grasped. A trolly, too, was sent almost up to the mouth of the furnace, and, by and by, it received the plate when the tongs had done their work. Everything was now ready. The doorway of the furnace was lifted up, the flames shot out and lit up the mill, and, while spectators shielded their faces with their hats or handkerchiefs, the workmen, with their backs to the furnace, pushed up the tongs until they grasped the plate within. Balks of wood were then put on each side of the furnace to enable the plate to be drawn out the more readily; but the flames seized upon them and appeared to devour them as if mere shavings. There was no time to lose, the order was given, and machinery began to move, the chain fastened to the tongs slowly tightened, and the huge mass, which had required twenty-seven hours in such a furnace as this before it was done, made its appearance. Fierce as had been the heat before, it was now ten times greater. One could hardly look upon the plate, white with heat, over and around which little blue flames appeared to be lingering. Slowly it fell upon the trolly, the tongs were then removed, and in a moment or two the rolls, which had been revolving for a while, caught the end of the plate; and the huge mass, weighing 35 tuns, passed between them with as much ease as if it were but a 4½ inch plate. Backwards and forwards it came six or seven times, each time the distance between the rolls being decreased, and the operation ended as soon as the required size had been attained. The rolling was most successful, and it is believed the plate is without a flaw. The destination of the plate is Spezzia, where the test is to be carried out.

The experiment shows that there is absolutely almost no limit to the thickness of which armor plate can be made. It was no idle boast on the part of Mr. Cammell when he said that, if Sir Joseph Whitworth's gun penetrated this plate, he would make one 30 inches or 40 inches thick. The result of the test at Spezzia will be watched with great interest.—*Iron.*

SCIENTIFIC AND PRACTICAL INFORMATION.

STRANGE NATURAL CISTERNS.

In the rough granite country back from Mossamedes, on the west coast of Africa, are some very remarkable natural cisterns. The country itself is peculiar, huge single rocks rising out of the nearly level plain in some places, and in others hills of rock, in several of which deposits of water are found at the very top. A recent traveler visited one of these, and describes it as a natural tank with a narrow entrance, containing some three or four hundred gallons of exqusitely clear and cool water. It was covered by vast slabs of granite, from which the rain drained into it during the rainy season, shading the water so that it could not be seen without a torch, and so protecting it that the sun cannot evaporate it during the dry season. Thus a bountiful store of excellent water is preserved while there is not a drop to be had elsewhere for miles.

A still more remarkable cistern of this sort is that of the Pedra Grande, or Big Stone, some thirty miles from Mossamedes, a huge rounded mass of granite rising out of the sandy plain. On the smooth side of this rock, twenty or thirty feet above the plain, is a circular pit about ten feet deep and six feet across. The rainfall on the rock above the pit drains into it, filling it completely every rainy season. The walls of the pit—which is shaped like a crucible, narrowing gently to the bottom—are perfectly smooth and regular, the enclosing granite being of the closest and hardest description. The cistern will hold several thousands gallons of water. Near by are smaller pits of similar character. Their formation is unexplained. The water of this strange well furnishes the natives and travelers with an abundant supply during the dry season; consequently it is a noted halting place.

A SPITTING SNAKE.

There is a dangerous snake, not uncommon about Benjuella, West Africa, called by the natives *naja neje*, and by the Portuguese *cuspedira*. It is small in size and remarkable from its habit of spitting when interfered with. The saliva is ejected to considerable distances, and is said to cause blindness if it touches the eyes. One of the snakes was captured by the natives and brought to where some English miners were at work. It was teased by a miner who was standing over the cage, which was on the ground, and retaliated by a discharge of spittle. Some of the liquid entered one of the miner's eyes; and though the eye was immediately washed out with water, it was very much irritated for several days. The snake was killed before any experiments could be made with it by the scientific superintendent of the mine; he has, however, no doubt of the miner's statement and that of his companions, corroborated as it is by the testimony of the natives and the Portuguese.

A RIVER OF INK.

In Algeria there is a river of genuine ink. It is formed by the union of two streams, one coming from a region of ferruginous soil, the other draining a peat swamp. The water of the former is strongly impregnated with iron, that of the latter with gallic acid. When the two waters mingle the acid of the one unites with the iron of the other, forming a true ink. We are familiar with a stream called Black Brook in the northern part of this State, the inky color of whose water is evidently due to like conditions.

A. RICCO, of Modena, Italy, says: To cure the swellings of chilblains, rub them well at night with petroleum. It will take three or four nights rubbing to cure them.

The Breaking of the Lynde River Reservoir Dam.

A serious disaster, causing a large destruction of valuable mills and other property, occurred in the vicinity of Worcester, Mass., on the 30th of March, through the rupture of the dam of the Lynde river reservoir, whence the water supply of the above city is derived. The reservoir has a capacity of some 670,000,000 gallons, and by the recent heavy rains became filled to its utmost extent. The embankment wall, it is said, was known to be too low for safety, and engineers had recommended its enlargement. These warnings, however, passed unheeded; and consequently, when the dam was subjected to an unusual strain, due both to the large amount of water in the reservoir and to the waste weir becoming choked, it became leaky, and a small stream began to escape through its masonry, thus commencing the destruction that was completed by the breaking of the whole structure thirty hours later. As soon as the first dangerous sign appeared, people in the vicinity of the threatened flood abandoned their houses and shops, and so the loss of life, which attended the like disaster at Mill River a year or so ago, was averted. The damage done is estimated at several million dollars. Several houses, the Bottomly, Smith & Co. Mills, besides a number of smaller manufacturing establishments, and eight hundred feet of the Boston and Albany Railroad were washed away.

THE NATIONAL STEEL TUBE CLEANER.

We show in the accompanying illustration an improved apparatus for cleaning the flues of steam boilers. All intelligent users of steam appreciate the economy of keeping the flues of their boilers clean and free from deposits of unconsumed carbon and ash, which are non conductors of heat and cause a marked difference in the working of a boiler.

The National Tube Cleaner is a plain, practical, durable tool, and has many points of advantage. Among these may be mentioned the absence of small steel springs or thin bands of metal, which, when thrust into a hot flue, lose their temper and elasticity. The scraping edges, supported on blades of Bessemer steel, are cut from saw plates, and are held in place by doubly riveted braces of malleable iron. The blades are dove-tailed into the malleable iron butt, which insures their being held firmly in place. The threaded steel rod in the center is provided with a washer, which runs up and down upon it, by means of which the spread of the blades is adjusted to the size of the flue. These implements received the silver medal at the American Institute in 1875, the first premium at the last Industrial Exhibition in Pittsburgh, and also at the Providence (R. I.) exhibition. It is manufactured by the National Steel Tube Cleaner Company, and has been introduced through the agency of the Chalmers Spence Company of New York. It is sold by the principal dealers in engineers' and mechanics' supplies throughout the country.

NEW BOOKS AND PUBLICATIONS.

THE FIRST GERMAN READER: a Modification of Marcel's Method. By Charles F. Kroeh, A. M., Professor of Modern Languages, Stevens Institute. 67 pp. New York city: D. Appleton & Co.

This is a concise and admirable instruction book, for English pupils, in German. The entertaining story of Cinderella is presented in German, accompanied by a literal linear translation, which exhibits at one view the peculiar arrangement of the language. Excellent directions, vocabularies, etc., are given, the author's object being to convey a practical knowledge of the subject without burdening the learner with the technicalities of grammar.

PORTRAITS OF CELEBRATED DOGS. Price $2, for Set of Eight Portraits. New York city: "Forest and Stream" Company, 17 Chatham street.

These are well executed wood engravings of celebrated pointers and setters, and they will undoubtedly have a large sale among the shooting fraternity.

THE PHILADELPHIA LEDGER. Philadelphia, Pa.: G. W. Childs.

The enterprising publisher of this old and respectable daily journal inaugurated, on March 27, the forty-first year of its publication, by increasing its size and improving its general appearance. Under the proprietorship and management of Mr. Childs, the *Ledger* has become one of the most profitable newspapers in the country.

REFERENCE BOOK FOR INVENTORS AND MECHANICS. 125 pages. Bound in cloth, gilt edges. Price, by mail, 25 cents. New York city: Munn & Co., Publishers SCIENTIFIC AMERICAN and SCIENTIFIC AMERICAN SUPPLEMENT.

This is a valuable little book for inventors, patentees, mechanics, and others. It contains the patent laws of the United States complete, with directions for obtaining patents, trade marks, caveats, designs, copyrights, and forms for transferring, by assignment and license, interests in patents. It contains the census of the United States, by States and Territories; and contains also engravings of 150 mechanical movements, which will be found convenient for all mechanics and inventors to have at hand for reference. A more valuable compilation of rare and useful information has never been condensed into so small a compass, or sold at so cheap a price.

EVERY MAN HIS OWN LAWYER. By John G. Wells. 612 pages. Price, by mail, $2.25. New York city: John G. Wells, 3 East 4th street.

Mr. Wells has just issued a new edition of his business form book, adapted for all classes of persons. It is a guide in all matters of law and trade, and s adapted for every State in the Union. To those who have occasion to draw conveyances, to frame wills, agreements, and powers of attorney, or to make assignments, this work will be found most convenient. It contains a synopsis of the laws of all the States relating to usury, the rights of married women to hold property, how to obtain pensions and letters patent, and other matters likely to arise in the life and experience of most persons.

THE ALDINE.—Parts 6 and 7 of the new issue of this beautiful art publication are just from the press; and they compare favorably with the five first numbers of this year's issue. Several finely executed wood engravings of American and foreign scenery and copies from celebrated paintings of our best modern artists, executed by our most distinguished designers and engravers, are features in these issues which render the publication of special interest to lovers of art. Published fortnightly by the Aldine Company, 18 and 20 Vesey Street, New York city, and supplied, to regular subscribers only, at 50 cents a number.

Recent American and Foreign Patents.

NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

IMPROVED TINNED BLANK.

John C. Milligan, South Orange, N. J.—This inventor forms a little extension lip at one part of the edge of a round plate or blank of tin plate, the object of which is to receive the beads of tin that flow to the lower edge, and there solidify on drawing the sheet out of the bath, so that they can be removed from the sheet by cutting off the lip without destroying the symmetry of the blank.

IMPROVED BALE TIE.

Jesse R. Horton, St. Louis, Mo., and Henry A. R. Horton, McKinney, Tex.—This is a simple device whereby the end of the band is held in close contact with the other end by means of a lug, so that the swelling of the bale can never affect the security of the fastening, since the flanges of said lug do not permit it to be pressed out of the slot. The lugs are so arranged that they do not catch in the cotton or wrapping of the bale, either in the act of locking or unlocking.

IMPROVED CORSET SPRING.

Joseph Day, New York city, assignor to himself and Nathan Hyman, same place.—This is a corset clasp composed of a broad stay, having fixed hooks upon it, in combination with an overlapping stay having eyes hinged to fastening bands which pass around the stay, said eye being made with broad base, to allow the easy connecting and separating of the parts.

IMPROVED MICA LIGHT FOR STOVES.

John W. Elliot, Toronto, Canada.—This invention consists in a mica light, provided with a handle at the upper end, a perforation, and a strengthening tip, the same being applied to a window frame having a lip. The plate is sprung into the rim and guard lip of the stove body, and is provided with an eyelet at the lower part to admit the entrance of air.

IMPROVED FILTERING APPARATUS.

Leo Prange, South Brooklyn, N. Y.—In this filter, the liquid is passed through a body of charcoal and a series of bags, formed of woven fabric and suspended vertically from short tubes attached to the bottom of a tank. In order to hold the charcoal necessarily employed as a filtering medium, a strainer supported on a circular flange forms a false bottom to the vessel. The liquor filters through the charcoal and enters the space between the bottoms, whence it escapes as fast as it can ooze through the bags. In order to indicate the bight of liquor a glass tube is attached to the outer side; and in order that the tube may not become choked, the lower end is made to communicate with the space between the false and true bottom, so that only clear or filtered liquor can enter.

IMPROVED LOCK FOR POCKET BOOKS.

Daniel M. Read, New York city.—The device is fastened by pushing a catch into one of the holes in the case of the lock, when the inclined end of the said catch strikes against the rounded forward edge of a latch bar, pushes it back, and passes it. To unfasten the lock, the rear edge of the catch plate is slightly raised, which throws the engaging end of the catch back a little, so that its upper incline may readily slip off the rounded edge of the latch bar. With this construction there is no projection upon the outside of the lock to wear the pocket.

IMPROVED METALLIC SEAL.

Alphonse Friedrick, Brooklyn, N. Y.—This invention relates to certain improvements in that class of metallic seals in which a section of wire is employed for forming the loop, the ends of which wire are bent and secured in a soft metal button by compression. It consists in the construction of the soft metal button, which is made with a deep circumferential groove around its edges forming two connected disks, with or without a hole through the central smaller portion or stem connecting the disks. Around this button, in the groove and through the hole, the wire is variously twisted and secured by the compression of the soft metal button which, when stamped, forms the two edges of the disks into a single milled flange, which imparts greater security to the seal.

IMPROVED GUIDE AND REEL BAND FOR FISHING RODS.

Francis Endicott, New York city, assignor to himself and Henry F. Crosby, same place.—This consists of open (expanding and contracting) guide and reel bands for fishing rods, constructed with a loop and binding screws on one end, and a tongue on the other end, passing through the loop for being readily fastened on rods of different sizes. In case a rod is broken, a temporary rod can be easily rigged, and the carrying of a rod may be avoided by taking the rings and reel along and procuring the rod when wanted for use.

PROCESS FOR SEPARATING MIXED COAL TAR PRODUCTS.

Charles Lowe and John Gill, Manchester, England.—The nature of this invention is, first, to submit the partially or wholly dydrated mixtures of tar acids to the prolonged action of temperatures between 15° Fah. and 56° Fah.; secondly, to separate the hydrated carbolic acid crystals, thus formed, from the mother liquors containing the liquid tar acids and a residue of carbolic acid dissolved in them; thirdly, to effect complete purification of the more or less hydrated carbolic acid crystals thus obtained by recrystalization, either by partial fusion or solution in water with subsequent refrigeration; and lastly, to prepare carbolic acid of high or complete degrees of purity by dehydrating the partially or wholly purified more or less hydrated carbolic acid crystals.

IMPROVED COMBINED WATCH CHARM AND KEY.

Patrick Dever, Glen Riddle, Penn.—This consists of a suitable case with a sliding and a spring-acted key, that is retained or released to protrude from the case by suitable catch device.

IMPROVED PRESS FOR FORMING SPRING SHANKS FOR SHOES.

Emil Briner, New York city.—The object here is to improve and perfect the press or dies for forming spring-shanks for shoes, for which letters patent have heretofore been granted to same inventor under date of February 9, 1875. New devices are provided for perforating the shank blanks and carrying off the punchings, for conveying the sheared-off blanks ready for the action of the shaping dies, and for the purpose of shaping, feeding, and dropping foward the shanks.

IMPROVED DOUBLE APRON.

William G. Heaney, Camden, N. J.—This is an improved double apron, designed for use in male diseases.

IMPROVED VARNISH FILTER.

Jerome Rich, Jackson, Mich.—This is a tube, in the bottom of which is a filter suitable for filtering the dust out of carriage varnish. Below the lower end, which is conical, is a conical cup valve, attached to a rod sliding up and down the tube, to close the filter to prevent any gum or skins from entering it as it passes down to the bottom of the can for filling, also to open the filter and let the varnish in from the bottom of the can. It is intended to draw the varnish from the filter by a liquor thief, the filtering tube meanwhile to remain in the can, and to be corked at the top to protect the varnish from the dust of the atmosphere.

IMPROVED ORE CONCENTRATOR.

Charles Crane and David F. McKim, Parley's Park, Utah Ter.—This invention consists of an endless carrier, slightly inclined laterally, along the upper side of which, near the receiving end, are spouts with fan-shaped corrugations, for distributing the slime in thin layers on the carrier as it slowly passes along. Near the other end are spouts for discharging clear water, for washing the matters received from the other spouts while being carried along under stationary brushes arranged above the carrier for stirring the matters on it. Below the carrier is a sluice for receiving the tailings washed off from the lower edge of the carrier, and at the end is a box to receive the ore. The box is divided parallel to the longitudinal axis of the carrier, to separate the ore into two grades. Directly behind where the ore falls into the box is a perforated pipe for discharging jets of water up to the carrier, for washing off any particles that may adhere to it.

IMPROVED APPARATUS FOR PUMPING SHIPS, ETC.

Charles Huxford, Edgartown, Mass.—This consists of a paddle wheel mounted on a float and dragging astern of the ship, so as to be revolved by the water and having an endless rope fitted around it, and around a pulley on the ship, in such a manner that the rope is made to work the pump, and thus save the working of it by hand in ships not having steam power.

IMPROVED CARTRIDGE BOX.

Charles K. Howe, Hallowell, Me.—This box is so constructed as to allow only one cartridge to be taken out at a time. It may be attached to the shoulder rest of a pocket rifle, or carried in the pocket. It is formed of a ring-flanged block, having holes (for the cartridges) in different radial planes, and covered by a slotted centrally pivoted disk, that has a flange overlapping the flange of block. It is a convenient device for carrying revolver or pistol cartridges, as well as those of rifles and larger fire arms.

IMPROVED SYRINGE.

Reinhold Vander Emde, New York city.—This invention consists in improving upon the ordinary syringe caps, made of soft rubber, by using a centrally perforated exterior cap, provided with a flange that fits around the end, and an interior groove that fits over the rim of the barrel. This offers a better guide and stuffing box for the piston rod, and allows of the same being readily removed for refitting.

IMPROVED DUMPING SCOW.

Daniel Dailey, New York city.—This is an improved dumping scow, from which the refuse may be readily and conveniently dropped for submersion. It consists of a scow divided by a longitudinal center bulkhead and lateral brace walls into compartments, which are each closed by hinged bottom gates that are raised or dropped by chains winding on a top shaft.

IMPROVED METHOD OF UNITING PIECES OF LEATHER, ETC.

George V. Sheffield, East New York, N. Y.—This is a new method of uniting pieces of leather, cloth, etc., by looping an under thread through a loop of the needle thread and drawing the under thread loop up to the surface by the needle thread, thus quadrupling the lower thread in the work, and binding the same by the upper thread, and connecting these quadrupled threads from hole to hole by a thread on each side of the work. The method is mainly designed for uniting boot and shoe soles with a waxed thread.

IMPROVED COMPOSITION FOR DENTAL PLATES, ETC.

Cornelius Reagles, Schenectady, N. Y.—This is an improved compound for dental plates, and for the various purposes for which ivory, gutta percha, and hard rubber are used, which may be molded, pressed, sawed, turned, planed, carved, inlaid, polished, etc., shall not be liable to combustion, shall have great tensile strength, and in the liquid form will make a waterproof varnish of great toughness and brilliancy. The ingredients are pyroxylin, compound ethylated camphor, flexible lac, rubber shavings, Canada balsam, and white wax. The important feature is the combination of india rubber and cellulose.

IMPROVED CENSER.

Rev. James J. Dunn, Meadville, Pa.—This invention consists of a reticulated pocket, for holding the charcoal, with a lamp burner arranged under it for igniting the charcoal more conveniently and maintaining the fire longer than can be done in the close fire pot of the ordinary censer, in which the fire often dies out before the service is over for want of air.

IMPROVED ARTIFICIAL LEG.

Joseph B. Warner, North Dighton, Mass.—This invention relates to an improved knee joint, by which it is impossible for the joint to bend while the weight is upon it. The lower section of the artificial leg is suspended by a sliding strap from the upper section, in connection with a slotted guide band of the detached knee piece, supporting the upper section and causing it to bear tightly on the sliding band when the weight rests on the leg.

IMPROVEMENT IN PLATING METALS.

Charles S. Minchew, Taunton, Mass.—This invention consists in a new process of plating Britannia ware with silver, whereby the ware may be made much harder and lighter and the resonance of solid silver ware imparted to the plated goods. The invention extends generally to the plating of all of the baser metals with the more precious metals, and to the process has been given the name of "impulsic plating," to distinguish it from the ordinary methods of plating. The invention consists, first, in the method of cleansing the articles to be plated by nascent hydrogen liberated by the electric current from a hot alkaline solution; and secondly, in depositing a thin coat of the precious metal, then heating the coated article, and afterwards suddenly cooling it, the steps of depositing the metal, heating, and cooling being repeated in succession until a sufficient thickness of plate is obtained. When the coated metal is first heated, the pores of the base metal expand and a partial vacuum is produced. Atmospheric pressure forces the thin coat of the precious metal into the opened cists, and the sudden cooling produces a contraction of the under metal, which seizes and holds the precious metal that is driven in.

IMPROVED PILL MACHINE.

Jacob Dunton, Philadelphia, Pa.—This invention relates to an improved machine for making pills by compression, and it consists in a movable or detachable compression chamber or powder receptacle, in combination with two movable dies having concaved ends, the upper one of which forms the plunger, and the lower one of which is made short and is adapted to be driven through a hole in a base piece together with the pill. The invention also consists in the construction of the base piece, which is provided with a hole terminating in a laterally discharging curved chute, through which the pill and lower die are driven out of the chamber into a convenient position; and it also further consists in the combination with the powder receptacle of the base piece provided with guides, which permit the powder receptacle to be shifted from its position for compressing to its position above the hole for discharging the pill without misplacement and without the delicate adjustment which would be otherwise required.

IMPROVED DEVICE FOR DETACHING HORSES.

Josephus T. Willis, Pushmataha, Ala.—This consists of locking sleeves, sliding at the ends of the whiffletree to lock or release the catches that retain the traces. The bands are moved by lever-rods connected to a fulcrumed center lever, governed by a forked lever and strap from the carriage. A pin strap extends from the main strap to a hole of the whiffletree, to lock the sleeve and allow the detaching of the traces only after withdrawing the pin.

IMPROVED AIR GUN.

Wilhelm Hebler, New York city.—This air gun is designed to reach the range of an ordinary rifle. The essential feature consists in a novel combination and arrangement of valves and other devices, in connection with the air-compressing chamber, whereby a very large amount of air may be compressed, which by its high expansive force throws the ball a long distance.

IMPROVED PHOTOGRAPHIC PRINTING FRAME.

Claude Léon Lambert, Paris, France.—This invention relates to certain improvements in photographic presses for working off positive proofs from the negative; and it consists in a casing having openings covered with glass of the size and shape of the outlines of the picture, upon which glass openings the negative is placed. A hinged leaf, provided with apertures corresponding to the openings, but a trifle smaller, is then fastened down upon the negative; and the sensitized paper being placed in little compartments above these apertures, a set of little doors, lined with felt, are shut down, and held in place by bearing springs on the lid, which, being fastened, holds the press tightly together.

IMPROVED TRUNK.

William J. Large, Brooklyn, N. Y.—This trunk is so constructed that the tray may be conveniently raised to obtain access to the body of the trunk, which may be conveniently moved from place to place. To the tray are connected vertical slides, which traverse ways in the sides of the trunk, and which support it when lifted above the body of the trunk, to allow access with the latter. There are several ingenious devices connected with this general feature.

IMPROVED ORNAMENTAL LINKS FOR NECKLACE CHAINS.

Shubael Cottle, New York city.—This invention consists in long hollow links, having holes at the ends of the slots of a larger diameter than the end parts of said slots, and having a small plate inserted in one end to receive the ends of the open ring. In this way a strong and beautiful necklace is produced from a comparatively small amount of material, while at the same time it has the appearance of being very heavy.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED PUMP.

George Washington Johnson, Yarmouth, Canada.—This invention improves the construction of the pump known as the Sluthour pump, so as to adapt it to be used on shipboard, and in other places where the pump should work continuously without danger of stoppage or delay from choking. A number of useful improvements are added to allow any obstruction to be conveniently removed from the valves or suction pipe, to enable the pump to work smoothly, to be conveniently sounded, and to admit of an even motion of the pump buckets to be produced when worked by a crank and fly wheel.

IMPROVED GRINDING AND HULLING MILL.

Elam Morrison Query, Harrisburgh, N. C.—This invention consists in constructing a grinding and hulling machine with reversible and, therefore, self-sharpening teeth on the cylinder and concave.

IMPROVED AUTOMATIC STOP MOTION.

Augustus A. Hagen, New York city.—This is an improved automatic stop motion for feed wheels in tobacco-cutting and other machines; and it consists of a fulcrumed lever, that operates by contact with a raised part of the feed screw, a transverse slide piece, and, by a connecting swinging slide, the spring pawl of the ratchet feed wheel, so as to throw the same out of gear.

IMPROVED NUT LOCK WASHER.

Isaac Van Kuran, Omaha, Neb.—This is an improved elastic washer for the nuts of rail joints and similar purposes, and consists of the base plate of the washer, with a large central opening, holding by side lips the elastic top plate in a central position. The device is cheaply made, and the drilling of holes and riveting is avoided.

IMPROVED LOCOMOTIVE ROCKER SHAFT AND BOX.

John T. Crowther, Carbondale, and William J. Crowther, Urbana, Ill.—This invention consists in an open bushing, made in one or two pieces, and provided with three sets of oil holes, in combination with the rock shaft and the box: and in the rock shaft made with three key seats in each end, the key seats in the one end being opposite the centers of the spaces between the key seats in the other end, to enable the shaft to be adjusted in six different positions. It is well known that the rocker shafts of locomotive engines soon wear oblong, which causes a loss of motion to the valves, and a corresponding loss of power to the engine. The present device enables the shaft to be repaired easily and quickly, and without disarranging in the least the valve motion.

IMPROVED PUNCHING AND SHEARING MACHINE.

Austin W. Comstock, Mount Pleasant, Iowa.—This machine is adapted for punching and shearing off flat and round iron, plates, bars, and rods. It consists of two levers fulcrumed to supporting standards, and provided with front jaws, having punch and die for perforating the plate, which is held by hooks of the lower jaw. The rear ends of the levers have square recesses for shearing off round and flat bars.

IMPROVED CRIMPING MACHINE FOR LEATHER.

Chas. M. Robinson and John F. Lister, Newton, Iowa.—The purpose of this invention is to provide a machine for shoemakers' use, to facilitate the work of crimping the leather for the uppers, cutting out the soles, and pressing the same into the proper form to fit the last without lap hammering. The invention consists in a table having a lever pivoted thereto at one end by means of links, and operated at the other end in vertical direction, to produce the necessary pressure by means of a secondary lever, to be worked by hand, which lever carries a crosshead, one end of which is pivoted to the first lever, and the other end to a set of links, pivoted at their lower ends to the table, which arrangement gives a compound motion for the operating lever, between which and the table the crimping, stamping, and pressing devices are contained.

IMPROVED COCK AND FAUCET.

Charles K. Dickson, Jr., St. Louis, Mo.—This invention consists in the combination of a three-armed head with the plug of a three-way cock, in such a way that the said arms may be directly over the openings of said plug, to indicate the position of said openings with reference to the three pipes of the cock. This device, we learn, has already been adopted by the Water Commissioners of St. Louis, Mo.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED DOOR CHECK.

Edsell W. Chamberlain, Sullivan, O., assignor to himself and J. W. Spencer, same place.—This invention consists in forming a reversible door check of two pieces, one of which has a pivot, base-plate, and check studs, and the other a latch and check; the whole to be used in connection with a spring. The device is composed of but two castings, ready to receive the spring and to be applied to doorways without drill, file, or other tool, at very small expense. It serves as a right or left check by simply changing sides.

IMPROVED SASH FASTENER.

Lloyd J. Earll, Pittsburgh, Pa.—This invention relates to certain improvements in that class of sash locks which have an arc-shaped head or binding surface, which bears either against the window sash or is pivoted to the window sash, and binds against the window frame, for the purpose of holding the window sash in any desired position; and it consists in means for tightening a continuous band of leather or rubber about the face of the holder to prevent scratching the paint. The invention also consists in a sliding bolt passing through a lug on said holder, so as to enter a socket of the window frame, and having a shoulder upon one side, so that, when the bolt is in the socket and turned, it cannot be withdrawn. The invention also further consists in the particular form of the socket made to receive the bolt, the same being made in the form of a wedge with a hollow head and flat face, which socket is to be driven into the window frame.

NEW AGRICULTURAL INVENTIONS.

IMPROVED GRAIN BINDER.

Joshua A. Kay, Melbourne, Colony of Victoria.—This is an apparatus for tying knots in single or double string, being mainly intended to be used in grain binders for tying knots in strings around sheaves of grain. The invention consists of certain tools, implements, or devices for tying knots together, with the mechanisms for imparting the necessary motion thereto. These devices consist, primarily, of a prolonged looper, a horizontally sliding hook, a rotating hook, and a hooked finger and thumb; and secondarily, of a needle, a knot slipper, a fixed hook, a top, bottom, and middle cord catcher, a holder, and a cutting knife, by the joint working of all of which inside of an oblong casing or knotting box the knots are produced.

IMPROVED PLOW SHOULDER.

Joseph G. Blount and Elias Haiman, Columbus, Ga.—This consists of a shoulder for the upper end of the plow plate to rest against, which may be adjusted as a longer or shorter plow plate is used, or as the plow plate wears away.

IMPROVED CORN PLANTER.

Charles A. Andersson, Mineral Ridge, Iowa.—This is an apparatus which plants the corn accurately without previously marking the land, and can be readily changed from a self-dropper to a hand dropper, as desired. The new features consist in combining, with a seed hopper having perforated walls and false bottom, a spring having points that pass through and hold the bottom; also, in combining seed plates and crank levers, connected by a rod having pairs of arms, with a rotary wheel having two inclines diametrically opposite and on different sides. The two rims and the alternate arms insure the uniform revolution of the wheel, even when the ground is rough.

IMPROVED CULTIVATOR.

Silas Walton, Moorestown, N. J.—This invention relates to an improved cultivator, so constructed as to pulverize the soil and pass clods and rubbish without clogging, having the blades so extended from the frame and so placed that they lift and pass under the vines and lateral parts of plants, thus allowing the earth to be thrown under them, and so adjusted as to be used as a cultivator only, by pulverizing the soil and leaving it flat, or used as a cultivator and plow combined, by both pulverizing and ridging the soil at the same time, either to or from the rows of plants, as desired. It consists in the combination, with the main beam and hinged arms of a cultivator, of certain standards which are in shape and position curved, downward and outward, terminating at the outward end with a vertically inclined stem, made concave on its upper edge, to carry reversible metallic hoes or blades.

NEW HOUSEHOLD ARTICLES.

IMPROVED BROILER.

Frederic Martin, Jr., West Jefferson, O.—This is an improved culinary vessel, that may be employed for broiling and baking, roasting coffee, and other purposes. It consists in a flat-bottomed case, having a lid with a central hole, provided with a pan having central bottom hole, and having a vertical crank shaft with stirrers thereon.

IMPROVED COMBINED TABLE KNIFE AND SPOON.

James Higgins, Detroit, Mich.—This inventor has arranged a spoon bowl-shaped cavity in the blade of a table knife, near the point, but without destroying the integrity of the edge, point, and back of the blade, so that the latter remains in suitable form for its functions.

IMPROVED HEATING STOVE.

Marius C. C. Church, Parkersburg, W. Va.—This invention relates to certain improvements upon the heating stove, for which letters patent No. 167,497 were granted the same inventor September 7, 1875, and it consists in the particular construction and arrangement of the parts in which the smoke pipe is connected with the back part of the fire chamber, instead of the top, and the upper tapered portion of the heating chamber is expanded into a closed drum, surmounted by a water vessel at the point of exit for the hot air through the detachable cover. An extra back plate of brick or metal forms the back of the fire pot, and a perforated partition of the same material rests thereupon and divides the heating chamber from the fire pot.

IMPROVED MATCH SAFE.

William Dawson, Philadelphia, Pa.—The object of this invention is to provide a convenient receptacle for the stubs or burnt ends of matches. After the match has been used, the disposal of the burnt end is always a source of more or less trouble. It either has to be thrown on the floor, producing in consequence a litter and an unsightly appearance, or it has to be thrown into the stove or carried out of the room, either of which involves more trouble than the insignificance of the object justifies. The invention consists in constructing a match safe with two compartments in the same containing case, one of which is provided with a lid and employed for holding the matches, and the other of which presents an opening through which the burnt ends or stubs are inserted, the said latter receptacle having also a door or slide, through which the accumulated stems may be removed.