

No. 656,716.

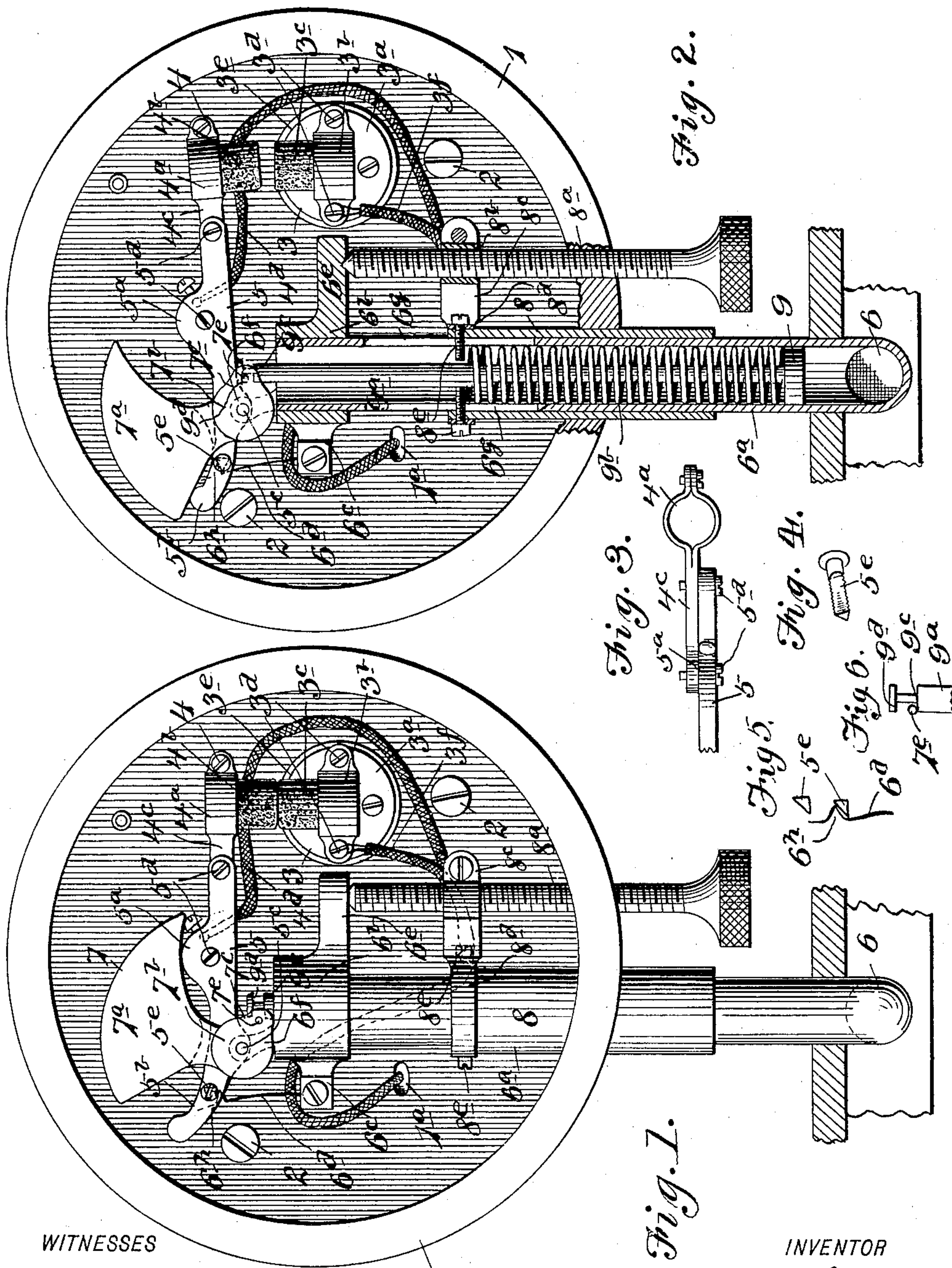
Patented Aug. 28, 1900.

C. A. ECK.

FLUID OPERATED ELECTRIC SWITCH.

(Application filed Feb. 12, 1900.)

(No Model.)



WITNESSES

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Fig. 1.

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FLUID-OPERATED ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 656,716, dated August 28, 1900.

Application filed February 12, 1900. Serial No. 4,872. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. ECK, a subject of the King of Sweden and Norway, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Fluid-Operated Electric Switches, of which the following is a specification.

My invention relates generally to electric switches, and more particularly to electric switches operated by fluid-pressure, to be used, for instance, in connection with electric air-pumps, and is specially designed to be used with the electric air-pump for which I filed application for Letters Patent of the United States on November 1, 1899, Serial No. 735,459.

In electric air-pumps that are utilized in connection with beer-casks, for example, and where it is desired to maintain a constant air-pressure on the top of the surface of the beer in said casks it is evident that as the beer or other liquid is drawn off the pressure decreases and has to be reinforced by an intermittent feeding of air occurring a number of times equal to the number of times the pressure is decreased by the said drawing off of the beer.

It is one object of my invention to produce an electric switch for starting and stopping an air-pump and adapted to be actuated by the variations in pressure of the fluid contained in the cask or tank to which the pump supplies air under pressure and so constructed as to cause an insufficient pressure to act on the switch to close the circuit and thus operate the pump, and, further, so constructed as to operate to act on the switch to break the circuit, so as to discontinue the operation of the pump when a sufficient pressure has been reached.

A further object of my invention is to provide means whereby the switch may be set to operate at any pressure desired.

To these ends my invention consists, broadly, of a stationary and a movable electrode, the latter adapted to move in and out of contact with the former. This movable electrode is operated on a quick action to open and close the circuit by means of a tilting weight actuated by ledges or shoulders

formed on the adjacent end of the piston-rod of a piston, on which latter the pressure in the cask or tank acts direct to reciprocate the same.

It further consists of means whereby the movable electrode when moved out of contact with the stationary electrode by the tilting weight is locked in its open position, so as not to close until the return action of the said weight causes it to drop back into its closed position.

It further consists in means whereby the piston, against which the fluid-pressure acts, may be so regulated as to be made to operate at different pressures, so that simply by adjusting same any desired pressure will operate to actuate same.

In the accompanying drawings I have shown a device constructed in accordance with my invention, it being understood that this is done for the sole purpose of imparting a clearer understanding of the matter, so that I do not limit myself to the exact construction therein set forth, but consider myself at liberty to make such alterations as properly come within the scope and nature of the claims.

In the said drawings, Figure 1 is a view of a device embodying my invention, showing the circuit closed. Fig. 2 is a view, partly in section, showing the circuit open. Figs. 3, 4, 5, and 6 are detail views.

Like numerals of reference indicate corresponding parts in the different views.

I shall describe a pressure-operated electric switch embodying my invention and afterward point out the novel features in the claims.

1 indicates the casing which protects the different parts constituting the device. This casing is fastened on the framework of the electric motor operating the pump by means of screws 2.

3 is the stationary electrode, comprising simply a base portion 3^a, carrying a collar 3^b, into which is removably inserted a piece of carbon 3^c. The base portion is fastened to the casing by means of screws 3^d, insulating material 3^e being interposed, so as to insulate it from the casing and from the framework of the motor.

4 is the movable electrode, comprising likewise a collar 4^a, into which is removably inserted the carbon 4^b, the said collar forming part of the arm 4^c, which is made of conductive material and fastened, by means of screws 5^d, to the arm 5, made of a suitable insulating material. This arm 5 is formed with a raised portion 5^a and a rearwardly-extending portion 5^b and is mounted loosely on the pin 5^c. On the portion 5^b is also secured a triangular pin 5^e. Two line-wires 3^f and 4^d pass from the armature of the motor out through aperture 1^a in the casing and are fastened one each to the stationary electrode 3 and the movable electrode 4, thus connecting those two points with the operative parts of the motor.

6 is a pipe leading from the cask or tank in which the pressure is to be maintained. From this pipe extends a vertical tube 6^a, formed with two vertical slots 6^s and with a suitable head 6^b, from which extends the lug 6^c, carrying the catch-spring 6^d, having the bent portion 6^h, and from which also extends a lateral lug 6^e. This head is further provided with two lugs 6^f, in which the pin 5^c is pivoted, and upon this same pin the tilting weight 7 is also fastened, so that the said pin 5^c and weight 7 move as one piece. This tilting weight 7 comprises the weight proper, 7^a, and two downwardly-projecting lugs 7^b, one on each side, each having an extension 7^c, carrying a transverse pin 7^e.

On the outside of the tube 6^a is a short guiding-sleeve 8, adapted to travel vertically by means of the hand-operated screw 8^a, working in the screw-cut hole 8^b of the lug 8^c, fastened to the ring 8^d, surrounding said sleeve and bearing against the lug 6^e. In this ring 8^d are inserted two screws or pins 8^e, projecting into the tube 6^a through the vertical slots 6^s, pressing upon the spring 9^b, coiled around the piston-rod 9^a of the piston 9. The upper part of the piston-rod 9^a is formed with two shoulders or ledges 9^c and 9^d, adapted to coact with the pin 7^e.

From the foregoing it will be seen that when the device is in its closed position, as shown in Fig. 1, it causes the motor to operate the pump to supply air under pressure to the cask or tank. Then when the desired pressure has been reached it will act on the piston 9 to lift same and with that the piston-rod 9^a, upon which the shoulder 9^c will lift the pin 7^e, thereby tilting the weight 7, which will fall on the rearwardly-extending portion 5^b and with a quick blow depress same, the triangular pin 5^e forcing itself past the bent portion 6^h of the spring 6^d, thus lifting the arm 5 and with that the electrode 4, thereby breaking the circuit, and thus stopping the motor operating the pump. When the pressure now decreases in the cask or tank, the piston will descend and the shoulder 9^d of the piston-rod will depress the pin 7^e, thus tilting the weight 7 back again, which latter then falls with a quick blow on the raised portion

5^a, depressing same and forcing the triangular pin 5^e up past the bent portion 6^h of the spring 6^d, thus bringing the arm 5 down and with that the movable electrode 4 into contact with the stationary electrode 3, thereby closing the circuit and causing the motor to operate the pump.

It should be noted that since the weight 7 moves independent of the arm 5 the latter does not change its position until it receives the quick blow of the weight, and, further, that when the triangular pin 5^e is forced past the bent portion 6^h of the spring 6^d it is caught there, and thus locks the movable electrode, so as to prevent its falling back on the stationary electrode, and it is not until the weight 7 strikes the portion 5^a that the arm 5 is released by the pin 5^e being forced past the bent portion 6^h of the spring 6^d.

Much stress has been laid upon the quick blow given by the weight. This is due to the fact that unless the two electrodes are quickly separated an arc-light is formed, which of course is undesirable.

Should it be desired to vary the pressure at which the switch will operate, it is only necessary to manipulate the hand-screw 8^a, thus compressing or extending the coiled spring 9^b, as the case may be, thereby regulating the degree of pressure necessary to cause the fluctuation of the piston 9.

Having thus described my invention, what I claim is—

1. In an electric switch, the combination of a stationary electrode, with a movable electrode, an arm, carrying said movable electrode, loosely pivoted, a tilting weight attached at the same point as the arm, a fluid-actuated mechanism adapted to tilt said weight back and forth to effect the movement, on a quick action, of the movable electrode to and from the stationary electrode, and means whereby the arm carrying the movable electrode is locked when acted upon by the tilting weight to assume its open position, and to be released when the tilting weight acts upon the arm aforesaid to close the circuit, substantially as described.

2. In an electric switch, the combination of a stationary electrode, with a movable electrode, an arm carrying said movable electrode loosely pivoted, a tilting weight attached at the same point as the arm and carrying a transverse pin, a vertical tube, a reciprocating piston working in said tube operated by fluid-pressure, means for obtaining a predetermined but adjustable mechanical pressure on said piston acting against said fluid-pressure, and a piston-rod on said piston formed with two shoulders or ledges adapted to coact with the transverse pin on the tilting weight to effect the tilting of said weight, for the purposes as set forth, substantially as described.

3. In an electric switch, a fluid-actuating mechanism for operating same comprising a vertical tube formed with a plurality of vertical slots and a horizontal lug, a reciprocating

ing piston having a piston-rod surrounded by
a coiled spring working in said tube, in com-
bination with a guiding-sleeve adapted to
travel vertically on the tube aforesaid and
5 carrying a plurality of horizontal pins ex-
tending through the vertical slots of the tube
to press against the coiled spring surround-
ing the piston-rod, and having further a hori-
zontal lug with a screw-cut hole, and a hand-
10 operated feed-screw operating in said screw-
cut hole and bearing against the horizontal
lug of the vertical tube, and adapted to op-

erate to effect the vertical movement of the
guiding-sleeve upon the vertical tube to regu-
late the pressure of the coiled spring, sub- 15
stantially as described.

Signed at Newark, in the county of Essex
and State of New Jersey, this 7th day of Feb-
ruary, A. D. 1900.

CHARLES A. ECK.

Witnesses:

WILLIAM H. DAY,
AXEL V. BEEKEN.