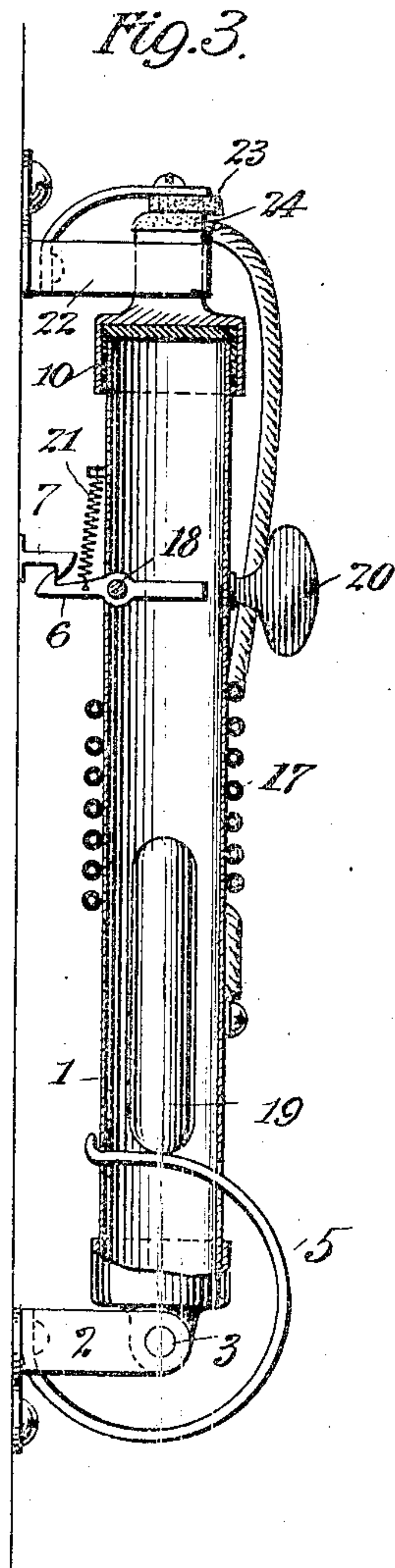
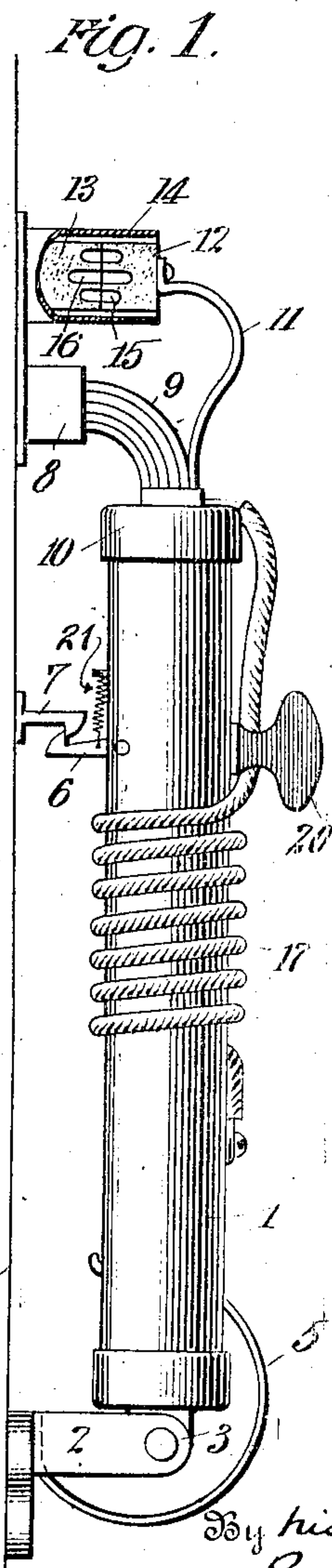
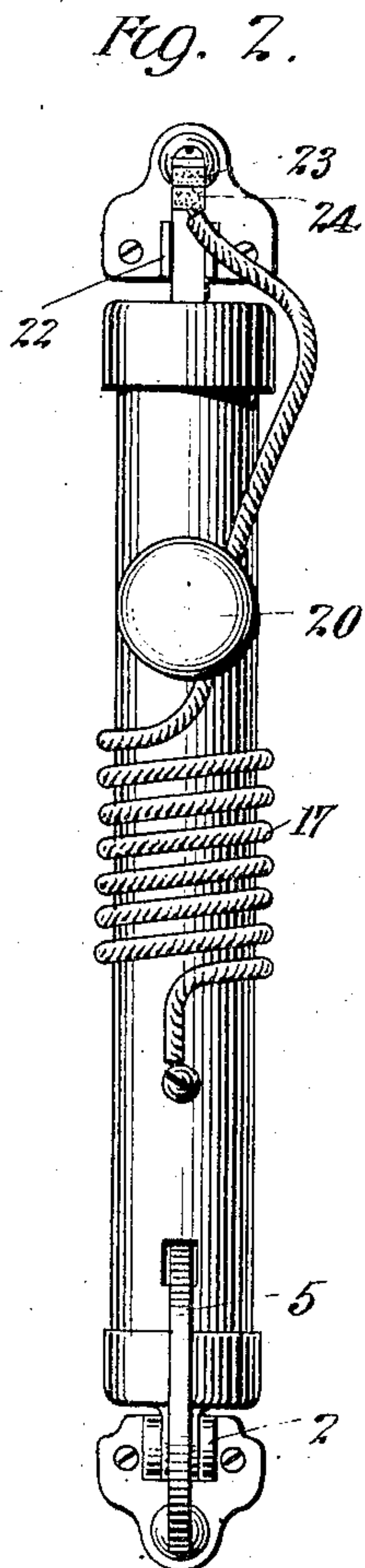


No. 896,469.

PATENTED AUG. 18, 1908.

R. SCOTT.
MAGNETIC CIRCUIT BREAKER.

APPLICATION FILED MAR. 3, 1906.



Witnesses
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UNITED STATES PATENT OFFICE.

RALPH SCOTT, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR TO SCOTT ELECTRICAL COMPANY, A CORPORATION OF MAINE.

MAGNETIC CIRCUIT-BREAKER.

No. 896,469.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed March 3, 1906. Serial No. 303,998.

To all whom it may concern:

Be it known that I, RALPH SCOTT, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Magnetic Circuit-Breakers, of which the following is a full, clear, and exact description.

My invention relates to a form of magnetic circuit breaker.

The main object of the invention is to provide a quick rupture of the circuit, and one in which destructive effects by the arc are almost wholly avoided.

A further object of the invention is to provide a circuit breaker which may be placed upon the usual fuse receptacles of a panel or switch board in place of the usual inclosed fuse which is employed.

A still further object of the invention is to obtain a hammer blow for opening the circuit breaker, and movable parts of light construction so as to be capable of a rapid movement.

With these and other objects in view, my invention consists in the construction, combination, in the location, and in the arrangement of parts, as hereinafter set forth and shown, and finally particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of a circuit breaker embodying the principles of my invention; Figs. 2 and 3 are front and sectional views showing a slightly modified carbon block, but embodying the same operating mechanism.

The formation of an arc during the rupture of an electrical circuit cannot, of course, be avoided. Not only is the entire potential of the circuit effective to produce such an arc, but the extra E. M. F. due to the inductance of the circuit, also has a serious effect in impelling the continuance thereof. In order that the arc may not be destructive to the mechanism of the circuit breaker, it is necessary that it be terminated at the period of its inception, and in order to secure this, a powerful blow-out effect is required, which may be secured by a magnetic field, or by an air blast, or the combination of these influences. In carrying out my invention, I arrange to have the circuit broken between carbon blocks, and I secure a powerful field, and an air blast at the instant of the arc's formation. The arrangement by which the air

blast is secured, I consider an important feature, it having been found in practice to be very effective.

Stated in general terms, the air blast arrangement comprises a pitted carbon block or blocks, which when brought together to close the electrical circuit, inclose air cells, the expansion of which, when the circuit is broken, effectually blows out the arc.

Referring to the drawings in which like parts are designated by the same reference signs, 1 indicates a movable arm or frame, hinged to a fixture 2, at the point 3, said fixture being adapted to be secured upon the face 4 of the panel board. 5 designates a spring by which the movable arm is constantly impelled outward from the face of the support or panel board 4. This movement is, however, normally restrained by a detent 6, engaging a catch 7, upon the supporting surface 4. The mechanism by which the detent 6 is disengaged from the catch 7 constitutes a feature of my invention, and will be later more particularly described.

Referring now more particularly to Fig. 1, I have indicated a block 8, preferably of copper, the surface of which is engaged by a bundle of leaf springs or blades 9, soldered or fixedly attached to a metallic fixture 10 on the upper end of the movable arm 1. The arrangement is such that when the detent 6 is engaged with the catch 7, a pressure is exerted by the leaf springs upon the block or anvil 8, so that a good electrical circuit is made. 11 designates an additional spring blade, which diverges from the path of the bundle 9, and has at its extremity a carbon block 12. 13 designates a stationary carbon block opposed to the block 12, and both of these carbon blocks are arranged to be closely surrounded by an incasing tube 14, which also projects from the supporting surface 4.

Instead of making the contacting faces of the carbon blocks 12 and 13 flat, plane surfaces of the ordinary form, I provide one or both of them with cavities 15, and I prefer to have a central cavity 16 deeper than the surrounding cavities 15. This, however, is not essential, it being merely necessary to have one or more cavities of convenient shape and size disposed upon the face of one or the other of the carbon blocks. By this arrangement, the formation of an arc when the blocks are separated, immediately heats the

air cells of the cavities 15 and 16 with explosive violence, and this sudden blast of gases throws the arc outward, and destroys it. The inclosing tube or casing 14 also assists to effect the prompt extinction of the arc, not only by confining the air so that it will be heated with explosive violence, but also makes the rapid expansion itself expel the movable carbon block from the tube, somewhat on the principle of a cannon or mortar.

The features by which the circuit rupture is made to occur between the carbon blocks, and these are separated for any required current value, may be of any description. I have devised a simple arrangement which is specially advantageous, and which I employ in practice. The movable arm is made of tubular form and may be of metal insulated from the head 10 in any suitable way.

17 denotes a coil of insulated wire which is wound upon the tube, the ends thereof being connected to the head 10 and to the tube, so that the circuit is completed to the bracket or fixture 2. The detent 6 previously mentioned projects into the center of this tube, being pivoted at the point 18, and is disposed to receive the impact of an iron core or hammer 19 loosely contained within the tube. The core 19 is so related to the coil 17 that the magnetism of the latter exerts an upward force upon said core, and if this force becomes sufficiently great, the core is impelled upward with a hammer blow against the detent 6, whereby it is released from the catch 7.

20 indicates a handle for re-positioning the movable arm, and 21 indicates a spring for moving the detent 6 into its latching relation.

The operation will be clear from the preceding description. Current normally flows from anvil 8 through brushes or spring blades 9, coil 17, to the metal fixture or bracket 2. In case of excessive current, the core 19 releases the detent 6 and the spring blades 9 are separated from the anvil 8. The circuit, however, momentarily continues through the carbon blocks 12 and 13, and when these separate, the arc is extinguished in the manner which has been already described.

In Figs. 2 and 3, I have illustrated a slightly modified form of carbon break which may be employed. In this construction, spring blades 22 project from the supporting

surface 4, and make electrical contact with the head 10. A carbon block 23 is also spring held from the surface 4, and contacts with a carbon plate 24 upon the movable head 10. The length of the carbon blocks is such that the circuit is broken at the blades 22 before the carbon blocks separate, so that a final rupture occurs between the carbon blocks. This arrangement does not, of course, secure the air blast extinguishment of the arc in the manner obtained by my preferred form previously described.

In any case, and with either of the modifications shown, a magnetic field is created in the region where the circuit rupture occurs by the coil 17, so that the blow-out of the arc is assisted in this way.

What I claim, is:—

1. Means for abruptly rupturing an electrical circuit, comprising carbon blocks having contacting faces, one of said faces having a cavity therein, and means for quickly separating said carbon blocks by movement in a direction perpendicular to the plane of their engaging faces.

2. Means for abruptly rupturing an electrical circuit, comprising a fixed carbon block having a cavity in its surface, and a movable carbon block having a cavity in the face engaging said surface, and means whereby said movable block is released to separate from the fixed block by a movement perpendicular to the plane of the engaging faces.

3. Means for abruptly rupturing an electrical circuit, comprising a fixed carbon block having perforations in its surface, a movable carbon block having perforations in the face engaging said surfaces, spring means for impelling said carbon blocks into contact with one another, and means for releasing the movable block to separate from the fixed block by a movement perpendicular to the plane of the engaging faces.

4. Means for abruptly rupturing an electrical circuit, comprising carbon blocks having engaging faces formed with cavities, and contained in an inclosing casing.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

RALPH SCOTT.

Witnesses:

FRANK S. OBER,
WALDO M. CHAPIN.