

The casts are now ready, as soon as perfectly dry, for the soap solution. For cheapness he selects a pure, good, hard soap, shaves it up, dries it and dissolves it in 50 or 60 per cent alcohol; 10 or 12 parts of alcohol to one of soap. Such a solution of Marseilles soap, known as "spiritusaponatus," can be had at any drug store. The finest appearance, as well as a high degree of durability, is obtained by the use of a solution of stearate of soda in strong alcohol. Both the solution and cast should be warm so that it may penetrate as perfectly and deeply as possible. It is no harm to repeat the operation several times, as long as the liquid is absorbed by the cast. When dry the cast is finished.

2. Process with silicate of potash solution. This process depends upon the conversion of the sulphate of lime into silicate of lime, an extremely hard, durable, insoluble compound, and is accomplished by the use of a dilute solution of silicate of potash containing free potash. To prepare this solution he first makes a 10 per cent solution of caustic potash in water, heats to boiling in a suitable vessel, and then adds pure silicic acid (free from iron) as long as it continues to dissolve. On standing, the cold solution usually throws down some highly silicated potash and alumina. It is left in well stoppered glass vessels to settle. Just before using it is well to throw in a few bits of pure potash or to add 1 or 2 per cent of the potash solution. If the plaster articles are very bulky, this solution can be diluted to one half with pure water.

The casts are silicated by dipping them (cold) for a few minutes into the solution, or applying the solution by means of a well cleaned sponge, or throwing it upon them as a fine spray. When the chemical reaction, which takes place almost instantly, is finished, the excess of the solution is best removed with some warm soap water or a warm solution of stearin soap, and this finally removed with still warmer, pure water.

The casts which can be immersed or easily moved around may be treated as above when warm; a very short time is required, but some experience is necessary. In every case it is easy to tell when the change is effected from the smooth dense appearance and by its feeling when scratched with the finger nail. It is not advisable to leave them too long in the potash solution, as it may injure them. A little practice renders it easy to hit the right point. The fresher and purer the gypsum and the more porous the cast, the more necessary it is to work fast. Castings made with old and poor plaster of Paris are useless for silicating. These silicated casts are treated with soap as above.

In washing plaster casts prepared by either method, the author recommends the use of a clean soft sponge, carefully freed from all adherent sand and limestone, wet with lukewarm water and well soaped. They are afterwards washed with clean water. They cannot, of course, be washed until thoroughly dry and saturated with carbonic acid. The addition of some oil of turpentine to the soap is useful, as it bleaches the casts on standing. The use of hot or boiling soapsuds must be avoided.—*Industrie Blätter.*

**ASTRONOMICAL NOTES.**

OBSERVATORY OF VASSAR COLLEGE.

**Position of Planets for November, 1877.**

**Mercury.**

Mercury may possibly be seen early in November, as it rises on the 1st at 5h. 57m. A.M., at a point several degrees north of that at which the sun rises. It cannot be seen after the first few days. On November 30 it rises at 8h. 6m. A.M., and sets at 4h. 52m. P.M.

**Venus.**

On November 1 Venus rises at 10h. 27m. A.M., and sets at 7h. 3m. P.M. On the 30th, Venus rises at 10h. 46m. A.M., and sets at 7h. 42m. P.M. It keeps nearly the same diurnal path through the month, increasing some in brilliancy.

**Mars.**

Although Mars is farther and farther from us, it will be very brilliant through the November evenings, as it has higher declination and comes to the meridian between 7 and 8 P.M.

On November 1 Mars rises at 2h. 47m. P.M., and sets at 1h. 44m. the next day. On the 30th, Mars rises at 1h. 13m. P.M., and sets at 12h. 54m. the next morning. Mars is moving rapidly toward the east, among the stars, and Saturn's apparent motion is toward the west; they are therefore approaching rapidly. According to the *Nautical Almanac* they will be in conjunction November 3 at midnight, Mars being the higher in altitude.

**Jupiter.**

Jupiter can be seen in the southwest. It rises on November 1 at 10h. 51m., and sets at 7h. 49m. P.M. On November 30, Jupiter rises at 9h. 22m. A.M., and sets at 6h. 21m. P.M.

**Saturn.**

On November 1 Saturn rises at 2h. 48m. P.M., and sets at 1h. 48m. of the next morning. On November 30, Saturn rises at 0h. 54m. P.M., and sets at 11h. 54m. P.M.

Saturn and Mars will be very nearly together on November 3, at midnight; they will diverge rapidly, as Mars rises higher in the sky and passes to the east of Saturn. Saturn is the most interesting planet at the present time; the ring which surrounds it seems exceedingly narrow, as the sunlight strikes almost in its plane. Through a good telescope the ring seems almost like a belt, running across the ball of Saturn and extending beyond the sphere on each side. Saturn has eight satellites. A large telescope will show

many of them lying around the planet, some at the distance of several times its diameter, and some skirting along the edge of the ring. On October 13 one of these moons was seen to pass across another, so that the two were seen as one for a few minutes. Saturn is so far off that few of these satellites can be seen with an ordinary glass; but Titan, the largest, can be found with a telescope whose object glass is two or three inches.

**Uranus.**

On November 1 Uranus rises at 0h. 36m. A.M., and sets at 2h. 8m. P.M. On November 30, Uranus rises at 10h. 41m. P.M., and sets at 11m. after noon of the next day. It has passed to the east of Regulus and a little below it in altitude.

**Solubility of Sulphur in Acetic Acid.**

Liebermann ("Wien. Anz.") finds that sulphur is soluble to no inconsiderable degree in warm concentrated acetic acid, and that a trace is taken up even by the dilute acid. If the concentrated solution be diluted with water, much of the sulphur separates as milk of sulphur; if it be evaporated with the Sprengel pump, fine long prisms of sulphur separate; when cooled, moreover, the liquid deposits sulphur in a crystalline form. All modifications of the element appear to be taken up by acetic acid. The author refers to analytical methods where these changes occur, and are apt to mislead the operator.

**Inventions Patented in England by Americans.**

From September 18 to October 5, inclusive.

- COMPRESSED AIR.—T. F. Rowland, Brooklyn, N. Y.
- ERASERS.—A. S. Mills, Brooklyn, N. Y.
- FIRE ARMS.—E. Remington & Sons, Ilion, N. Y.
- LOCKS.—M. A. Dalton, Cincinnati, O.
- LOOM.—B. J. Stowe, New York city.
- MATCHES.—E. B. Beecher, Westville, Conn.
- PAPER CUTTING, ETC.—G. L. Jaeger, New York city.
- PAPER FASTENERS.—P. H. Sweet, Washington, D. C.
- PESSARIES.—W. H. W. Campbell, Norwich, Conn.
- POSTAGE STAMPS, ETC.—J. Sangster et al., Buffalo, N. Y.
- PRINTING PRESSES.—T. S. Bowman, St. Louis, Mo.
- PULP MACHINE.—A. H. Elliott, New York city.
- RAILWAY CROSSINGS, ETC.—J. S. Williams (of Riverton, N. J.), London, England.
- TREATING BLOOD.—W. L. Palmer, New York city.
- WATER CLOSETS, ETC.—J. E. Folk, Brooklyn, N. Y.
- WINDOW SHUTTERS, ETC.—A. Bijar, New York city.
- WOOD SCREWS.—A. L. R. Monson, New York city.

**Recent American and Foreign Patents.**

**Notice to Patentees.**

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We shall be pleased to make estimates as to cost of engravings on receipt of photographs, sketches, or copies of patents. After publication, the cuts become the property of the person ordering them, and will be found of value for circulars and for publication in other papers.

**NEW MISCELLANEOUS INVENTIONS.**

**IMPROVED COMPOSITION FOR PAVING BLOCKS.**

James S. Wethered, New York city.—This invention relates to a compound for paving blocks and other purposes, and it consists in a composition formed by mixing pulverized slag with asphaltum and heavy petroleum or other non-drying oils. The inventor says: In carrying out my invention I take 17 parts of asphaltum (Trinidad preferred) and subject it to a slow heat until it becomes liquid. I then add 3 parts of heavy petroleum or other fixed oil, and thoroughly mix them together, and while this mixture is still hot I add 80 parts of broken, granulated, or pulverized iron or other slag, or its equivalent, which has been previously heated. I then, by aid of suitable machinery, thoroughly incorporate the ingredients while in the heated state, and form the composition into blocks, which I subject to heavy pressure in molds. I do not confine myself to the exact proportions herein stated, as the proportion of oil may be varied to suit the quality of the asphaltum, the oil being one of the most essential ingredients, as it renders the block elastic and durable.

**IMPROVED SAP SPOUT.**

Francis E. Lord, Readsborough, Vt.—This invention relates to a sap spout for maple and other trees, by which the sap is taken up in superior manner, and the bucket suspended therefrom without the use of nails or other iron material, which is injurious to the tree. The invention consists of a centrally perforated spout, whose end that is driven into the tree is made longer and provided with a rim, and annularly recessed and perforated or mortised to take up the sap. The outside of the spout is provided with side recesses for attaching a hanger or hook, from which the pail or other vessel is suspended. The connection of the spout and hanger or hook dispenses with the iron spouts and nails, which are so injurious to the trees.

**IMPROVED METHOD OF PURIFYING RAW ANIMAL FAT.**

Isaac Mayer, New York city.—The object of this invention is to furnish a superior machine tallow, by a quick, cheap, and convenient process, from raw animal fat without the use of special machinery; and it consists of treating the raw fat with diluted nitric acid, then boiling the fat, and finally separating the tallow from the heavier fibers by cooling. The raw animal fat is first cut up in small slices or blocks of about one inch in size, and then treated in a wooden vessel with diluted nitric acid of about 2° Baumé. The acid has to cover entirely the fat, and is allowed to remain in the vessel for from thirty to forty-eight hours or more, the liquid being then poured off, and the so-prepared fat exposed to boiling in an iron vessel for from fifteen to thirty minutes, the fat being stirred up from time to time to prevent the burning of the fibrous and tendinous parts. The fat is then removed and allowed to cool under addition of water, the fibrous parts settling on the bottom of the cooling vessel, while the tallow is obtained at the top, and readily drawn off or removed. The fibrous sediments form a valuable food for pigs, while the tallow is of clear and superior nature, and obtained in a cheap and convenient manner, without the use of expensive presses, etc., and without producing any obnoxious odors.

**IMPROVED MEAT BLOCK.**

Newton Wells, Painsville, O.—This invention consists of a meat block having a roughened plate detachably applied thereto, so that it can be used for tendering meat, and by removing said plate the block is left with a plain or flat surface, upon which meat may be cut or dressed. The block is provided with a cover to protect it from flies and dirt. The block is de-

signed for use in families for chopping, pounding, or tendering meat. It is also provided with an attachment consisting of a plate of iron of suitable thickness, the upper surface of which is roughened or provided with pyramidal projections, and upon the lower side of which lugs are formed that project over the edge of the block for retaining the plate in position. Meat may be tendered upon this plate by means of an ordinary plain mallet. The block is so small that it is easily moved from place to place, and may be washed without difficulty.

**IMPROVED TRANSFERABLE BARREL COVER.**

Sylvester W. Sheldon and Daniel Dunscomb, New York city.—This invention consists in the combination of an adjustable fastening device with a barrel cover that is made in two parts and hinged together. The cover is attached to a barrel by placing it upon a barrel with brackets or fasteners outside and the block inside of the rim of the barrel, and forcing the block outward by turning the thumb screw until the edge of the barrel is firmly clamped between the brackets and the block.

**IMPROVED COFFEE ROASTER.**

John H. Bankston, Pulaski, Tenn., assignor to himself and T. J. Wells, of same place.—This invention relates to an improved device for roasting coffee, baking bread, meat, cakes, and other articles in perfect manner by the radiated heat of an open fireplace, so as to utilize the heat in convenient and economical manner; and the invention consists of a conical reflector with fixed cap or apex, being supported in suitable manner, with the open base or mouth toward the fire, and provided with flanges and supports for the baking pans, roasting cylinder, etc. The device is used by placing either the roasting cylinder or baking pan in position in the reflector, and then placing the reflector before the fire. The roasting cylinder is then slowly turned by the crank or handle of the cylinder shaft, the roasting being accomplished by the heat of the radiated and reflected rays of the open fire. The bread, cakes, meat, etc., are baked in the same manner by placing the mouth of the reflector at proper distance from the fire, the same being readily moved by a top handle.

**IMPROVED METHOD OF SETTING ARTIFICIAL GEMS.**

Henry Pic and Maurice Nelson, Paris, France, assignors to Veit & Nelson, New York city.—The object of this invention is to substitute for the soldering and gluing or cementing on of glass, enamel, or other imitation stones on their metallic mountings, an improved method of setting the stones in articles of jewelry for mourning or fancy purposes, by which the breaking off of the stones from the metallic parts is prevented, and a more durable and neater style of such articles obtained. The invention is intended to overcome the objections to the methods heretofore employed, and consists of glass and enamel melted on stems, which are riveted, screwed, soldered, or otherwise affixed to the perforated metallic mountings. The stones are thereby firmly connected to the metal parts without any danger of breaking off and marring the appearance and effect of such articles. A substantial and durable class of ornamental jewelry is thus furnished, which gives thereby greater satisfaction, and may be used for a large number of different applications.

**IMPROVED MAINSPRING ATTACHMENT FOR WATCH BARRELS.**

Edwin H. Flint, Cincinnati, O.—The winding of the watch is effected by turning the arbor, which carries the outer end of the spring around, and coils the inner end of the spring around the boss of the barrel wheel. The advantages claimed for this improved watch are that it is perfectly dust proof, it does away with the usual retaining mechanism, and obviates injury to the watch in case the spring breaks.

**IMPROVED LAMP BRACKET.**

Thomas J. Jury, Spencer, Ind.—This invention has for its object the combination, with a sectional jointed bracket and clamp, of a rotary spool stand and a lamp holder. The bracket is composed of sections jointed together, so that they will articulate freely, and can be extended or contracted at will. A clamp is applied for the purpose of fastening the bracket to the edge of a table. The spool stand is free to rotate on a post that is secured to the section, and into the upper side of which stands are fixed a number of pins, intended to receive spools of thread and allow the spools to rotate freely while the thread is being unwound from them. The lamp is held in its place on a shelf by means of fixed lugs and a movable lug, which latter is confined by means of a clamp screw, and allows the lamp to be removed from the shelf.

**IMPROVED FAUCET.**

William S. Lempert, Fort Davis, Tex.—The object of this invention is to furnish an improved faucet, which shall be so constructed that it will not be liable to be injured by being screwed into and out of the cask, which will not be liable to leak, which will have the button of the valve stem protected from accidental injury, and shall be simple in construction and easily operated. The invention consists in the combination of the inner part provided with the square or octagonal flange, the outer part provided with the valve seat, the spring chamber, the channel, and the nozzle, the cup or flange, the valve, valve stem, and button, and the spiral spring. This faucet can never be left open by carelessness, accident, or manipulations of children, as the moment the pressure is taken from the button it closes itself securely.

**IMPROVED SMOKE-EXCLUDING MASK.**

George Neally, New York city, assignor to himself and Charles W. Bloomingdale, of same place.—A great many persons perish by being suffocated by the smoke and gases in attempting to escape from burning buildings, while also a large quantity of valuable property is destroyed by the inability of the firemen to determine the location of a fire on account of the smoke, so that it gains such headway that it is impossible to check it before a great deal of damage has been occasioned by throwing the water in localities where the fire does not really exist. The invention consists of a novel combined mask and cap, of suitable elastic material, that fits tightly to the head, and whose mouth and nose are connected, by a mouthpiece and one or more tubes with suitable filters containing moistening sponges, which filters are again connected, by one or more tubes, with an elastic water receptacle strapped around the neck or body, so as to resupply from time to time the filters with the required degree of moisture by a slight pressure on the receptacle.

**IMPROVED WRENCH.**

Jacob Eiseman, Galena, Ill.—This invention relates to an improvement on monkey wrenches, and the nature of the invention consists in the combination of a detachable serrated jaw with the fixed jaw of a monkey wrench, whereby the common nut wrench can be made to serve as a pipe wrench. The movable jaw is confined in its place on the wrench by a hook that passes over the nose of the jaw and the pin that passes through the ends of the jaw back of the shank. This affords a very strong attachment, and enables a common monkey wrench to be converted into a pipe wrench.

**IMPROVED ADDING MACHINE.**

William L. Hofer, Deposit, N. Y.—This invention has reference to an adding and subtracting machine, by which these arithmetical operations may be accomplished in quick and accurate manner by mechanical means; and the invention consists of a revolving wheel or disk, provided with the figures from 1 to 99, and with a corresponding number of holes or notches, that are engaged by a centrally pivoted spring arm and pin for working the disk. A raised circular rib, at the under side of the revolving disk, engages, by the end points of the rib, which are a small distance apart, a sliding and toothed bar, so that the slide moves at every revolution of the disk, and indicates the hundreds and thousands on the face plate of the machine, while the tens and units are read off in a side recess of the face plate.

## IMPROVEMENT FOR DRYING FERTILIZERS, ETC.

Asa P. Meylert, Brooklyn, N. Y.—This apparatus consists of a large drying chamber, having a series of sectional spaces at both sides, which are divided by partition walls, having communicating openings at alternately opposite sides of the main chamber. A series of cars are made to pass on a tramway through the drying chamber. These are constructed with inclosed vertical partitions and closed ends, having horizontal platforms or trays intervening between the partitions, which platforms communicate with the sectional side spaces, and the linear space between the vertical inclosed partitions occupied by the series of platforms is similar to the length of a side section in the drying chamber. The platforms or trays within the cars are placed in successive series, one platform being put above another in a series, with an intervening space between each two platforms in a series. Each of these platform spaces is open on both sides, to let the heated air pass through below and above the material to be dried, thus providing a free transit for the air from one side section of the apparatus to another opposite.

## IMPROVED HEDGE-FENCE LAYER.

Ferdinando Poole and Wilson A. Pendergraft, Augusta, Kan.—The object of this invention is to furnish an improved machine for bending down and pressing together the Osage orange and other hedge plants, and holding them until tied, so that the hedge may be narrow and the upright shoots close together, making a close hedge. As the bent and compressed hedge plants come out at the rear end of the machine they are bound by a wire or tarred cord carried upon spools pivoted to the rear end of the frame work of the machine. The wire or cord is passed around the plants with a needle, through the eye of which it passed, and is then tied and cut off, the said wire or cord being never withdrawn from the said eye, but being slipped through the eye as each knot is tied. In this case the wire or cord is continuous, is secured to a plant or stake at the place of beginning, and is fastened with a half hitch each time it is passed around the plants. The hedge plants may be laid the first time close to the ground, and afterward laid one or more times at a higher level, so as to form a thick, close hedge with comparatively few plants.

## IMPROVED GATE.

Aaron Hyre, Churubusco, Ind.—The object of this invention is to furnish an improved gate, which shall be so constructed that it may be readily opened and closed by a person in a vehicle or upon horseback, and which shall be simple in construction, convenient in use, easily operated, and not liable to get out of order. The gate slides open and shut upon a bar attached to the upper parts of the post, and which passes between the adjacent edges of two horizontal bars of the said gate and between the cross-bars attached to said horizontal bars. A series of levers are so arranged and placed in connection and pivoted to the upper ends of two posts, placed upon the opposite sides of the rear part of the gate, and at such a distance from it that a person sitting in a vehicle can reach and operate the levers, the forward ends of which project toward the roadway, to open and close the gate before the horses have come in contact with the gate, and after his vehicle has passed through the gateway.

## NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

## IMPROVED WAGON BRAKE.

Christopher Heinen, Leavenworth, Kan.—The object of this invention is to furnish an improved brake for wagons, which shall be simple in construction, conveniently applied, and reliable in operation. To the end parts of the brake bar are secured the castings, upon the forward side of which are formed slightly wedge-shaped grooves to receive the wooden rub blocks, which are thus forced more firmly to their seats by the friction of the wheels. To the brake bar are attached the rear ends of two rods, which pass forward through the spaces between the rear axle and its bolster, and their forward ends are pivoted to the upper ends of short arms formed upon or rigidly attached to a shaft which works in bearings attached to the rear axle, and to one of its ends is rigidly attached, or upon it is formed, a longer arm, which projects upward at the side of the wagon box or body, and to its upper end is pivoted the rear end of a rod that extends forward along the side of the wagon box or body, and to its forward end is pivoted the lever, by means of which the force of the brake is applied to the wheels.

## IMPROVED THILL COUPLING.

Frederick C. Potter, Poughkeepsie, N. Y.—The object of this invention is to furnish an improved thill coupling which shall be simple in construction, safe and noiseless in use, and easily coupled and uncoupled. To disconnect the thill irons from the clips the thills are raised to a vertical position, in order that the lugs may be drawn out of the notches in lugs. The function of a rubber block is to prevent rattling of the thill iron in the socket when the parts are in working position, the projecting end of the thill iron being then in contact with a leather plate. A cam projection comes in contact with the leather plate when the thills are thrown up into vertical position, and the friction serves to hold them in such position out of the way.

## IMPROVED SHUTTER BOWER AND FASTENER.

Thomas B. Rogers, Jr., Brooklyn, N. Y., assignor to himself and Peter Cooper, New York city.—The object of this invention is to provide a convenient and reliable shutter fastener and adjuster. The shutter is adjusted by loosening a thumb screw, releasing a catch, and swinging the shutter open to the desired point, and clamping it by means of a screw. The engagement of the convex portion of the screw with the concavities of the bar insures the fastening of the shutter in any desired position. When the shutters are wide open the bar is engaged by a catch, which is pivoted between ears that project from a plate attached to the shutter. This catch is provided with a shoulder, which prevents it from dropping below a horizontal line drawn through its pivot, and the same shoulder projects sufficiently to touch the bar when the shutter is open, and throw the catch over in case the catch should remain in a vertical position when disengaged from the bar. A plate is attached to the window stool to receive the end of the screw when the shutters are closed.

## IMPROVED COMBINED AWNING AND SHUTTER.

William A. Hoyt, Paris, Tex.—This invention relates to an improvement in the class of awnings which are hinged to a building front and supported at their outer ends upon pivoted posts, the awnings being thus adapted to fold against the side of the building to protect the same in case of fire. The improvement consists in the construction of the posts for supporting the awning and the means for attaching them to the awning and securing them to the pavement. The hooks are affixed to the outer sides of the posts, and the upper ends of the latter are cut off at an obtuse angle, to adapt them to fit against the under side of the awning, and thus support the same in the inclined position required. By this construction, when the posts have been attached to the awning and brought into vertical position, they are secured rigidly in place by pushing down sliding bolts. In case of fire in front of the building or upon the opposite side of the street, the two outer posts are first removed. The bolt is then drawn in the central one, and the awning is allowed to drop. By means of this improvement the glass and wooden portions of the front are covered, so that the fire cannot affect them. This device may be used instead of ordinary shutters, as it renders the front burglar-proof, and as an awning it is more durable and serviceable than those of canvas or wood.

## IMPROVED CARRIAGE.

Warren H. Hancock, Augusta, Ga.—This is an improved carriage for agriculturists' implements, such as stalk cutters and the like. To the frame

of the carriage are fitted the axles and the wheels. With one wheel is connected a friction drum of conical form, and provided with a clutch that engages with teeth on the wheel. A conical drum on the crank shaft is arranged with its larger portion opposite the smaller portion of the friction drum. An intermediate wheel is placed on a rod that is supported by a vertically sliding frame, whose lower end passes through a mortise in the platform, and is connected with a lever and a ratchet bar, projecting through the platform. A spring bolt engages with ratchet, and has a disengaging lever that projects through platform. The intermediate wheel is grooved and provided with a clutch, moved by a lever acting through a lever and rod. The intermediate wheel is forced between the drums by pressure on a ratchet bar, and the motion of conical drum transmitted to friction drum and the wheel. The relative speed of the drums is varied by means of sliding the intermediate wheel on the rod.

## NEW HOUSEHOLD INVENTIONS.

## IMPROVED CHURN.

William H. Sterns, Humboldt, Neb.—The object of this invention is to furnish an improved churning apparatus which shall be so constructed that the milk may be thrown into violent agitation, so as to bring the butter in a very short time by the movement of the churn body, and which shall be simple in construction, effective in operation, and not liable to get out of order. The invention consists in a frame work to adapt it to receive the operating mechanism; in the combination of bars and hooks with the frame, and with a platform upon which the churn body stands; in the combination of bars, pivot, and a crank with the driving gearing, and with the platform that carries the churn body; in the combination of pivoted bars and a swinging bar with the frame and the platform upon which the churn body stands; and in the combination of pins with the base frame and with the platform upon which the churn body stands.

## IMPROVED BAKING OVEN.

Samuel Axford, Freeport, Ill.—This invention relates to baking ovens, and it consists in a baking oven of circular form, having a revolving shelf or table, and constructed with a furnace outside of the main wall, and with three flues leading one each from the furnace door, the oven door (outside thereof), and the body of the oven. The heat and unconsumed products of combustion then pass into the oven through an opening in the furnace side thereof, thence out through opening and flue into the chimney.

## IMPROVED IRONING TABLE.

Charles W. Barber and George Lenox, Lindleytown, N. Y.—The object of this invention is to furnish an improved device which shall be so constructed as to serve as a receptacle or basket to receive the clothes to be ironed, as clothes bars to air or dry the clothes, and as a table and a shirt board for ironing them, and which may be folded into small compass for storage and transportation. To the bars at one end of the device is hinged the end of a board, which forms the shirt board, and which is supported in place, when raised, by bars, the upper ends of which are hinged to the lower side of the outer part of the board. The lower ends of these bars are notched or have hooks formed upon them to hook upon the hooks or pins attached to the lower parts of the bars hinged to the end of the board.

## IMPROVED WASHING MACHINE AND CHURN COMBINED.

Wiot H. Clarke and William Collins, Council Grove, Kan.—The object of this invention is to furnish an improved machine which shall be so constructed that it may be used as a clothes washer or as a churn, and which shall be simple in construction, convenient in use, and noiseless and effective in operation. When the machine is to be used as a churn, a churn body is placed within the suds box to receive the milk. The churn body is provided with a closely fitting cover, through the center of which the dasher shaft passes. This construction allows hot or cold water to be put into the suds box, around the churn body, to temper the milk as required. When the machine is to be used as a washer, the dasher and the churn body are removed.

## NEW MECHANICAL AND ENGINEERING INVENTIONS.

## IMPROVED DRAFT-EQUALIZING DEVICE FOR HORSE POWERS.

John R. Dickinson, Ida, Mich.—The object of this invention is to furnish a draft attachment for horse powers which shall be so constructed as to compel all the teams to draw equally, which may be so adjusted as to prevent a weak horse or team from being drawn too far back, and which shall be simple in construction, easily applied, and reliable in use. In case a weak horse or team be used, a pawl is pivoted in the outer part of the box, to which is attached a short chain, a part of which is formed by a spiral spring, and which has a hook attached to its outer end, to be hooked into the main draft chain, so that if the weak horse or team is drawn back by the said chain the pawl may be drawn against the chain to clamp it, and prevent the said weak horse or team from having to draw against the others. The spring is designed to prevent the chain from being broken should the pawl slip upon the chain. The chain passes round a pin attached to the box, and which is provided with a ferrule or tubular washer to prevent wear. The chain can be readily detached or allowed to hang, and the pawl turned back or detached when not required for use.

## IMPROVED LIFT PUMP.

Emory Barnes, Mount Pleasant, Mich.—This invention has relation to means for raising water, and the nature of the invention consists in combining, with a submerged cylinder, a piston which is depressed by a helical spring and raised by means of a treadle and a chain, which is attached to the piston rod and passed over a pulley attached to the discharge pipe. By depressing the treadle the piston will force water up through the discharge pipe. At the foot of this pipe is a check valve, which allows piston to force water up the pipe, but prevents it from returning.

## IMPROVED CARPET-SEWING MACHINE.

Joseph Hesse, San Francisco, Cal.—The object of this invention is to furnish an effective and readily operated hand sewing machine, by which carpets may be readily and evenly connected by a loop stitch formed of one thread. The invention consists of a bent main plate or saddle straddling the edges of the carpet, and having a rectangular plate, to control the distance of the stitch from the edges and compress them for the needle. A presser spring, with a lifter and feed roller, is attached to the inside of the main plate. The feed bar, needle bar, and devices for imparting motion to the reciprocating hook receive their motion from a hand crank wheel and driving shaft geared therewith, the feed bar operating two feed pawls and rollers, working independently of each other. The compound motion of the thread hook is imparted by a top plate with guide grooves and the beveled upper end of the hook stem, in connection with pins and a bevel plate of the connecting rod of needle bar and driving shaft.

## IMPROVED VALVE.

Seth Lloyd, Conshohocken, Pa.—Hitherto it has been the experience in valves for steam and water pipes that, by the frequent screwing and unscrewing of the same, the screw portions are worn out while the other parts of the valves are still in good condition. The valves need also re-packing from time to time, which is troublesome and expensive. Valves are also frequently placed at points which are reached only with difficulty for the purpose of packing. Now, the object of this invention is to furnish a valve with improved stem, that produces a steam or water tight fitting without requiring any packing for the stuffing box, and which has no parts that wear out by use, being capable of application directly for use as they are furnished by the manufacturer. The invention consists of a compound and spring-acted valve stem, of which the upper handle section is connected to the lower valve-operating section by a kind of coupling or

clutch, both sections having conical valves that are forced by an interposed spring against seats of the casing or box to produce the tight fitting of the stem.

## IMPROVED HORSE POWER.

Thomas C. Churchman, Sacramento, Cal.—The object of this invention is to furnish an improved horse power for thrashers, separators, and other machinery, which shall be so constructed as to give two motions at each revolution of the traction wheel, which shall be free from the jerking motion which always accompanies the action of a crank, and which shall be simple in construction and convenient in use. The invention consists in an improved horse power, formed by the combination of the step, the spindle having a bearing or box upon its upper end, the guide standard provided with a ring at its lower end, the grooved disk, the sliding T blocks, and the pitman bent twice at an angle, with each other and with the shaft and the traction wheel.

## IMPROVED HORSE POWER.

Isaac D. Albin, Sr., Chilhowee, Mo.—The object of this invention is to furnish an improved portable horse power for thrashers, separators, and other agricultural machinery, the power having the advantage of being run with double reversible draft and any desired number of horses, from two to fourteen, according to the machinery to be driven. The horse power may also be as a single power, and the transmitting shafting be arranged in elevated position above the horses, or in a position near the ground, as desired. The double reversible draft frames of the power produce the balancing of the apparatus so as to dispense with the staking or chaining down of the same, and admit, therefore, a lighter construction and its mounting on a wide truck or common farm wagon, all of which serve to render this horse power of great advantage for the various applications. The invention consists of a master wheel and frame, having a number of draft levers that are driven in one direction, and of a pinion frame, with levers that are drawn in opposite directions, the draft levers of the pinion frame being elevated to admit the horses of the master wheel to pass under them, inside of the track of the horses attached to the pinion frame. The pinion frame transmits the power by suitable gearing to a crown wheel, and by an intermeshing speed pinion to the driving line shaft, that is supported in a triangular top frame.

## IMPROVED CAR COUPLING.

James R. Lamb, St. James, Minn.—This invention refers to that class of car couplings that may be coupled without danger automatically, the link being held in a horizontal position for entering the approaching drawhead, and the pin dropped on the entrance of the link. The entering of the link pushes the follower back and drops the pin, so as to couple thereby the cars. The follower presses on the link and forces it against the pin, holding the link by the curved and concave top part in horizontal position for the coupling, so as to readily enter the mouth of the drawhead to be coupled. The follower gives the link the necessary play, so as to work free in the drawhead when coupled. The pin is supported stationary in the curved end of the slide piece without being released by the forward motion of the follower, so as to allow the backing of a lot of loose cars on side track, or other operations in which cars are not required to be coupled.

## IMPROVED CHANNELING MACHINE.

George W. Bacon, South Groveland, Mass.—The object of this invention is to produce an effective cutter for sole-channeling machines. The channeling knife has a chisel shaped cutting edge at its projecting end, near which the grooving knife is placed, its cutting edge projecting below the channeling knife. When in use this knife is prevented from springing downward and backward by a grooved block which receives the tongue of the knife. The knife thus secured cuts evenly and forms a uniform groove and channel.

## IMPROVED NUT-TAPPING MACHINE.

Samuel L. Worsley, Taunton, Mass.—In front of the mandrel that carries the tap there is a nut holder, having in it a mortise of the thickness and width of the nuts to be tapped, which extends horizontally through the holder at right angles with the mandrel. A follower is fitted to the holder, and is forced by a spring against the nut in the holder. The nut blanks are fed to the mortise in the holder through a chute, and are carried by a follower. The feeder has in its upper edge a groove, which receives the nut blanks from the hopper when the feeder is dropped down, and delivers the blanks to the chute when the feeder is raised up. The time of the movement of different parts is governed by cams and by change wheels on the machine, which are proportioned to the different sizes of nuts. The blank holder is provided with the removable portions, which are changed when the holder is adapted to different sizes of nut blanks.

## IMPROVED STEAM ENGINE.

Jacob J. Anthony, Sharon Springs, N. Y.—The object of this invention is to furnish an engine that is simple in construction, compact in form, and efficient in operation, which may be adapted to any of the purposes for which ordinary engines are used; but it is especially designed for locomotives and steam boats. The operation of this improved engine is as follows: Steam is admitted to the chest through an opening, whence it passes through ports to the steam chest and through one of the ports into a cylinder. The valves, by their connection with a lever, are made to move in opposite directions, so that when one of the supply ports is opened the exhaust port below it in the same end of the cylinder is closed, while at the opposite end of the cylinder the exhaust port is open and the supply port is closed. The piston is propelled by the steam toward the end of the cylinder until it strikes one of the ribs, when the valves are shifted and the piston is moved toward the opposite end of the cylinder. The reversing of the engine is effected by admitting steam to the valve chest to start the engine on one side of a partition, and afterward admitting it to the other side. All of the cylinders may be used in connection, or by disconnecting the coupling they may be used in pairs. When the engine is applied to steamboats one pair of cylinders may be connected with each wheel, and by the action of the engine alone the boat may be steered.

## IMPROVED CAR HEATING APPARATUS.

James F. Callaway, Louisville, Ky.—A steam pipe leads from the dome of the locomotive back to and through all the cars of the train. It is laid in convolutions over the floor of each car, and valves control admission of steam and escape of water of condensation. Suitable flexible couplings connect the pipe sections between the cars.

## IMPROVED DITCHING AND EXCAVATING MACHINE.

Samuel A. De Force, Crockett, Tex.—The object of this invention is to furnish an improved machine for making ditches and other excavations, which shall be so constructed as to separate the slice from the soil, raise it and deposit it at the side of the cut, which will feed itself forward automatically, shall be simple in construction, and easily guided and controlled. The invention consists in the combination of a rotating cutter and a reciprocating holder with the shaft upon which they are hung and with the frame work of the machine; in the combination of segmental gear wheels and bevel gear wheels with the shaft and the bevel gear wheel that carries the holder and the cutter; in the combination of a spout with the cutter, a holder, and an endless carrier; in the combination of a spring and arm with the shaft, to which the spout is attached, for moving the spout forward to receive the dirt; in the combination of an arm, lever, and stop pin with the cutter and the shaft, to which the spout is attached, to move the spout back to allow the cutter and holder to pass; in the combination of stops, a latch, and stop pins with the shaft, the frame, and the cutter, for controlling the movements of the holder from the movement of the cutter; in the combination of a tooth, sliding rod, spring lever, and gear wheel with the bevel gear wheel and the axle of the carriage; in the combination of gear wheel, a clutch, sliding bar, and lever with the driving shaft and frame.