No. 735,590. PATENTED AUG. 4, 1903.

G. C. RICHARDS.

STAMP MILL.

APPLICATION FILED OCT. 9, 1902.

NO MODEL.

Fig. 1.

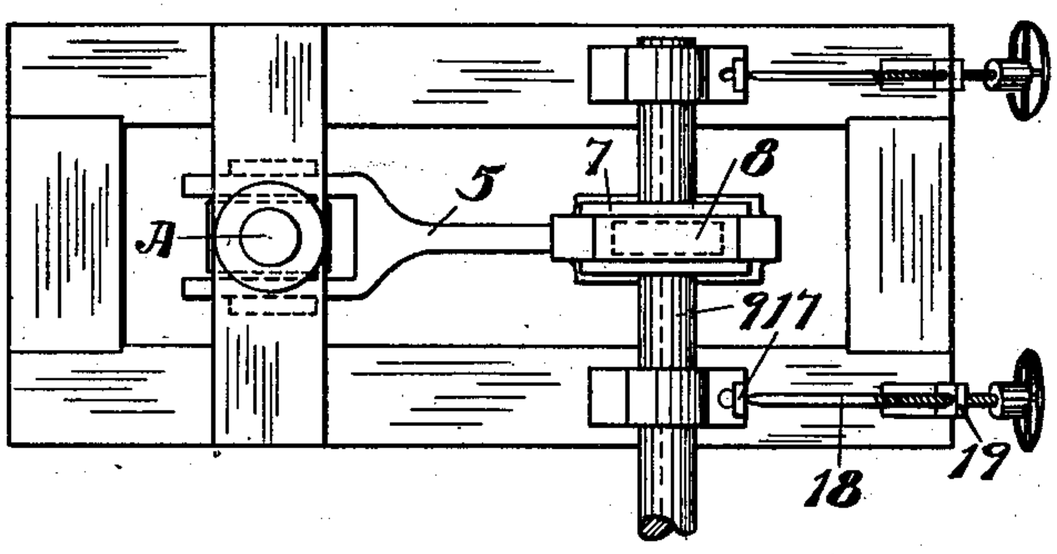


Fig. 4.

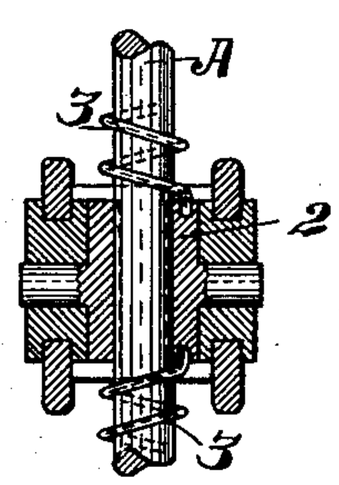


Fig. 2.

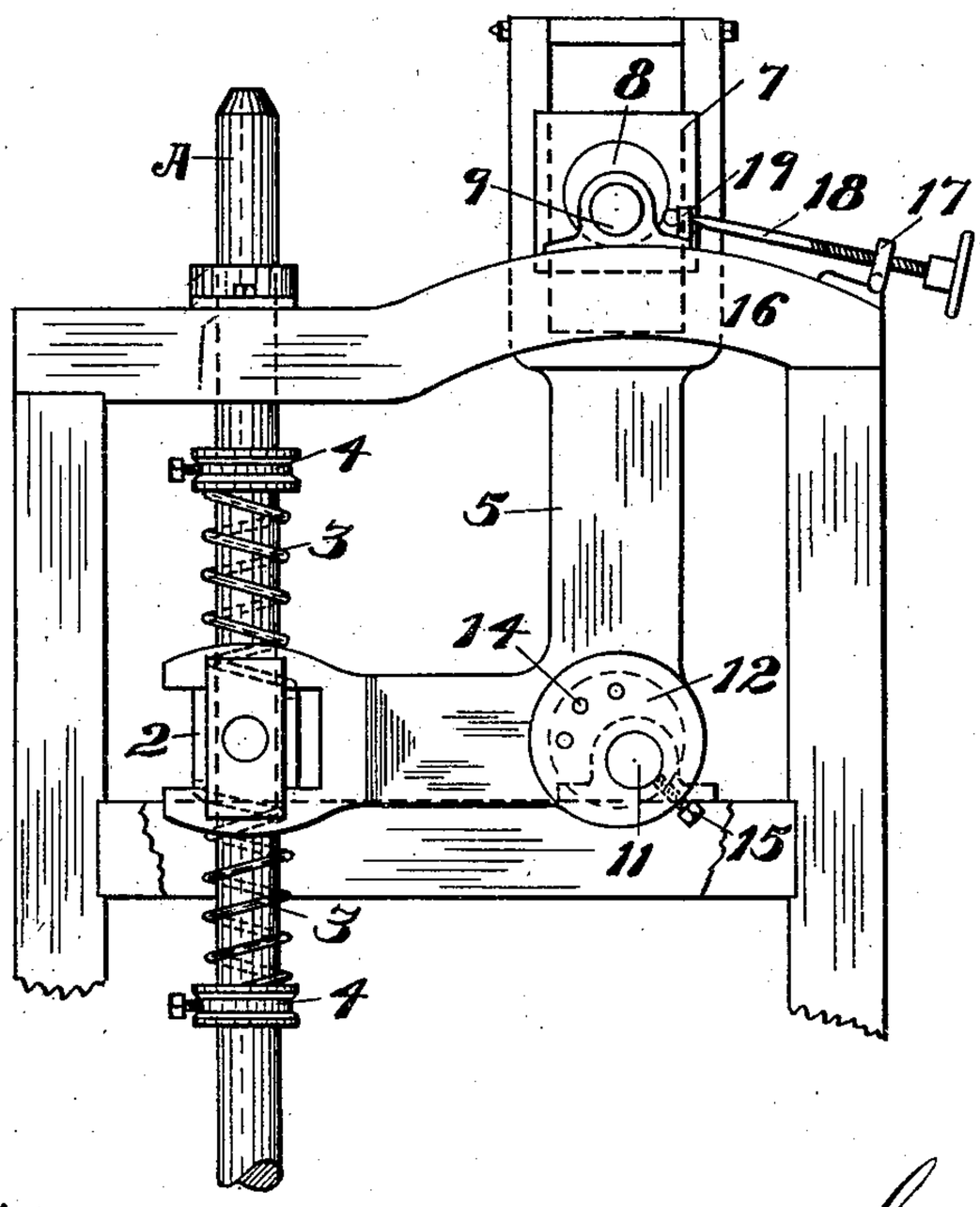
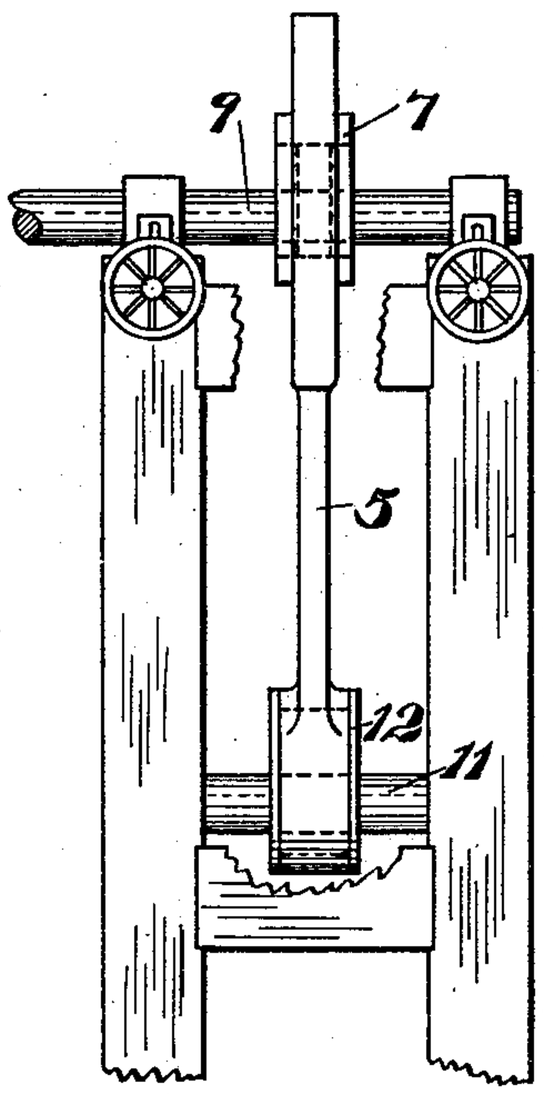


Fig. 3.



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No. 735,590. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

GEORGE CLARK RICHARDS, OF BERKELEY, CALIFORNIA.

STAMP-MILL.

SPECIFICATION forming part of Letters Patent No. 735,590, dated August 4, 1903.

Application filed October 9, 1902. Serial No. 126,476. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CLARK RICHARDS, a citizen of the United States, residing at Berkeley, county of Alameda, State of California, have invented an Improvement in Stamp-Mills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in stamp-mills; and it consists in a mechanism for actuating the stamp, a means for adjusting the stamp stem and shoe, means for regulating the position of the actuating-lever to vary the drop of the stamp and adjusting each stamp and stem independently, and means for raising the stamp-stems for the purpose of replacing the shoes when old and worn out.

It also comprises a means for turning the stamp and its stem while in operation.

Referring to the accompanying drawings, Figure 1 is a plan view of my invention. Fig. 2 is a side elevation of same. Fig. 3 is a rear view of same. Fig. 4 is a cross-section of tappet and spring connection.

As shown in the present invention, A represents a stamp-stem; 2, a tappet loosely fitting the stem, having sufficient length of bearing, so that it may slide freely upon the stem.

3 3 are stout spiral springs, the ends adjacent to the tappets being fixed thereto in any suitable manner. The opposite ends abut against collars 4, which are normally fixed to the stem above and below, so that when pressure is applied to raise the stamp-stem the upper spring will be compressed, and when the tappet is moved downward at a more rapid rate than the natural fall of the stamp by gravitation it will act to compress the lower spring, and thus add to the force of the blow of the stamp. The ends of the springs which contact with the tappet may be bent to enter holes bored in the top and bottom of the tappet, respectively, or otherwise permanently connected therewith. The outer ends of the springs rest against the collars 4, and they operate to turn the stamp-stem as follows: The means by which the tappet is reciprocated consists of a lever and reciprocating mechanism, to be hereinafter described. This lever is attached to the tappet, so that the latter does not turn. The springs 3 are coiled in opposite directions, one having a right-hand turn, the other a left-hand turn. When these springs are compressed, the act of compression causes each to twist or wind slightly in the direction of its twist, and this acts against the collar against which it is then pressing, and thus turns the collar and the stamp-stem slightly. When the tappet is moved in the other direction, compressing the other spring, it also winds or twists slightly, and by reason of its coiling in the opposite direction it acts to turn the stamp and stem in the same direction that it was previously turned by the other spring. When the direction of motion is reversed and the pressure on the spring relieved, it leaves the stem in the position to which it was turned, the spring simply uncoiling a little and being in readiness to take a new hold on the collar when again pressed against it. In this manner the alternate reciprocation of the tappet and the compression and extension of the right and left springs acts to continually turn the stamp and stem in one direction.

As the shoes and dies become worn it is desirable to adjust them so that they will fall and give the proper crushing effect upon the ore beneath. The levers 5, of which there is one for each stamp, are here shown in the form of bell-crank levers fulcrumed at the angle and having one end connected with the tappet 2 and the other end slotted and having the slidable box 7 movable longitudinally in the slot. Within this box is fitted an eccentric 8, mounted upon a shaft 9, through which power is applied to revolve it. The eccentric revolving within the box presents a greater wearing-surface than an ordinary crank-pin, and it is especially advantageous, because it may be revolved and adjusted upon the shaft, so as to regulate the drop of the stamp to equalize any number of stamps from two upward. In order to vary the drop of the stamp and also to lift the stamps when it is necessary for the purpose of cleaning up or changing shoes or dies, I have shown the fulcrum at the angle of the lever consisting of a shaft or pin 11, having an eccentric 12 fixed to the shaft and turnable within a sleeve formed in the angle of the lever. The eccentric may have pin-holes or other means, as at 14, by which it can be turned upon its shaft, and when turned to a desired point of ad-

justment a set-screw 15 serves to secure the eccentric and lever to oscillate in unison. It will be seen that by turning the eccentric upon the shaft the lever may be raised or lowered bodily, and if the stamps or shoes have become worn, so that they do not act properly, by turning the eccentric slightly the lever can be lowered and its relative position to the tappet 2 so changed that the latter will act to raise and drop the stamp and stem properly. It will be seen that in this manner the drop of each stamp and stem can be regulated independent of the others and with relation to its own particular necessities. This raising and lowering of the lever will have no effect upon the actuating-eccentric, as it and its box are slidable in the guide at the upper end of the lever and will operate equally well at any point at which they may relatively stand.

The boxes in which the shaft 9 is turnable are mounted upon guides 16, which in the present case are in the form of arcs radial to the fulcrum-shaft of the bell-crank lever. These boxes have screw-threaded nuts 17 connected with them and screws 18 enter the boxes. The shaft of each screw is turnable in a stationary support, as at 19, and may have a hand-wheel or equivalent turning device, so that by revolving it the upper end of the lever may be moved to one side or the other, and the stamps can be raised or depressed bodily by this action.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a vertically guided and movable stamp-stem and a tappet slidable thereon, of a lifting-stop fixed to the stamp-stem and a compressible spring below, said spring having one end secured to the tappet and the other contacting with the stop, and means for reciprocating the tappet whereby alternate compression and elongation of the spring, and lifting of the stamp-stem, serves to rotate the stamp and stem.

2. The combination with a vertically guided and movable stamp-stem, of a tappet slidable thereon, a plurality of stops or collars fixed above and below the tappet, oppositely-coiled spiral springs surrounding the stamp-stem between the tappet and collars, and having one end of each attached to the tappet, means by which the tappet is reciprocated without rotation, whereby the alternate compression and twisting of the springs acts to rotate the stem and stamp.

3. A vertically guided and movable stamp-stem, a tappet slidable thereon, a lifting contact device above the tappet and a compressible spring below, and having one end secured to said tappet, a shaft journaled at one side of the stem and a lever fulcrumed thereon, with means for oscillating the lever, and an eccentric fitting a hole in the lever and turnably adjustable upon the fulcrum-shaft.

4. A vertically guided and movable stamp-stem having a tappet slidable thereon, compressible springs through which the tappet acts to impart motion to the stem, a bell-crank lever, a shaft upon which the angle of the lever is fulcrumed an eccentric turnable in a hole or sleeve in the lever and adjustable upon the shaft whereby the stamp may be raised or depressed with relation to the actuating means.

5. A vertically guided and movable stamp-stem having a tappet slidable thereon, compressible springs through which the tappet acts to impart motion and rotate the stem, a fulcrumed shaft having an eccentric adjustable thereon, a hole or sleeve through the angle of the lever within which the eccentric is turnable to raise or lower the lever with relation to the tappet, a guide formed in the arm of the lever opposite to that which engages the tappet, a slide movable in said guide, a driving-shaft and an eccentric mounted thereon and turnable in a hole or sleeve in the slide.

6. A vertically guided and movable stamp-stem having a tappet slidable thereon, compressible springs and collars fixed to the stamp-stem between which and the tappet the springs are located, a bell-crank lever, a shaft upon which it is fulcrumed at one side of the stem, so that one arm of the lever engages the tappet, a slot or guide upon the other arm of the lever, a slide movable therein, a shaft having an eccentric rotatably adjustable thereon and turnable in a hole or sleeve in the slide.

7. A vertically guided and movable stamp-stem having a tappet slidable thereon, compressible springs and collars fixed to the stamp-stem between which and the tappet the springs are located, a bell-crank lever, a shaft upon which it is fulcrumed at one side of the stem, so that one arm of the lever engages the tappet, a slot or guide upon the other arm of the lever, a slide movable therein, a shaft having an eccentric rotatably adjustable thereon and turnable in a hole or sleeve in the slide, an arc upon which the journal-boxes of the driving-shaft are slidable transversely, screw-threaded nut and screw turnable within the nut whereby the driving-shaft and lever may be moved to raise or depress the stamp-stem.

In witness whereof I have hereunto set my hand.

GEORGE CLARK RICHARDS.

Witnesses:
ELROY W. SMITH,
LOUIS A. GREATA.