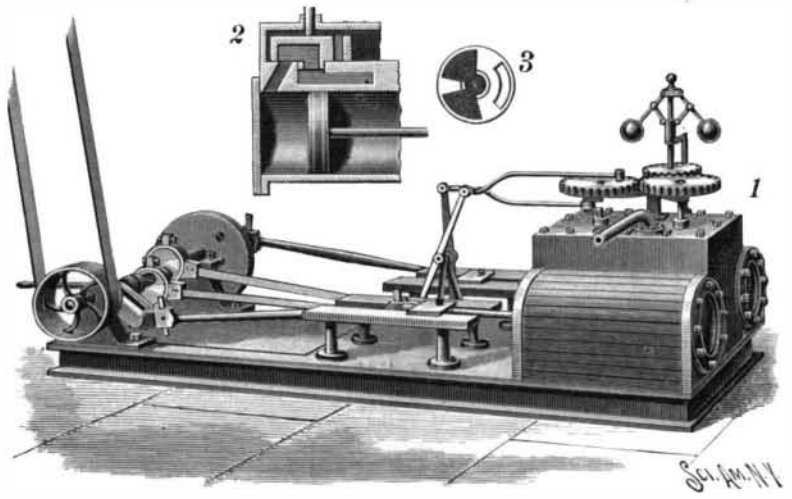
AN IMPROVED STEAM ENGINE.

The accompanying illustration represents a durable, simple, and comparatively inexpensive engine, in which two cylinders are arranged side by side and have their piston rods connected to a common crank shaft. The improvement has been patented (letters patent No. 571,034), and is being introduced by Col. H. S. Blanchard, of Helena, Mont. The engine has no dead center, and its rotary valves are arranged to so cut off and cut in the steam that a volume of one full port will always be exerted on a piston, and when the crank is on the quarter, giving the greatest leverage, there being no pressure exerted and energy lost when a crank is on the center. Fig. 2 is a detail sectional view of one of the steam valves and connections, showing means for a quick exhaust, and Fig. 3 is an inverted plan view of the valve. The cranks are placed at an angle of ninety degrees to each other, and one is preferably arranged directly on the shaft while the other is on the fly wheel, the steam chest being midway of the cylinders. In the bottom of the steam chest is a base plate which serves as a seat for the rotary valves, which revolve above groups of ports in each end of the steam chest, the ports being arranged in pairs and connected with channels or leads which deliver into the end portions of the cylinders, there being also ports connected with channels which lead to the exhaust pipe. The valves have each a constant and steady motion in one direction, although moving opposite to each other, but by means of a forked shifting lever the engine may be easily and instantly reversed. Each cylinder begins to take steam when the crank arm is at an angle of about forty-five degrees off dead center, but one cylinder being in power at a time, and remaining in power while the crank arm is passing through an arc of about ninety degrees, when steam is shut off from the first cylinder and admitted to the other cylinder, each cylinder using the steam expansively in finishing its stroke. The same power continuously applied by the cylinders alternately to the same leverage, i. e., top and bottom quarters of the wheel, results in a uniform turning movement through the entire revolution and is designed to afford a gain in leverage of thirty-seven per cent besides the gain by not being in power on the dead centers, which actual tests are said to show to be as much more. The steam supply is very nicely and automatically regulated by the governor, which is substantially like the ordinary ball governor, but it is applied to the controlling valve in a different way. Its swinging arms are connected by short arms with a sliding sleeve on the governor shaft, this sleeve being secured to an angle lever pivotally connected by a link with a crank on a shaft at one side of the steam chest, and having arms connected with the slide valves. In case anything breaks, the steam is entirely shut off, thus stopping the engine.



BLANCHARD'S DUPLEX STEAM ENGINE.

The Antiquity of the Steel Square.

The author of "The Steel Square and Its Uses" speaks of the antiquity of that useful tool as follows:

"Pliny says that Theodorus, a Greek of Samos, invented the square and level, but this cannot be, for the square figures in the represented designs of the Tower of Babel, one of the earliest known structures. The city of Babylon was a perfect square, and the bricks used in its buildings and walls were square; so probably were those in Babel. Now, to form squares correctly, and to introduce them in endless combination into buildings, it needed a guiding instrument of some kind. So the square, as a constructive tool, came into use. Among the ruins of Babylon, Nineveh, and Petra it is said to have been found represented. There are pictures and sculptures from the ruins of Thebes in Egypt showing the square in the hands of the artisan. Evidences of its use are also to be seen in ruins in India, which are thought by some to antedate those found in Egypt. Among the ruins of the Aztecs, or the people before them, in Peru and Brazil, it has also been found; and though tools of stone and flint, such as axes, hatchets, hammers, etc., were the first used by primitive man in these ruins that date back beyond history, the square is found, and specimens may be seen in the British Museum. The square was regarded by the ancients as a symbol of completeness. Simonides speaks of a man square as to his hands, feet, and his mind, etc. Aristotle uses a similar expression." It now transpires that the square was known and used by the ancient Babylonians, as far back as 9,000 years before Christ, if we are to place any confidence in the recent discoveries made at Nippur by Americans who are making excavations at that ancient city.

Protective Spectacles for Workmen.

Injury to the eyes by dust, sparks, flying splinters, and stones is by no means rare, and only imperfectly prevented by the ordinary spectacles. These are made either of wire gauze, and are then so dark that the men cannot help taking them off occasionally, or of glass. The latter are not liked, says Stone. A cold draught makes them dim, and the grimy hands are not suited for cleaning them. They are destroyed by heavy blows, moreover, and themselves give dangerous splinters, and the side frames have to be pressed close against the cheeks, so that ventilation is stopped, and the men complain about hot eyes. Dr. Thomalla, of one of the Berlin accident wards, has devised a spectacle made of Schering's gelatoid, an elastic perfectly transparent material, which can be hardened in amyl-acetate. If really broken by flying pieces, the mass does not splinter. Ventilation is effected through oblique perforations, through which under exceptionally unlucky circumstances only a splinter or dust particle might find its way. The gelatoid does not condense moisture on its surface, and does not become so hot as glass near an open fire. It does not catch fire.

RECENTLY PATENTED INVENTIONS.

Mechanical.

PREVENTING END MOTION IN SHAFTS, ETC.—Joseph Himes, Port Blakely, Washington. To prevent longitudinal movement in either direction of shafting and spindles, this invention provides that a journal portion of the shaft or spindle shall have a swelled portion in the form of two integral cone frustums, and that to these shall be applied, at the bearings, coniform sleeves, in pairs, slidably connected by a tongue and groove, permitting their longitudinal adjustment, but preventing the rotative movement of either sleeve. The device may be applied in connection with a supporting step block for a vertical shaft, or in an end or other bearing for a horizontal shaft. Two patents have been granted the inventor on this invention, one relating more particularly to a bearing for continuous horizontal shafts.

PUMP.—Elmo G. Harris, Rolla, Mo. This pump is arranged to be economically worked by compressed air, and is more especially designed for raising water in mines or delivering water in a water delivery system. The pump has two closed pumping chambers with bottom pipe connections for admitting and discharging water and top connections for admitting and discharging air, a shifting valve or switch forming a part of the connections from the inlet and discharge pipes of the air compressors to the pumping chambers, there being also an operating mechanism for the shifting valve.

CLEANING TEXTILE FIBERS. — Louis Drach, Buhl, Germany. From the cops, or from the reel carrying the yarn, the threads pass through thread guides and over a rod to the cleaning device, as provided by this invention, which comprises adjustable jaws with teeth in a zigzag path for the thread, mounted on a pivoted support connected with a lever whose free end is connected with the thread guide board, whereby, when the board is raised and lowered to distribute the coils of thread upon the bobbin, the cleaning device is also raised and lowered by the lever, and the angle of inclination of the threads and their tension is maintained.

HAMMOCK MAKING MACHINE.—Ignacio Basulto, New York City. This machine comprises a series of needles or bars around which the thread is wound by suitable movable guides, there being mechanism for advancing the meshes thus formed, and means for feeding the material forward. A fabric of practically unlimited length may be made, there being used as many mesh-feeding bars as the complete fabric has rows of meshes, and various patterns may be produced by using cylinders with cam grooves of different shapes.

Agricultural.

ONION TOPPER.—Arba E. Vrooman, Arthur, North Dakota, and Warren F. Vrooman, Madison, Ohio. To quickly remove the tops from vegetables without bruising or injuring them, these inventors have devised a simple and inexpensive machine, to be run either by power or by hand, the various parts being readily adjustable for large and small vegetables. Supported over topping rollers is a trough having an opening registering with the space between the rollers, fingers extending along one side of the trough, and there being a connection between the roller driving device and the finger carrying bar. The rollers engage the tops to pull them from the vegetables, the latter being discharged in good condition, while the tops and clinging dirt and dust accumulate beneath the machine.

CORN HUSKER.—Marcus W. Bailey, Woodhull, Ill. A husking glove provided by this inventor has a finger cap, a finger band, a hinged connection between the sides of the band and the finger cap and a flexible connection between their fronts, there being also a point on the top edge of the finger cap and a rigid thumb ferrule with a flange extending above its upper surface. Ample provision is made for ventilation in the glove, by means of which the corn may be husked cleanly and quickly, without unduly tiring the operator.

STUMP PULLER.—Edgar Nelson, St. Mary's, Ohio. A simple and forceful means for applying power is described in this invention, applicable for pulling stumps and other purposes, the device being a part of the anchor or connecting means, by which the strain may be released when desired, and the slack partially taken up before commencing the pull. The tension draught device has an interposed slack member consisting of a long link with S-shaped bar connecting its opposite sides, while a retaining device attached to the tension draught device is adapted to hold the ends of the slack member.

Miscellaneous.

BICYCLE BRAKE.—Albert N. Godfrey, Port Townsend, Washington. Journaled in a hanger pivotally connected by a link with the front frame fork is a pulley with slightly concave rim covered with vulcanized rubber, to bear on the bicycle tire, the ends of the pulley being coniform and being journaled in vertical slots in concave-shaped shoes on the inside of the hanger. Extending up from the hanger is a pusher bar connected with a brake-actuating lever whose free end extends near the handle bar at one side. A spring holds the brake pulley normally away from the wheel, but by a slight movement of the brake lever the brake pulley is moved downward, inducing frictional resistance between its coniform ends and the inside shoes of the hanger at the same time that a graduated resistance takes place between the pulley and the wheel of the bicycle.

RUDDER FOR BOATS.—Levi M. Thomas, Punta Gorda, Fla. The rudderstock, according to this invention, is connected by a brace with the upper portion of the rudder blade, and the lower portion of the latter is pivotally connected with the boat by a socketed plate on the skeg, and a plate on the rudder carrying a pin. Attached to the rear of the boat is a bearing for the rudder stock, consisting of a hinged clamp with adjustable locking device. With this construction the rudder may be readily shipped and unshipped and the device is strong and simple.

SEWING MACHINE ROLLER BEARINGS.—William S. Sutton, Belvidere, Ill. The bearings provided by this invention each consist of a cup movably held in a frame, a cone on a revoluble post projecting into the cup, a set of balls in the cup engaging the cone, and a threaded sleeve surrounding the revoluble post and screwing in the frame with its inner end engaging the cup to adjust the latter. Any wear may thus be readily taken up, and the friction of the moving parts is reduced to a minimum.

VALVE MECHANISM.—James A. Healy, Nashville, Tenn. For flushing devices, hydrants, etc., a valve mechanism is provided by this inventor that may be easily reached for repairs, bich will be self-closing, and in which leakage is reduced to a minimum. In a discharge tank having a waste outlet is a water receiving and discharging pipe with valve seat and valve in its lower end, a valve casing in the pipe having a valve and a waste outlet, and there being a connection between this valve and the first valve. A stem extends upward from the waste outlet valve, a push rod having a cup-shaped lower end into which the stem extends, while a valve pipe surrounds the rod and a plug valve on the rod engages in a valve seat in the valve pipe.

FENCE.—James W. Hammett, Eureka, West Virginia. In wire fences this invention provides a peculiar construction and arrangement of a brace panel and a hillside post, to increase the strength and stiffness of the fence and adapt it to firmly stand on a hillside, and also to be easily repaired, should it be weakened by caving or washing of the bank. The post has a slotted and wedge-shaped metal foot, and an angular surface bracket, with one end attached to the post and the other end slotted to receive anchorage pins, while a diagonal brace extend from the surface bracket to the post.

NECK YOKE.—John W. Harper, Higgins, Neb. The top of the outer end of the pole, according to this invention, has a roughened surface or an attached cogged plate, on which a curved cam plate with a cog surface is pivotally held by means of a loop extending beneath the pole, a crossbar at the upper ends of the loop forming a pivot for the cam. Straps or rods extending through the center of the pole, and held in position by nuts, connect with the pole loop, and hold the cam in binding contact with the cogged plate on the pole, so that, whether the draft be forward or back, any slipping of the yoke is prevented.

FOLDING BED.—Israel A. Dodge, Fort Worth, Texas. A bed which can be cheaply made, and may be easily moved from place to place, is provided by this invention. the bed body having sliding handles and a hinged frame turning down to secure the bedding. Pivoted to the body are base legs which form a stop, and pivoted outer legs are connected by links with the base legs. When turned edgewise the bed takes up but small space for storage or shipment, and is light and easily handled and perfectly safe, requiring no dangerous weights or springs.

FOLDING BED.—George S. Hastings, Long Island City, N. Y., and William W. Flagler, New York City. A multiple folding bed or structure has been devised by these inventors, in which a number of beds may be folded to be out of the way, and with their backs against each other when not in use, in like manner to berths upon a vessel. The beds are pivoted at their rear ends in a frame, within which the beds fold one back of the other, the legs being pivotally connected with the uppermost bed near its outer side, while a supporting bar connects the legs and receives the outer portion of the lower bed. A weight is attached to the legs to assist in holding the beds in folded position. Beds in the nature of bunks may be quickly and inexpeusively erected according to the construction provided for by this invention.

BATH TUB. — John C. Lacy, Long View, Texas. A small portable or foot tub is, according to this invention, provided with a removable shield and seat capable of enlarging the size of the tub and of furnishing a rest for the person using it. The shield is crescent shaped and bent so that its lower edge may lie snugly against the upper edge of the tub, the upper edge of the shield extending outward and upward from the tub. The shield also has a seat and a pocket on each side is held in place by means of side clips, while pivoted to its back are folding wire rod legs.

PRESERVE JAR GRAPPLE. — Henry Gartelman, New York City. To facilitate the handling of jars while filling them with preserves, etc., this inventor provides a device comprising two pivoted arms with bands of steel or other flexible material secured to the arms on opposite sides of the pivot, the bands being adapted to engage the peripheral surface of the jar. On the outer end of one of the arms is a foot to engage the bottom of the jar as it is clasped by the tool. The diameter of the bands may be readily increased for jars of different sizes, and, with this implement, jars and their contents may be heated and then handled, and the cover fastened in place, without soiling or scalding the hands.

SAFETY RAZOR STROP. — Albert L. Silberstein, New York City. This strop has a spring-pressed casing fitted to slide on the strop bed, a blade holder journaled on the casing having a shaft carrying at its ends gear wheels, racks sliding on the sides of the casing being in mesh with the gear wheels. The operator, by simply moving the racks forward and backward, causes an automatic sliding of the cutting edge of the razor blade over the holder, and also an automatic reversing of the strop at the end of each stroke.

ASH SIFTER.—Charles A. Morse and George F. Shattuck, New York City. In a suitably constructed casing adapted to receive in its upper end the material to be sifted is a peak shaped screen, there being under the screen a hopper and a chute discharging into the ash pan. Coal and cinders rolling down the sides of the peak shaped screen are directed by deflectors upon other screens and carried in a zigzag course to a coal box, any ashes being separated and carried to the ash pan. The work of separating the ashes from the coal and cinders is thus automatically performed.

GARMENT PIN.—Jennie McK. Secord, Rotterdam Junction, N. Y. This inventor has devised a fastening pin for hats and bonnets, or which may be used as a shawl pin, or with other articles of apparel. It has a ringlike head, around cross bands of which are passed an elastic cord, forming separate runs of the cord, which also carries a block in which is a recess to receive the point of the pin. After pushing the pin through the article the pin point keeper is placed over the point by stretching the cord.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.