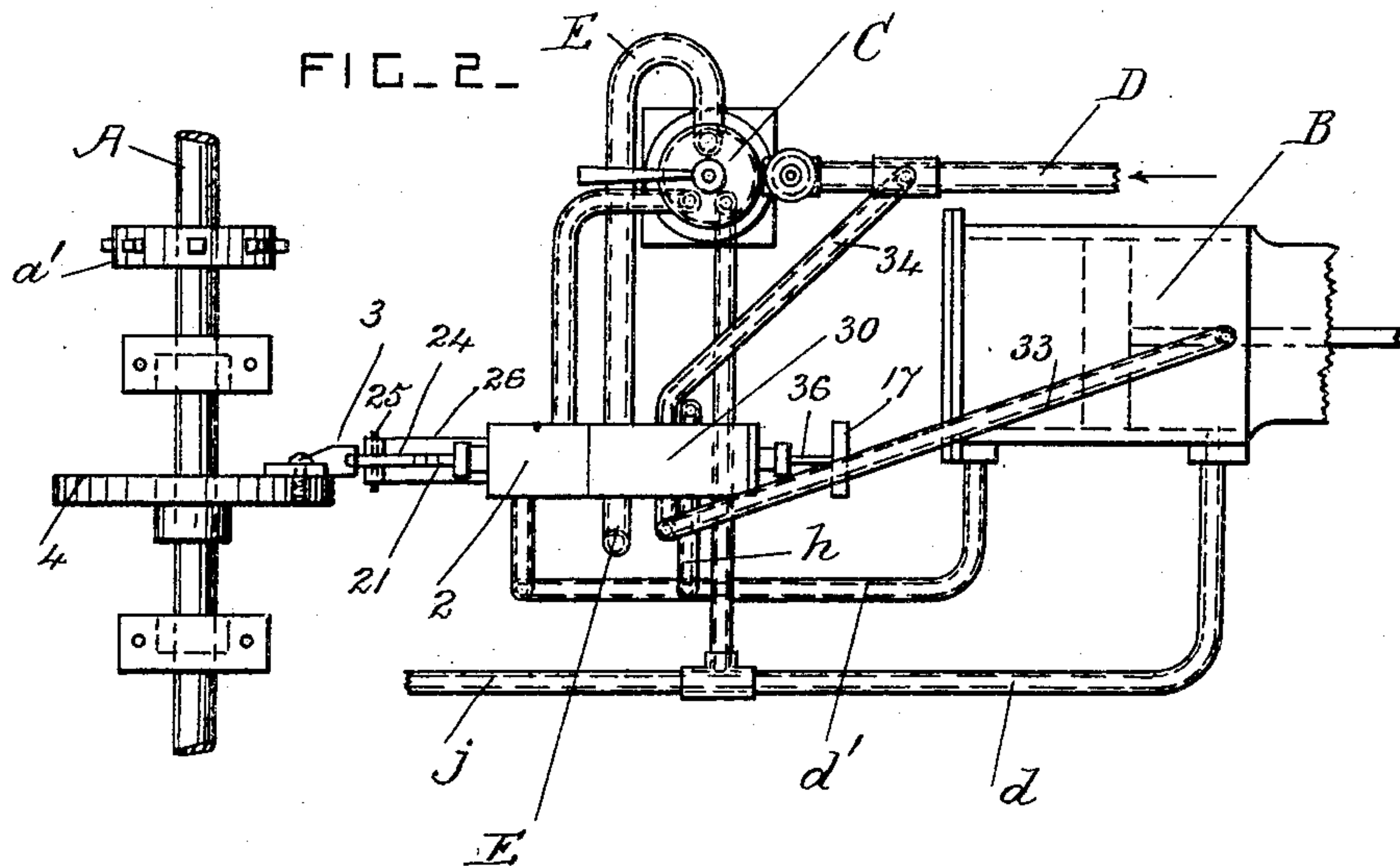
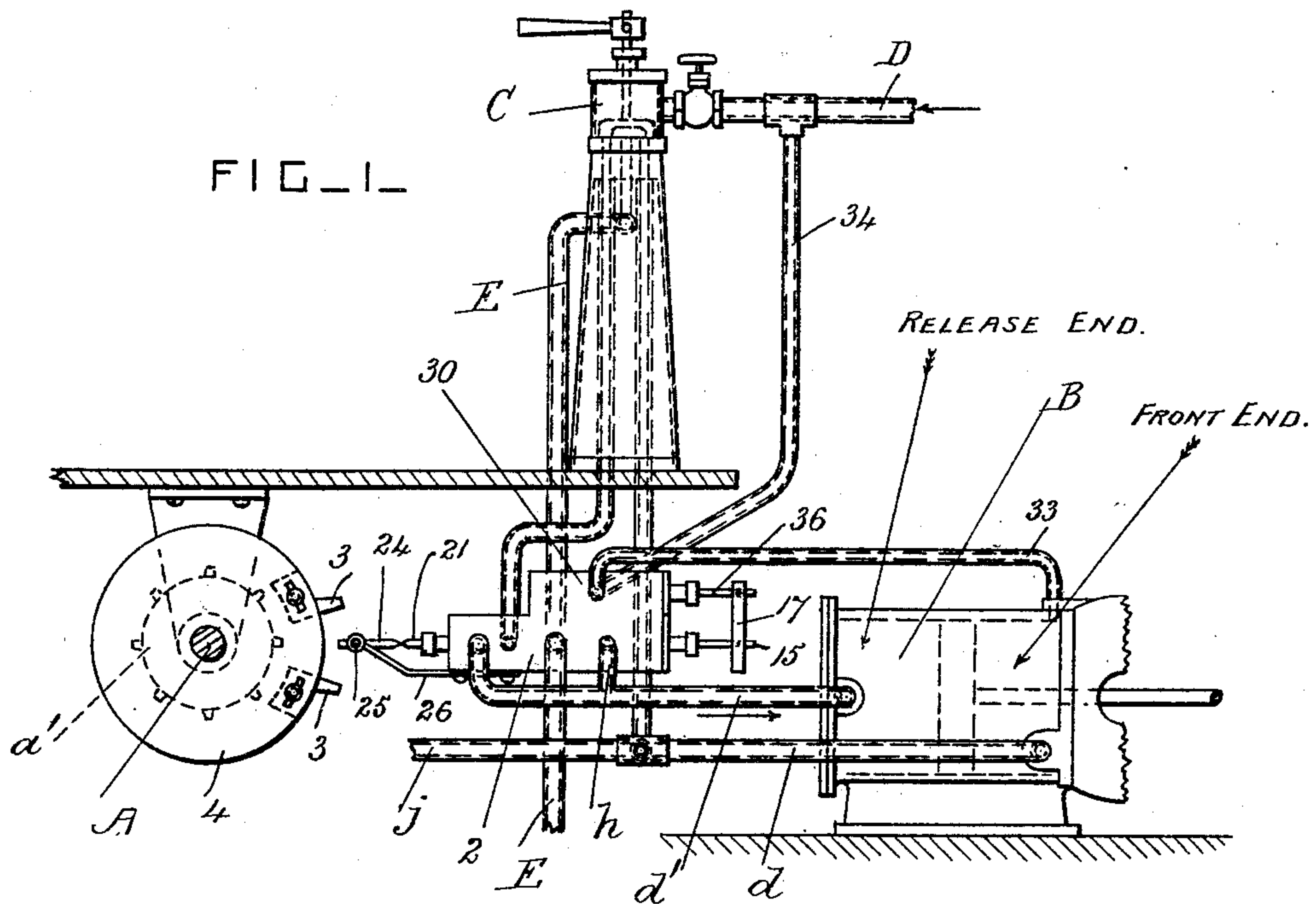


929,871.

2 SHEETS—SHEET 1.



WITNESSES:

W. E. Oliver

L. B. Middleton

INVENTOR

Robert H. Nicholson

BY

Herbert W. Jenner.

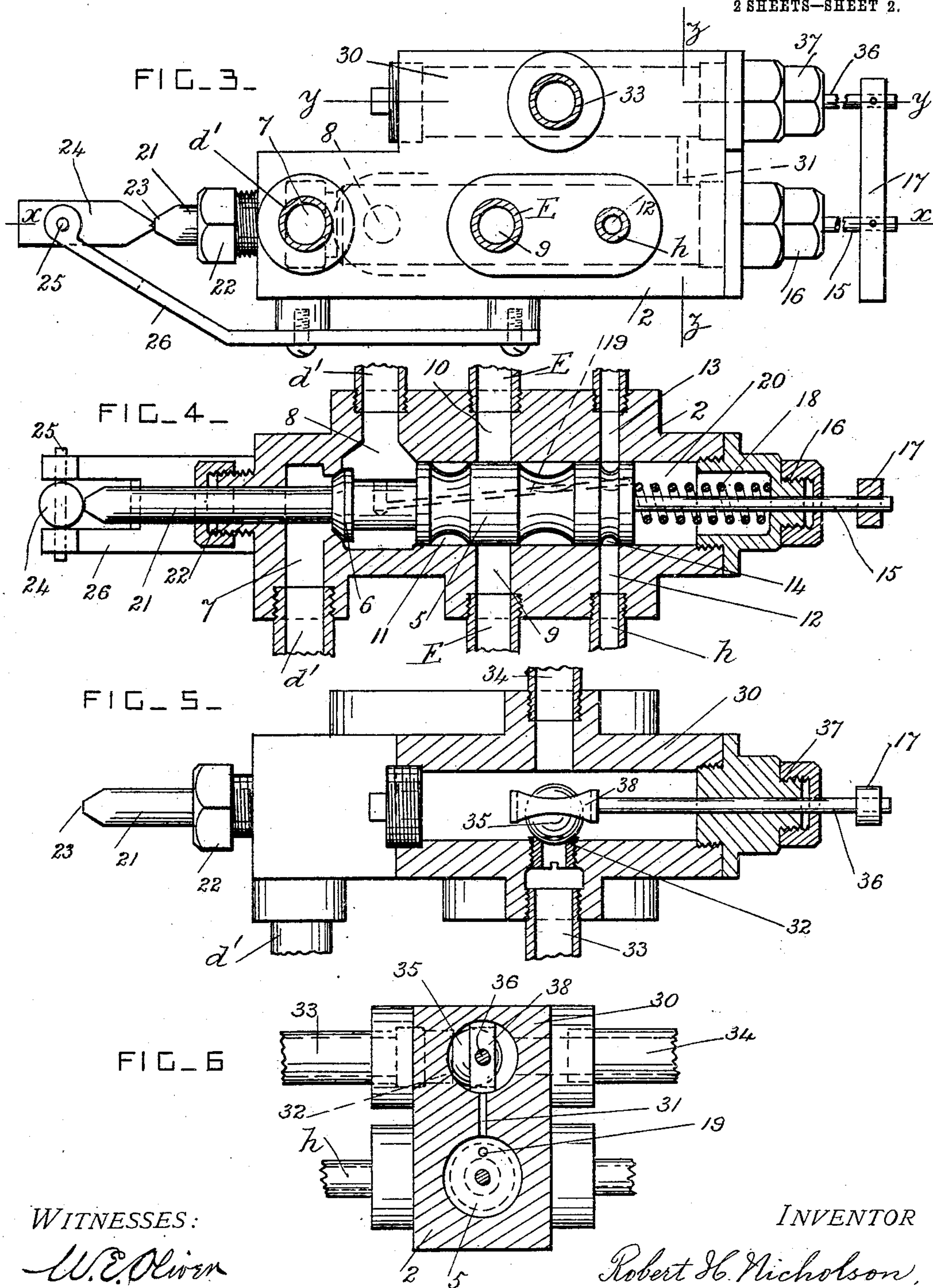
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R. H. NICHOLSON.
CONTROLLING MECHANISM FOR WINDING ENGINES.
APPLICATION FILED DEC. 10, 1908.

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Patented Aug. 3, 1909.

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ROBERT H. NICHOLSON, OF WILKES-BARRE, PENNSYLVANIA.

CONTROLLING MECHANISM FOR WINDING-ENGINES.

No. 929,871.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed December 10, 1908. Serial No. 466,826.

To all whom it may concern:

Be it known that I, ROBERT H. NICHOLSON, a citizen of the United States, residing at Wilkes-Barre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Controlling Mechanism for Winding-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to valves and controlling devices for regulating the action of mechanism employed in connection with the steam cylinders of the brakes of winding engines used in connection with mines; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a side view of portions of the brake operating mechanism showing the novel valves applied to it. Fig. 2 is a plan view of the same. Fig. 3 is a detail side view of the valves, drawn to a larger scale. Fig. 4 is a longitudinal section through the throttle-valve, turned around one-quarter from the position shown in Fig. 3 and taken on the line $x-x$ in Fig. 3, and showing the valve closed. Fig. 5 is a similar longitudinal section through the auxiliary steam-admission valve, taken on the line $y-y$ in Fig. 3. Fig. 6 is a cross-section through the valves, taken on the line $z-z$ in Fig. 3.

This invention relates more particularly to the brake operating mechanism shown and described in the patent issued to me on February 12, 1907, No. 844,038.

A is a driving shaft provided with a driving wheel a' , and revolved from the crank-shaft of any approved winding or hauling engine. This shaft is driven at a suitably slow speed by any approved intermediate gearing.

B is a steam cylinder for actuating the brake mechanism of the said winding engine, and thereby bringing the mine cage to a standstill at the top and bottom of the mine shaft.

C is the hand-valve operated by the engineer, and D is the main steam supply-pipe connected to the said valve. Two pipes d and d' are also connected to the regulating-valve C and to the respective ends of

the steam-cylinder B. When the automatic mechanism shown in the said patent is used, the pipe d is provided with a branch j which connects it with the said mechanism and with the same boiler to which the main steam-pipe D is connected. The pipe d supplies steam to set the brake, and the pipe d' supplies steam to release the brake. E is the exhaust-pipe which is also connected to the valve C. The valve C is provided with any suitable disk or slide having ports and passages by means of which the pipes d and d' are placed in communication alternately with the exhaust-pipe E.

All the above-mentioned parts are similar to those described in the hereinbefore mentioned patent, and the automatic stop-mechanism for applying the brake, also described in the said patent, is also preferably used in carrying out this invention, but the novel valves hereinafter described may be used when automatic mechanism for setting the brake is not provided.

When the automatic mechanism for setting the brake is provided, it is arranged so that it comes into operation when the cage is at a prearranged distance from the point of landing. In order to make the landing in a satisfactory manner it is necessary for the engineer to operate the regulating-valve C by hand so as to release the brake to a slight extent, and in so doing it is possible for him to move the cage beyond the landing where it should come to rest. This release of the brake is effected by moving the engineer's valve C by hand to admit steam from the main pipe D through the pipe d' , in the direction of the arrow adjacent to the horizontal portion of the said pipe in Fig. 1, to the release or rear end of the cylinder B. The area of the rear side of the piston being a little greater than its front side, and the steam admission through the pipe d' being a little more free than the automatic admission through the pipe d , the piston is moved to the right, to ease off the brake, although the steam which was admitted to the front end of the cylinder B automatically to set the brake, at about 100 feet from the landing, is still exerting its pressure in the front end of the cylinder B.

In order to prevent the overwinding of the cage when steam is thus admitted to release the brake, a throttle-valve 2 is arranged in the steam-pipe d' and exhaust-

pipe E, and this throttle-valve is operated automatically by means of tappets 3 secured to a disk 4 which is revolved by the said shaft A. The disk 4 may be one of the
 5 disks used for the automatic application of the brake described in the said patent, or a separate disk may be provided, if preferred.

The throttle-valve 2 is provided with a slidable valve 5 for opening and closing its
 10 ports and passages, and this valve 5 is preferably of the piston type having a disk-valve 6 at one end, but any form of slidable valve may be used which will open and close the various ports and passages.

7 and 8 are the lateral passages which are connected with the pipe d' , and these passages are regulated by the disk-valve 6.

9 and 10 are lateral passages which are connected with the exhaust-pipe E, and these passages are normally connected by an
 20 annular groove 11 in the piston-valve.

12 is a lateral passage which is connected by a branch-pipe h with the pipe d' , which communicates with the release end of the
 25 steam-cylinder, and 13 is a passage which is connected constantly with the atmosphere.

14 is an annular groove in the piston-valve 5 for connecting the passages 12 and 13.

30 A stem 15 projects from one end of the piston-valve and passes through a stuffing-box 16 on the valve-casing.

17 is a crossbar or handle on the projecting end portion of the stem 15 for setting
 35 the piston-valve in one direction. The spring 18 is arranged in a spring chamber 20, and 19 is a hole or passage formed longitudinally in the piston-valve so as to connect the spring-chamber 20 constantly
 40 with the release-pipe d' on the side nearest the regulating-valve C, so as to equalize the pressure and permit the said piston-valve to slide freely. This passage 19 can however be omitted if desired, and any
 45 other approved means can be provided which will permit the valve to slide freely.

The piston-valve has a stem 21 at its other end, which is slidable in a stuffing-box 22, and this stem has preferably a blunt pointed
 50 end 23.

24 is a tumbler which is pivoted on a pin 25 in a bracket 26 secured to the valve-casing. The arms of this tumbler or catch are of unequal length, and its longer arm is provided with a grooved and pointed end for
 55 engaging with the blunt pointed end 23.

The short arm of the tumbler or catch 24 is arranged in the path of the tappets 3 of the disks 4. The arms of the tumbler or
 60 catch are made of unequal length, and are proportioned so as to regulate the quickness of the action of the tappets upon the throttle-valve.

The tappets 3 are adjustable, and they are
 65 set so as to strike the tumbler 24 at pre-

arranged points in the travel of the mine cage. When either one of the tappets tips over the catch or tumbler, the spring 18 moves the piston-valve to the position shown in Fig. 4, so that the steam in the pipes d' 70 and E is throttled, and the overwinding of the cage is prevented.

The closing of the throttle-valve 2 takes place before the cage has passed the landing, and the engineer cannot admit any more
 75 steam through the pipe d' to the release end of the cylinder. The steam pressure which was applied through the pipe d' automatically at about 100 feet from the landing again becomes effective in the front end of
 80 the cylinder directly the throttle-valve 2 closes the pipe d' , and again moves the piston to the left to set the brake hard on.

When the steam is throttled by the closing of the throttle-valve the end portion of
 85 the pipe d' which is connected to the steam-cylinder is placed in communication with the atmosphere by means of the branch-pipe h and the passages 12 and 13 in the throttle-valve, so that if the piston in the said cylinder is not steam-tight, the steam leaking past
 90 it from the front end of the cylinder to which the pipe d' is connected can pass into the atmosphere and not form a resistance in the release end of the cylinder and the
 95 pipe d' .

When the winding-engine is provided with a brake which is applied by means of heavy weights operated by gravity, and the
 steam-cylinder B is only used to raise the
 100 said weights and thereby release the brake, the throttling of the steam in the exhaust-pipe E is not necessary. The same throttle-valve can be used with the pipe E disconnected, or a special throttle-valve can be provided in which the passages 9 and 10 are
 105 omitted.

In order to more completely guard against over-winding, an auxiliary steam-admission
 110 valve 30 is provided, and its casing is arranged on one side of the casing of the throttle-valve 2, and is connected with the chamber 20 by a small hole or port 31, so that the steam-pressure is equalized between the casings, and so that the action of the
 115 spring may be assisted by the pressure of the steam.

The valve 30 is provided with a valve-seat 32 on one side, and 33 is a pipe which connects the opening through the said seat with
 120 the front end of the steam-cylinder B. This pipe 33 may be connected direct to the cylinder, or it may be connected to the pipe d' which is connected to the front end of the cylinder. The casing of the valve 30 is connected with any steam-supply pipe not controlled by the engineer's valve C, by means
 125 of a pipe 34, and the pipe 34 can advantageously be connected to the steam supply pipe D, as shown in Fig. 1. 130

A ball-valve 35 normally rests on the seat 32 and closes the pipe 33. A stem 36 is slidable in a stuffing-box 37 on the valve-casing and is secured to the crossbar or handle 17.

5 The stem 36 is provided with a cage or eye 38 which engages loosely with the ball-valve, and the stem 36 is arranged parallel to the piston-valve 5 so that they both slide together.

10 When the throttle-valve is operated by the spring 18 to close the pipes *d'* and E, the ball-valve 35 is moved off its seat, and steam is admitted from the pipe D, through the pipes 34 and 33, to the front end of the
15 steam-cylinder B. This steam operates to set the brake hard on, and increases the safety action of the apparatus. The operation of the auxiliary steam-admission valve is automatic, and cannot be controlled or
20 modified by the engineer.

What I claim is:

1. In controlling-mechanism for winding-engines, the combination, with a brake-releasing cylinder, a steam-pipe therefor, and
25 a hand-operated regulating-valve normally controlling the admission of steam through the said pipe to the said cylinder to release the brake; of a normally-open throttle-valve inserted in the said pipe, and trip-mechanism adapted to be operated by the said winding-engine to effect the closure of the said
30 throttle-valve automatically at a prearranged point.

2. In controlling-mechanism for winding-engines, the combination, with a brake-operating cylinder, a steam-pipe connected to one end thereof, and a hand-operated regulating-valve normally controlling the admission of steam to the said cylinder to release
40 the brake; of a normally open throttle-valve inserted in the said pipe, trip-mechanism adapted to be operated by the said winding-engine to effect the closure of the throttle-valve automatically at a prearranged point, and a normally-closed auxiliary steam-admission valve connected to the opposite end
45 of the said cylinder from the said steam-pipe and operating automatically to set the brake hard-on when the said throttle-valve is closed.
50

3. In controlling-mechanism for winding-engines, the combination with a brake-operating cylinder, a steam-pipe connected to one end thereof, and a hand-operated regulating-valve normally controlling the admission of steam to the said cylinder to release
55 the brake; of a normally-open throttle-valve inserted in the said pipe, trip-mechanism adapted to be operated by the said winding-engine to effect the closure of the throttle-valve automatically at a prearranged point, a normally-closed auxiliary steam-admission valve connected with the opposite end of the
60 said cylinder from the said steam-pipe, and a coupling device connecting the two said

valves together so that the said admission valve is opened when the said throttle-valve is closed.

4. The combination, with a brake-releasing cylinder, a steam-pipe therefor, and a
70 regulating-valve controlling the said pipe; of a throttle-valve inserted in the said pipe, an auxiliary steam-admission valve connected to the opposite end of the said cylinder from its said pipe, a coupling device connecting the two said valves together so that
75 the said admission valve is closed while the throttle-valve is open, driving mechanism provided with a tappet, and a catch which holds open the said throttle-valve until dis-
80 engaged by the said tappet.

5. The combination, with a brake-releasing cylinder, a steam-pipe therefor, and a regulating-valve controlling the said pipe;
85 of a throttle-valve inserted in the said pipe, a valve-casing provided with a valve-seat and a steam admission pipe connected to the opposite end of the cylinder from its said steam-pipe, a ball-valve normally closing
90 the said seat, a slidable stem engaging with the ball-valve and operatively connected with the said throttle-valve, driving-mechanism provided with a tappet, and a catch which holds the throttle-valve open and the
95 ball-valve closed until disengaged by the said tappet.

6. The combination, with a brake-releasing cylinder, a steam-pipe therefor, and a regulating-valve controlling the said pipe;
100 of a throttle-valve inserted in the said pipe and provided with a steam escape passage also connected with the said pipe and normally out of communication with the atmosphere, and means for operating the said
105 throttle-valve automatically at a prearranged point to close the passage between the said cylinder and the said regulating-valve and to place the said steam escape passage into communication with the atmosphere.
110

7. The combination, with a brake-releasing cylinder, a steam-pipe therefor, and a regulating-valve controlling the said steam-pipe and provided with an exhaust-pipe; of
115 a throttle-valve provided with passages which connect it with the said steam-pipe and exhaust-pipe respectively, said pipes and passages being normally open, and means for operating the said throttle-valve
120 automatically at a prearranged point where by the said pipes are closed simultaneously.

8. The combination, with a valve casing provided with passages, of a valve slidable
125 in the said casing and normally connecting the said passages, said valve being provided with a stem which projects from the casing, a pivoted catch normally arranged in line with the said valve stem and provided with a pointed end which bears against the projecting end of the said stem, tappet mechan-
130

ism for disengaging the said catch, and means for sliding the valve automatically to close the said passages when the said catch is disengaged.

- 5 9. The combination, with a valve casing provided with passages, of a valve slidable in the said casing and normally connecting the said passages, said valve being provided with a stem which projects from the casing,
10 a pivoted catch normally arranged in line with the said valve stem and provided with a pointed end which bears against the projecting end of the said stem, a second stem con-

nected to the said valve and also projecting from the casing and affording a means for retracting the valve, tappet mechanism for disengaging the said catch, and means for sliding the valve automatically to close the said passages when the said catch is disengaged.

In testimony whereof I have affixed my signature in the presence of two witnesses.

ROBERT H. NICHOLSON.

Witnesses:

FAITH A. BULLARD,
FELIX ANSART.