

No. 735,452.

PATENTED AUG. 4, 1903.

W. L. BLISS.
ELECTRIC SWITCH.

APPLICATION FILED FEB. 26, 1902.

NO MODEL.

Fig. 1.

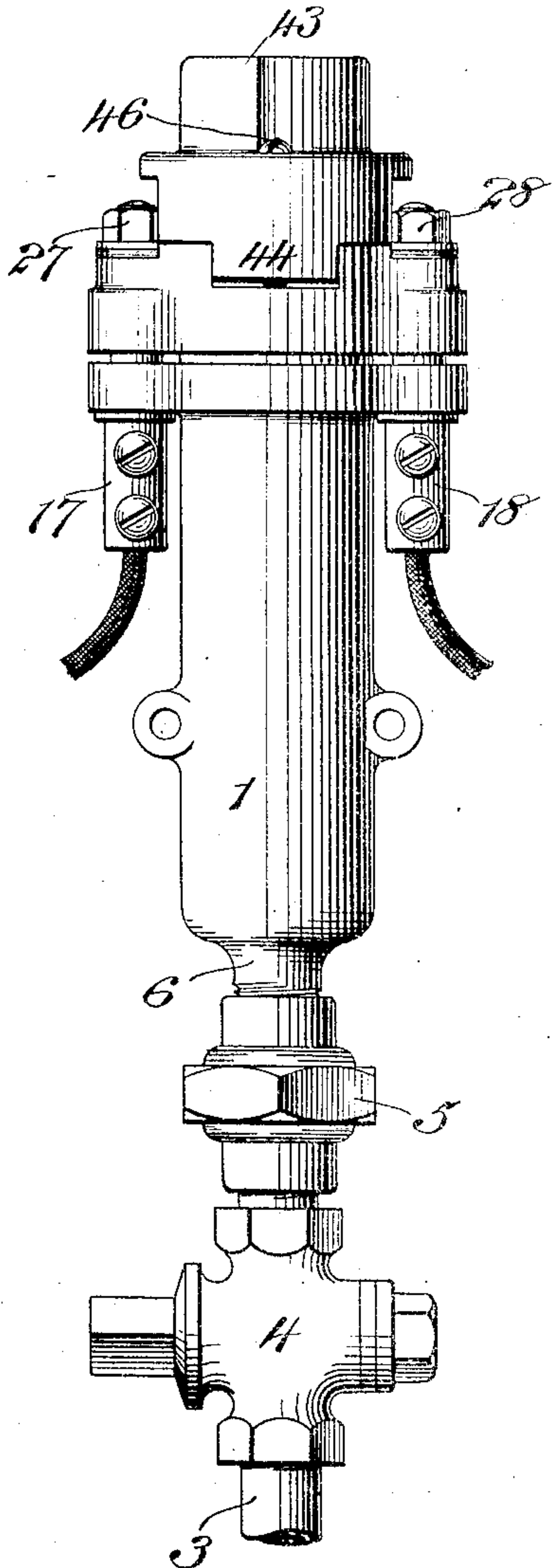


Fig. 2.

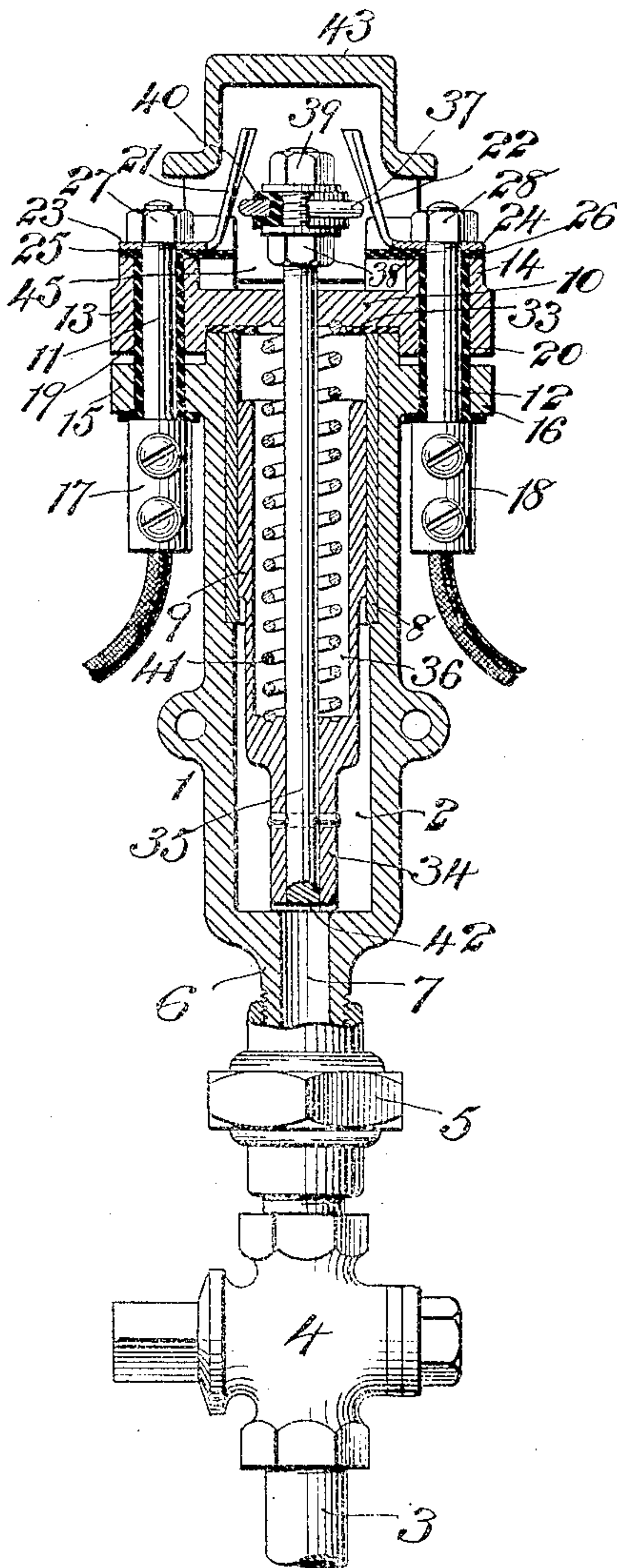
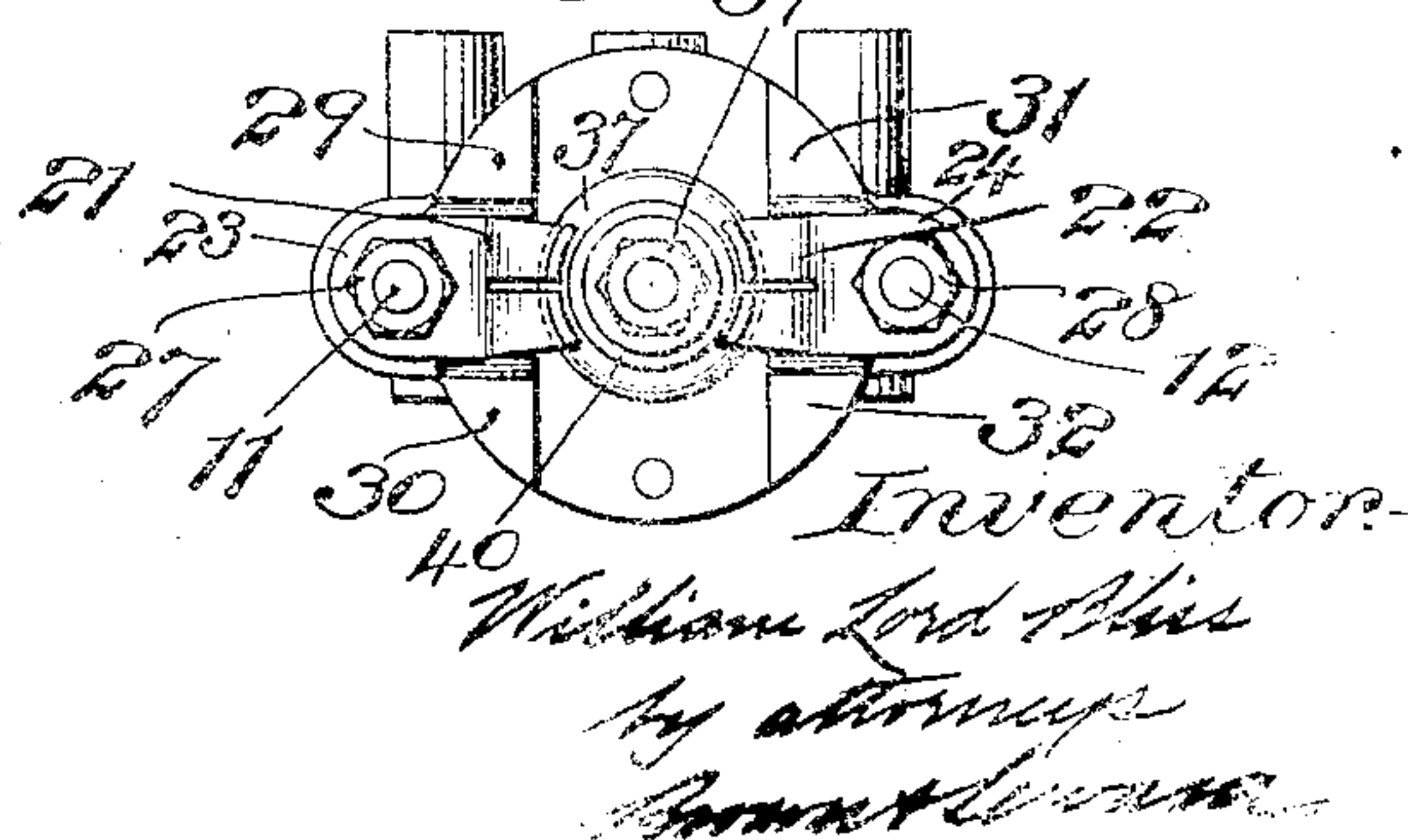


Fig. 3.



Witnesses:
George Barry Jr.
Henry F. Hime

Inventor:
William Lord Bliss
by attorneys
Barnett & Co.

UNITED STATES PATENT OFFICE.

WILLIAM LORD BLISS, OF BROOKLYN, NEW YORK, ASSIGNOR TO BLISS ELECTRIC CAR LIGHTING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 735,452, dated August 4, 1903.

Application filed February 26, 1902. Serial No. 95,739. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LORD BLISS, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

My invention relates to an improvement in electric switches, and has for its object to provide an automatic switch which will be under the control of a motive fluid—such, for instance, as compressed air—whereby the switch is closed under pressure and opened by the release of the pressure.

A further object is to provide certain improvements in the construction, form, and arrangement of the several parts of the switch, whereby the switch will be simple and positive in operation, in which the cylinder will be self-sealing, so as to prevent the escape of the motive fluid, and in which the parts are well protected, thus rendering the switch particularly applicable for use where it is subjected to rough treatment.

This switch is particularly applicable for use in connection with car-lighting systems, wherein it is connected to the pneumatic signal-pipe of the car and is controlled thereby for making and breaking electrical circuits in the lighting system.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the switch in side elevation. Fig. 2 is a vertical central section through the same, the switch being shown open as when the pressure is withdrawn from the piston; and Fig. 3 is a top plan view of the switch with the contact-plate protecting cap or cover removed.

The cylinder of the switch is denoted by 1, and the piston-chamber therein by 2. The piston-chamber 2 is connected to a fluid-pressure pipe 3, which may be the train signal-pipe of a car. A cock 4 is interposed between the pressure-pipe 3 and cylinder 1 for positively controlling the admission of fluid-pressure to the interior of the cylinder. When the pressure-supply pipe 3 is the signal-pipe of a railway-car, it must never be opened to

the atmosphere except by special apparatus for that purpose. (Not shown.) The cock 4 serves to close the pressure-supply pipe 3, thus permitting the removal of the switch for repairs or other purposes. The cock 4 may be a simple straight cock or a "three-way" cock having a vent to relieve the pressure in the cylinder 1 when said cock is turned so as to close the pressure-supply pipe 3. A coupling or union 5 of usual form connects the cock 4 with the hollow lug 6, depending from the bottom of the cylinder 1, the bore 7 through the lug opening into the bottom of the piston-chamber 2. A lining tube or bushing 8 is fitted within the piston-chamber 2, from its top to a point about half-way down within the chamber, for engaging the periphery of the hollow piston-head 9 of the piston, which is located within the piston-chamber. A cylinder-head 10 serves to close the upper end of the piston-chamber within the cylinder 1, which head is secured in position by means of bolts 11 and 12, which pass through lugs 13 and 14 on the cylinder-head and lugs 15 and 16 on the cylinder. The heads of these bolts 11 and 12 are developed into binding-posts 17 and 18 below the lugs 15 and 16 upon the cylinder for the attachment of the circuit-wires of the switch. These bolts 11 and 12 are insulated from the lugs 13 14 15 16 by the flanged tubes 19 20, of fiber or other suitable insulating material.

Contact-plates 21 22 are secured to the bolts 11 and 12 in the following manner: These contact-plates 21 22 have laterally-extended portions or bases 23 24, which embrace the ends of the bolts 11 and 12, which project above the lugs 13 and 14 of the cylinder-head, between which bases and the tops of the said lugs are interposed insulating-washers 25 26, of mica or other suitable insulating material. The nuts 27 28, which engage the screw-threaded ends of the bolts 11 and 12, serve not only to clamp the contact-plates 21 22 in position, but also serve to clamp the cylinder-head 10 in its position with respect to the cylinder.

The upwardly-extended portions of the contact-plates 21 22 are brought inwardly toward each other and preferably are curved

in cross-section and slotted to insure a good contact with the connecting-disk 37, carried by the piston, to be hereinafter described.

To hold the contact-plates against displacement by swinging around on the bolts when the switch is subjected to severe jars or when the nuts 27 and 28 become loosened, I provide the cylinder-head 10 with four lugs 29 30 31 32. The contact-plate 21 is retained in position between the lugs 29 and 30, and the contact-plate 22 is retained in position between the lugs 31 and 32.

The insulating-washers 25 and 26 are bent up on each side so as to interpose insulation between the contact-plate 21 and the lugs 29 and 30 and between the contact-plate 22 and the lugs 31 and 32.

A packing-ring or gasket 33 is interposed between the cylinder-head 10 and the top of the cylinder 1, which gasket is also engaged by the upper end of the bushing 8, so that when the cylinder-head is drawn into its position the gasket 33 will be compressed between the cylinder and cylinder-head for preventing the escape of pressure from the piston-chamber 2.

The piston, which is fitted to slide within the cylinder, is provided with a reduced shank 34, depending from the hollow piston-head 9. A rod 35 is secured rigidly within the said shank 34 of the piston and projects upwardly therefrom through the bore 36 of the piston-head and through holes in the gasket 33 and cylinder-head 10. A connecting-disk 37 is locked in position upon the upper end of the rod 35 by lock-nuts 38 39, which may be adjusted to bring the connecting-disk 37 into proper relation with the contact-plates 21 22. This connecting-disk 37 is completely insulated from the rod 35 by a sleeve 40, of any desired insulating material. This connecting-disk 37 is so adjusted that it will break contact with the contact-plates 21 22 when the piston approaches the limit of its inward or downward movement and will make contact with the contact-plates when the piston approaches the limit of its outward or upward movement. A spring 41 is interposed between the bottom of the bore 36 within the piston and the cylinder-head 10 for positively returning the piston to the limit of its downward movement when pressure is withdrawn therefrom.

The bottom of the shank 34 of the piston is provided with a transverse groove 42 there-through, so as to keep an open communication between the duct 7 and the interior of the piston-chamber even though the piston be at the limit of its downward movement.

As the piston is forced upwardly under fluid-pressure the upper end of the piston-head will be caused to engage the gasket 33, and thus serve to seal the piston-chamber completely and prevent the leakage of pressure therefrom between the cylinder and cylinder-head. By thus making the piston automatically seal the cylinder the expense and care of making

the piston-head 9 an accurate fit in the bushing 8 are avoided.

To protect the connecting-disk 37 and contact-plates 21 22, I provide a cap or cover 43, which is provided with depending portions 44 45, which fit between the lugs 30 32 and 29 31, respectively, for seating the cap firmly upon the cylinder-head 10. Screws 46 serve to removably secure the cap 43 in its position.

When this switch is used in connection with a car-lighting system, it is operated by the pneumatic signal-pipe of the car, as follows: When there is no pressure in the signal-pipe—as, for instance, when the locomotive is detached from the train—the piston will be in its lowered position and the electrical connection broken through the circuit in which the switch is located. When the locomotive is attached to the train and the signal-pipe is coupled up to the locomotive, the pressure of air within the signal-pipe will force the piston upwardly, thus completing the circuit. The circuit will be kept intact as long as there is pressure in the signal-pipe, and this is the period during which it is desired to keep the circuit unbroken.

It will be seen that the switch as above constructed is very simple and one which will withstand a great amount of hard usage, thus rendering it particularly applicable for use in connection with car-lighting systems. It will also be seen that the parts are well protected and the contact between the connecting-plate 37 and contact-plates 21 22 will be always kept bright because of the frictional sliding movement of the connecting-disk along the inner faces of the contact-plates as the piston is raised and lowered. The structure is also materially simplified by utilizing the bolts which secure the cylinder-head to the cylinder as binding-posts and for securing the contact-plates in position.

It is evident that slight changes might be resorted to in the form, construction, and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. A fluid - pressure - controlled electric switch comprising a cylinder, contact-plates carried thereby, a piston fitted to reciprocate in the cylinder, a connecting-disk exterior to the cylinder for engaging and disengaging the contact-plates, a rod for connecting the connecting-disk to the piston and a removable cap for protecting the contact-plates and connecting-disk.

2. In a fluid-pressure-controlled electric switch, a cylinder, a cylinder-head, a packing-ring interposed between the cylinder and cylinder-head and a piston fitted to reciprocate in the cylinder, the said piston being arranged to engage the packing-ring when at the limits of its outward movements for preventing the escape of pressure from within the cylinder.

3. A fluid - pressure - controlled electric switch comprising a cylinder, a cylinder-head, contact-plates, bolts for securing the contact-plates to the cylinder-head and the cylinder-head to the cylinder and a piston fitted to reciprocate in the cylinder arranged to engage and disengage the contact-plates as the piston is reciprocated.

4. A fluid - pressure - controlled electric switch comprising a cylinder, a cylinder-head, contact-plates, bolts for securing the contact-plates to the cylinder-head and the cylinder-head to the cylinder, a piston fitted to reciprocate in the cylinder and a connecting-disk carried by the piston arranged to engage and disengage the contact-plates as the piston is reciprocated.

5. A fluid - pressure - controlled electric switch comprising a cylinder, a piston fitted to reciprocate therein, a cylinder-head, contact-plates, bolts insulated from the cylinder and cylinder-head for securing the contact-plates, cylinder and cylinder-head together,

binding-posts carried by said bolts and a connecting-disk carried by the piston arranged to engage and disengage the contact-plates as the piston is reciprocated.

6. A fluid - pressure - controlled electric switch comprising a cylinder, a hollow piston fitted to reciprocate therein, a cylinder-head, contact-plates carried thereby, a connecting-disk for engaging and disengaging the plates, a rod connecting the disk with the piston and a spring for normally returning the piston to the limit of its inward movement for positively disengaging the disk from engagement with the contact-plates when pressure is removed from the piston.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 8th day of February, 1902.

WILLIAM LORD BLISS.

Witnesses:

FREDK. HAYNES,
HENRY THIEME.