J. DESMOND.

CONTROLLER FOR ELECTRIC MOTORS.

APPLICATION FILED DEC. 13, 1909.

1,049,460. Patented Jan. 7, 1913.

Fig. 1.

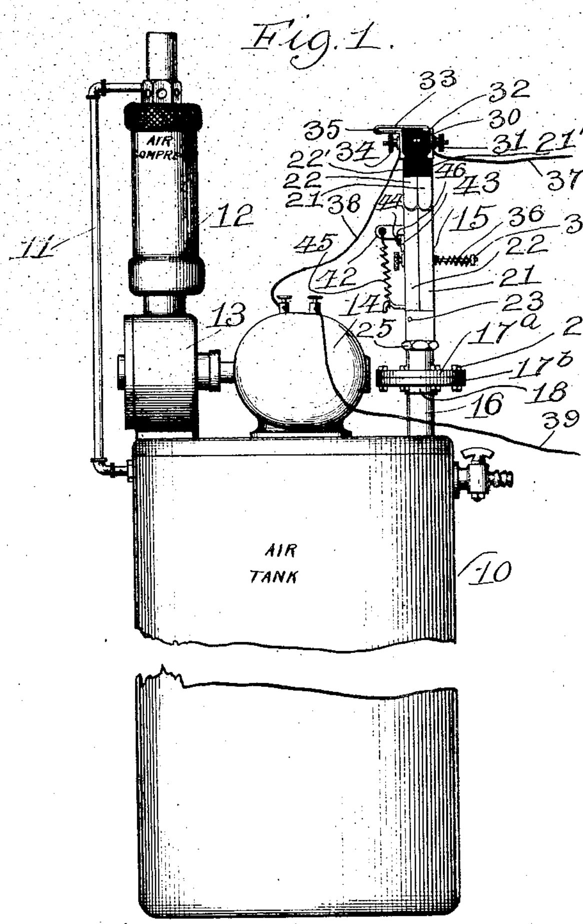


Fig. 2.

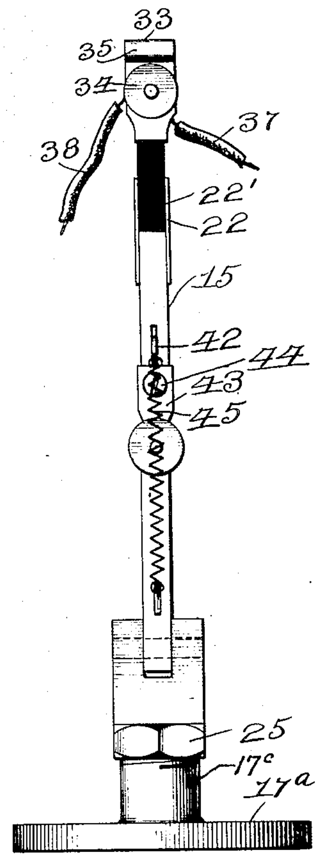


Fig. 4.

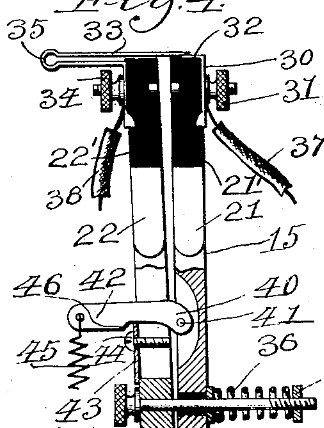
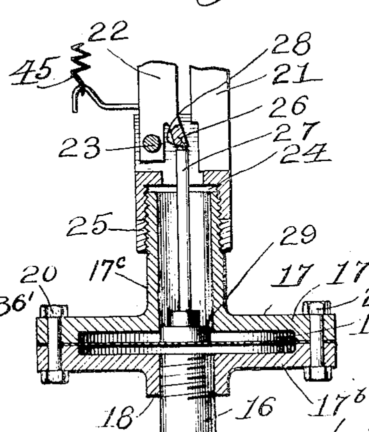


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN DESMOND, OF CHICAGO, ILLINOIS, ASSIGNOR TO ARTIZAN BRASS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CONTROLLER FOR ELECTRIC MOTORS.

1,049,460. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed December 13, 1909. Serial No. 532,857.

To all whom it may concern:

Be it known I, JOHN DESMOND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Controllers for Electric Motors, of which the following is a specification.

My invention relates to controllers for electric motors and has especial reference to automatic controllers for starting and stopping an electric motor, upon the occurrence of a variation from a predetermined condition to be established and maintained in the device with which said motor is associated.

One of the objects of my invention is to provide a new and improved device of the character described.

In the drawings, Figure 1 is an elevation of the device shown associated with an electric motor used to compress air within a tank; Fig. 2 is an enlarged elevation of a portion of the controller taken at right angles from that shown in Fig. 1; Fig. 3 is a broken-away enlarged lower portion of the device in section as illustrated in Fig. 1; and Fig. 4 is a similar view of the upper portion of the device.

In all of the views the same reference characters indicate similar parts.

10 indicates, generally, an air tank within which air under compression is to be stored and normally maintained at a selected predetermined pressure. An air compressor, 12, is, for convenience, mounted on the tank and connected thereto by means of pipe 11. An electric motor, 14, is connected to the compressor by means of any suitable gearing, in the single embodiment illustrated being directly connected thereto.

The controller, 15, is connected to the tank 10 and supported thereon by pipe, 16. A diaphragm casing, 17, is composed of two parts, 17^a and 17^b, the latter having screw-threaded connection with the pipe 16, as clearly shown at 18. A diaphragm is firmly held between the two parts of the casing 17 by bolts, 20. The part 17^a has a central, cylindrical, screw-threaded projection, 17^c, upon which are mounted a stationary arm, 21, and a relatively movable arm, 22. The latter is pivoted, as at 23, to a screw-threaded support, 24. A check nut, 25, holds the support 24 in adjusted position in the projection 17^c for a purpose to be hereinafter described.

The upper portions of the arms, 21 and 22, are composed of insulating material, 21′ and 22′, respectively. The arm 22 is provided with an inwardly-projected heel, 26. A stem, 27, is pointed at its smaller end, as at 28, for engagement in a depression of the heel 26. The stem 27 is provided with an enlarged head, 29, for vertically guiding the stem within the cylindrical projection 17^c. The lower end of the pin 27 rests upon the top of the diaphragm.

Upon the upper insulating ends of the arms, 21 and 22, is carried an electric switching device for opening and closing an electric circuit for controlling an electric motor. The switch consists of the metallic strip, 30, bent over the end of the insulating extension, 21′, of the arm 21 and held in place by the terminal binding screw, 31, the contact of the strip being beveled, as at 32. A coöperating terminal, 33, is secured in a similar manner to the part 22′ by a terminal screw, 34. The strip 33 is made longer than actually necessary to bridge the ends of the arms 21 and 22 and is bent back upon itself, as at 35, to render it more elastic, that it may make frictional contact with its cooperating terminal without undue friction between the parts.

An adjusting spring, 36, serves to hold the arms, 21 and 22, in substantially parallel relation and the switch closed. Circuit wires, 37, 38, and 39, are portions of a circuit for including the controlling device and motor in circuit with any suitable source of electric current.

The operation of the device is as follows: The motor, 14, is started in the usual manner. It operates the air compressor, 12, which pumps air into the tank 10, through the pipe 11. When the air within the tank has reached a predetermined pressure, the center of the diaphragm 19 is thereby raised, the stem 27 is correspondingly lifted and operating under the heel 26 it moves the lever 22 against spring 36 to break contact between the switch terminals 30—33. It is very desirable to make a quick break between the switch terminals and it is also advantageous to have the motor run for a considerable period of time and to correspond-

ingly prolong the intervals between the working periods of the motor. To this end, I provide a variable, switch-moving device, comprising a latch lever, 40, pivoted to one of the arms, as at 41, and projecting beyond the companion arm, as at 42. A wearing plate, 43, preferably of hardened steel, is held rigidly by a screw, 44, on the arm 22. The latch lever 40 is held in yielding contact with the plate 43 by the spring 45. On the under surface of the latch 40 is provided an inclined shoulder, 46.

When pressure is applied upon the diaphragm to separate the vertical arms to open the switch, the plate 43 is brought into contact with the inclined shoulder, 46, before connection is broken between the switch terminals, 30—33. When pressure within the tank is further augmented the plate 43 lifts the latch 40 against the effect of the spring, 45, by the instrumentality of the tapered shoulder 46. After the shoulder has been passed, the movement of the arm 22 is very rapid, being relieved of the resistance of the latch device 40, the switch terminals being quickly separated, and the motor stops. When the air pressure within the tank is decreased sufficiently, the spring 36 draws the arm 22 toward the arm 21 and thereby the switch is automatically closed and the motor again started. Considerable variation in the pressure to be normally maintained within the tank may be made by adjustment of the tension of the spring, 36, by means of the screw-threaded nut 36′. Further variation in maintained pressure may be made by adjusting the support 24 on the projection 17^c and securing it in adjusted position by the check nut 25.

While I have thus described in some detail a single embodiment of my invention, it will be understood by those skilled in the art that the particular construction and arrangement might be considerably varied without departure from the spirit of the invention, and I do not desire to be understood as limiting the invention to such particular embodiment further than is specified in the following claims.

What I claim is:

1. In a switch mechanism, the combination of a diaphragm, a casing supporting said diaphragm, a frame adjustable toward and from said diaphragm, vertically disposed parallel arms, one fixed and one pivoted at its lower end to said adjustable frame, switch terminals carried by the upper ends of said arms, and a member movable by said diaphragm to abut against the end of said pivoted arm, whereby adjustment of said frame may vary the position of abutment between said member and the pivoted arm.

2. In a motor controller, a pressure-responsive device, a casing therefor, a stem movable by said pressure-responsive device, a switch arm providing an abutment for coaction with said stem, and a screw-threaded support for said arm, said casing providing a screw-threaded projection for reception thereof, and said stem and abutment lying in the axial center of said support and projection, whereby turning of said support upon said projection varies the effective distance between said abutment and stem.

3. The combination of two vertical arms, one whereof is pivotally mounted, contacts separable upon pivotal movement of said arm, a spring normally holding the arms together, one arm having a slot therein, a plate presenting a latch-engaging edge across said slot, a latch pivoted to the other arm, extending through the slot, and having a tapered shoulder for engagement of said plate, and a spring tending to hold said latch against the plate.

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

JOHN DESMOND.

In the presence of—
W. Linn Allen,
Mary F. Allen.