street railway 140  
 Carriage, submarine 188  
 Carriage tops and backs, shifting 237  
 Carriages, fifth wheel of 173  
 Cars, construction of railroad 316  
 Cars, ventilating railroad 237  
 Cars, warming passenger 12  
 Cartridge, metallic 76  
 Cartridge, patched 76  
 Cartridge, solid 124  
 Cartridges 28, 93  
 Cartridges waterproof, rendering 28  
 Carriage retractor for breech-loading fire-arms 110  
 Cart, self-weighting 270  
 Case, clock 125  
 Case, physicians' prescription 300  
 Cask, sheet metal 141  
 Cask, water-tight 141  
 Casters, furniture 348, 381  
 Casters, glass table 45  
 Cast-iron, artificial 409  
 Cement for slate roofing 29  
 Chair, folding 108  
 Chair, railroad 396  
 Chair, reclining 126  
 Chair, spring-back 44  
 Chamfering and crozing machine (combined) 141  
 Chenille, machinery for manufacturing 93  
 Cherries, machine for stoning 285  
 Chest and table for bread-making (combined) 316  
 Chimney-cleaner, lamp 92  
 Chimney fastenings, lamp 317, 410  
 Chimneys, attachment to lamp 12  
 Chimneys for lamps, mica 28, 157  
 Chimneys, lamp 76, 157  
 Chimneys, spring catch for lamp 13  
 Churns 12, (3), 15, 140 (2), 172, 189, 316, 317, 364, 381, 409 (2)  
 Cigar machine 29  
 Clamps in the manufacture of matches, tapers, &c., machine for filling dipping 221  
 Clasp for harness tugs 108  
 Clasps to hoop skirts, apparatuses for attaching 333, 410  
 Cleaner for lamp chimneys 269  
 Cleat for boats, belay 300  
 Cloak, tent, bed &c. (combined) 285  
 Clock, watch 44  
 Clock, ice 333  
 Cloth, machinery for fulling 108  
 Cloth, manufacture of figured rubber 103  
 Cloth, machine for dressing and drying woolen 60  
 Clothes-dryers 28, 156, 300  
 Clothes-dryer window 77  
 Clothes for cleaning gloves 28  
 Clothes-wringers 12, 13, 27, 28, 29, 60, 77 (2), 93, 221  
 Clothes-wringer and mangle (combined) 29  
 Clothes-hanging apparatus 285  
 Coals, 12, 149, 285  
 Coating for oil barrels and casks 351  
 Cock for pumps, blow-off 157  
 Cock, two-way stop 156  
 Coffee-roasters 44, 365  
 Coffin, ventilating 285  
 Colors, producing aniline 189 (2)  
 Collets, machine for revolving extensions (combined) 397  
 Columns, shafts, braces, &c., construction of 11  
 Compass, mariners' 205  
 Composition for blasting powder 409  
 Composition for cleaning painted wood-work, stone, &c., 189  
 Composition for concrete pavements 188  
 Composition for covering projectiles 140  
 Composition for filling shrapnel and other similar projectiles 13  
 Composition for sizing for use in the manufacture of floor cloths, &c., 316 (2)  
 Composition for treating vegetable paper 308  
 Composition, lubricating 44 (2)  
 Composition substitute for horn, hard rubber, &c. 204  
 Compound, hard rubber 12  
 Confectionary, machine for making 269  
 Condenser for coal-oil stills 204  
 Condenser for steam engines 141  
 Condensers, surface 174, 317  
 Cooking apparatus 409  
 Copper manufacture of sheet 317  
 Cord-tightener for curtain fixtures 125  
 Cork-cutting machine 76  
 Corn, device for husking 188  
 Corn-shellers and cleaners (combined) 44, 300  
 Corn-shellers 12, 76  
 Corset 172  
 Cot, hammock 316  
 Coupling, belt  
 Couplings, car 61, 108, 157 (2) 172, 188, 189, 301  
 Coupling, friction 332  
 Couplings, hose 205 (2), 381  
 Coupling, shaft 141  
 Covers of ink-wells, fastening the 409  
 Covers to vulcanizing flasks, fastening 60  
 Crates and chairs (combined) 125  
 Cranberries for preservation, putting up 397  
 Crane, hoisting 269  
 Crank for driving sewing machines and other machinery 157  
 Crisps for horses 172  
 Crutch, 301  
 Crystal, machines for cutting 237  
 Cultivators 27, 28, 29, 93, 108, 109, 140 (2), 141, 269, 300, 316, 333, 348 (3) 349, 361, 365, 381 (5), 409  
 Culvert 221  
 Cup, drinking 44  
 Curry-comb 301  
 Curtain fixtures 45, 189  
 Cushions for shuttle-boxes 60  
 Cushion to prevent sunstroke, head 28  
 Cushions, lining billiard 61  
 Cut-off for hydrants 173  
 Cutter for sugar-cane, &c., 125  
 Cutter, hay or feed 173  
 Cylinder for polishing gunpowder 173

**D**

Dam 188  
 Dampers 285  
 Desk, writing 45  
 Detector, counterfeit coin 61  
 Detector, low water 301  
 Die for cutting beveled soles for boots and shoes 76  
 Die for forming hats 349  
 Ditching machines 29, 236  
 Dirt-scraper 94  
 Dome 12  
 Dome or cupola, shot-proof 348  
 Doors and gates, weight and lever attachment for 108  
 Door-knobs to their spindles, mode of fastening 77, 92  
 Door-plate and card-receiver (combined) 204  
 Door, fastening for chamber 253  
 Dough under pressure, apparatus for measuring out and discharging 61  
 Drag and cultivator (combined) 348  
 Drawbridge, self-acting 44

Dress, millstone 61  
 Dress protector 125  
 Drill, hand 140  
 Drills, grain 13, 253, 365 (2)  
 Drills, seed 13, 253  
 Dust-moons connected with machines for picking cotton, &c. 156  
 Dye, hair 61

**E**

Egg-beater 109  
 Elevator, floating grain 141  
 Elevators, hay 77, 253  
 Elevators, water 11, 45, 77, 124, 141, 173 (2), 188, 204, 316  
 Electrical instrument for medical purposes 157  
 Engine, carding 349  
 Engine, condensing steam 397  
 Engine, oscillating steam 348  
 Engine, pumping 125  
 Engine, water 204  
 Engines, automatic stop motion for steam 300  
 Engines, circulator for steam 12  
 Engine for city railroads 189  
 Engines, hot-air 108, 365  
 Engines, method of heating feed-water for steam 29  
 Engines, rotary 13, 140  
 Engines, steam 60, 350, 396  
 Envelope for sewing needles 12  
 Envelope, picture 61  
 Escapement, chronometer 284  
 Evaporating by means of steam, apparatus for 172  
 Evaporators for saccharine juices or liquids 108, 333 (2), 349  
 Evaporators for saccharine juices, portable 61, 173  
 Evaporators, sugar 124, 141, 221, 237, 301  
 Excavator, submarine 189  
 Extractors, stump 60, 157, 253, 285 (2)  
 Eyelinet machines 93, 141

**F**

Fabric for hats and bonnets 125  
 Fabric for roofing 221  
 Fabric, manufacture of palm-leaf 411  
 Fabric, water-proof 61  
 Fabrics, machines for manufacturing water-proof 61  
 Facot for wrought-metal cannons, hydraulic pumps, &c. 409  
 Faucet, 221  
 Feathers, machine for dressing 44  
 Fence, 269  
 Fence, field 300  
 Fence for sheep-folds 285  
 Fences, portable 11, 45, 156, 381  
 Feters, animal 108  
 Figures, automatic apparatus for walking 77  
 File, paper 141  
 Finger for harvesters, guard 317  
 Fire-arm 108  
 Fire-arm, repeating 28  
 Fire-arms, breech-loading 28, 93 (2), 221, 237, 253, 285, 300 (2), 316, 333, 348, 349, 351, 396  
 Fire-arms, cap-priming attachment to 45  
 Fire-arms, magazine 108, 141, 189  
 Fire-arms, revolving 12, 13, 108, 236, 333, 365, 381, 397 (2), 410  
 Fire-escape 109  
 Fire regulator for steam boilers 126  
 Flax for cast-iron pipes 396  
 Flax and hemp, machinery for dressing 29 (2), 124, 221, 285 (2)  
 Filers, spinning 205, 236, 333  
 Flocks, machine for cutting 284  
 Flour, apparatus for filling sacks with 109  
 Foot, preserving articles of 411  
 Footlights for theaters, mode of constructing and arranging 28  
 Foot-warmer 92  
 Forceps, tubular 381  
 Forms, machines for turning irregular 92, 125  
 Frame, bonnet 92  
 Frame, cheese 411  
 Freezers, ice-cream 300, 348  
 Frilling and crimping, machine for 396  
 Fruit and vegetables, mode of preserving 12  
 Fruit-gatherers 29, 188, 332  
 Fuel, artificial 173  
 Funnels, pendent measuring 12  
 Furnace for coal-oil stills 61  
 Furnace for roasting ores and for other purposes 365  
 Fuses for explosive shells 109 (3), 188  
 Fuses for explosive shells, concussion 12 (157, 221, 253 (2))  
 Fuses for explosive shells, time and concussion (combined) 77, 141, 253, 317  
 Fuses, machinery for manufacturing safety 397

**G**

Gage, carpenters' bench 365  
 Gage for carriage axles 365  
 Gage for sewing machines, folding and sucking 27  
 Gages, steam 76, 173, 253  
 Gas, apparatus for carbureting 108  
 Gas, making illuminating 12, 29, 60, 108, 157, 270, 410  
 Gas, portable apparatus for manufacturing illuminating 125  
 Gate for water-courses, stock 12  
 Gates 28, 317, 409  
 Gates, devices for closing 285, 381  
 Gear for steam engines, variable cut-off 397  
 Generators, steam 12, 76, 172, 205  
 Gin, cotton 316  
 Globes, school 204  
 Gold and silver, machines for amalgamating fine particles of 253  
 Governors, centrifugal 12, 270, 397  
 Grain-binder 411  
 Grain-cleaning machines 157, 285, 396  
 Grain, device for spreading 92  
 Grain, mode of sifting and bagging 141  
 Grain, scouring and cleaning 237  
 Grain-winner 173  
 Grate 125  
 Grate-bars 124  
 Grate for coal stoves and furnaces 365  
 Grate for burning petroleum and other liquid fuel 317  
 Grates, stove 109, 285, 365  
 Grubbing machine 109  
 Guard or key, watch-chain 301  
 Guide for sewing machines, braiding 333  
 Guide for sewing machines, felling 93  
 Gun, centrifugal spring 365  
 Gun, repeating 397  
 Gun, revolving battery 332  
 Guns in revolving towers by electricity, discharging 61  
 Guns, riding of 254  
 Gun-stocks, machines for making 44  
 Gutters to buildings, mode of sustaining 333

**H**

Halter, bridge 92  
 Hames, adjustable 16  
 Hammers 77, 204, 392  
 Harness for looms 140  
 Harness, slide for breast-straps for 13

Harrow and seed-drill (combined) 301  
 Harrows, seed-sowing 348  
 Harrows 45, 188, 285, 397  
 Harvesters 29, 45, 60, 61 (3), 77, 92, 93 (2), 103, 109 (2), 157, 205, 221, 316 (2), 317, 332, 397 (2)  
 Harvesters, corn 77, 92, 109, 285, 333  
 Harvesters, cutting apparatus for 397  
 Hat 172  
 Hats, apparatus for pressing and ironing 93  
 Hay, machine for spreading and turning 316  
 Hay, machines for loading and pitching 156, 365  
 Heater, 13, 390, 391  
 Heater and ventilator for tents (combined) 396  
 Heater, condenser and filter (combined) 105  
 Heater for lamp chimneys 253  
 Heater for railroad cars 109  
 Heaters or boilers, vulcanizing 140  
 Heaters, sad iron 156, 350  
 Heating apparatus, feed-water 299  
 Heating apparatus, steam 108  
 Hemp and flax for carding, machinery for preparing 237  
 Hedges, machines for trimming 109, 205  
 Hinge for shutters 333  
 Hinges, butt 333, 365  
 Hoe 12  
 Hoisting machines 381, 409  
 Holdbacks for carriages 188, 205  
 Holder for bills, notes, &c. 301  
 Holder for lamp shades 253  
 Holder for pens, pencils, &c. 285  
 Holds of ships, vessels, &c., extinguishing fire in the 237  
 Hook and terret for harness saddles 157  
 Hook for fastening garments, spring 349  
 Hook, snap 92  
 Hoops, sail-link to mast 13  
 Hopper of a machine for sowing grain, &c., broadcast 92  
 Hopper-boy for flour mills 253  
 Horsepower, circuit 173  
 Horsepower, endless chain 189  
 Horsepowers 45, 93, 221, 253  
 Horseshoe 93  
 Horseshoes, machines for making 44, 109, 189, 204, 221, 397  
 Hounds and fish wheel (combined) 27  
 House, portable 300  
 Hub for vehicles 189  
 Hubs, machines for boring 253  
 Hulling machine 188  
 Hydraulic apparatus 204

**I**  
 Ice, hoisting and shipping 125  
 Illumination 296  
 Instruments, operating swells in musical 301  
 Iron, steel, &c., process of electroplating 301

**J**  
 Jacks, lifting 13, 140, 237, 253, 397  
 Jar for provisions, &c. 125  
 Jars, fruit 269, 333, 365  
 Joints, artificial knee 409  
 Joint fastenings for railroad rails, machines for making 316  
 Joint for ribs of umbrellas and parasols 157  
 Joints, mode of securing railroad 12  
 Journal and journal-box 221  
 Juice, apparatus for evaporating and de-fecating sorghum 221  
 Juice of apples, grapes, &c., expressing the 77  
 Juices of fruits, concentrating and pre-serving for use cider and other 92  
 Juice, portable apparatus for evaporating saccharine 77

**K**  
 Key and corkscrew for bottle fasteners 237  
 Kettle, tea 60  
 Kiln, charcoal 125  
 Kiln for drying lumber 28  
 Knife handle 157  
 Knife, shoe 411  
 Knives, pocket 173, 270  
 Knitting machine, circular 93  
 Knitting machines 141, 189 (2)

**L**  
 Ladder apparatus, fire 12  
 Lamp, fountain 76  
 Lamp, incandescent 253  
 Lamp, kerosene 189  
 Lamp-top 157  
 Lamps 13, 93, 94, 141, 157, 189, 205, 220, 221, 285 (2), 397, 409  
 Lamps, coal-oil 11, 156, 189, 301, 397  
 Lamps, kerosene 141, 410  
 Lamps, lighting apparatus 29  
 Lamps, mode of removing chimneys and filling 27  
 Lamps, railroad 172, 269  
 Lantern, coal-oil 189  
 Lantern, kerosene 141  
 Lantern, signal 396  
 Lanterns, 45, 61, 332  
 Lard, apparatus for cooling 410  
 Laths, shoe 222, 409  
 Latch, gate 381  
 Latches, door 156, 301  
 Lathes, watchmakers' 332, 364  
 Leather, machines for pebbling or embossing 157  
 Leather-splitting machine 61  
 Legs, artificial 28, 29, 92  
 Letters, addressing 204  
 Level, spirit 348  
 Lighter, Döbereiner hydrogen 365  
 Lining for coal-oil casks 221  
 Link, adjustable 125  
 Link for horsepowers 189  
 Linsed, &c.-machine for crushing 317  
 Liquids, apparatus for defeating 13  
 Liquids, apparatus for evaporating saccharine 249, 365  
 Liquids, evaporating saccharine 28  
 Liquids lighter than water, apparatus for burning 349  
 Lock for mail bags, seal 76  
 Lock, pad 205  
 Lock, sash 12  
 Locks 77, 109 (2), 125 (2), 156 (2), 237, 285, 348, 349 (2), 364, 410  
 Logs and timber, mode of rafting 316  
 Loom for weaving wire-cloth 189  
 Looms 92, 94, 109, 141, 237  
 Looms, harness motion of power 300  
 Looms, take-up motion for power 333  
 Lubricator for scroll saw stocks 301  
 Lubricator for steam engines 396  
 Lubricator, railroad journal 140  
 Lubricators 300, 409

Masts and rigging 77  
 Matches, manufacture and packing of friction 365  
 Mattress 29  
 Melodeon 29  
 Measure, funnel 125  
 Measure, rotary disk 351  
 Meat-choppers 237, 397  
 Meat-mincing machine 157  
 Meats, apparatus in smoking 11  
 Meats, salting 301  
 Metals, machines for planing, milling and cutting 301, 270, 317  
 Meter, fluid 61  
 Meters, water 156, 300  
 Milk, apparatus for concentrating 189  
 Mill, cider 45  
 Mill, convertible apple 141  
 Mill for metals, boring 125  
 Mill, fanning 12  
 Mill, felling 105  
 Mill, gig 237  
 Mill, spike 237  
 Mills, grinding 253, 317, 348  
 Mills, sugar-cane crushing 140, 236  
 Millstones, balancing 103  
 Millstones, machines for dressing 77, 300, 316 (2)  
 Mirror for attachment to a window, &c. 92  
 Mittens 61  
 Molds for casting metals 364  
 Molds for casting plow-shares 44  
 Molds for shot and shells, forming 29  
 Mop-head 93  
 Motion, converting 77 (2)  
 Movement, clock and watch 125  
 Mowing machine 333

**N**  
 Nail machine 270  
 Nails for horse-shoes, machine for making 410  
 Needles into paper, machine for sticking 44  
 Needle-making sewing machine 204 (2)  
 Netting to windows, mode of applying 44  
 Nets, machine for making seine 236  
 Night-soil, treating 204  
 Nitrate of potash from nitrate of soda, manufacture of 93  
 Nozzle for hose and pipes 286  
 Nuts, machine for making 301

**O**  
 Oil, apparatuses for testing coal 221, 317  
 Oil from pigs feet, extracting 141  
 Oils, apparatus for gassing and burning carbon 125  
 Oils as fuel, apparatus for burning mineral 316  
 Oxide of zinc for use in paints, preparation of white 205  
 Ordinance, apparatus for casting 77  
 Ordinance, breech-loading 12, 13, 61, 109, 173, 204  
 Ordinance, device for indicating the elevation of 109  
 Ordinance, mounting 172, 221  
 Ordinance, operating 301  
 Ordinance, revolving 108, 140, 253  
 Ores and amalgamating the precious metals, apparatus for grinding 94  
 Ores and minerals, process of calcining 205  
 Ornaments used for pictures and mirror frames, architectural purposes, &c., device for cutting up composition 205  
 Oven for re-burning bone-black 157  
 Oven 27

**P**  
 Packing for piston and valve rods 28, 108  
 Packing for rotary pumps 381  
 Packing for steam engines 350  
 Paddle, pendulum 140  
 Pad, truck 93  
 Panels to wooden frames, constructing and attaching iron 205  
 Pans for saccharine liquids, evaporating 61, 333  
 Pantaloon, attaching straps to 12  
 Pantographic reversing instrument 156  
 Paper-cutting machine 12  
 Paper-folding machine 29  
 Paper, machine for folding and stitching 205  
 Paper, trimming wall 44  
 Pegging machine 44  
 Pegging machine, hand 140  
 Pegs, preparation of shoe 77  
 Pencil 333  
 Penholders 236, 365  
 Penny 109  
 Petroleum and other oils to produce a vehicle for paints and varnishes, treating 205  
 Petroleum, apparatus for distilling 221  
 Petroleum for the manufacture of illuminating gas, preparing 220  
 Photographs, apparatus for producing vignette 61  
 Pliers, forceps 28 (2), 44  
 Picks, handle for millstone 141  
 Pictures, &c., machine for rolling photographic 109  
 Piers for bridges, &c., mode of building 237, 201  
 Pile for railroad rails 317  
 Pile of fagot for shoe-rails of gun-carriages 156  
 Pin 173  
 Pin, clothes 204  
 Pins, shawl 108, 332  
 Pipe, machine for molding cement 28  
 Pipe, steam or hot-air 140  
 Pipes, tobacco 92, 125, 396  
 Pistons for force pumps 300, 349  
 Piston for steam engines 29  
 Pitchfork, horse 349  
 Plane 29  
 Planing and matching machine combined 343  
 Planing machine, metal 125  
 Planter, hand corn 317  
 Planters, corn 60, 61, 92, 109, 124, 188, 253, 301  
 Planters, seed 29, 44  
 Plants, machinery for separating fibers from 23, 397  
 Plates, apparatus for cutting tined implements from metal 380  
 Plates, manufacture of corrugated 205  
 Plate, stereotype 108  
 Plates, machine batteries, means of affixing defensive armor 381  
 Pliers for closing shirt clasps 27  
 Plow and gun (combined) 12  
 Plow beam 220  
 Plow, cultivator 349  
 Plow point 220  
 Plowshare 92  
 Plowshares, machine for forging, bending and shaping 286  
 Plow, sub oil 77  
 Plows 108, 125, 140, 237, 300, 381  
 Pocket, safety 29  
 Potato-diggers 205, 285, 409  
 Potatoes, machine for planting 284  
 Pot for refining sugar, drip 396  
 Powder, blasting 269  
 Power for churning 60  
 Power, motive 236, 397  
 Power to produce a reciprocating movement, application of wind 125  
 Preserver, corpse 316

Pressing-house 93  
 Press, baling 173  
 Press, cheese 60  
 Press, chop 221  
 Press, engraved plate printing 301  
 Press, foot 221  
 Press for stamping tickets, &c., 316  
 Press, hay 77  
 Press, hay and cotton 77  
 Press, hay and hemp 237  
 Press, tobacco 301  
 Presses, printing 332 (2)  
 Pressboard-holder, tailors' 285  
 Printing, application of photography to 317  
 Priming, method of preventing steam from 172  
 Projectile 45  
 Projectile, compound explosive 285  
 Projectiles, application of soft metal packing to 220  
 Projectiles for ordnance, explosive 173, 333  
 Projectiles for rifled ordnance 60 (2), 125, 316  
 Projectiles from smooth-bored ordnance, rotating 103  
 Projectiles, giving rotation to ordnance 103  
 Projectiles, mode of discharging 11  
 Propeller, cantering 140  
 Propeller, canal-boat 237  
 Propeller for land conveyance 380  
 Propeller, marine 221  
 Propeller, tree and plant 301  
 Pulley, friction 61  
 Pump, cattle 156  
 Pump, cream 237  
 Pump for low-pressure steam engines 205  
 Pump, reciprocating 11  
 Pump, 12, 28, 45, 60, 77, 109, 270, 285, 300, 317, 332 (2), 381  
 Pumps, instrument for reaming out the barrels of ships' 270  
 Pumps, rotary 12, 236, 353 (2), 348  
 Pumps, steam 93, 270, 333

**Q**  
 Quartz-crusher 381

**R**  
 Rack book 410  
 Rack, hay and grain 269  
 Rack, port 45  
 Rack, portable and convertible sheep 348  
 Radiator 124  
 Railroads, mode of constructing and applying rails to 76, 205  
 Railways 253  
 Rakes for harvesters 13, 410  
 Rakes, horse 11, 109, 172, 205, 343, 349, 356, 350, 381  
 Ram, steam marine 204  
 Ratan machinery 61, 109 (2) 110  
 Reel, hose 205  
 Reel, lamp 11, 156, 188  
 Refrigerators 172, 183  
 Register, hot-air 92  
 Registers, grain 109, 253  
 Rein-guard for horses 349  
 Regulator, fire-damper 157  
 Regulators, gas 173, 183, 364  
 Reservoirs for lamps, placing 110  
 Retainers for hydraulic presses 77, 172  
 Retorts, gas 124, 125  
 Rice, cleaning 409  
 Riffing machines 397 (2)  
 Rigging and spars of ships and other navigation vessels 221  
 Rings, spermatorrheal 173, 410  
 Rocket, war 93  
 Roller for washing machines 222  
 Roller, field 188  
 Roofing, machines for seaming metal 253  
 Roofing, tile 156  
 Roots, machine for cutting 92  
 Rope to fiber, machinery for reducing 124  
 Rudder 125  
 Ruler, parallel 60

**S**  
 Sabot for feathered projectiles 93  
 Saddle 348  
 Saddle, riding 204  
 Saddles, harness 13, 189  
 Sad-iron 410  
 Sail, fan-shaped 125  
 Sail for ships and other navigable vessels 221  
 Sail, gaff 93  
 Sail, apparatus for the manufacture of 156  
 Sash-fasteners 45, 109, 237, 397  
 Sausage-filers 157 (2)  
 Sawing, boring, molding and planing machine (combined) 109  
 Sawing machine adapted for the use of the auger and chisel 205  
 Sawing machine, gig 29  
 Sawing machine, hand 45  
 Sawing machines 157, 301  
 Sawmills, headblocks for circular 237  
 Saw, self-setting head-block for 28  
 Saw gear 301  
 Saw scroll 60  
 Saws, machine for filing 92  
 Saws, machine for gumming 381  
 Saws, machine for setting and upsetting 365  
 Scabbard for bayonets, steel 156  
 Scale-beam 332  
 Scale, platform 285, 349  
 Screen for separating oats from wheat 109  
 Screen, grain 301  
 Screen, metal 365  
 Screen, sand 125  
 Screws, machine for shaving and nicking the heads of wood 77  
 Screws, machine for threading wood 141  
 Scythe snaths, nibs for 45  
 Seat and back for chairs 109  
 Seed-coverer for grain drills 172  
 Seed-dropping device, hand 285  
 Seeding machine, broadcast 349  
 Seeding machines 13, 44, 93, 124, 140, 237 (2), 285  
 Separators and smut machines 316 (2)  
 Separators, grain 12, 28, 29, 221, 269, 285, 332, 358, 409 (2)  
 Settee for railroad passenger cars 188  
 Sewing machines 124, 140, 157, 204, 253, 269, 348, 349  
 Sewing machines, fan attachment to 237  
 Shackle or handcuff 110  
 Shad-bait lamp 13  
 Sharpener, knife and scissors 13  
 Shave, boot-heel 109  
 Sheet-metal for eaves-troughs, connecting 333  
 Shell, compound explosive 285  
 Shell, or projectile, liquid-fire 350  
 Shells, exploding devices of 12, 221  
 Shield for riflemen, portable 316  
 Shield for surface condensers 317  
 Shingles and other lumber, machine for sawing 61 93  
 Shot, chain 29  
 Shot, explosive canister 317  
 Shoulder-stick for finishing boot and shoe soles 172  
 Shuttle, weavers' 12  
 Sieves for gas purifiers, wooden 301, 337  
 Sifting machine 173  
 Sight for ordnance, adjustable 397  
 Sight for rifles, back 316

Silver from waste solutions, apparatus for saving 61  
 Skate fastening 221  
 Skates 29, 157, 236, 269, 317, 349, 397, 410  
 Skirt, axle 28  
 Skirts, skeleton 44, 61, 110, 189, 285, 365  
 381  
 Slats, device for holding blind 365  
 Sleeve-fastener 29  
 Sling or carrier, coat 381  
 Smut machines 172, 173, 237  
 Snap-dragon 189  
 Snuffers for lamps 253  
 Soap, manufacture of 172, 237, 286, 301  
 Socket for auger handles, shank 61  
 Soda-cutter 157  
 Sofa and vessel-berth (combined) 205  
 Sounding instrument 141  
 Sower, broadcast 124  
 Spark-arrester 270  
 Speed in machinery, device for changing 29  
 Spindles, mode of tightening followers to mill, 365  
 Spinning-rolls, covering 156  
 Spirits, treating ardent 77  
 Splice, railroad 397  
 Splint, surgical 12  
 Spokes, machine for cutting tenons on wheel 397  
 Spring, air 236  
 Spring, carriage 156  
 Spring for car trucks 108  
 Springs, railroad car 109, 317  
 Square, trying 365  
 Staff, millers stone 220  
 Stamp, hand 125  
 Stand-head for crushing ores 173  
 Standard, wagon 44  
 Stand, camera 7  
 Stand, flower 397  
 Stave-dressing machines 28, 93, 300  
 Steam-generating apparatus 284  
 Steel, apparatus for hardening strips of 157  
 Steering and propelling apparatus (combined) 28  
 Steering apparatus 220, 364  
 Stereoscope 204  
 Stirring and mixing, apparatus for 270  
 Stitch, button-hole 269  
 Stock, animal-shoeing 349  
 Stone, artificial 140 (2)  
 Stone, raising and transporting 12  
 Stop, window 317  
 Stop, army 396  
 Stoves 13, 284, 335, 409  
 Stove, gas 44  
 Stoves, cooking, 77, 93, 220, 300  
 Straps for harness, &c., process for forming leather 269  
 Straps, shoulder 397, 410  
 Strainer, wire-gauze 365  
 Strip, weather 349  
 Strippers, sugar-cane 28, 396  
 Straw-cutters 28, 60  
 Stretcher, boot and shoe 317  
 Stump-pullers 285, 348  
 Studs, mode of fastening shirt 13  
 Sub-foundations, forming 349  
 Substances, apparatus for preserving animal and vegetable 125  
 Sugar, manufacture and refining of 124, 397  
 Supporter, abdominal 28  
 Supporter, corset skirt 92  
 Surfaces, process of obtaining printing 397  
 Suspender fastening 125  
 Sweat hats 183  
 Swine from roofing, device for preventing 120  
 Swing 156

**T**  
 Table, extension 222  
 Table, ironing 29  
 Tablet for containing medicines, sugar 317  
 Tacks, apparatus for leathering 284  
 Tack-hark and obtaining extracts, apparatus for leaching 109  
 Tanning 274  
 Tap for tapping pipes 349  
 Taps, reamers, &c., guide attachment for 348  
 Tar to manufacture roofing cement, process of treating coal 270  
 Teeth, artificial 157, 237  
 Telegraphs, circuit-closer for 28  
 Tenoning machine 140  
 Tenoning machine, hand 76  
 Tent 92  
 Thills to axles, attaching 189, 253, 349  
 Thrashing machines 13, 108, 156  
 Thrashing machines, operating shakers of 205  
 Thrasher, grain 410  
 Thrashers and separators, grain (combined) 410 (7), proof 381  
 Tige for fire-arms 221  
 Timbers, mode of uniting 317  
 Tip for umbrellas and parasols 157  
 Tires, machine for rolling 365  
 Tires, machines for upsetting 12, 28, 189, 226 (2), 237, 410  
 Tobacco leaves, process of stripping 365  
 Tobacco, machine for preparing 141  
 Tobacco, manufacture of 237  
 Tobacco, method of preparing chewing 365  
 Tombstone 94  
 Tongue, pipe 44  
 Tool 29  
 Tool, blacksmith's 351  
 Tools for forming the necks of bottles 410  
 Tool for soles, channeling 333  
 Tool-holder for turning lathes 125  
 Tool-rest for turning lathes 221  
 Tooth, cultivator 397  
 Topsails and courses of ships, apparatus for reefing 381  
 Torpedoes under water, apparatus for discharging 365  
 Towers, revolving battery 61, 254  
 Track, city railway 77  
 Traction for locomotive engines 221  
 Trap, animal 237  
 Trap for sinks, &c., odor 12  
 Trap, mole 252  
 Trap, steam 237  
 Trees, machines for sawing down 60  
 Trimming, machine for producing folded 124  
 Trimmings, manufacture of tape 220  
 Trowel, plastering 301  
 Truck, store 77  
 Trucks, car 285, 409  
 Trunk, 109  
 Tube, smoking 45  
 Tubes for cooling the breech of ordnance, arranging water 76  
 Tubes in tube-sheets, method of securing 28  
 Tubing manufacture of iron 140  
 Tub, butter 189  
 Types, machine for setting up 330  
 Type to cylindrical surfaces, attaching movable 317

Valve for steam pumps 333  
 Valve gear of steam engines 300  
 Valve or wicket for canal-lock gates 44  
 Valves for heating feed-water for steam boilers 45 (2)  
 Valves for steam engines 204, 253  
 Valves for steam engines, slide 173, 317, 364  
 Valves of steam engines, apparatus for opening 285  
 Varnish, copal 333  
 Vat, tanning 45  
 Vegetable-cutters 61, 141  
 Vehicles, mode of securing crossbars and shafts to 221  
 Vehicle, running gear of 44  
 Vehicles, velocipede 11, 140  
 Veneers, machinery for cutting 44  
 Ventilating apparatus 365  
 Ventilator for buildings 110  
 Ventilator for hats, sweat leather 28  
 Ventilator for railroad cars 110  
 Vessels for extracting essences 44  
 Vessels, means of protecting war 338  
 Vessels, mode of raising sunken 300  
 Vessels-of-war, constructing and arming 333  
 Violin 300

**W**  
 Wad for projectiles, india-rubber 333  
 Wagon 316  
 Warning apparatus, portable 333  
 Warps, machinery for dressing and sizing 332  
 Washboard, circular 140  
 Washing and wringing machines (combined) 269, 285  
 Washing machines 27, 28, 44, 60, 93, 124, 126, 140, 141, 156, 173, 237, 253 (2), 285, 316, 365  
 Water, apparatus for raising and forcing 56  
 Water by steam, device for raising 285  
 Weighing apparatus 172  
 Wells, apparatus for cleaning 189  
 Wheel and axle, car (combined) 316  
 Wheels, casting water 397  
 Wheels, current water 125, 172  
 Wheels, feathering paddle 28  
 Wheels, mode of connecting felles of 316  
 Wheels, wind 269, 285  
 Wheels, water 60 (2), 173, 205, 237, 332, 396  
 Whiffletree 284  
 Whiffletrees, fastening for securing traces to 108  
 Whiffletrees, mode of attaching and de-taching 316  
 Wick for lamps 172  
 Wind-breaker for lanterns 121  
 Windmill 44  
 Wines, manufacture of domestic 92  
 Windlass, horse-power 140  
 Windlass, vertical 108  
 Windlasses and capstans, construction of chain 125  
 Windlasses, mechanism for operating ships' 44, 333  
 Window for tents, ventilating 93  
 Wire, annealing iron and steel 270  
 Wire with gutta-percha, rubber, &c., machine for covering 409  
 Wiper for blackboards 253  
 Wood-bending machines 94, 124, 409  
 Wood, machines for sawing 108, 237  
 Wood, process for imitating the grain of 220  
 Wood, process of preserving 60  
 Wool, cotton, &c., machinery for cleaning 12, 300  
 Wool, machine for oiling 269  
 Wrenches 29, 33  
 Wrenches, pipe 93, 172  
 Wringing machines, clothes 156, 172, 189, 221, 301, 316, 333, 365, 381  
 Wringing machines, rollers for 27

**Y**  
 Yoke and fastening, bell 364  
 Yoke, ox 333

**RE-ISSUES.**  
 Aniline to produce a red coloring matter or dye, treating 409 (2)  
 Box, journal 334  
 Brace, ball 333  
 Cable for telegraphs, submarine 205 (2)  
 Can, preserve 334  
 Capstan for ships, compound 270  
 Car, iron 94  
 Case, burial 158  
 Chairs, machine for bending the lips of wrought-iron railroad 141  
 Clothes-wringers 409 (2)  
 Compound, lubricating 158  
 Damper for stoves, ventilating 365  
 Elevator, hay 205  
 Elevator, water 45  
 Fence, wire 190  
 Food made from beans, peas, &c., articles of 205  
 Furnace, steam boiler 397  
 Hat-bodies, manufacturing 13  
 Head for lead pencils, &c., rubber 29  
 Horsepower 45  
 Juices and solutions by means of steam, evaporating sugar 317 (4)  
 Lock and latch (combined) 410  
 Molds, mode of heating 222  
 Planter, seed 173  
 Press, oil 94  
 Propeller, double-cone marine 45  
 Prop, carriage 173  
 Register, hot-air 285  
 Screen for flour bolts 155  
 Separator, grain 365  
 Stoves 173 (4), 365  
 Tip, boot and shoe 190  
 Wheel for fly-wheels, &c., metallic 94  
 Wheels, cast-metal car 13, 61  
 Willows, machine for peeling 189

**EXTENSIONS.**  
 Boot-tree 317  
 Boxes for the journals of railway cars 381  
 Brake for railroad cars 365  
 Bungs, machine for cutting 233  
 Press 284

**DESIGNS.**  
 Anklets 141, 410  
 Background, photographic 123  
 Board, chess or checker 233  
 Bottle 301  
 Bracket, lamp 126  
 Can, fruit 126  
 Carpet patterns 126 (2), 141 (20), 158, 350  
 (8), 410 (12)  
 Case, base of a saw 141  
 Case, postage-stamp 141  
 Cases, clock 15, 301, 350  
 Cases, burial 126, 190  
 Chair 238  
 Chimney, lamp 410  
 Coffins, lifting-handle plate for 141  
 Cutlery, handles of table 410  
 Floor-cloth patterns 126, 410  
 Frame for fireworks, hand 62  
 Gateway and fence for burial plots 110  
 Inkstand 183  
 Medalion of President Lincoln 173  
 Shawls, &c., border of 286  
 Shoe 45  
 Spoon and fork handle 238  
 Spoon, shank 188  
 Stoves 13 (4), 45, 126 (2), 205, 238 (3), 410 (3)  
 Trade-marks 141 (2), 410