No. 692,735. Patented Feb. 4, 1902.

J. R. THOMPSON.

COMBINED ELECTRIC SWITCH AND SPARK BLOW-OUT MECHANISM.

(Application filed June 17, 1901.)

(No Model.)

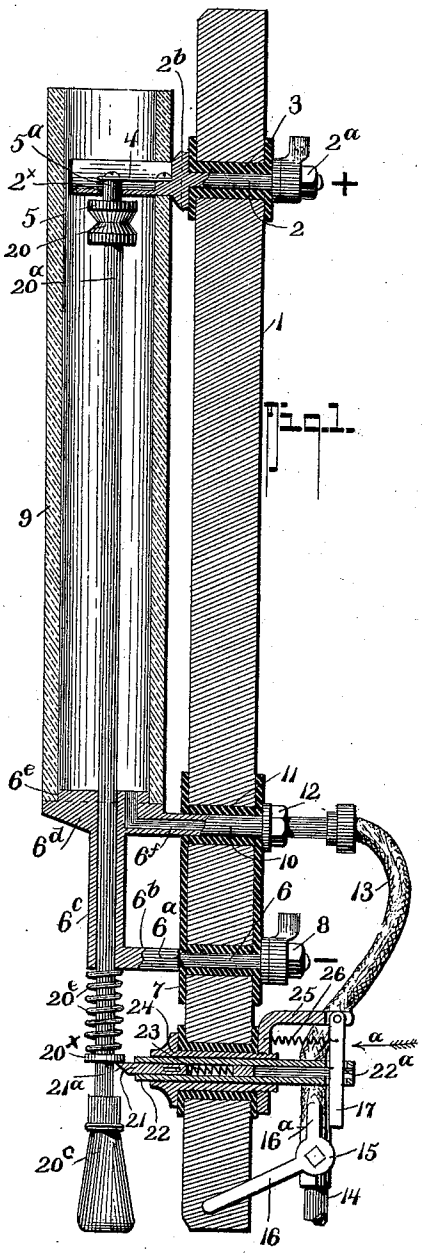


FIG. 1.

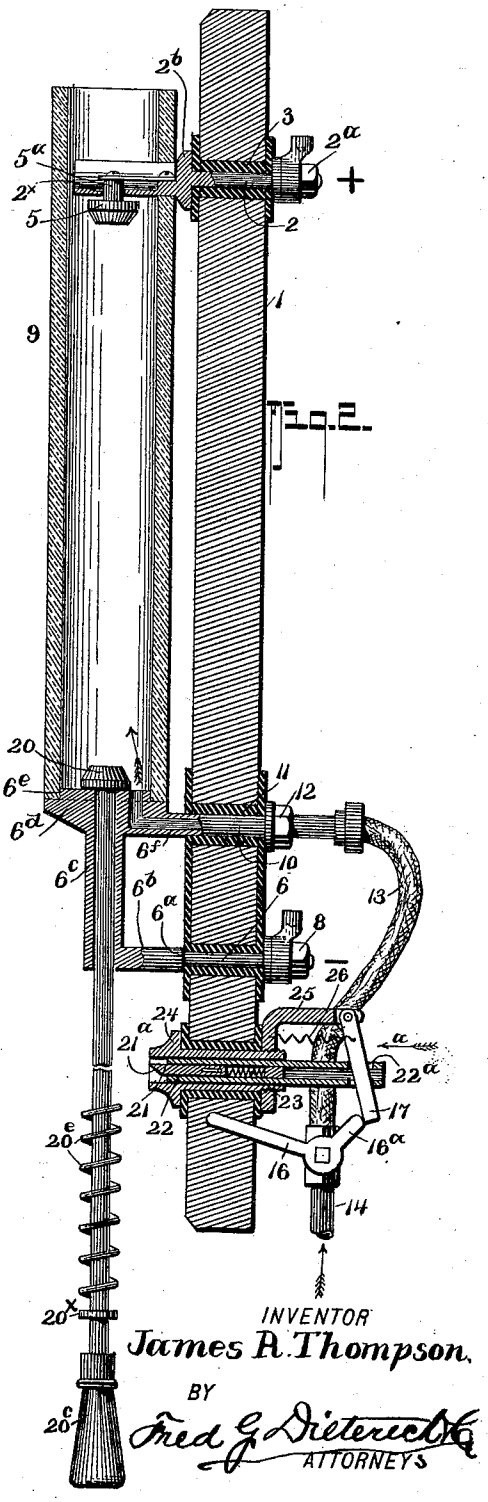


FIG. 2.

WITNESSES:

Guy C. Worthington

Louis Dieterich

INVENTOR

James A. Thompson.

BY

Fred G. Dieterich & Co.

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES R. THOMPSON, OF PORTLAND, OREGON.

COMBINED ELECTRIC SWITCH AND SPARK-BLOW-OUT MECHANISM.

SPECIFICATION forming part of Letters Patent No. 692,735, dated February 4, 1902.

Application filed June 17, 1901. Serial No. 64,902. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. THOMPSON, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Combined Electric Switch and Spark-Blow-Out Mechanism, of which the following is a specification.

This invention, while in its general nature relates to electric switch-operating devices, more especially seeks to provide a mechanism of this kind having as a coöperative part thereof a simple and effectively-operating means for blowing out the arc or sparks such as are usually incident in current-breakers of high-tension electric-current distribution; and said invention primarily seeks to provide a means for discharging a current of air in a direction opposing that of the movement of the shifting member of the contacting points to retard the jumping or following of the spark or flame in the direction of the moving contact member and extinguish the same, and thereby avoid the making of an arc or sparking and all of the danger incident to such action.

My invention also comprehends a novel and effectively-operating means for turning on a current of air in the direction of the fixedly-held one of the contacting members of the switch in advance of breaking the current by the separation of said contacts, whereby to positively overcome the danger of the formation of an arc or flame, and in its more complete nature means are also provided for concentrating the air pressure or current about the contacting points, whereby to overcome all danger of back or counter air-currents and maintain the flow of air in a condensed volume about the contact-points and in the direction desired to effect a perfect blowing-out operation.

In its more subordinate features my invention consists in certain novel features of construction and peculiar combinations of parts, all of which will hereinafter be fully explained, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of my improved switch mechanism, the parts being in their normal position, the switch being closed, and the air-current to the switch-contacts cut off. Fig. 2 is a similar view, the switch-contacts being open and the air-current valve open to admit air to operate against the contact-points.

In the accompanying drawings I have illustrated my improved electric switch mechanism as disposed in a vertical position; but I desire it understood the position may be horizontal or otherwise so long as the component parts are maintained in the relative position shown.

In the drawings, 1 designates a supporting member, which may be a wall, post, or other body of wood, slate, or other non-conducting material or of metal, as shown; but when the latter the several metal members supported thereby are properly insulated therefrom, as will hereinafter be further explained.

At the upper end the support 1 has a terminal stud 2, that passes through the insulating-sleeve 3 and is held fast by the clamp-nut 2^a and the flange 2^b, and the outer end of the stud 2 is recessed to receive the spring-plate 4, that supports the substantially stationary held contact-button 5, the stem 5^a of which passes up through the aperture $2^\times$ in the outer end of the stud and is made fast to the spring-plate, as shown. The button 5 I shall term the "stationary contact," as its movement is but slight when compared to the movement of its mate, the spring 4 being merely to assist in maintaining the two buttons in contact, and said spring may be omitted and the member 5 made fast to the stud 2, with which the +-terminal of the circuit-wire connects, as shown.

6 designates a second stud that passes through an insulating-sleeve 7 on the support 1, as shown, and to one end of which joins the other terminal of the circuit-wire. The stud 6 is held securely in position by the clamp-nut 8 and the shoulder 6^a of the outer or projecting end 6^b, which has an upwardly-extending tubular sleeve 6^c, that terminates in a hub 6^d, having an annular seat 6^e for the lower end of a cylinder 9, of non-conducting material, open at the top and extended above the contact member 5, which it surrounds, as clearly shown in the drawings.

At one edge, preferably that facing the support 1, the hub 6^d has a second stud 10, that passes through the insulator-sleeve 11, said stud being provided with a channel-way 6^f, as shown. The stud or pipe 10 is held fast

by the clamp-nut 12. The inner end of said pipe in practice is formed for the convenient attaching therewith of an air-conducting pipe 13, of flexible or rigid material, which also joins with an air-feed pipe 14, which in practice connects with a suitable air reservoir or supply. (Not shown.)

15 designates a valve in the feed-pipe 14, the sleeve of which has an operating-handle 16, formed with a crank or lug 16^a, for engaging the switch-releasing trip member 17, presently again referred to.

20 designates the movable contacting button, which is mounted on the upper end of the metal rod 20^a, that passes down through the cylinder 9 and through sleeve 6^e, with which it has electrical contact, and the lower end of rod 20^a has a handle 20^c for pushing the rod 20^a up to its normal or circuit-closing position, to which position it is held by a spring-catch 21, held in a barrel 22, and to its outer or normal position by the barrel-spring 23.

To facilitate locking the rod 20^a to its upper position, the latch 21 has a beveled edge 21^a, with which the annular flange $20^\times$ on rod 20^a engages. The rod 20^a, with its contact member 20, is moved to its down or circuit-breaking position by the coiled spring 20^e, disposed about the rod 20^a between the flange $20^\times$ and the tubular sleeve 6^d.

The barrel 22 is slidably held in a sleeve 24, mounted on the support 1 and insulated therefrom, and the inner end of the barrel is slotted at 22^a for the passage therethrough of the trip-lever 17, which consists of a short bar pivotally supported from a bracket 25, mounted on the sleeve 24. Normally the lever 17 is pulled in the direction indicated by arrow *a* by the spring 26 and serves to push the barrel 22, with its latch, out in position to provide for locking the rod 20^a to its raised position.

It should be stated that the valve-orifices in the air-feed pipe and the crank or lug member on the valve-handle are relatively so arranged that by manipulating the handle to engage the trip 17 to release rod 20^a to break the circuit the air-current is opened to the cylinder 9 prior to the release of rod 20^a, the reason for which will presently be made plain.

The manner in which my improvement operates is simple and best explained as follows: The parts being in the position shown in Fig. 1, the contacts being closed, and it is desired to interrupt or break the current, the handle of the air-controlling valve is turned in the direction indicated by the arrow. This movement first opens the valve and allows air to pass through the valve and discharge into the cylinder 9, as indicated, it being understood that in the practical arrangement of my invention the air charge is held normally stored under pressure. Hence as soon as the valve is opened an air-current will blow upward in the cylinder 9 in the direction of the upper or fixedly-held contact before the current is broken by the separation of the contacts, which operation is effected immediately after the air is turned on by the lug on the valve-handle engaging the tripper-lever, which pulls the barrel 22, with the spring-latch, back, releases the spring-pressed rod 20^a, which is quickly plunged downward by the action of the spring around it to cause the contacts to separate, and by reason of the concentrated air volume about the contacts and the force of the air-current in the direction stated arcing or sparking is reduced to the minimum, and even should it occur the flame or spark would be blown out and all danger of the same following the receding contact member overcome.

While I prefer to utilize the combination of parts shown and described, it is manifest the same may be modified without departing from the scope of the appended claims.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus as described, a supporting member, a stud or bracket 6 projected therefrom, having a tubular sleeve 6^e, and an air-channel 6^f that discharges through the upper end of the bracket 6, an air-blast pipe connected with the channel 6^f, a spring-actuated rod 20^a, slidable in the sleeve 6^e, a contact at the upper end thereof, a cylinder mounted on the sleeve 6^e, into which the upper end of the rod 20^a projects and the channel 6^f discharges, a stationary contact member held on the support and projected within the upper end of the cylinder, a valve for controlling the air-blast, a detent for holding the sliding rod and its contact to its closed position, and a single lever device for coöperating with the detent and the air-blast-controlling valve, adapted to release the said sliding rod, and open the valve when the movable contact leaves the stationary contact, all being arranged substantially as shown and for the purposes described.

2. The combination with the support, the two terminals, one of which carries a contact member, the other one having a tubular sleeve, a cylinder of non-conducting material supported on said sleeve, and surrounding the aforesaid contact member, a rod slidable in the sleeve, said rod carrying a contact member adapted to close up against the other contact member, means for normally forcing the rod to a downward position, a detent for holding said rod with its contact closed against the other contact, the aforesaid sleeve having an air-inlet discharging into the cylinder, a valved air-feed pipe discharging into the sleeve air-inlet, said valve having a handle provided with a trip adapted to engage and release the detent devices that hold the slidable contact-rod, all being arranged substantially as shown and described.

JAMES R. THOMPSON.

Witnesses:
W. T. VAUGHN,
J. H. MIDDLETON.