

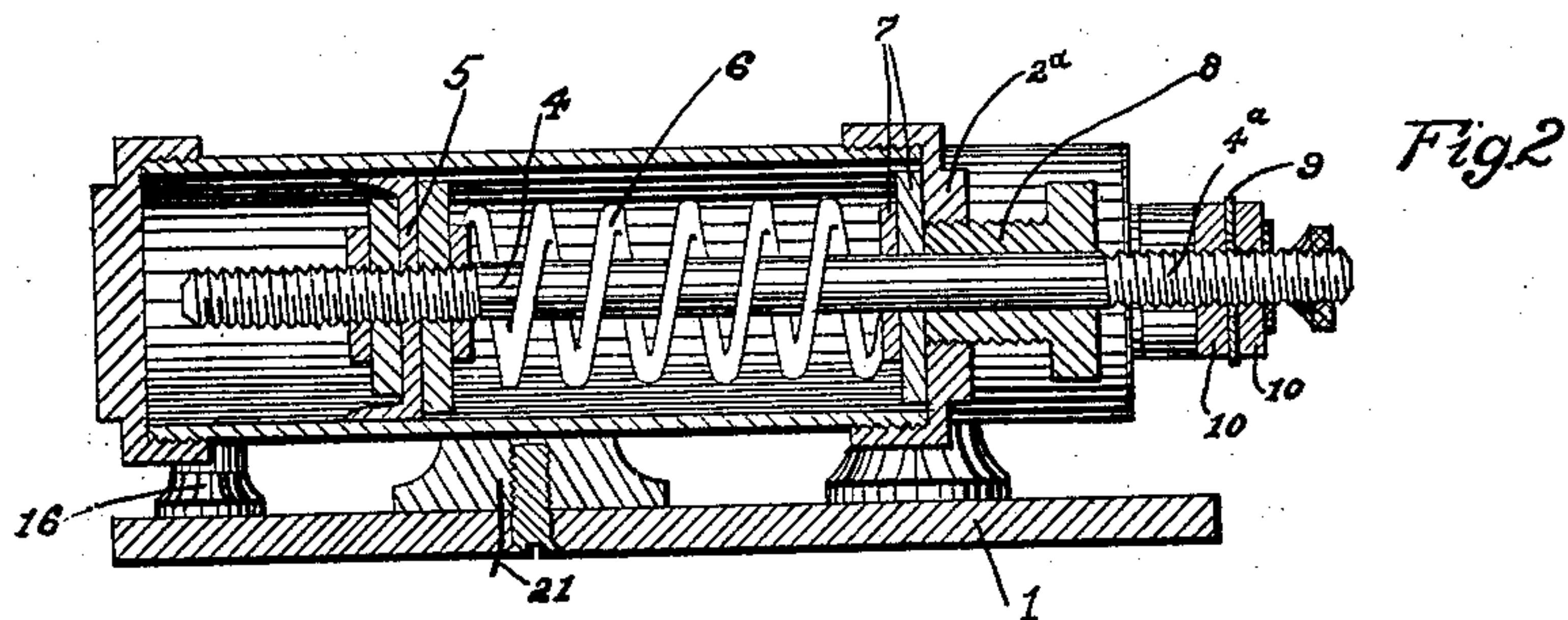
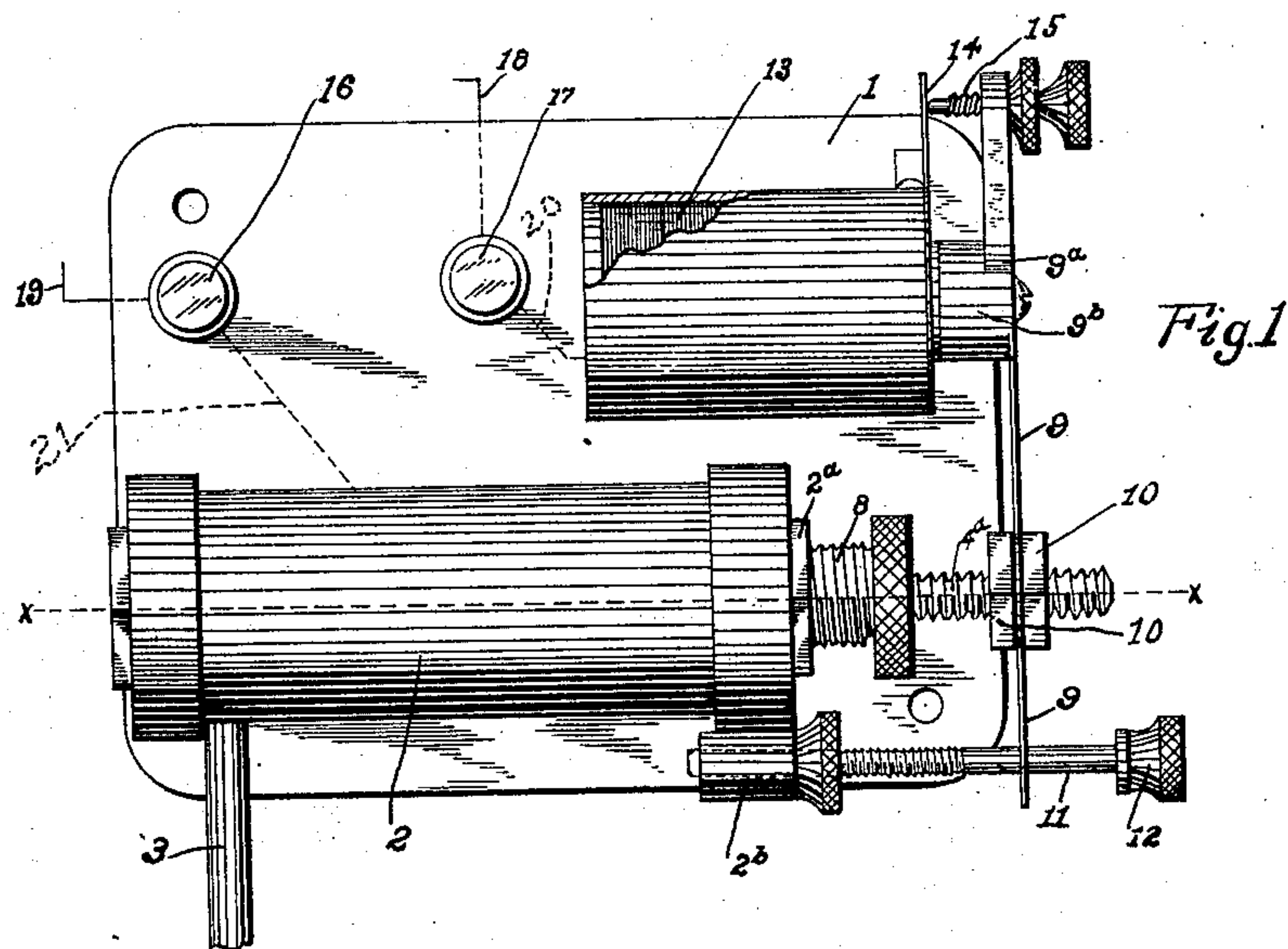
**No. 692,475.**

**Patented Feb. 4, 1902.**

**C. REYNOLDS.**  
**AUTOMATIC CIRCUIT BREAKER.**

(Application filed Oct. 10, 1901.)

(No Model.)



*WITNESSES:*

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# UNITED STATES PATENT OFFICE.

CARL REYNOLDS, OF COLUMBUS, OHIO.

## AUTOMATIC CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 692,475, dated February 4, 1902.

Application filed October 10, 1901. Serial No. 78,160. (No model.)

*To all whom it may concern:*

Be it known that I, CARL REYNOLDS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Automatic Circuit-Breakers, of which the following is a specification.

My invention relates to the improvement of automatic cut-offs of that class which are adapted to automatically break an electric circuit to an electric motor; and the objects of my invention are to provide an improved cut-off of this class adapted to be operated by a predetermined pressure of air, steam, gas, or the like; to so construct my improved cut-off as to insure the breaking of the circuit without arcing or the creation of an electric spark between the contact-points, and to produce other improvements in details of construction and arrangement of parts, which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved cut-off, and Fig. 2 is a longitudinal section on line *x x* of Fig. 1.

Similar numerals refer to similar parts throughout both views.

In carrying out my invention I employ a suitable supporting-base 1, upon which is mounted a cylinder 2, said cylinder having leading thereto at a point near its outer end a supply or inlet pipe 3. This pipe 3 may lead from an air-storage reservoir, into which air is pumped in the usual manner by a motor-operated pump. Within the cylinder 2 I provide a piston or plunger rod 4, the latter carrying on its inner end portion an adjustable head 5, which is adapted to fit and slide within said cylinder. Interposed between the head 5 and the forward end 2<sup>a</sup> of the cylinder and surrounding the plunger-rod 4 is a spring 6, the forward end of the latter bearing upon a suitable disk or disks 7, mounted loosely on the rod 4. The outwardly-extending portion of the plunger-rod 4 passes loosely through the central opening of a spring adjusting-screw 8, the latter having a threaded engagement with a central opening in the end 2<sup>a</sup> of the cylinder 2 and having its inner end adapted to bear against the outer plate 7. Beyond the adjusting-screw 8 the rod 4 ter-

minates in a threaded extension 4<sup>a</sup>, which passes through an opening in a horizontal spring-strip 9, which extends at right angles with said rod 4, said spring-strip being clamped in its position on said rod extension 4<sup>a</sup> by means of adjusting-nuts 10. The spring-strip 9 has its outer portion terminating in an armature-bar extension 9<sup>a</sup>, which is provided at its junction with the spring-strip 9 with an inwardly-projecting armature boss or lug 9<sup>b</sup>. That end of the spring-strip 9 which is opposite the end having the armature-bar extension 9<sup>a</sup> has passing loosely therethrough an adjusting-screw 11, the inner end portion of the latter having a threaded engagement with an internally-threaded opening of a laterally-projecting lug 2<sup>b</sup> of the cylinder 1. The outer end of the screw 11 is provided with a fixed head 12.

Mounted upon the base 1 and extending in a direction parallel with the cylinder 2 is an electromagnet 13, the latter having projecting from one end thereof and from its coil a contact-strip 14, with the outer face of which is adapted to contact the point of a contact-screw 15, the latter being adjustably supported in the outer end of the armature-bar 9<sup>a</sup>. The base 1 is provided with binding-posts 16 and 17, to which lead contacting wires 18 and 19. From the binding-post 17 a wire 20 (indicated in dotted lines) leads to the wire coil of the magnet 13, while from the binding-post 16 a wire 21 leads to the cylinder 2.

In order to illustrate the operation of my device, I will assume that a pump operated by an electric motor is engaged in pumping air into a reservoir from which the pipe 3 leads to the cylinder 2 and that the magnet is charged from an electric circuit from the motor through the wires 20 and 21, the current from the latter being conducted through the cylinder 2 and its plunger 4 to the strip 9 and thence to the armature-lug 9<sup>b</sup>. This being true, it is obvious that said armature-lug 9<sup>b</sup> will through the attraction of the magnet be in contact therewith and the contact-screw 15 will be in touch with the contact-strip 14. When the air which enters the pipe 3 attains a sufficient pressure within the cylinder 2 to move the plunger 4 outward, it is obvious that the spring-strip 9 will first have imparted thereto an outward bend or bulge, which



will be followed by the armature-lug 9<sup>b</sup> leaving its contact with the core of the magnet and by the contact-screw 15 breaking its contact with the strip 14. It will be observed, 5 however, that owing to the fact that said spring-strip is first sprung outward and that this condition is attained prior to the breaking contact of the screw 15 and contact-strip 14 the armature-bar will be suddenly and 10 immediately sprung to such distance from said contact-strip as to obviate any tendency toward sparking or the formation of an arc, thus insuring the breaking of the circuit and demagnetizing the magnet without arcing. 15 It will readily be understood that the tension of the spring 6 may be increased by turning inward the screw 8 and that the position of the spring-strip 9 on the threaded portion 4<sup>a</sup> of the plunger 4 may be changed by manipulation of the clamping-nuts 10. 20

From the construction herein shown and described it will be seen that simple and effective means are provided for breaking an electric circuit by pressure within the cylinder, and although my invention is described 25 as being particularly adapted for use in connection with a motor-operated air-pump and its reservoir it is obvious that the same might be employed in conjunction with other mo-

tor-operated apparatus where a pressure of 30 air, steam, gas, or the like is accumulated.

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

1. In an automatic circuit-breaker, the combination with an electromagnet, of an armature-bar and contact projection thereon, said bar having a suitably-supported spring-strip extension and means for imparting an outward movement to said spring-strip prior to 40 the breaking of the contact between the armature-bar and magnet-contact projection, substantially as specified.

2. In an automatic circuit-breaker, the combination with a cylinder and a spring-actuated plunger-rod and plunger working therein, said cylinder having an inlet-pipe at one end, of an electromagnet 13 having a contact-strip 14, an armature-bar having a contact-point 15 and a spring-strip 9 connecting 50 said armature-bar with the outwardly-extending portion of said plunger-rod and wires running respectively to the magnet-coil and to the cylinder, substantially as specified.

CARL REYNOLDS.

In presence of—

C. C. SHEPHERD,  
A. L. PHELPS.