(No Model.) 2 Sheets—Sheet 1.

# R. McGOWEN.

## PUMP CUT-OFF MECHANISM FOR STAND PIPES.

No. 534,170. Patented Feb. 12, 1895.

Fig. 1

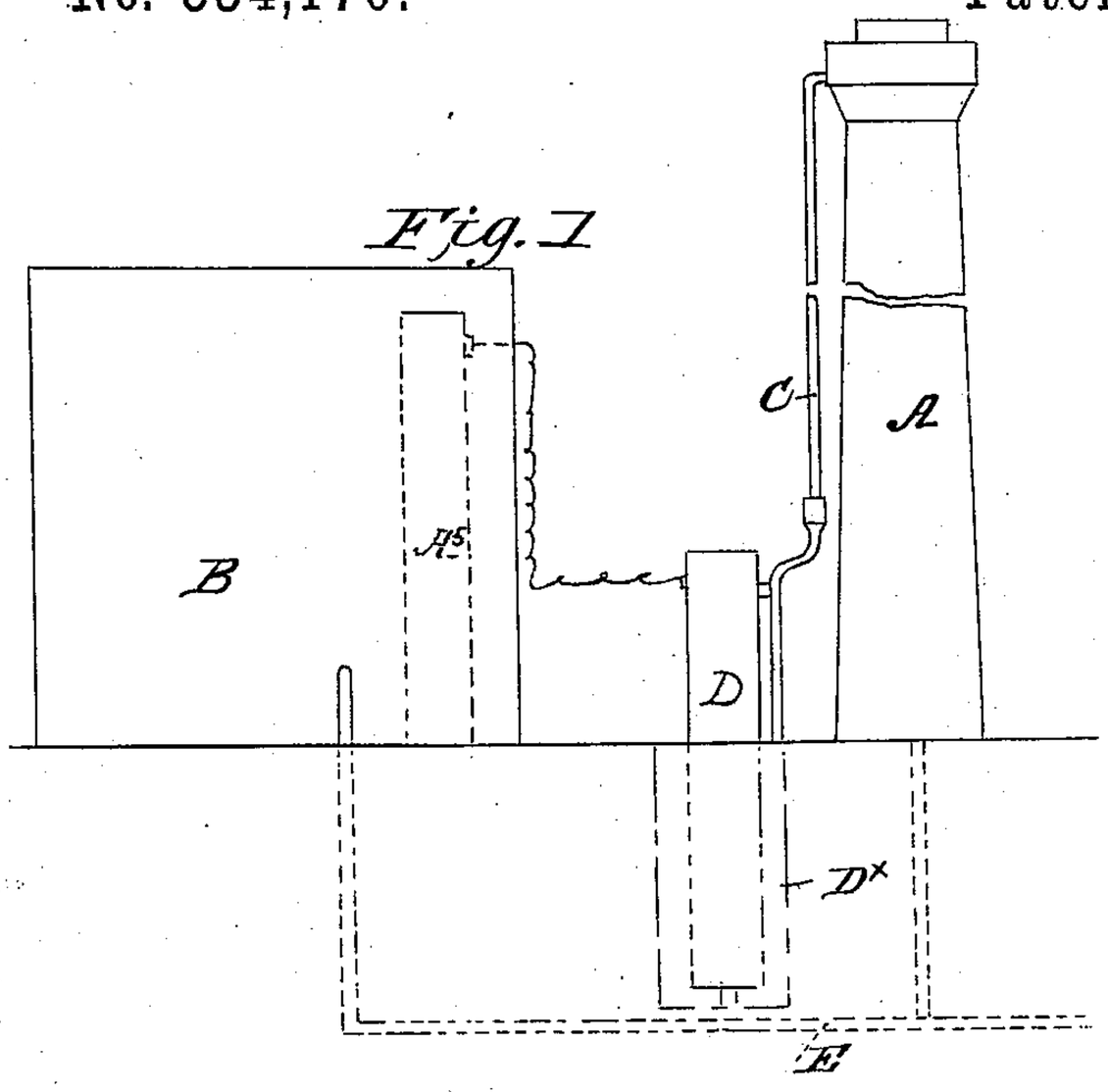



Fig. 3.

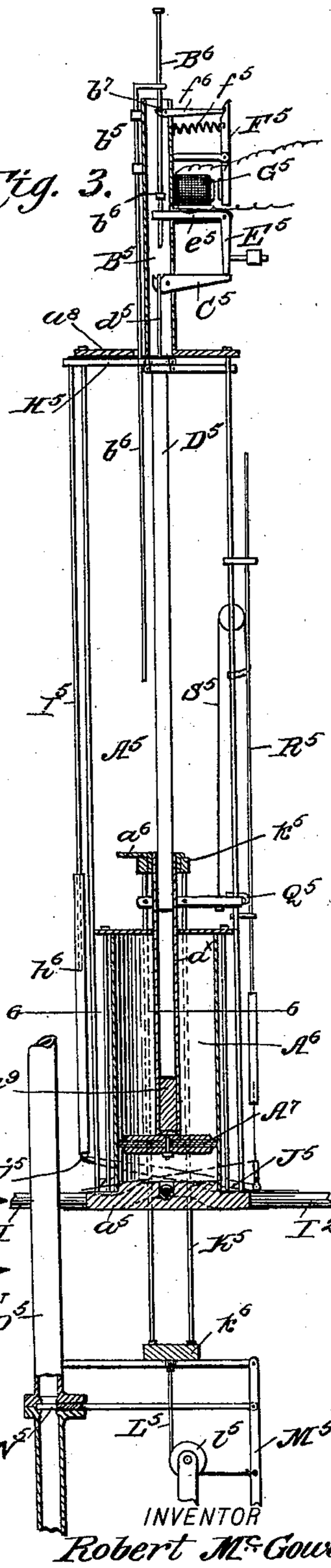



Fig. 5.

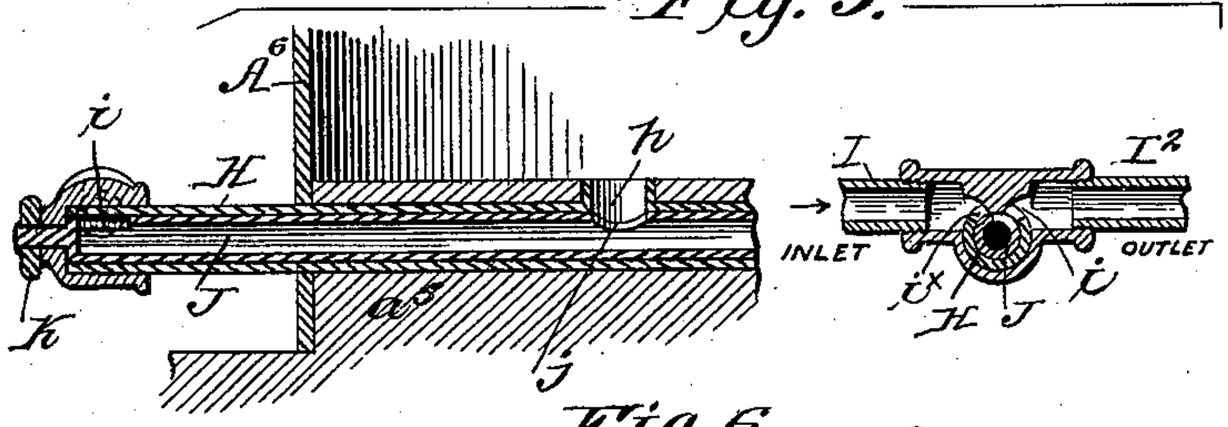
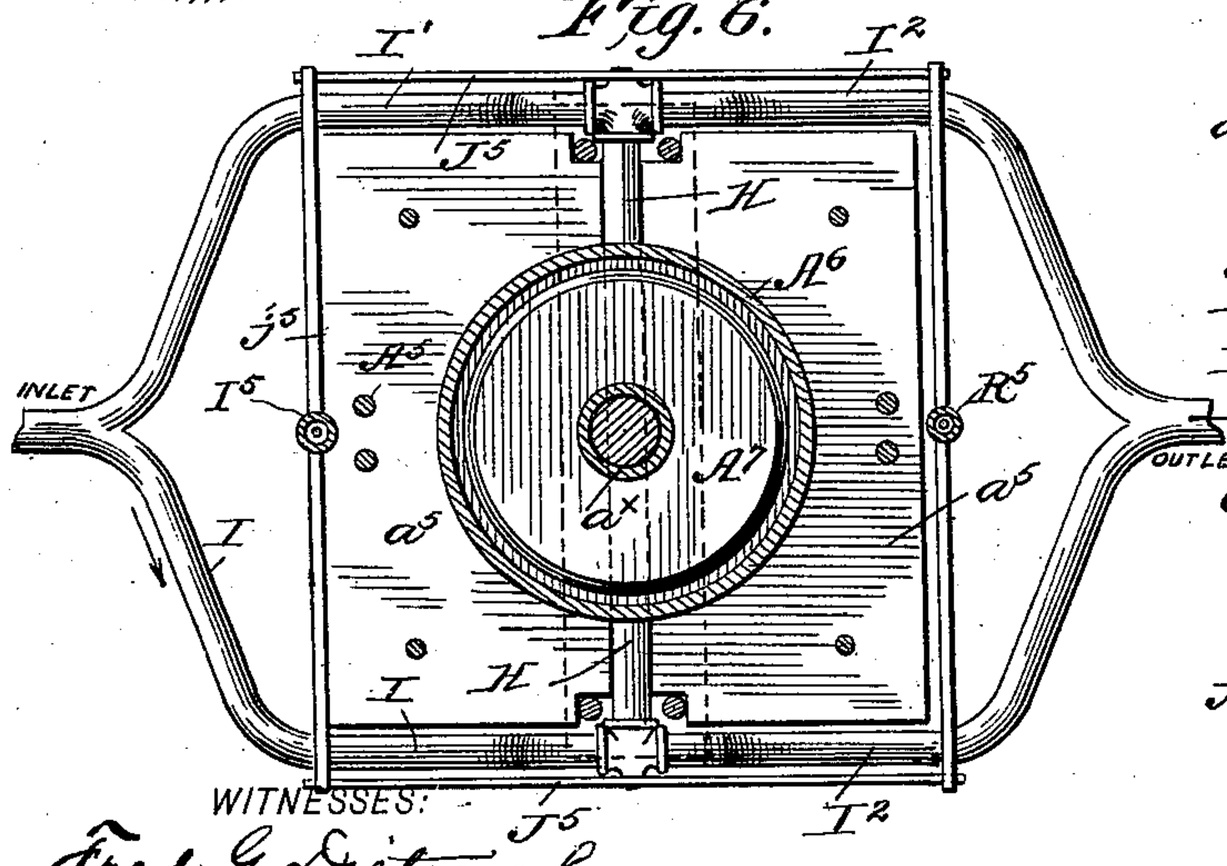



Fig. 6.




WITNESSES:

Fred J. Dieterich

A. D. Blondel.

INVENTOR

Robert McGowen.

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

# R. McGOWEN.

## PUMP CUT-OFF MECHANISM FOR STAND PIPES.

No. 534,170. Patented Feb. 12, 1895.

Fig. 2.

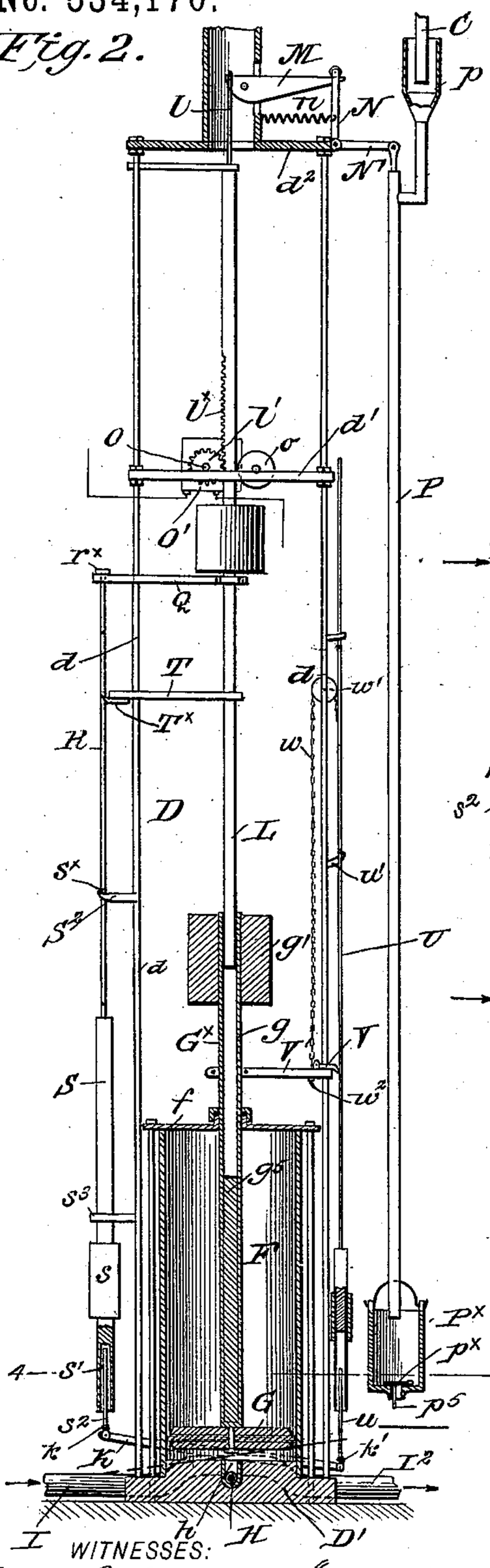
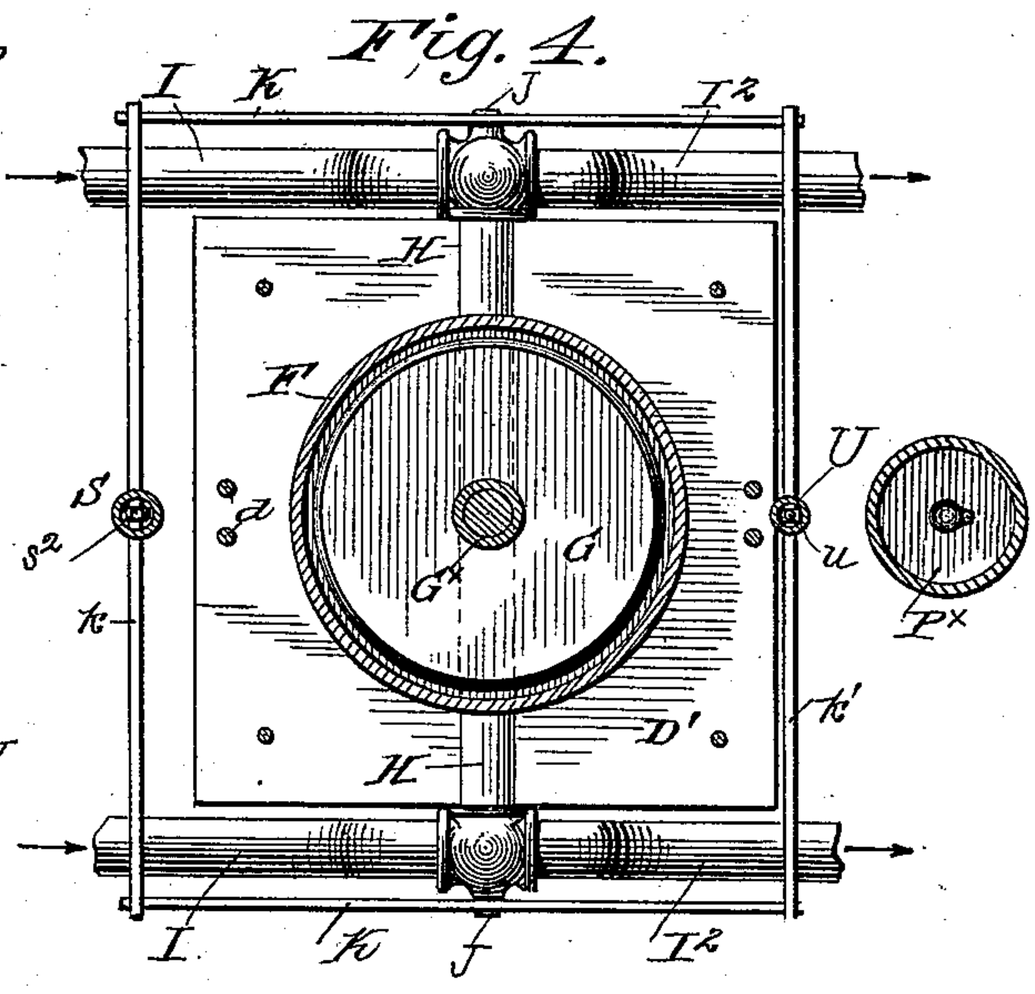



Fig. 4.




WITNESSES:

Fred G. Dieterich

M. D. Blondel.

INVENTOR

Robert McGowen.

BY Munn & Co

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

ROBERT McGOWEN, OF WASHINGTON, INDIANA.

## PUMP CUT-OFF MECHANISM FOR STAND-PIPES.

SPECIFICATION forming part of Letters Patent No. 534,170, dated February 12, 1895.

Application filed February 24, 1894. Serial No. 501,350. (No model.)

*To all whom it may concern:*

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

My invention relates to an improved cut off mechanism for the pumping engines of stand pipes, which will serve to cut off the said engine when the water reaches the top of or any predetermined point in such pipe and which is automatically set in operation by the water in the stand pipe as it rises above such point, or top of the pipe.

The invention also has for its object to provide electro-mechanically operated means, which, while serving to positively operate for their intended purposes, will, after having been set in operation, to cut off the pump, automatically reset themselves to their normal position.

With other minor objects in view, my invention consists in such peculiar combination and novel arrangement of parts as will hereinafter be first described in detail and then pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic side elevation of my improved mechanism connected with a pump station and stand pipe. Fig. 2 is a vertical section partially in elevation of the magneto operating mechanism hereinafter referred to. Fig. 3 is a similar view of the pump cut off valve operating devices. Fig. 4 is a horizontal section taken on the line 4—4 Fig. 2. Fig. 5 is a detail view of the shifting valves in the cylinder water feed pipes. Fig. 6 is a detail horizontal section on the line 6—6 Fig. 3.

Referring to the accompanying drawings A indicates the stand pipe, and B the pump station, which are arranged in any well known manner.

C indicates the overflow pipe which is usually connected with the stand pipe near its upper end, and which extends to the base, where it discharges.

When pumping into a stand pipe, it sometimes happens, through negligence of the pump operator, or irregular pumping capacity, that the pipe overflows a considerable length of time before such fact becomes known to the pump operator, which overflow frequently causes considerable damage to surrounding property, as well as a great waste of water. This serious objection I overcome by the employment of the devices shown, and which consist essentially of a cut off mechanism proper, and intermediate adjusting devices operated by the water from the overflow pipe, to hold such cut off mechanism in operation until the water in the stand pipe shall have receded below the overflow point.

Referring now more particularly to Fig. 2 D indicates a supporting frame formed of the base D′, the stay rods *d d* and the cross heads *d′ d²*, the lower part of such frame being located in a well hole D× whereby to bring such end in close proximity to a water supply pipe E, and to prevent freezing.

F indicates a cylinder projected up from the base and containing a piston G, the rod or stem G× of which passes through the cap plate *f* of the cylinder, is projected as at *g*, and provided with a counterweight *g′*, such upper end *g* being formed tubular for a purpose presently described.

Extended transversely under the base D is a feed pipe H which has valved connections at its ends with the feed laterals I I′ of the water main E, and has a central opening *h* which discharges centrally into the cylinder F under the piston G, such valved connections being constructed to alternately open up communication between such cylinder and the feed laterals, and to close off such laterals to open up communication between the cylinder and the exhaust sections I² of such pipes I I′.

As a simple cut off valve mechanism I employ the means most clearly shown in Fig. 5, in which J, indicates a tubular pipe section held to rotate in the pipe H, and having its ends projected to receive oscillating levers K K, and provided with a longitudinal opening *j* which is adapted to be at all times in communication with the opening *h*, in the pipe H and to be alternately moved into register with the inlet and exhaust ports *i i*× in the feed pipes I I′ as shown.

By the construction described it will be readily understood that by oscillating the levers K in alternate directions, the water

will be let into the cylinder to raise the piston or to be drawn off therefrom to allow it to recede by gravity.

Within the tubular stem *g* is held to slide a central rod or operating bar L which is held to its upper or normal position by means of a bail portion *l*, on its upper end engaging a pivoted trigger arm M, which is held to its locked position by a bell crank tripper N, normally held in engagement with such arm M, by a retractile spring *n*, as clearly shown in Fig. 2, and adapted to be automatically released in a manner presently described.

The operating bar L has on one face a rack $l^{\times}$, which engages a pinion *l'*, on a shaft O, of an electric magneto or energizer O' which projects into the magneto casing and gears with its rotary armature in the ordinary manner.

At one side of the main frame is held a vertically movable catch pipe P, the upper end of which connects with the arm N' of the bell crank N, and has at such end a funnel mouth *p*, which is held over the lower end of the overflow pipe C. On the lower end of the pipe P is held a bucket $P^{\times}$ formed in its bottom with a flap outlet valve $p^{\times}$, which is lifted when the bucket is at its lowermost position by a stem $p^5$, to let off the water held in such bucket.

It should be stated that the operating bar which engages the pinion O as before stated and which is also guided by a roller *e*, on its opposite side, as shown in Fig. 2, is adapted to drop by gravity when released, its lower end being guided in the hollow stem *g*, and in which, at the bottom, is a yielding piece $g^5$, to cushion the said bar as it falls.

Q indicates an arm projected from the bar L, through which extends a rod R of a light flexible wire, formed on the upper end of a frame S the lower end of which is weighted as at *s* and formed into a socket portion *s'*, in which is held for a limited free movement a push pin $s^2$, such frame being normally suspended on a hook $S^2$ on the main frame, and is guided at its lower end in a loop $s^3$ as shown.

Projected at one side from the bar L, is a guide or arm T provided with a trip $T^{\times}$ which when the said bar descends, engages the cross member $S^{\times}$ on the rod R, which is normally supported on the hook $S^2$, and causes such member $S^{\times}$, through the flexure of the rod, to slip from the hook $S^2$ to allow the frame S to instantly drop.

When the parts are in their normal position the push pin $s^2$, rests on the cross bar *k*, which connects one end of the levers K, and when in such position, it follows, that, when the bar L is released, it drops, and as it reaches its lowermost position its trip member T will move the frame S to move off from its support $S^2$, and cause it to instantly drop by gravity, and as it thus falls it will swing the levers K to the position shown in dotted lines, such movement opening up communication between the cylinder and the water inlet pipes I I'. A gravity operated frame U similar to frame S is disposed on the opposite side of the cylinder, the push pin *u* of which rests on the cross bar *k'*, and such frame is hung on a hook *u'* as shown.

V indicates a tripper projected from the tubular stem *g*, which engages the frame U when said stem is moved to the limit of its upper stroke, to allow such frame U to drop to oscillate the levers K in a reverse direction, to cut off the water supply from the cylinder and open up a communication between it and the exhaust pipe sections $I^2$.

The frame U is connected at its upper end with one end of a chain *w*, which passes over a guide pulley *w'* and extends down through the tripper arm V' and has a collar or stop $w^2$ at such end, such construction providing simple means for bringing the frame U back to its upper position as the piston G recedes by gravity.

So far as described it will be seen as water drops or flows out into the pipe C, and the water accumulates in the bucket on pipe P, such pipe will, as the weight in the bucket overcomes the tension of the tripper spring, pull the tripper away from the trigger arm that holds the bar L to allow it to drop, which movement imparts motion to the magneto shaft and energizes the magnet on the pump cut off devices presently referred to. The bar L in its descent operates to release frame S, which operates to open up a water pressure under the piston, which in turn rises and lifts bar L, and as the bar is thus raised, its upper lateral arm Q will engage the head $r^{\times}$ on the rod R of the frame on the upper end of frame S and elevate it to engage its supporting hook. It will also be noticed that as the piston rises its arm V' will carry the tripper V up until it engages the frame U, when such frame is disengaged from its supports, and as it drops its push pin will serve to oscillate the levers K to cut off the water pressure under the piston and release the water from the chamber. Now as the piston returns to its lower position the chain *w* will be drawn down and the frame U lifted back to its place, thus resetting all the parts to their normal position. It should be stated however, that the water in the stand pipe sometimes rises or falls so irregularly and its upper surface is so agitated, that even after the bucket and pipe P have been depressed, it will continue to trickle over into pipe C. To this end in practice the tension of the trigger spring is such as to but slightly overcome the weight of pipe P and the bucket. Hence it follows that so long as any quantity of water trickles down pipe C and accumulates in the bucket, the tripper will be held from becoming automatically engaged by the trigger or supporting arm and so long as such arm is thus disconnected, the bar L and the piston will maintain an alternate reciprocating movement through the alternate shifting of the levers K, and thereby maintain, as it were, during such overflow of the pipe, a con-

tinued electric circuit to operate to hold the pump cut off mechanism in a position for stopping the pump.

The pump cut off devices proper, the construction of which is most clearly shown in Fig. 3, consist of a frame $A^5$ having at its lower end a base $a^5$, on which is mounted a cylinder $A^6$ with which are connected at the lower end hydraulic operating devices, constructed and arranged precisely similar to the hydraulic operating means for lifting the piston on the magneto operating devices, the upper end of the tubular stem $a^\times$ on the piston $A^7$ having however an additional lifting arm $a^6$ for a purpose presently explained.

$B^5$ indicates a casing projected up from the cross head $a^8$ in which is held to slide vertically a weighted sash frame $B^6$, the upper end of which connects with a lift rod $b^5$ extended below the cross head, as at $b^6$, and adapted to be engaged by the lifting arm $a^6$, when the piston $A^7$ rises to its highest point. Pivoted in the casing $B^5$ is a trip lever $C^5$ the inner end of which forms a catch to receive a loop $d^5$ on the upper end of the plunger rod $D^5$, the lower end of which fits and is vertically movable in the tubular stem $a^\times$, its drop therein being cushioned by a yielding packing $a^9$ as shown.

The trip lever $C^5$ is normally held to its locked position by a bell crank lever $E^5$, one end $e^5$ of which projects into frame $B^6$, under its cross bar $b^6$.

$F^5$ indicates a pivoted armature lever normally held drawn with its hook end inward by a spring $f^5$, its lower end being held to operate over an electro magnet $G^5$, while its upper or hook end engages a pivoted dog $f^6$ which in turn engages a stud $b^7$, on the sash frame $B^6$, as shown, and such frame is supported normally by the dog $f^6$.

$H^5$ indicates an arm projected from the plunger rod $D^5$, to which is bolted a rod $I^5$ held to slide in a guide sleeve $h^6$, held on the cross bar $j^5$, which connects one end of the valve levers $J^5$.

$K^5$ indicates a sash like frame consisting of upper and lower cross pieces $k^5$ $k^6$, the upper one of which connects with the upper end of the tubular stem $a^\times$, while the lower piece extends under the cylinder $A^6$, and has secured thereto an operating cable $L^5$, which passes under a guide $l^5$, and connects to hinged lever $M^5$, which in turn is pivotally connected with a plunger or cut off valve $N^5$ held to operate in the steam pump supply pipe $O^5$, as clearly shown in Fig. 3.

By the construction shown in such Fig. 3 it will be readily seen that when the electro magnet $G^5$ is energized in the manner heretofore described, the armature lever will be drawn to disengage the dog $f^6$ which thereby releases frame $B^6$, and as it drops, it the frame $B^6$, will engage the bell crank lever which holds the trip arm $C^5$, and release such arm $C^5$, and allow the plunger $D^5$ to drop by gravity. As such plunger descends its rod $I^5$ telescopes into guide sleeve $h^6$, depressing the bar $j^5$ thereby turning on the water under piston $A^7$, which, then slowly rises, raises the frame $K^5$ and gradually closes the valve $N^5$.

The piston as it rises operates by means of its lateral arm $Q^5$ a cut off and resetting device $R^5$, constructed and arranged to operate precisely like that used in connection with the magneto operating mechanism before described. The piston on its upward stroke also serves to reset the electrically operated tripping mechanism for plunger $D^5$ by means of the arm $a^6$ which engages with rod $b^6$ and carries it together with sash frame $B^6$ to a position where $B^6$ will engage with pivoted dog $f^6$. At the same time loop $d^5$ engages with its trip lever $C^5$ thereby placing plunger $D^5$ and sash frame $B^6$ in their normal position.

After the water is drawn off from under the cylinder $A^7$ such cylinder will slowly drop by gravity and with it frame $K^5$, which then leaves cable $L^5$ slack, as the cut off valve $N^5$ will be held closed and packed by the steam pressure against it, and until the same is again opened by operating the swinging lever $M^5$ back to its outer position.

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

1. In a pump cut off mechanism for stand pipes, in combination with the steam supply pipe and a cut off valve operating therein, hydraulically operated means connected therewith for shifting such mechanism to close the valve, tripping mechanism for normally holding the hydraulically operated mechanism from operation, an overflow pipe on the stand pipe, and releasing devices connected with the said tripping mechanism operated by the overflow from the stand pipe, all arranged substantially as shown and for the purposes described.

2. In a pump cut off mechanism for stand pipes, the combination with the cut off valve, means for moving it to its cut off position, and electrically operated devices including a magneto or energizer for setting in operation such valve operating means, of a reciprocating bar connected with the magneto for operating it, reciprocated in one direction by gravity, a trigger mechanism for holding it elevated, and a counterbalance device, arranged to be set in operation by the stand pipe overflow connected with the said trigger, adapted to release such trigger when overbalanced by the overflow, all arranged substantially as shown and for the purposes described.

3. In a pump cut off mechanism for stand pipes, the combination with the cut off valve and electro mechanical means, including an electro magneto, for operating such cut off valve, a reciprocating bar connected with the magneto shaft, operated in one direction by gravity, hydraulic means for operating it in a reverse direction, trigger devices for holding such bar normally elevated, a spring actuated pawl or lever for normally holding such

trigger locked, a counterbalance mechanism connected with such lever, and arranged to be operated by the overflow from the stand pipe all arranged substantially as shown and described.

4. In a pump cut off mechanism for stand pipes, the combination with the cut off valve and electro mechanical means for operating it, and a magnet or energizer, of the magneto operating bar held to reciprocate in one direction by gravity, hydraulic means, set in operation by the descent of such bar, adapted to reciprocate such bar in a reverse direction and a trip mechanism arranged to be set in operation by the overflow from the stand pipe, connected with the magneto operating bar, all arranged substantially as shown and for the purposes described.

5. In a pump cut off mechanism for stand pipes, the combination with the cut off valve and mechanical means for operating it and a magneto, of a magneto operating bar held to reciprocate in one direction by gravity, hydraulic means for reciprocating the said bar in a reverse direction, said hydraulic means held to engage said gravity bar and lift it to its elevated position, a trigger or holding pawl adapted to be automatically engaged by such bar as it is elevated, a counterbalance connected to such trigger operated by the overflow from the stand pipe, and tripper devices connected with the hydraulic operating means and connections between such tripper and the piston member of the hydraulic means, arranged substantially as shown whereby the hydraulic means are cut off as the piston ascends, as set forth.

6. In a pump cut off mechanism for stand pipes, the combination with the cut off valve and electro mechanical means for operating such valve, including a magneto having an extended shaft, provided with a pinion, of a reciprocating bar, gravity operated in one direction, and provided with a rack member engaging the magneto shaft pinion, hydraulically operated mechanism connected with the bar, said mechanism means set in operation to elevate the gravity bar, by the drop movement thereof, a tripping lever, adapted to automatically engage the gravity bar and hold it normally to its elevated position, a counterbalance connected with such lever, and held to be operated by the overflow from the stand pipe, and a valve cut off mechanism for the said hydraulic means, set in operation by the lift movement of the said hydraulic mechanism means al! arranged substantially as and for the purposes described.

7. In a pump cut off mechanism for stand pipes, the combination with the cut off valve, an operating frame connected therewith, hydraulically operated devices for operating such frame, a reciprocating plunger adapted to set in operation such hydraulic devices, and movable by gravity in one direction, trip devices for holding such plunger elevated, and electro mechanical means for operating to release such trip devices,—all arranged substantially in the manner shown and described.

8. In a pump cut off mechanism for stand pipes, the combination with a cut off valve movable to its open position by hand, of closing mechanism connected therewith, consisting of a reciprocating frame, movable by gravity in one direction, a hydraulic means for moving it to its opposite direction, a plunger or drop bar adapted when released to set in operation the hydraulic devices, an electro mechanical tripper for holding the said bar normally to its upper position and valve shifting mechanism for the hydraulic means set in operation by the upward movement of the plunger bar, and adapted to cut off the hydraulic means, all arranged substantially in the manner and for the purposes shown and described.

ROBERT McGOWEN.

Witnesses:
P. C. McGOWEN,
EMIL GLASER.