(No Model.) 4 Sheets—Sheet 1.

R. McGOWEN.

CUT-OFF MECHANISM FOR STAND PIPES.

No. 534,171. Patented Feb. 12, 1895.

Fig. 1.

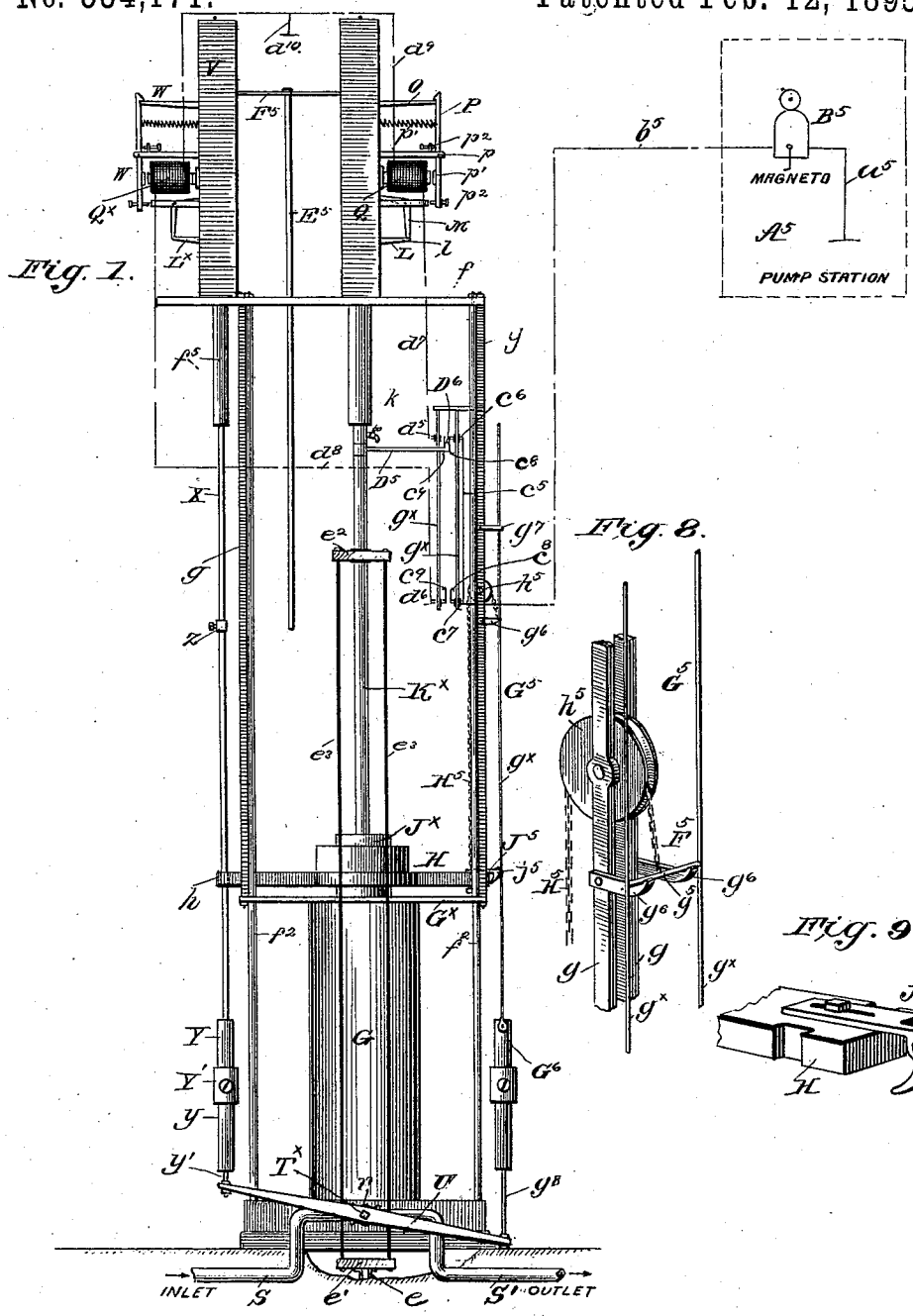

Fig. 8.

Fig. 9.

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Fig. 2a

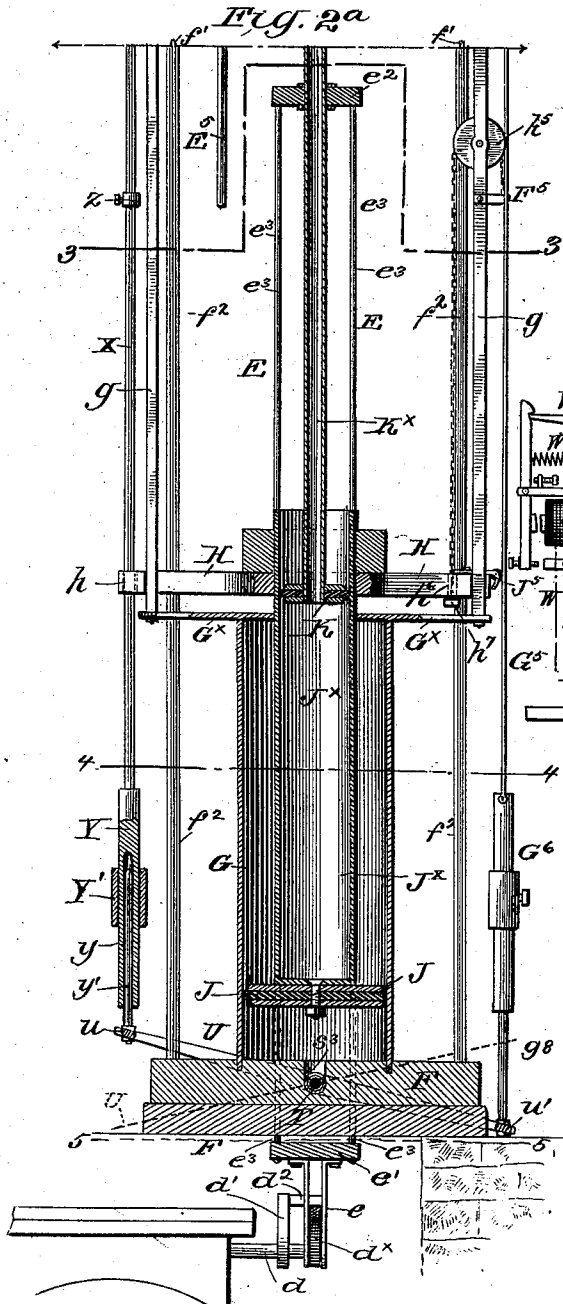

Fig. 2.

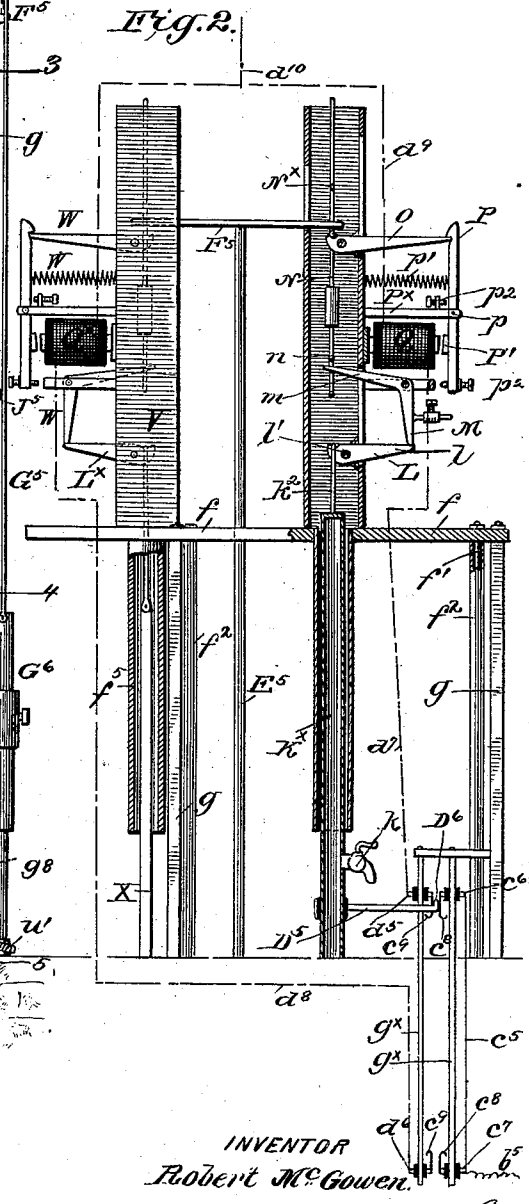

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Fig. 3.

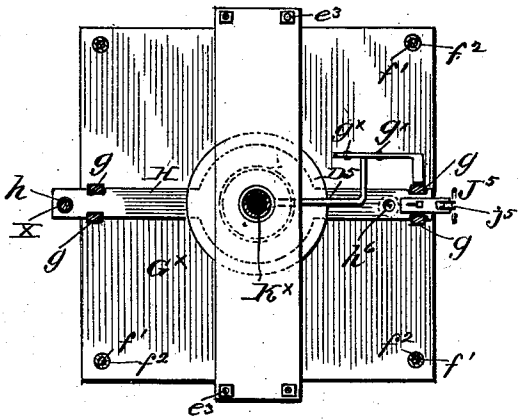


Fig. 4.

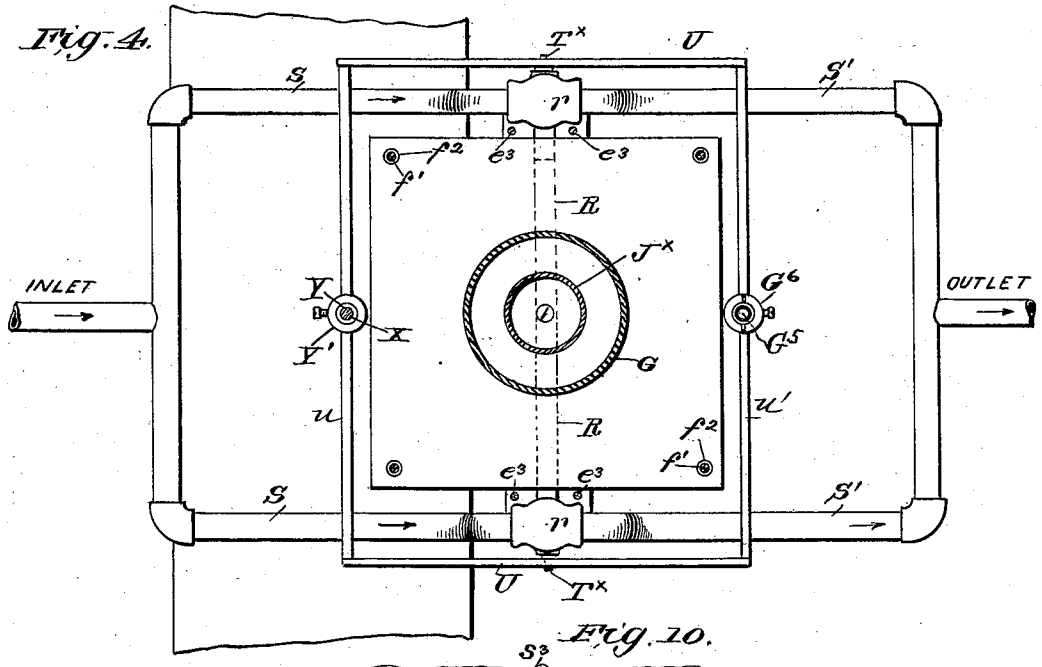
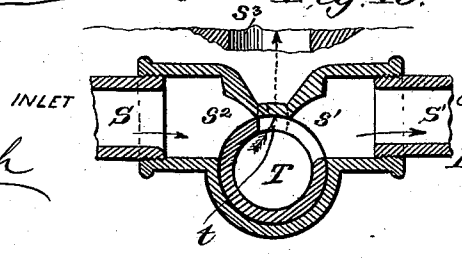


Fig. 10.



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CUT-OFF MECHANISM FOR STAND PIPES.

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Fig. 5a

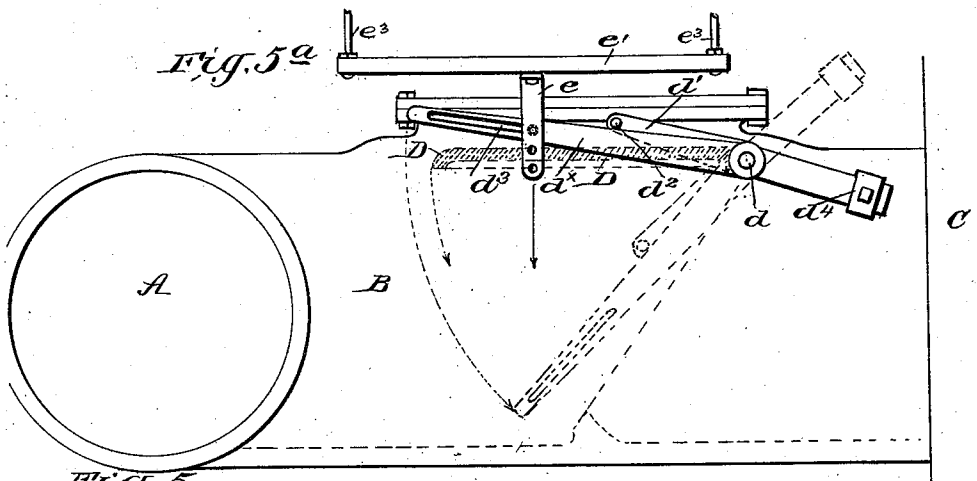


Fig. 5.

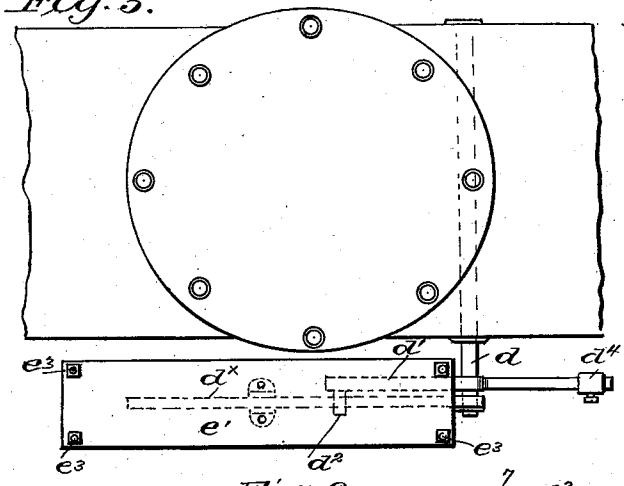


Fig. 7

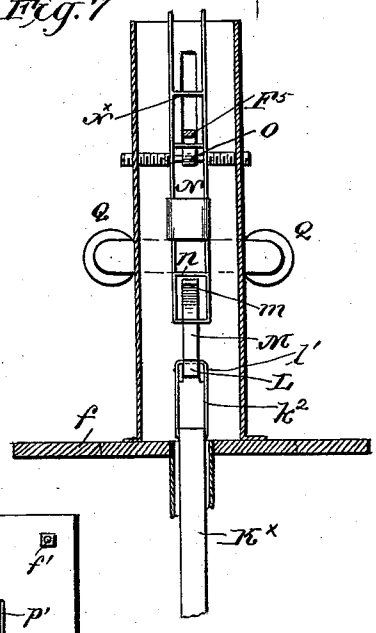
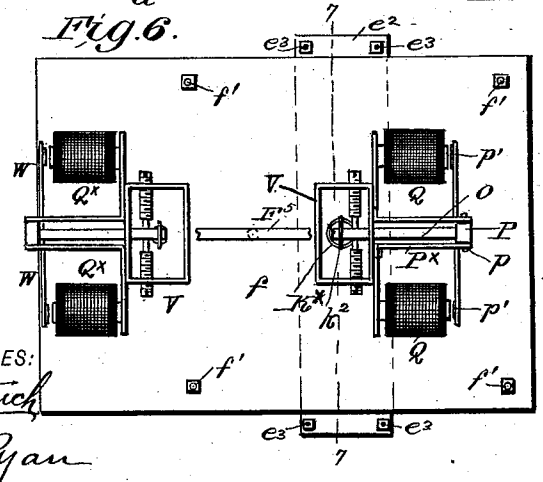


Fig. 6.



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UNITED STATES PATENT OFFICE.

ROBERT McGOWEN, OF WASHINGTON, INDIANA.

CUT-OFF MECHANISM FOR STAND-PIPES.

SPECIFICATION forming part of Letters Patent No. 534,171, dated February 12, 1895.

Application filed February 24, 1894. Serial No. 501,361. (No model.)

To all whom it may concern:

Be it known that I, ROBERT McGOWEN, of Washington, in the county of Daviess and State of Indiana, have invented a new and Improved Cut-Off Mechanism for Stand-Pipes, of which the following is a specification.

My invention relates more particularly to means for automatically cutting off the stand pipe from the water mains which have fire plug laterals, whereby the full pressure in such main can be instantly utilized in case of fire, and such invention has for its object to provide simple and inexpensive means adapted to be set in operation from the pumping station or other desired point, and which will positively serve to instantly cut off the stand pipe from the water main, and place it in communication therewith again, as may be desired.

To these ends the invention consists, first, in a combined electrically and gravity operating mechanism for cutting off the main from the stand pipe; secondly, in electro-hydraulic operating means for elevating the said cut off mechanisms to restore them to their normal position, and thirdly, in mechanically operated tripping devices adapted to be operated by the upward movement of the cut off means, whereby to close off the hydraulic elevating means, and for drawing off the water.

My invention further consists in such novel arrangement and peculiar combination of parts, all of which will hereinafter be fully described in the specification and then particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved cut off mechanism. Figs. 2 and 2^a are longitudinal vertical sections of the upper and lower portions thereof. Fig. 3 is a horizontal section of the same on the line 3—3 Fig. 2^a. Fig. 4 is a similar view of the same on the line 4—4 Fig. 2^a. Fig. 5 is a detail sectional plan view on the line 5—5 Fig. 2^a. Fig. 5^a is a side view of the parts shown in Fig. 5. Fig. 6 is a plan view of one of the electro mechanical tripping devices. Fig. 7 is a sectional view thereof on line 7—7 Fig. 6. Figs. 8 and 9 are detail views hereinafter specifically referred to, and Fig. 10 is a sectional view of the cut off valve hereinafter referred to.

In the practical construction of my invention, I employ in connection with the valve or gate in the water main or the lateral leading to the stand pipe, valve closing and opening devices, which can be instantly set for automatic operation from the pump station, or any other desired point, and such devices include plunger and tripping mechanism electrically released and adapted to close the valve by a gravity movement and to set in operation, hydraulic means, which will operate to return such plunger and tripping devices to their normal position, which return movement of such parts will set in operation supplemental tripping mechanism which will serve to automatically cut off the hydraulic lifting means.

Referring now to the accompanying drawings, A indicates the main pipe, B the stand pipe lateral and C the stand pipe, all of which may be of any ordinary arrangement. Within the section B of the main pipe, is disposed a gravity valve D hung on a rock shaft, the outer end d of which has a lever or crank arm d', fixedly held thereon, provided at its end with a lateral pin d^2, and on the said end of such shaft is also pivoted loosely a second lever arm d^x; the front end of which has an elongated slot d^3, which connects adjustably with an arm e, of the plunger or vertically movable frame presently referred to, and to facilitate the lifting movement of the valve D the same may have its crank arm d' weighted as at d^4 such weight being however less than the weight of the valve proper whereby such valve will drop by gravity.

As shown in Fig. 2^a the valve operating arms are disposed in a trench or well hole, over which is disposed the solid base F of the operating or plunger mechanism supporting frame. This frame it will be noticed consists of a cross head f, supported on the strain rods f', f', it being fixedly held by the tubular sleeves f^2, which surround such rods and are interposed between the base and the cross head as clearly shown in Figs. 2 and 2^a. A fixed cylinder G projects centrally upward from the base. The upper end is closed by a cross plate G^x which is braced by a pair of guide rods g g at each side, which are fixedly connected with the upper cross head f as shown. Between the guides g g is held for vertical

reciprocation a weighted cross bar H, to which is rigidly connected the tubular stem $J^{\times}$, of a piston J, which is fitted to move in the cylinder G, such stem extending normally above the cylinder G, and is open as shown.

E indicates a sash frame, which consists of a lower transverse bar e', which passes under the base F, an upper transverse bar e^2 disposed normally some distance above the cylinder G, and the connecting or strain rods e^3 e^3 which pass down at one side of the base F and the cross plate $G^{\times}$, as most clearly shown in Figs. 3 and 4.

Within the tubular stem or cylinder $J^{\times}$ is held for vertical reciprocation a piston K, on the lower end of a tubular stem $K^{\times}$, the upper end of which, when in its uppermost position projects above the cross head f, it being closed at such end, and provided near such end with a bleeding off cock k as shown. It will be noticed by reference to Fig. 2^a that the stem $K^{\times}$ passes through the upper cross bar e^2 and is connected fixedly therewith, while its upper end has a loop or hook member k^2 whereby it is supported on a tripping arm L or dog, which is adapted to be electrically released in the manner presently described.

The tripping arm L is pivoted at l' and has its long member l normally held to its locked position by a bell crank lever M, the long arm m of which projects within a vertically movably weighted guide frame N, the lower cross bar n of which is adapted to engage such arm m, when the frame is released.

It will be noticed by reference to Fig. 2, that the frame N is normally held to an elevated or normal position by a pivoted pawl O, which in turn is held to a locked position by a pivoted armature pawl P, pivoted at p to the frame $P^{\times}$ and normally held to its locked position by the spiral spring p', its vibratory movements being limited by the adjusting screws p^2 p^2 as shown. The lower end of the pawl P has an armature P′ which is operated by the electro magnet Q, the circuit wires of which are extended and arranged in a manner presently described.

So far as described it will be readily understood, that when the magnet Q is energized, as hereinafter stated, the pawl P will be drawn with its rear end inward, thereby throwing its upper end outward and disengaging the pawl O, which releases the frame N, and allows it to drop and as it drops its cross bar n engages the bell crank lever M, and releases the trip L, such drop being limited by the stop $N^{\times}$, engaging a lifting bar presently referred to. As the tripper arm L is thus released the sash frame E and the tubular stem and piston connected therewith will drop by gravity, the impact force of which is however checked by the air dash pot formed in the cylinder $J^{\times}$, the cushioning or resistance force of which can be regulated by setting the bleeding off cock k. As the frame drops, the arm e carries arm $d^{\times}$ down with it and thereby frees the valve arm d' and allows the valve D to drop to a closed position, where it is held by the pressure from the main pipe. Thus it will be seen that the closing operation of the valve is effected by electrically released gravity mechanism.

By providing an air cushion or dash pot devices arranged as shown, the sash frame E will be protected from a sudden jar, thereby causing a steady closing movement of the valve D.

Having thus described the closing operation of the valve I shall now proceed to describe the means for elevating the sash frame and opening the valve.

Referring now more particularly to Fig. 4 it will be noticed that extended transversely under base F is a feed water pipe R which opens centrally into the cylinder G, and such pipe R has valved connections r r with main feed pipe laterals S S. These valve connections, which are alike and held to operate in unison, have each an outer section provided with inlet port s' (see Fig. 10) and an outlet or exhaust port s^2, and a main discharge s^3, which opens into the cylinder. Within the outer section is held a tubular valve T provided with a longitudinal slot or point t which is adapted when shifted in one direction (indicated in full lines Fig. 10) to bring into communication, the main or feed pipe with the cylinder G, and when shifted in the other direction (see dotted lines Fig. 10) to open up communication between such cylinder and the exit or exhaust pipe section S′. The ends of the valve T are projected as at $T^{\times}$ and connected centrally with oscillating levers U U, the ends of which are connected by cross arms u u', such arms normally being disposed in the position shown in Fig. 2^a, in which position, the main or water feed pipes are cut off from the cylinder.

In a guide frame V, projected up from the cross head f, are disposed electrically operated tripping devices W, which are constructed and operated in a manner precisely similar to the electrically operated tripping devices L, M, N, O, P, and Q before referred to. Suspended from the tripper arm $L^{\times}$, of the devices W, is a rod X guided at its upper end in a sleeve f^5, and which passes through an aperture h, in the cross bar H and is secured at its lower end in a stem Y, having a socket y and on which is held a weight Y′, and in such socket y a push pin y' is held for limited movement therein, it normally resting upon the cross bar u as shown.

Z indicates a tappet adjustably secured on the rod X for a purpose presently explained.

While the electro magnets Q and $Q^{\times}$ can be set in operation by independent circuit wires and energizing magnets I prefer to employ for simplicity of operation and economy in construction, a single circuit arranged in the manner clearly shown in Fig. 1, in which A^5 indicates the pumping station or other operating point. B^5 are energizing magnets with which in practice is connected an alarm bell;

a^5, the ground wire and b^5 the main circuit wire. This wire it will be noticed connects with a metallic arm c^5 of a length equal to the movement of the piston K, which connects with binding posts c^6 c^7 passed through insulated boxes in one of the guides $g^\times$ $g^\times$ at one side, the inner ends of which have contact plates c^8 c^8. Similar contacts c^9 c^9 are secured on the inner ends of posts d^5 d^6 passed through insulated boxes in the opposite guide member $g^\times$, the upper one d^5, of which is connected by the wire d^7, with one pole of the magnet Q, while the other d^6 connects by the wire d^8, with one of the poles of the opposite magnet $Q^\times$, and such magnets are joined by the wire d^9, from which extends a ground wire d^{10}. By thus arranging the electric circuit wires as described and shown I am enabled to use a single circuit, which is alternately used to operate the different magnets Q $Q^\times$. On the tubular stem $K^\times$ is an arm D^5 insulated therefrom, on the end of which a metallic contact member D^6 is secured which is held to move between the plates c^8 and c^9 and alternately contact therewith. In operation, when the several parts are in their normal positions the arm D^5 is between the upper contacts c^8 and c^9, and when in such position it follows, should the energizer B^5 be turned, the current would travel through the said upper contacts to the magnet Q, and thereby release the drop mechanism before referred to, which stays at its lowermost position, until the pump station operator has been notified that the stand pipe can again be placed in communication with the main pipe. After the piston K has reached its lowermost position the arm D^5 will be moved in contact with the lower plates c^8 and c^9 and thereby complete a circuit between the energizer B^5 and the magnet $Q^\times$. It will thus be seen that by operating such energizer the magnet $Q^\times$ will be thereby energized to operate the tripper arm $L^\times$, to release the rod X, which falling by gravity engages the cross bar u and moves the levers U U, down to the position shown in dotted lines in Fig. 2^a, which movement opens up the valves T and allows the water from the pipes S under pressure to enter cylinder G under the piston J to slowly raise it. As the cylinder J is thus raised the piston K and the sash frame E carried thereby are elevated, as also the cross bar H, such upward movement serving to raise the stem $K^\times$ into engagement with trigger arm L, which arm is placed in a locked position, by the continued rise of the bar H, which in its movement engages a lift device formed of a rod E^5 having a transverse bar F^5 at its upper end, which projects laterally between the side guides and into the lifting frames N to engage their cross bars $N^\times$ as shown. It should be stated however that just before the bar H engages the rod E^5, it engages the tappet on the rod X, and lifts the said rod to engage the tripper $L^\times$, the said rod or lifter E^5 being in the nature of a double lift, which will at the same time set the two tripper mechanisms, which occurs just after the stem $K^\times$ and the rod X have been elevated to engage the trippers L $L^\times$.

From the foregoing it will be seen that after the magnet $Q^\times$ is energized to trip the arm $L^\times$, and the hydraulic means set in operation, the devices which set in operation such hydraulic means are automatically reset by the said hydraulic elevating means, as are also the valve opening mechanism and its electric tripping devices. I also utilize such elevating or hydraulic means to automatically operate to cut off the water supply from the cylinder G, and for such purpose I employ the devices shown to the right in Figs. 2 and 2^a and also in Figs. 8 and 9, which consist of a cage or frame G^5 normally suspended by a cross bar g^5, from a hook or supporting finger g^6, and guided at its upper end in a loop g^7.

At the lower end of the frame G^5 is secured a weighted socket member G^6, in which is held for free movement a push rod g^8 as shown, which normally rests upon the cross bar u'. To the cross bar g^5 is secured one end of a chain or cable H^5, which passes up over a pulley h^5, held between the guides g g, and passes down through an aperture h^6 in the the cross bar H and carries at its lower end a collar or weight h^7. Such bar H has a projecting guide J^5, the outer edges of which pass between the rods $g^\times$ of the frames G^5, and such guide J^5 has a roller j^5 which engages the cross rod g^5 when the piston J is at its highest point and moves such rod g^5 from the hook finger g^6.

Referring now to more particularly to Fig. 2^a it will be noticed that when the levers U have been depressed by the rod X, the member u' is as the position shown in dotted lines, which forces the push rod g^8 up in to the pocket of the member G^6. Now as the cross bar H is moved up as before stated, and just as soon as it reaches its uppermost position, its guide J^5 will force the frame G^5 from the hook g^6 and thereby allow the weighted member to drop against the cross arm u', and as the opposite weighted socket has been also elevated it follows that the valves U will be rocked back to the position shown in full lines, to open up a communication between cylinder G and the exhaust pipes S', the plunger rod on the bar u, traveling up into the socket of member Y during the lift movement of such bar u. As the water passes out from under piston J and the piston and the cross bar H in consequence recede to their lower position, such bar H will engage the weight or collar h^6 on the chain H^5 and pull upon the frame G^5 and raise it until its bar g^5 slips over the hook g^6, the roller j^5 serving as a convenient guide for the outer end of the chain or cable during such operation.

From the foregoing taken in connection with the accompanying drawings, it is thought the complete operation of my improved mechanism will be readily understood.

By the construction shown, the entire operation of turning off or turning on the valve

in the stand pipe lateral as well as an automatic resetting of all of the mechanism can be accomplished by a mere turning of the crank of an electro magnet to energize the electric operating devices. The several parts are so constructed and arranged as to positively operate and automatically connect themselves during the operation of closing the valve in the stand pipe lateral. It is manifest that in the practical construction of my invention the detail arrangement and construction of parts may be modified without departing from the broad ideas of my invention. I do not therefore limit myself to such construction.

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

1. A cut off valve operating mechanism for stand pipes, comprising a vertically reciprocating frame connected with the valve and adapted to drop by gravity to close such valve, tripping devices held normally locked to form a support for such frame when elevated, and electrical devices connected with the tripping devices including an electro magnet for energizing the same to release the tripping devices and the gravity frame, all substantially as and for the purposes shown and described.

2. A cut off valve operating mechanism for stand pipes, comprising a gravity operated frame connected with the valve, and adapted to close it when released, lifting devices for returning such gravity frame to its normal or elevated position and electro mechanical means for setting in operation such gravity and lifting devices substantially as shown and described.

3. In a cut off valve operating mechanism for stand pipes, in combination, a gravity operated frame connected with the valve, a trip device for holding such frame to its normal or raised position, means for releasing such trip device a lifting mechanism adapted to raise such gravity frame back to its normal position, means for setting such mechanism in operation and devices for shifting the lift mechanism, arranged to be automatically set in operation by the movement of the lift mechanism, whereby it is returned to its normal or lowered position, all arranged substantially in the manner shown and described.

4. In a cut off mechanism for stand pipes, in combination, a vertically reciprocating gravity frame, connected with the valve and adapted to close it as it drops, hydraulically operated lifting devices, oscillating levers connected therewith for alternately shifting the valves of the hydraulic feed pipes, a tripping means adapted to engage such levers and move them in one direction, electro mechanical trigger devices for holding the tripping and gravity frames to their elevated or normal position, a shifting contact maker on the gravity frame, independent sets of contacts, connected one set with the gravity frame triggers and the other with the tripping frame, said contact maker adapted to be alternately moved into engagement with the said sets of contacts, and an electro magnet in the main circuit for energizing the electrically operated devices successively as set forth.

5. In a cut off valve mechanism for stand pipes substantially as described, the combination with the main frame, the cut off valve having a projecting rock shaft, a vertically reciprocating frame connected at its lower end to the rock shaft, and means for normally holding such frame to its elevated position, of an air cylinder, a piston having a tubular stem held to reciprocate therein, said stem being connected with the reciprocating frame to travel therewith, and having an escape outlet, all arranged substantially as shown and described.

6. In a mechanism for the purpose described, the combination with the feed pipe, a pivoted drop valve held thereon, having a crank arm, a gravity operated frame, connections between the lower end thereof and the valve crank arm, the tripping devices L, M, N and O, for holding such frame normally to its upper position, and the electro magnet Q and the armature lock pawl devices, all arranged substantially as shown and for the purposes described.

7. A mechanism for the purposes described, comprising a gravity operated frame connected with the cut off valve to close it as it drops, tripping devices arranged to connect with the upper end to hold it elevated, hydraulically operated lifting devices, for elevating such gravity frame, a gravity drop bar for setting such lift devices into operation, tripper levers for normally holding such drop elevated, and resetting mechanism connected with the said tripper and trigger devices for the gravity frame and drop bar, adapted to be engaged by the lift devices when raised, and to automatically reset the said tripper and trigger devices, as and for the purposes shown and described.

8. In a mechanism for the purposes described, the combination with the valve operating gravity frame, the fixed cylinder G, the piston J operating therein, the cross frame H connected thereto, the drop bar X having a tappet or stop portion, and the tripping devices W, of the valved feed pipes S—S′ having a lateral, opening into the bottom of cylinder G, said pipes S—S′ having valved connections with such laterals adapted to be alternately shifted to open up a feed or discharge connection with such cylinder, and oscillating lever arms connected to the valved connections adapted to be moved in one direction by the drop bar X, all arranged substantially as shown whereby the piston J will be raised when the bar X shifts the said levers and whereby such bar X will be automatically reset in connection with the tripping devices W, and whereby the valve oper-

ating gravity frame will be raised to its upper position and the cut off valve opened as set forth.

9. In a mechanism for the purposes described, the combination with the gravity operated frame E, connected with the cut off valve, the cylinder G, piston J having a stem $J^{\times}$ carrying a cross bar H, the feed and exit pipe sections S—S′, the connecting feed pipe R, opening up into the cylinder G, the valve devices T, constructed to be alternately shifted to feed the water into the cylinder or to place it in communication with the exit pipe sections S′, and the oscillating valve levers U U, of the drop bar X having a stop portion, a second drop frame G^5 normally supported on the main frame, at an elevated position, a trip mechanism on the bar H, adapted to release such frame G^5 when said bar is on its upstroke, a lift device connected with said bar and the frame, whereby to automatically elevate the frame G^5 as such bar is lowered, said bar adapted to engage the stop on bar X on its upstroke, all arranged substantially as shown and for the purposes hereinbefore described.

10. In a mechanism for the purposes described, the combination with the cut off valve operating frame E, having a piston member K, the cylinder G, the piston J having a tubular stem $J^{\times}$ adapted to form a cylinder for the piston K, the feed and exit pipes S—S′, the lateral R, connected therewith and the valved connections T, all arranged substantially as shown, of the oscillating levers U, the drop rod X, and the drop or gravity operated frame G^5, and lifting and tripping devices connected with the stem $J^{\times}$, adapted to engage the frame G^5 and release it, to drop and to raise bar X on the upstroke of piston J, and to draw the frame G^5 upward on the down stroke of such piston, all arranged substantially as and for the purposes set forth.

11. In a mechanism for the purposes described, the combination with the gravity frame E, the drop bar X, the hydraulically operated lifting devices and electrically operated tripping devices connected with frame E, and similarly arranged devices connected with drop bar X, constructed to normally hold the said frames to their elevated positions, a main circuit wire connected with a connecting conducting member having separated contact portions at one end, connected with the magnet of the tripping devices for frame E, and separated contacts at the opposite end connected with the magnet of the drop bar tripping devices, means for energizing the circuit, and a shifting contact member on the gravity frame E adapted to be alternately moved in contact with the separated contacts at the ends of the conducting member, all substantially as and for the purposes shown and described.

12. In a mechanism for the purposes described, the combination with the valve operating gravity frame E of the tripper arm L, the bell crank lever M the pivoted lever O, the weighted frame N, the magnet Q and the armature bar P all arranged substantially in the manner shown and for the purposes described.

13. A cut off valve mechanism for stand pipes, comprising a gravity operated frame connected with the valve and adapted to close it as it falls, trip devices for normally holding it elevated, lifting mechanism hydraulically operated, means for setting it in operation to rise, a tripping device operated by the upward movement of such lift mechanism to cut off the lifting force of such devices whereby they will resume their normal position, said lift devices connected with and adapted to elevate or raise the frame E to its normal position and in engagement with its trip mechanism, and connections between such lift mechanism and its operating frame, arranged substantially as shown, whereby such frame is automatically reset to its normal position as the said lift devices move back to their normal position as and for the purposes set forth.

ROBERT McGOWEN.

Witnesses:
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