No. 608,361. Patented Aug. 2, 1898.

D. CRAIG.

PUMP.

(Application filed Mar. 15, 1897.)

(No Model.)

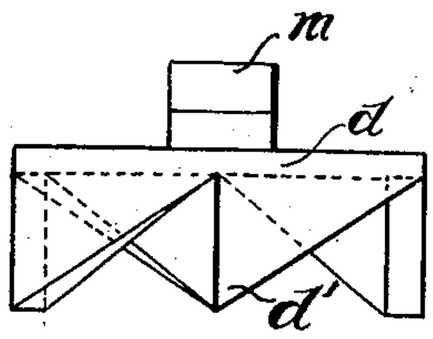

FIG. 2.

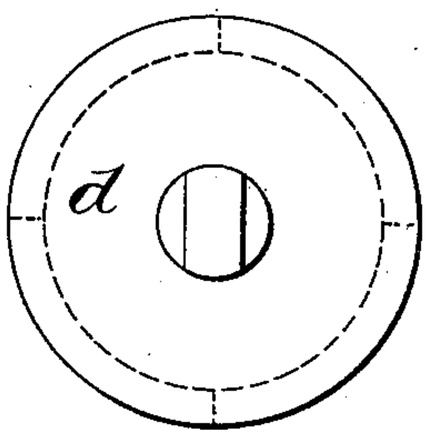

FIG. 3.

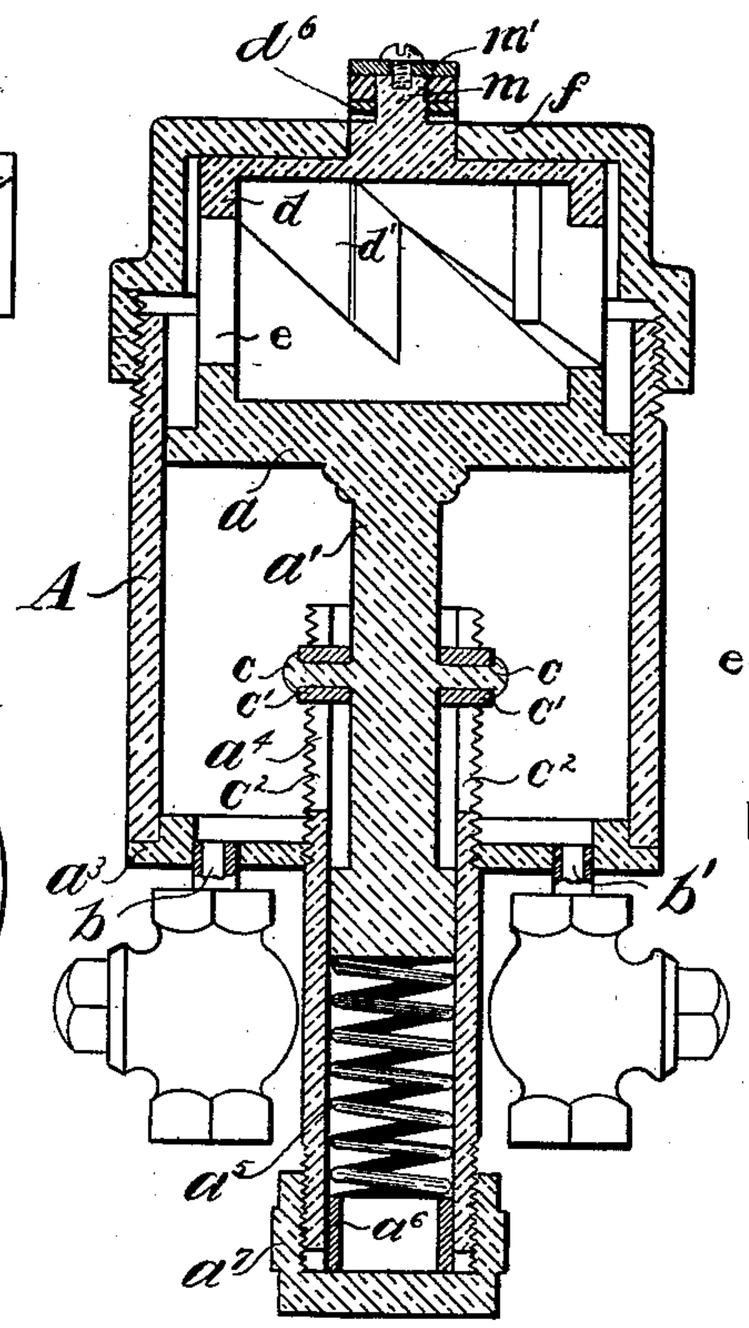

FIG. 1.

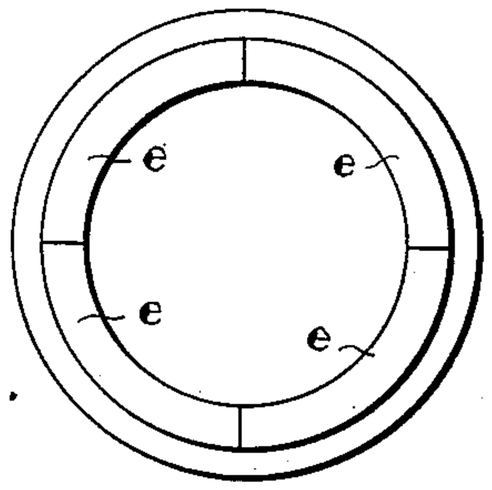

FIG. 4.

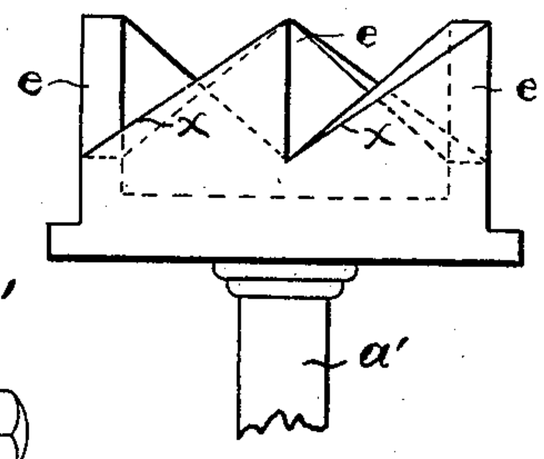

FIG. 5.

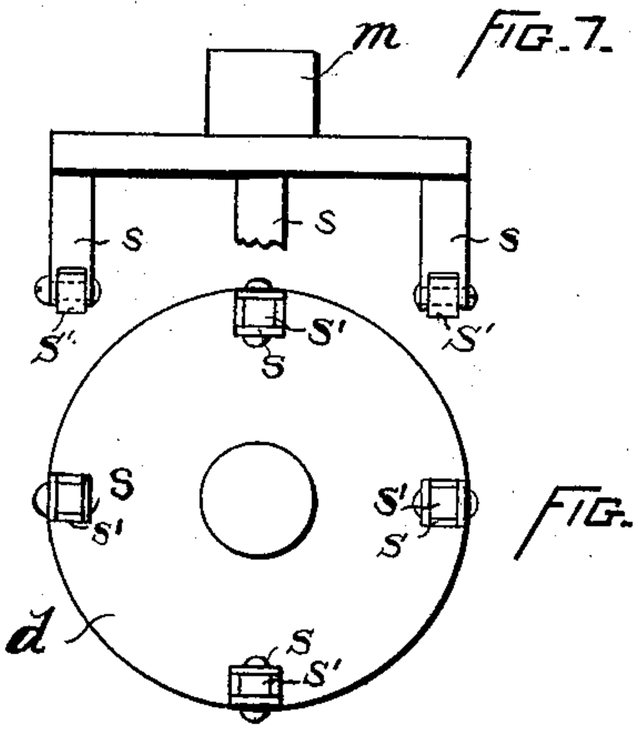

FIG. 7. FIG. 8.

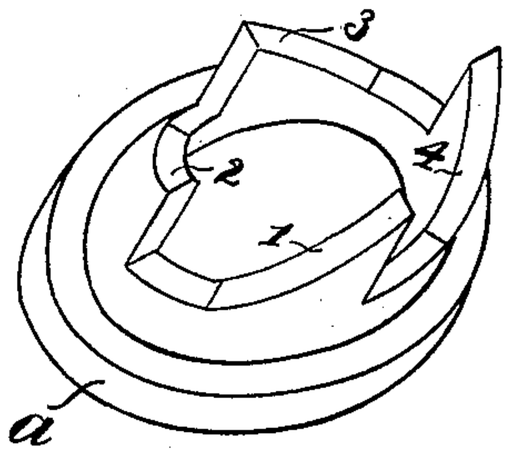

FIG. 6.

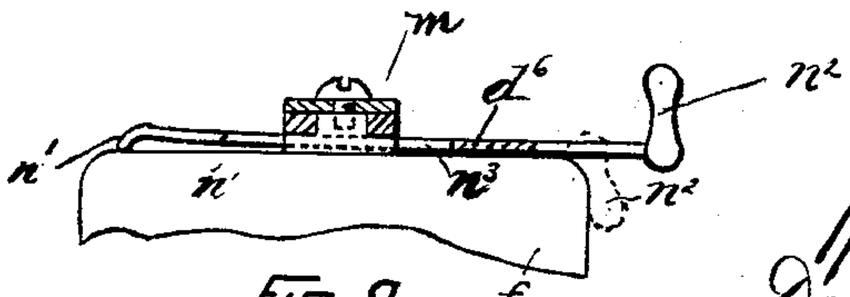

FIG. 9.

WITNESSES.
Harry O. Robinson.
Arthur A. Randall

INVENTOR.
David Craig
by F. J. Stoyle atty.

UNITED STATES PATENT OFFICE.

DAVID CRAIG, OF MELROSE, MASSACHUSETTS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 608,361, dated August 2, 1898.

Application filed March 15, 1897. Serial No. 627,471. (No model.)

To all whom it may concern:

Be it known that I, DAVID CRAIG, of Melrose, county of Middlesex, State of Massachusetts, have invented an Improvement in Pumps, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to pumps, and has for its object to improve the construction of the operating mechanisms therefor, whereby a rotating actuator working against a spring-pressed piston is adapted to impart a reciprocating motion to said piston.

In accordance with this invention a pump-cylinder having an inlet and an outlet contains the piston, which is adapted to work up and down or reciprocate therein, and means are provided for restraining said piston from rotation as it reciprocates. A disk or plate, hereinafter referred to as the "rotatable actuator," is contained in the cylinder and is adapted to be rotated by hand or otherwise, it being located just above said piston, and on the adjacent faces of said disk and piston projections are formed or provided which by engagement one with the other cause the piston to move in one direction as the disk or plate is rotated, said piston being returned by means of a spring. The projections which are formed or provided on one of said parts (either upon the disk or plate or upon the piston) are formed with inclined edges oblique to the axis of the rotating disk or plate and with straight edges substantially parallel to the axis of said rotating disk or plate, so that the piston will be moved positively by engagement of the projections along said inclined portions and will be permitted to quickly return upon disengagement of said projections. The projections having the inclined edges are thus formed like ordinary ratchet-teeth and are hereinafter referred to as "ratchet-teeth," and as they project from the face of the disk or plate or from the face of the piston they appear as crown ratchet-teeth. In order that the piston may be returned its full stroke by means of its return-spring, spaces will be provided between the ratchet-teeth. I prefer, however, to form or provide ratchet-teeth of this description on the adjacent faces of both the rotating disk or plate and on the piston, or in lieu of thus providing each part with ratchet-teeth I may form several downwardly-projecting arms on the under side of the rotatable disk or plate, the ends of which will bear upon or against the ratchet-teeth on the upper side or face of the piston, or, if desired, this may be reversed, so that the piston will have erected upon its upper side or face upwardly-projecting arms adapted to bear upon or against ratchet-teeth on the under side or face of the rotatable disk or plate.

The invention further consists in an improved hand-lever for rotating said actuator, which may be extended and locked in its extended position when in use and when not in use may be unlocked and caused to occupy a position out of the way.

Figure 1 is a vertical section of a pump embodying this invention. Fig. 2 is a side elevation of the rotatable actuator, showing the crown-ratchet teeth. Fig. 3 is a plan view of the rotatable actuator shown in Fig. 2. Fig. 4 is a plan view of the piston, showing particularly the crown ratchet-teeth formed on the upper side. Fig. 5 is a side elevation of the piston shown in Fig. 4. Fig. 6 is a perspective view of the piston, showing the crown ratchet-teeth. Figs. 7 and 8 are respectively a side elevation and plan view of a modification to be referred to, and Fig. 9 is a detail of the hand-lever for revolving the actuator.

A represents the cylinder of a pump embodying this invention, and *a* the piston which is adapted to work up and down or reciprocate within said pump-cylinder A. A guiding-piston *a'* is secured to or made integral with said piston *a* and projects downwardly from its under side or face into a socket formed in the bottom or base-plate a^3 of said pump-cylinder A. I have herein shown said socket as formed as a tube a^4, which projects up through the base-plate or bottom of the pump-cylinder and into the interior of said cylinder A and extends downward below the bottom of said pump-cylinder A, as shown in Fig. 1, and said guiding-piston *a'* is adapted to enter and work within said tube. A spiral spring a^5 is contained in said tube or socket, being located at the bottom thereof, against which said guiding-

piston bears, and said spiral spring is adapted to hold the piston A in an elevated position up against a rotatable actuator, to be described. The lower end of said spiral spring a^5 rests upon the upper end of a short tube a^6, which is contained within the tube a^4, and a threaded nut a^7 fits tightly over the lower end of said tube a^4 and abuts against the lower end of said short tube A^6, and by such means the tension of said spiral spring a^5 may be regulated or adjusted by turning said nut a^7 up or down. Said pump-cylinder is provided with an inlet-pipe b, having an inwardly-opening check-valve, and with an outlet-pipe b', having an outwardly-opening check-valve. The piston a is provided with means for restraining it from rotation, which, as herein shown, consists in forming upon said guiding-piston a' two laterally-projecting lugs c, one at each side thereof, which may have friction-rolls c mounted upon them, and said lugs c are adapted to enter and work up and down in two oppositely-located vertical slots c^2, formed in the side walls of the tube or socket a^4. The actuating mechanism for the pump consists in forming crown ratchet-teeth e upon the upper side of said piston a, as shown in Figs. 1, 4, 5, and 6, and in providing a rotatable actuator, which consists of a plate d, placed above said piston a and having upon its under side crown ratchet-teeth d', (see Figs. 2 and 3,) which are so disposed as to engage the crown ratchet-teeth e on the upper side of said piston a, and said actuator $d\ d'$ is adapted to be rotated by a hand-lever d^6 or otherwise, and as it rotates its crown ratchet-teeth d' engage and slip by or over the crown ratchet-teeth e on the upper side of the piston a. A cap f is screwed down on the pump-cylinder A, against the interior of which said rotatable actuator $d\ d'$ bears, said cap f thus holding said actuator $d\ d'$ and preventing it from moving away from said piston a or rising as it is rotated, and being thus held from rising the piston will consequently be moved against or in opposition to its lifting or restoring spring.

The projections or ratchet-teeth formed or provided on the plate d and those formed or provided on the piston are formed with inclined edges oblique to the axis of the rotating disk or plate and with straight edges substantially parallel to the axis of said rotating disk or plate, so that the piston will be moved positively by engagement of the projections along said inclined portions and will be permitted to quickly return upon disengagement of said projections. When the actuator $d\ d'$ is rapidly rotated, the resilience of the spiral spring a^5 is not sufficient to return said piston to its initial or normal elevated position before the actuator will have revolved through a small arc, and as a consequence the crown ratchet-teeth on said actuator $d\ d'$ will not engage the crown ratchet-teeth on said piston a from end to end, but will first engage them part way up—as, for instance, as shown at x, Fig. 5—thus shortening the stroke of the piston a, and to obviate this difficulty I may cut away a portion of the teeth, so as to form flat faces 1 2 3 4, (see Fig. 6,) whereby spaces are provided between the teeth, thus allowing the actuator $d\ d'$ to continuously revolve and give the spiral spring a^5 time to recover and return the piston a to its normal elevated position before the inclined edges of the next teeth are brought into operative position, and consequently the stroke of said piston will not be shortened.

The rotatable actuator $d\ d'$ may be revolved by a hand-lever d^6, which consists of a long narrow piece of metal having a projection n' formed at or near one end and a handle portion n^2 hinged at or to the other end, and a longitudinal slot n^3 is formed in its body portion, as shown in Fig. 9, and the end of a stem m, secured to or made integral with said rotatable actuator $d\ d'$, is adapted to enter said longitudinal slot n^3 in said hand-lever, and a washer m' is secured to the top of said stem to hold said hand-lever in place.

When in use, the hand-lever is drawn out from its retracted position (shown by dotted lines in Fig. 9) into its extended position, (shown by full lines in said figure,) and the stem m of the actuator $d\ d'$ will slide along the longitudinal slot n^3, formed in the hand-lever d, and the projection n', formed on the under side of said hand-lever at or near its end, will be drawn up upon the face of the cap f and will serve to support that end of the handle away from the said cap, thus reducing the friction between the lever and said cap and also serving to prevent wabbling or rocking of said handle, and by its frictional contact with the face of the cap f will prevent said lever from sliding or slipping longitudinally, except when forcibly moved in that direction.

As a modification of actuating mechanism for the spring-actuated piston I may form several downwardly-projecting arms s on the under side of the rotatable actuator $d\ d'$, four such arms being herein shown, (see Figs. 7 and 8,) and their ends, which may be provided with friction-rolls s', are adapted to bear upon or against the crown ratchet-teeth on the upper side or face of the piston a; or, if desired, this construction may be reversed, so that the piston a will have erected upon its upper side or face upwardly-projecting arms adapted to bear upon or against crown ratchet-teeth on the under side or face of the rotatable actuator $d\ d'$.

I have herein shown a spiral spring A^5 as a means of moving the piston one way, said piston being moved in the opposite way against said spring a^5 by a rotatable actuator $d\ d'$; but I desire it to be understood that in lieu of and as an equivalent for said spiral spring any other form of spring or elastic cushion may be employed.

I claim—

1. In a pump, a pump-cylinder, having an

inlet and an outlet, a spring-pressed piston working therein and a revoluble actuator therefor, crown ratchet-teeth on the adjacent face of one of said parts located short distances apart to thereby provide spaces between the end of one tooth and the beginning of the next tooth, and projections on the other part which engage said ratchet-teeth to move the piston one way and which enter and bottom in said spaces to permit full return stroke of the piston, substantially as described.

2. In a pump, a pump-cylinder, having an inlet and an outlet, an actuator and a spring-pressed piston, the adjacent faces of said parts provided with projections, a tube in which the piston works, an adjustable nut on the lower end of said tube, and a short tube in the tube containing the piston adapted to control the pressure of the spring against the piston by adjustment of the nut, whereby the piston is reciprocated and its action controlled, substantially as described.

3. In a pump, a pump-cylinder, having an inlet and an outlet, a spring-pressed piston working therein provided on one face with a series of crown ratchet-teeth located short distances apart to thereby provide spaces between the end of each tooth and the beginning of the next tooth, a revoluble actuator provided on one face with projections which engage the ratchet-teeth of the piston to move it one way and which enter and bottom in the spaces between said ratchet-teeth to permit full return stroke of the piston, and means for restraining the piston from rotation, substantially as described.

4. In a pump, a pump-cylinder, having an inlet and an outlet, a spring-pressed piston working therein, crown ratchet-teeth on the adjacent face of one of said parts located short distances apart to thereby provide spaces between the end of one tooth and the beginning of the next tooth, and crown ratchet-teeth on the other part which engage said ratchet-teeth to move the piston one way and which enter and bottom in said spaces to permit full return stroke of the piston, substantially as described.

5. In a pump, a pump-cylinder, having an inlet and an outlet, a spring-pressed piston working therein provided on one face with a series of crown ratchet-teeth located short distances apart to thereby provide spaces between the end of each tooth and the beginning of the next tooth, means for restraining it from rotation consisting of a socket on said cylinder having vertical slots through its walls and a rod on said piston having projections, the piston adapted to reciprocate in the socket and the projections to slide in the slots, substantially as described.

6. In a pump, an adjustable operating-lever for rotating the actuator of said pump, a projection formed at one end, a handle portion hinged to the other end and a longitudinal slot formed in said operating-lever to adjustably connect it to the actuator, whereby, when said operating-lever is extended to operate the pump said projection will engage the cap of the pump-cylinder and raise and frictionally hold said operating-lever in its extended position and when not in use said operating-lever may be moved and lowered to occupy a position out of the way, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID CRAIG.

Witnesses:
B. J. NOYES,
HARRY O. ROBINSON.