No. 675,246. Patented May 28, 1901.

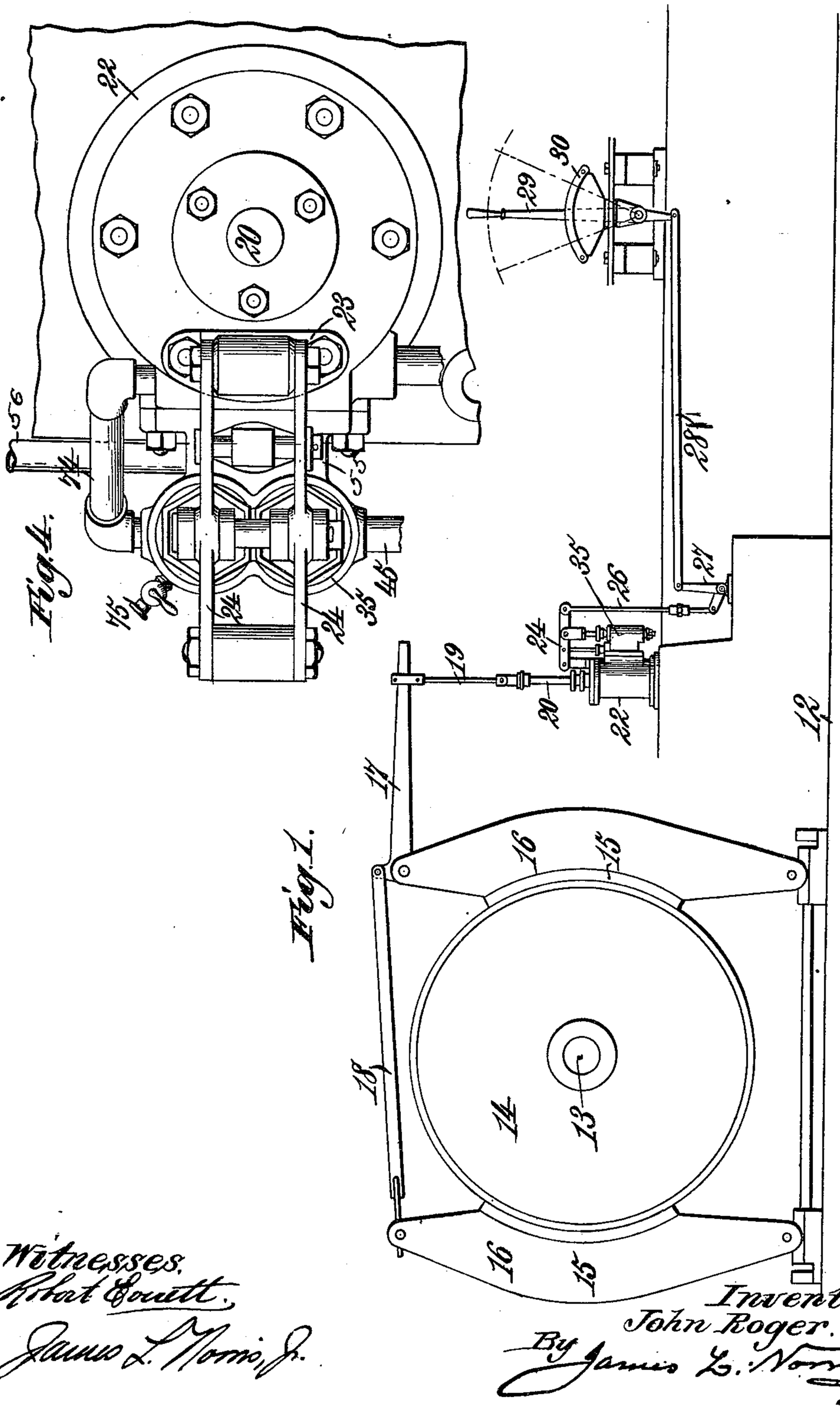
J. ROGER.

PRESSURE REGULATING APPARATUS.

(Application filed Feb. 7, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses.
Robt Govett.
James L. Norris, Jr.

Inventor.
John Roger.
By James L. Norris.
Attis.

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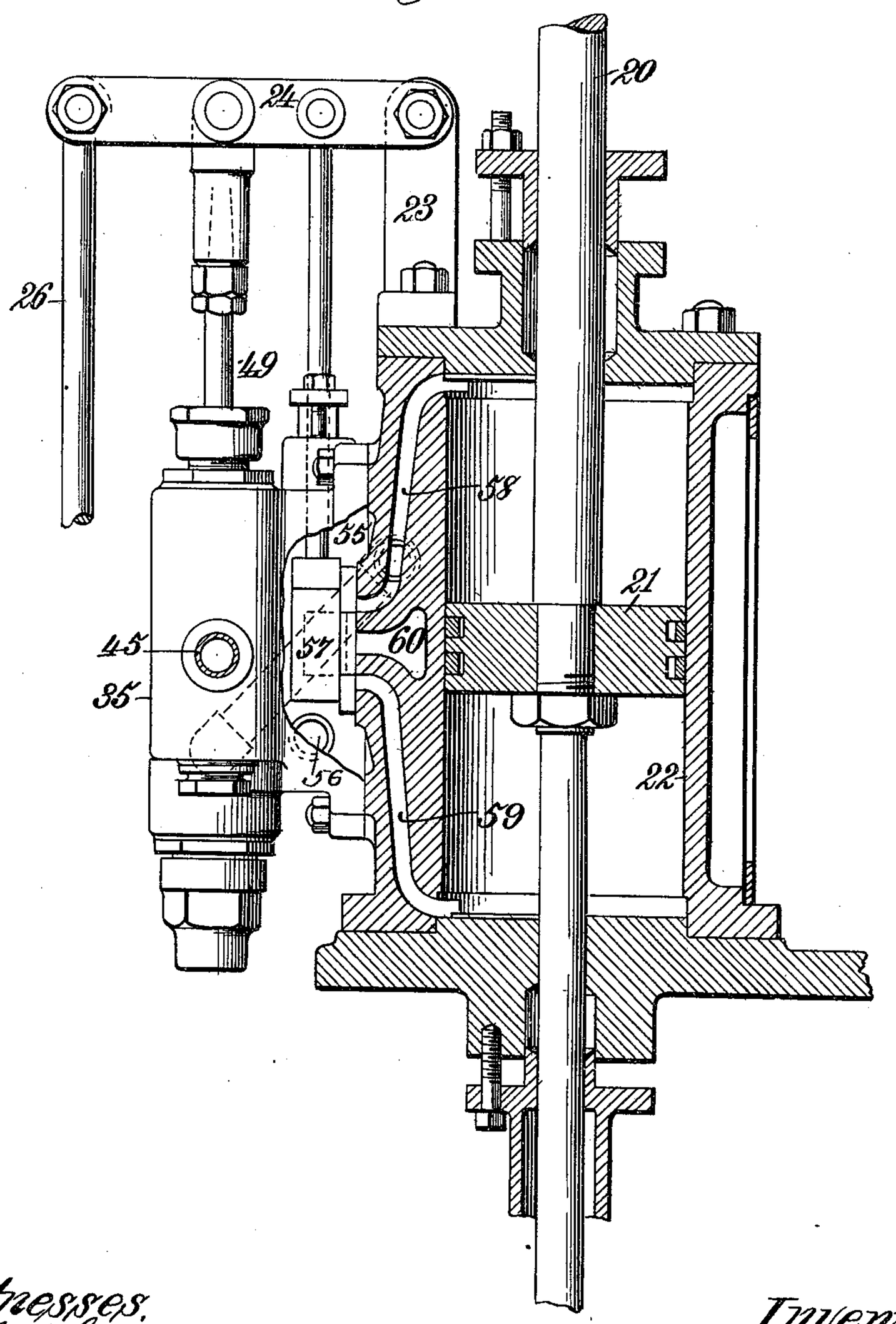
(No Model.) (Application filed Feb. 7, 1901.) 3 Sheets—Sheet 2.

Fig. 2.



Witnesses.
Robert Everett.
James L. Norris Jr.

Inventor.
John Roger.
By James L. Norris.
Atty.

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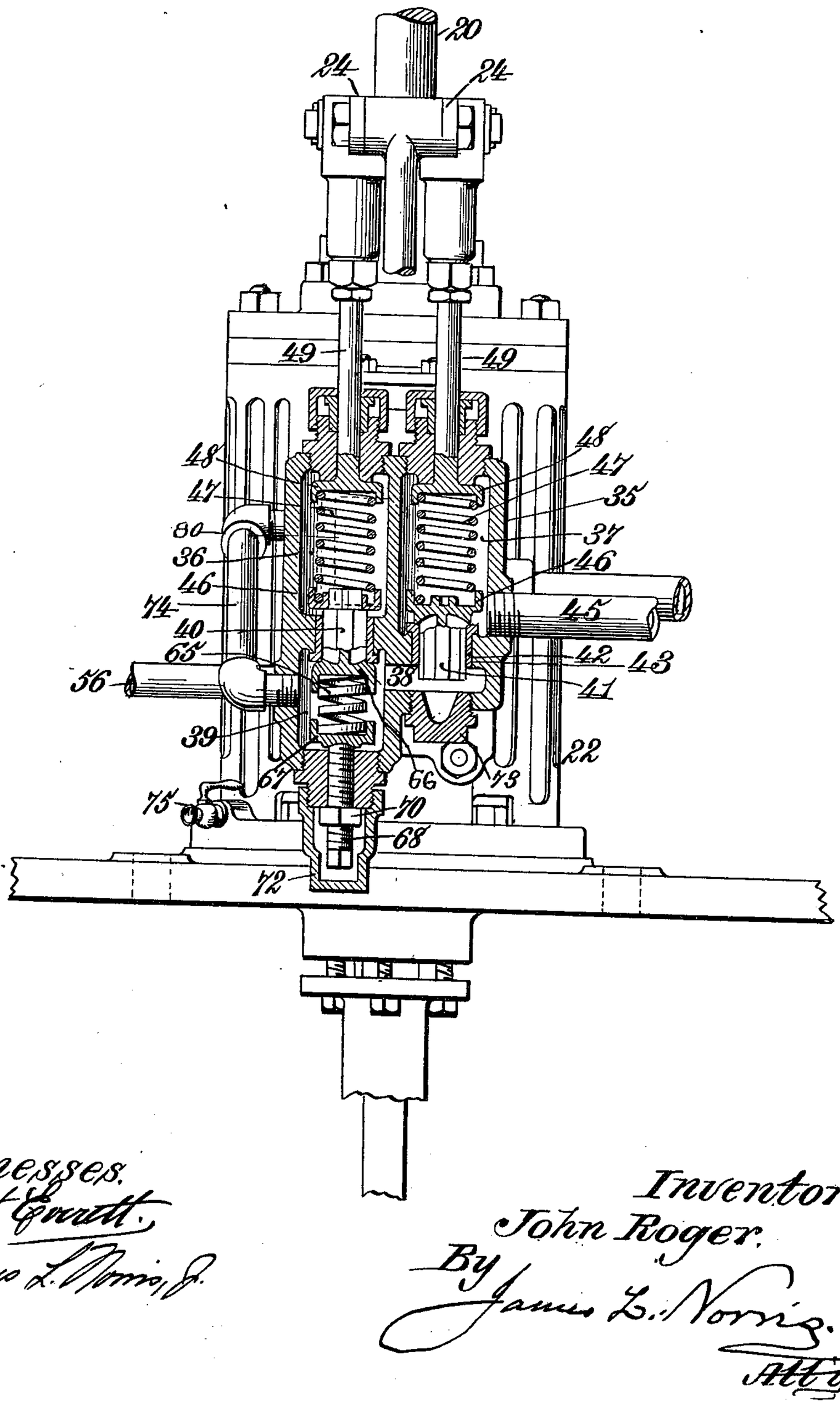
3 Sheets—Sheet 3.

Fig. 3.



Witnesses.
Robert Gault.
James L. Norris, Jr.

Inventor.
John Roger.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

JOHN ROGER, OF DENVER, COLORADO.

PRESSURE-REGULATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 675,246, dated May 28, 1901.

Application filed February 7, 1901. Serial No. 46,425. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROGER, a citizen of England, residing at Denver, in the county of Arapahoe and State of Colorado, have invented new and useful Improvements in Pressure-Regulating Apparatus, of which the following is a specification.

This invention relates to a pressure-regulating apparatus; and the object of the invention is to provide a simple and efficient construction capable of applying differential forces in accordance with the weight or load to be governed; and the apparatus is adapted for many different uses, though it has been found highly advantageous and will be hereinafter described in combination with a friction-brake for hoisting-drums.

In this specification I employ several terms in their generic meaning, intending thereby to include within their scope equivalent elements, and I also use the word "steam" as the motive energy; but it is obvious that this is not essential, for other actuating fluids can be utilized with the same ensuing benefits—such, for example, as compressed air.

In the drawings the apparatus is shown in one simple embodiment thereof, wherein—

Figure 1 is a side elevation of the same in conjunction with a power-brake of the kind generally employed for checking a hoisting-drum. Fig. 2 is a sectional elevation of the apparatus. Fig. 3 is a transverse section thereof, and Fig. 4 a plan view.

Like characters designate like parts in all the figures of the drawings.

The improved apparatus can be employed with facility in connection with different appliances requiring a variable pressure upon any movable part, and it is represented in Fig. 1 in one adaptation thereof that is in combination with a brake for hoisting-drums where the force applied to the brake can be adjusted manually and readily to conform to the load suspended. Referring more especially to said Fig. 1, the numeral 12 denotes a base or bed upon which certain of the working parts of the hoisting apparatus may be mounted, it having suitable bearings to sustain the rotary drum-shaft 13, having a brake-wheel 14, adapted to be peripherally engaged at diametrically opposite places by the frictional contact pieces or shoes 15, secured to the brake posts or levers 16, pivotally mounted at their lower ends upon the base or bed 12. An angle-lever, as 17, is pivoted at its angle to the upper end of the right-hand post 16, a link, as 18, being jointed to the short arm of the angle-lever and likewise connected at its opposite extremity to the upper end of the left-hand post. By drawing the long arm of the angle-lever down the brake-posts can be moved toward each other for the purpose of checking the brake-wheel, and the wheel can be freed by the opposite movement thereof. An arm, as 19, extends downward from the long arm of said angle-lever, and it is pivoted to the upper end of the piston-rod 20, the piston 21 thereof being slidable in the cylinder 22. (Shown as being in its neutral position in Fig. 2.) A vertical bearing 23 rises from the upper head of the cylinder, and a lever, as 24, is fulcrumed thereto, a link 26 being pivoted to the outer end of said lever and depending therefrom. This link is united to the suitably-fulcrumed angle-lever 27, connected with the rod 28. This rod is pivoted to the lower end of the hand-lever 29, shown in its ineffective position. This lever can be maintained in a desired position by pawl and segment, only the latter being shown and being denoted by 30.

The several parts are represented as occupying their idle positions in Fig. 1, during which time the brake-shoes 15 are held against the brake-wheel 14 simply by their weight.

By moving the hand-lever 29 to the right steam, through the agency of intermediate ports, hereinafter described, will be admitted to the upper side of the cylinder to depress the piston for applying the brakes, while said piston will be lifted by moving the lever to the left of its central position to free the brakes, the degree of force to be applied to the piston, and hence to the brakes, being obtained by the amount of movement of the hand-lever 29, the effect increasing as said lever is moved to the right, as will be hereinafter more particularly set forth.

In the embodiment of the apparatus illustrated it involves in its construction a casing arranged in the present instance in juxtaposition to and communicating with the cylinder 22. Said casing is shown as being of cylindrical form, it being denoted by 35, and

having communicating supply and exhaust chambers, as 36 and 37, communication being afforded through the transverse port or passage 38, leading from the chamber or compartment 39, in which a suitable medium for normally holding one of the valves closed is located.

There are operative in the casing 35 a pair of valves of suitable type which for convenience I shall term "supply" and "exhaust" valves, as the first controls the supply or feed of steam to the cylinder 22 and the other governs the exhaust from the valve-casing 35, it being in the nature of a relief-valve, as it opens to permit the escape of excessive steam. The valves are designated respectively by 40 and 41, they being of the plug kind and being oppositely movable. These valves are movable in and are surrounded by bushings, as 42, fitted snugly in bores formed in the interior wall 43 of the casing, the working ends of the valves being tapered to fit against correspondingly-shaped seats on the two bushings. The supply-valve 40 is moved downward to open the same, while the reverse action follows with respect to the exhaust-valve 41, said latter valve as it lifts permitting exhaust or excessive steam to enter the chamber 37 and from thence pass to atmosphere through the exhaust-pipe 45, tapped into said casing. Both valves have enlarged annular heads, as 46, at their upper ends recessed on their upper faces to form seats for the lower ends of coiled protractile springs 47 of similar strength, both springs when the parts are in their neutral positions being lax or ineffective. The upper ends of said springs fit in seats or recesses formed in the enlarged annular feet or bases 48 of the vertical spindles 49, both valves being, therefore, spring-controlled and also simultaneously operable through the agency of said spindles. Said spindles extend through stuffing-boxes in the top of the duplex valve-casing and are connected to the lever 26 for action in unison thereby. Therefore when the spindles are thrust downward the supply-valves will be moved in a direction to open the same, while the exhaust-valve will be forced against its seat or closed through the medium of the intervening coiled springs, this motion being secured by swinging the hand-lever 29 to the right or in a direction to set the brake and arrest the motion of the hoisting-drums.

A chamber, as 55, is arranged between the cylinder 22 and casing 35, and the steam-supply pipe 56 from the boiler (not shown) leads into the said chamber 55, from which it passes into the chamber 36 through the port or opening 80. A slide-valve, as 57, of ordinary kind and operating in the usual manner is located in the chamber 55, and it controls the supply-ports 58 and 59 and the exhaust-port 60, the stem of said valve extending upward and being pivoted to the lever 24, so that it can be operated in unison with the supply and exhaust valves previously described. The chamber 55 communicates with the supply-valve chamber 36 for the purpose of supplying steam to the duplex-valve casing and necessarily communicates with the ports 58 and 59, so that steam can be delivered through the latter into the cylinder 22 to lift the piston 21, and hence throw off the brake device; but the supply of steam to depress the piston first passes through the regulating apparatus, so as to determine the force to be applied to the brake device.

The supply-valve 40 is normally maintained against its seat by yieldable means, as the coiled spring 65, which is stronger than and acts in opposition to the spring 47, the upper end of said coiled spring being disposed in a seat formed in the under face of the annular enlargement or head 66 at the lower end of the supply-valve, while the opposite end of said spring fits in a similar seat in the correspondingly-shaped head 67 of the adjusting-screw 68. The screw extends through the plug 69, tapped into the lower end of the casing 35, and is embraced by the check-nut 70, serving its usual function, and the lower end of which is surrounded by the detachable cap 72, threaded onto the plug. By removing these parts access may be had to one side of the casing 35, a similar result being secured with respect to the other side of the casing by unscrewing the threaded cap or nut 73, fitted into the lower side of the casing in line with the exhaust-valve chamber. By turning the screw 68 the tension of the spring 65 can be regulated in accordance, of course, with the amount of force to be applied to the valve 40 to hold it closed. A diagonally-disposed pipe, as 74, is tapped into the cylinder 35 and cylinder 22, it communicating directly with the supply-port 58 and compartment 39, which, it will be remembered, is in communication with the supply-chamber 36. It will therefore be seen that so long as the slide-valve 57 covers the port 58 there is no communication between the chamber 55 and the port 58. The steam entering the chamber 55 therefore passes from the chamber 55 into the chamber 36 through the port or opening 80, by the valve 40 into the chamber 36, and from thence into the pipe 74, which conducts it to the port 58 to flow into the upper end of the cylinder 22. When the spindles 49 are thrust downward, the two valves will be actuated one in a direction to open the same and the other in a direction to close the same by the compression of the springs 47, said spindles being acted on by the lever 24 for the purpose of depressing the piston and setting the brakes. When said lever 24 is lifted to release the brakes, the springs will relax until they reach their ineffective condition, and afterward as the lever is moved upward the spindles will pass free of the springs, these parts not being connected. During the elevation of said parts the slide-valve 57 will be lifted, so as to uncover the port 59 and admit steam into the cylinder for raising its piston, the exhaust

passing through the port 58. When supply-steam passes to the upper side of the cylinder for lowering the piston, the exhaust will take place through the port 59.

The slide-valve is not an essential part of the mechanism, for it is necessary only where steam is employed as the motive factor to provide positive outlets for the steam at the ends of the stroke of the piston.

The cylinder 22 has a draw-off cock 75 at its lower end, serving the usual purpose.

When a sufficient pressure is brought to bear on the supply-valve 40 to counteract the pressure of the spring 65 bearing against the same, the valve will open, allowing a sufficient amount of steam to pass into the compartment or space 39 to create a pressure in this space. When the differences in pressure between the chamber 36 and space 39 reach that point where the spring 65 again becomes active, then the supply-valve will be closed, thereby cutting off steam from the space 39, and consequently from the upper end of the piston. The steam delivered to the space 39 will flow into the pipe and from thence pass into the cylinder 22 through the port 58 to force the piston 20 down. The steam thus supplied to the cylinder will act in correspondence to the pressure applied to the spring 47. By increasing the pressure on said spring, due to increasing the stroke of the hand-lever 29, additional force can be applied to the piston 21. Should the pressure on the piston 20 be too great, the valve 41 will be at once opened, permitting the superfluous steam to escape. The pressure in the cylinder 22 will therefore vary with the amount of compression applied to the coiled springs 47 and may be either increased or decreased at will to suit different cases.

The apparatus may be modified within the scope of the appended claims and may be employed for many different purposes other than that particularly described herein. For example, it may be incorporated in an air-brake apparatus for railway-cars.

Having described the invention, what I claim is—

1. In an apparatus of the class described, a casing having communicating supply and exhaust chambers; supply and exhaust valves mounted in said chambers, both spring-controlled; and a spring acting against one of said valves to hold it normally against its seat.

2. In an apparatus of the class described, a casing having communicating supply and exhaust chambers; supply and exhaust valves mounted in the respective chambers, both yieldingly controlled; and yielding means to normally maintain the supply-valve against its seat.

3. In an apparatus of the class described, a casing having supply and exhaust chambers; oppositely-movable spring-controlled valves in said chambers; and a spring bearing against the supply-valve to hold it normally against its seat.

4. In an apparatus of the class described, a casing having communicating supply and exhaust chambers; supply and exhaust valves both spring-controlled and mounted in the respective chambers; yieldable means for normally holding the supply-valve to its seat; and means for simultaneously operating both valves.

5. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers; supply and exhaust valves operative in the respective chambers; yieldable means normally holding the supply-valve against its seat, spindles extending into said casing, and springs bearing respectively against the spindles and valves.

6. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers, supply and exhaust valves operative in the respective chambers, a spring normally holding the supply-valves closed, a member for simultaneously opening both valves; and yieldable means between said valve-opening member and the valves.

7. In an apparatus of the class described; a casing having communicating supply and exhaust chambers; supply and exhaust valves operative in the respective chambers; yieldable means for normally holding the supply-valve shut; a lever; spindles projecting through the casing and operated by said lever, and springs bearing against the spindles and valves, respectively.

8. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers, supply and exhaust valves operative in the respective chambers and both spring-controlled; a spring bearing against the supply-valve for holding it normally to its seat, and means for regulating the tension of said spring.

9. In an apparatus of the class specified, a casing having supply and exhaust chambers, supply and exhaust valves mounted in the respective chambers and both spring-controlled; yieldable means for normally holding the supply-valve shut; and a port communicating with said casing and containing a member adapted to be actuated by fluid received from the supply-chamber.

10. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers, supply and exhaust valves mounted in the respective chambers and both spring-controlled; yieldable means for normally holding the supply-valve to its seat; a cylinder communicating with the supply-chamber and having a piston, a valve controlling the admission of fluid to the cylinder from the supply-chamber; and means for simultaneously operating all of said valves.

11. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers, supply and exhaust valves

mounted in the respective chambers and both spring-controlled; yieldable means for normally holding the supply-valve to its seat; a cylinder communicating with the supply-chamber and having a piston; a valve controlling the admission of fluid to the cylinder from the supply-chamber, means for simultaneously operating all of said valves, and a brake operated by said piston.

12. In an apparatus of the class specified, a casing having communicating supply and exhaust chambers, supply and exhaust valves mounted in the respective chambers and both spring-controlled, yieldable means for normally holding the supply-valve to its seat; a cylinder communicating with the supply-chamber and having a piston, a valve controlling the admission of fluid to the cylinder from the supply-chamber, a lever for effecting the simultaneous operation of all the valves, a second lever operatively connected with the other lever and manually controlled, and a brake connected with and operated by the first lever.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOIIN ROGER.

Witnesses:
N. HADFIELD,
JAMES HENDERSON.