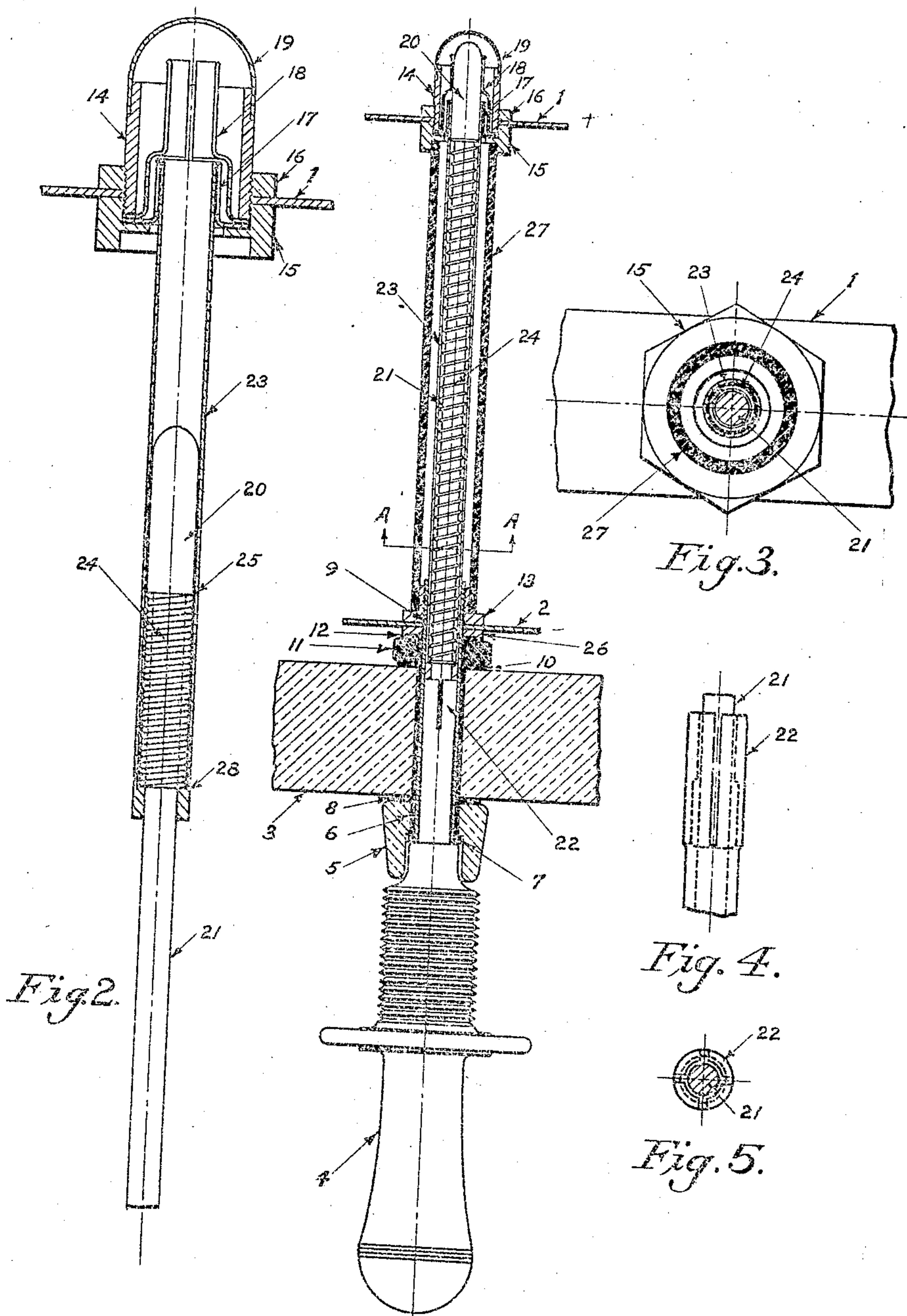


No. 874,293.

PATENTED DEC. 17, 1907.

F. W. BLAIR,
CIRCUIT BREAKER.
APPLICATION FILED JUNE 19, 1906.



WITNESSES:
James B. Bond
Edmund C. Sibbell

Fig. 1.

INVENTOR

Frank W. Blair
BY

Wm. S. Pomeroy
ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK W. BLAIR, OF NEW YORK, N. Y.

CIRCUIT-BREAKER.

No. 874,293.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed June 19, 1906. Serial No. 322,382.

To all whom it may concern:

Be it known that I, FRANK W. BLAIR, a citizen of the United States, residing at No. 157 West Forty-seventh street, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Circuit-Breakers, of which the following is a specification.

My invention relates to improvements in circuit-breakers in which a cylindrical metal rod is made to engage two or more sets of contacts, and in which the circuit is completed or broken by a movement of this rod along the axis of said contacts. Heretofore, devices of this kind have been constructed in such a way that, upon opening the circuit, the secondary connection leaves the secondary contact with a velocity no greater than that at which the primary connection leaves the primary contact, but with practically the same velocity; whereas, I have devised a circuit-breaker of the type above set forth, and hereinafter more fully described, in which the secondary connection does leave the secondary contact with a velocity greater than that at which the primary connection leaves the primary contact, and with a greater velocity than the primary connection attains throughout its entire movement; so that whatever may be the velocity of the primary connection, the velocity of the secondary connection, at the instant of leaving the secondary contact, and for a short interval of time thereafter, shall be greater than that of the primary connection by the velocity supplied by a compressed helical spring. This result is attained by mounting upon the movable connection, or plug, a cylindrical tube, acting as a secondary connection, and frictionally engaging a set of secondary contacts, said tube being held in position upon the plug, or primary connection, by an open helical spring, in such manner, that, upon opening the switch, pulling out the plug, the tube is left in frictional engagement with its contacts until said helical spring is compressed so that contiguous turns are in contact, or nearly so, whereupon the tube is drawn from its contacts and instantly snaps back to its original position upon the plug.

The objects of my invention and the advantages thereof are: the prevention of all arcing between primary contacts and plug, and the production of a long and practically instantaneous break of circuit.

In the accompanying drawings, which

illustrate my invention, Figure 1 is a sectional plan of a so called plug-switch, complete, embodying my improvements. Fig. 2 is an enlarged sectional view showing the construction and arrangement of the plug, spring, secondary tube connection, and primary and secondary contacts. Fig. 3 is a sectional elevation on line A—A, Fig. 1, and Figs. 4 and 5 are views of details.

Referring to Fig. 1, 1 and 2 are the connection strips, or bars, between which electrical connection is to be established.

3 is the panel, or switchboard, of marble, or other insulating material, supporting the switch and the connections thereto. The tube 9, forming one terminal of the switch, is flanged at its outer end 7, and, by this means, holds in position the insulating bushing 6, porcelain insulator 5, and washer 8. Upon its other end the tube 9 has a screw thread which engages the nut 13, thus clamping the insulating washers 10 and 12; insulating button 11, metal washer 26, and connection strip 2 all firmly in position on the back of the panel.

The primary and secondary contacts, 18 and 17, are clamped in position by means of two locknuts, 15 and 16, screwed upon the tube 14, the end of which is closed by means of the cap 19. These nuts, 15 and 16, also serve to clamp this terminal of the switch firmly to the connection bar 1, in the manner clearly shown. The contacts, 17 and 18, are thimble shaped punchings, of sufficient size to frictionally engage the tube 23, and the end of the plug 20, respectively.

Fig. 2 illustrates a portion of the switch with the plug removed from its contacts and the spring 24 compressed to the point at which the secondary connection leaves its contact. The plug has a reduction in its diameter at the point 25 to the size shown at 21, thus forming a shoulder upon which one end of the spring rests, and furnishing an annular space of sufficient size to admit the spring. The other end of the spring is seated upon a shoulder in the tube, at the point 28, formed by a reduction in its bore to a size sufficient to make it a sliding fit upon that portion of the plug of reduced diameter.

In its normal position, the end of the tube 23 rests upon the piece 22, shown enlarged in Fig. 4, which is a continuation of Fig. 2. The piece 22 is enlarged, throughout a portion of its length, to a diameter sufficient to

enable it to frictionally engage in the tube 9, in this manner furnishing connection to the other terminal of the switch.

Fig. 5 shows the method of boring out and slotting the end of the piece 22 to give it sufficient elasticity to admit of its entering the tube 9. The remaining portion of this piece is soldered to the plug 21, inserted in a hole in the handle 4, and permanently attached thereto.

The switch is entirely inclosed by means of the insulating tube 27, fitting over an elongation of the nut 13, and in a recess in the locknut 15.

It is evident that this form of quick break attachment, as applied to a rod connection, may be employed for rupturing circuits through air, oil, or other insulating media.

From the above construction it is obvious that, with the plug in position, electrical connection is established between the bars 1 and 2, through the tube 9, plug contact 22, plug 20—21 and contacts 17 and 18. Upon withdrawing the plug, the friction of the contact 17 upon the tube 23 causes the tube to remain stationary in said contact until the spring 24 has been compressed, whereupon the tube snaps back to its original position upon the plug, in this way causing a practically instantaneous, and long, break in the circuit, and extinguishing any arc formed at the contacts.

What I claim as new, and wish to secure by Letters Patent, is—

1. An electric-circuit breaker comprising a plug, as a primary connection, a tube mounted upon and yieldingly connected with the plug by means of an open helical spring, as a secondary connection, and primary and secondary socket-contacts to engage the plug and tube respectively.

2. An electric-circuit breaker comprising a plug, as a primary connection, a cylindrical tube mounted upon the plug, as a secondary connection, primary and secondary socket-contacts to engage the plug and tube respectively, and an open helical spring mounted upon the plug, and within the tube, seated at one end against a shoulder on the plug near the end thereof next the contacts and at the other end against a shoulder in the tube near the end thereof next the handle.

3. An electric-circuit breaker comprising a plug, as a primary connection, a cylindrical tube mounted upon the plug, as a secondary connection, primary and secondary socket-contacts to engage the plug and tube respectively, and an open helical spring mounted upon the plug, and within the tube, seated at one end against a shoulder on the plug near the end thereof next the contacts and at the other end against a shoulder in the tube near the end thereof next the handle, and acting upon the tube to retract it from its socket-contact as the plug is withdrawn and the spring sufficiently compressed.

4. A plug-switch comprising primary and secondary socket-contacts and primary and secondary connections consisting of a plug and tube respectively, the latter mounted upon the former and yieldingly connected therewith by means of an open helical spring mounted upon the plug and within the tube, the spring being seated at one end against a shoulder on the plug near the end thereof next the contacts and at the other end against a shoulder in the tube near the end thereof next the handle, and operating when the plug is withdrawn from its contact until contiguous turns of the spring are in contact, or nearly so, to retract the tube from its socket-contact.

5. A plug-switch comprising a movable plug, an insulating handle rigidly attached thereto, a spring contact, carried by the plug, to engage one terminal of the switch, and a cylindrical tube mounted upon and yieldingly connected with the plug by means of an open helical spring and adapted to frictionally engage a stationary secondary contact at the other terminal of the switch, the plug making the primary connection and adapted to frictionally engage a stationary primary contact at said last mentioned terminal of the switch.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this sixteenth day of June 1906.

FRANK W. BLAIR.

Witnesses:

JOSEPH POOL,
FITZHUGH DIBBELL.