

(No Model.)

E. M. BENTLEY.
ELECTRIC CIRCUIT BREAKER.

No. 490,762.

Patented Jan. 31, 1893.

FIG. 1.

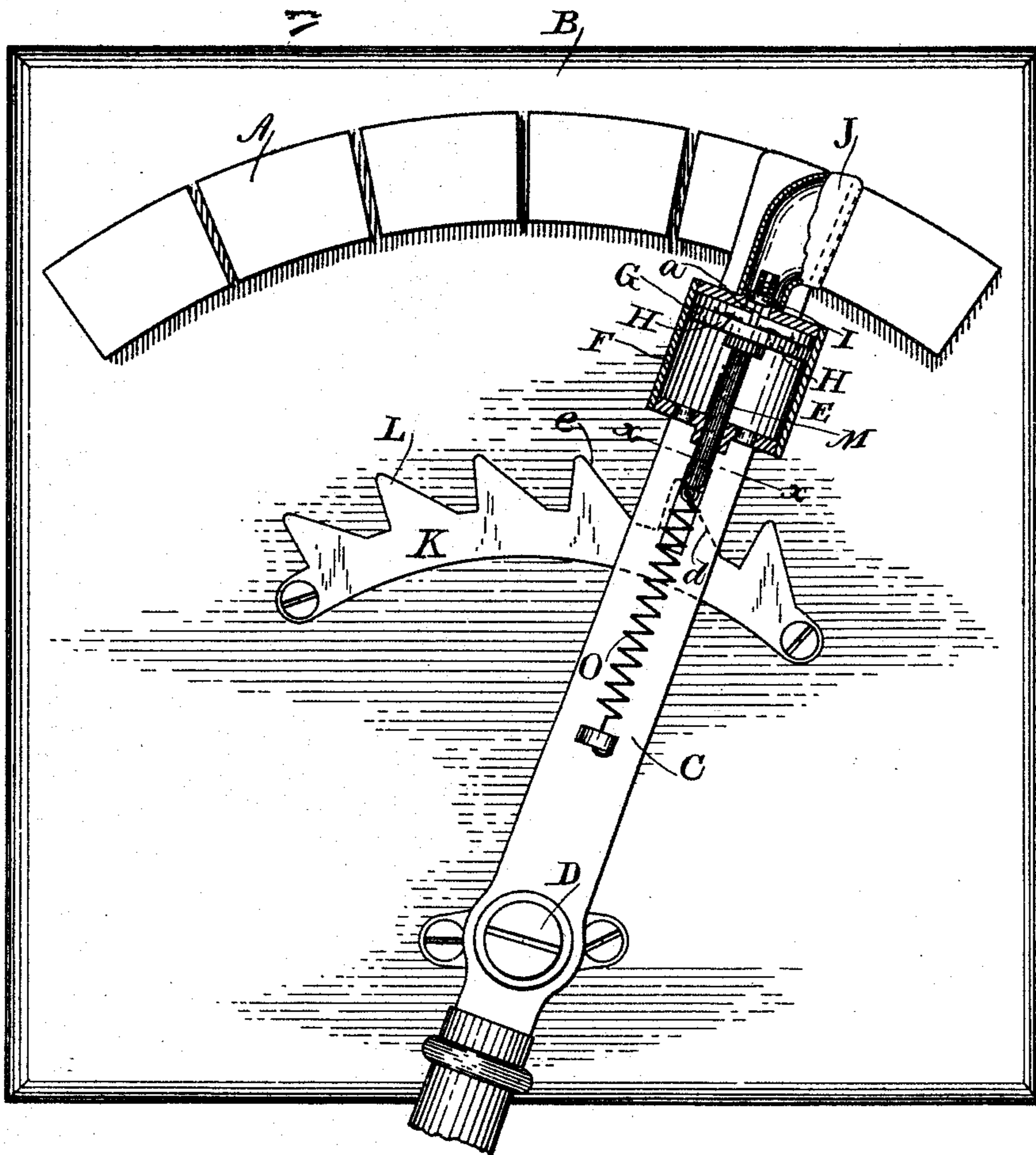


FIG. 3.

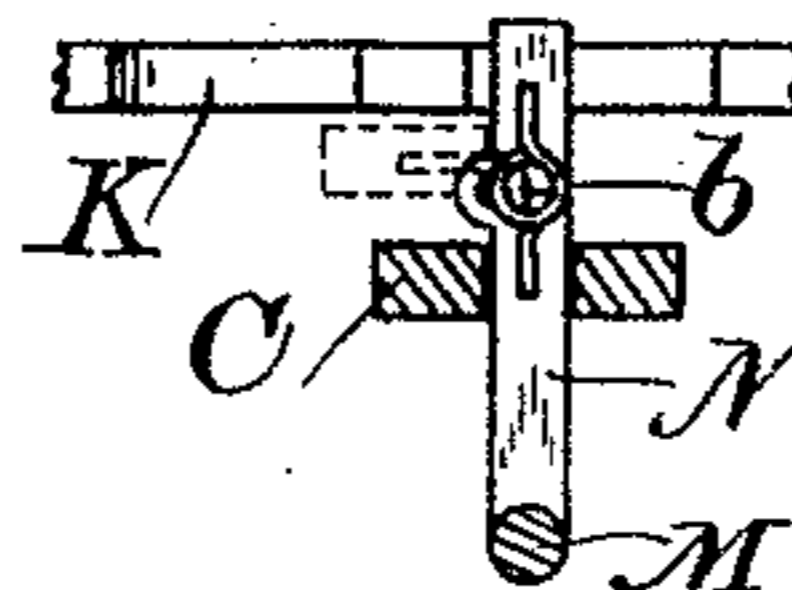
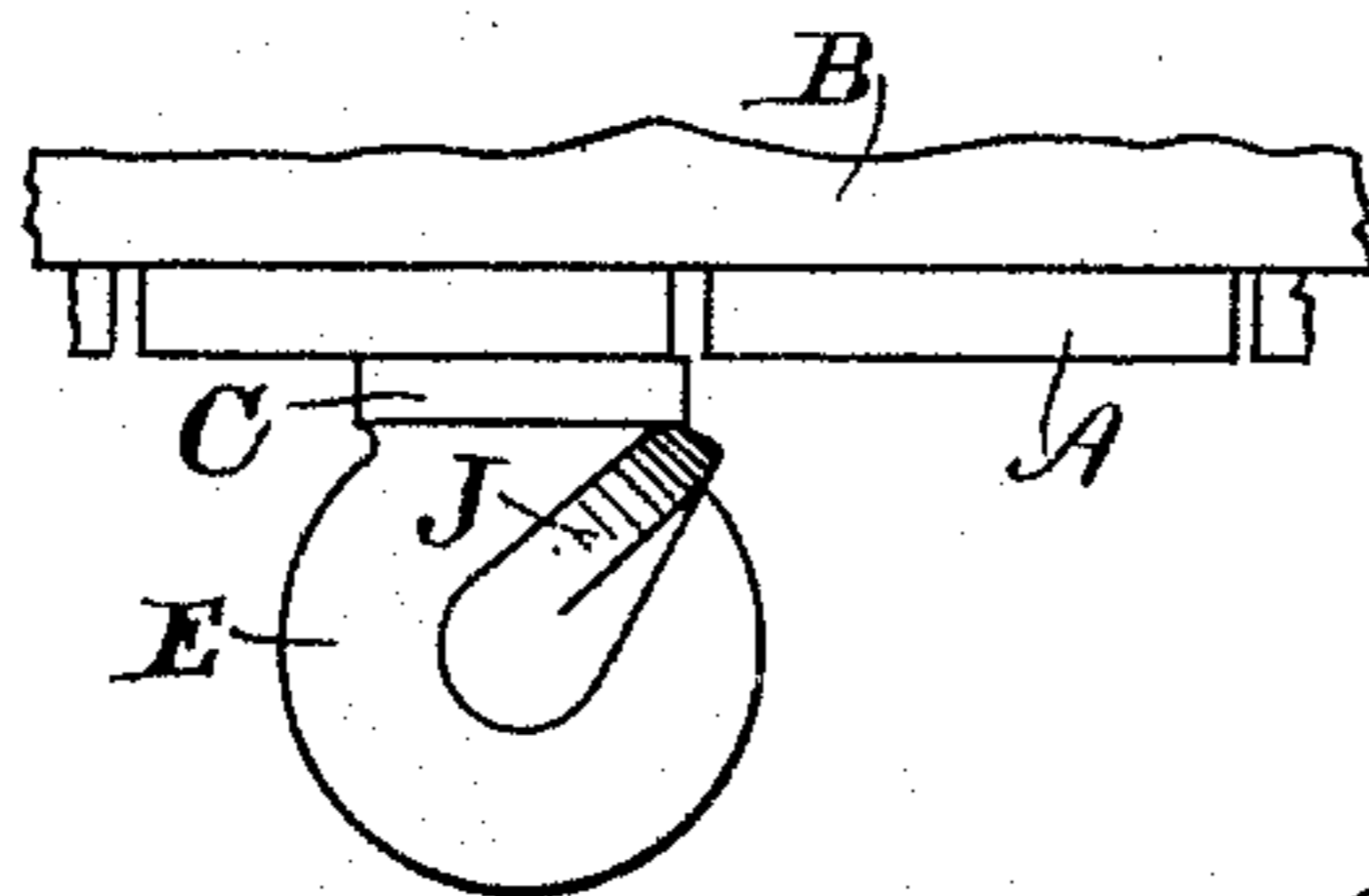


FIG. 2.



WITNESSES.
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UNITED STATES PATENT OFFICE.

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ELECTRIC-CIRCUIT BREAKER.

SPECIFICATION forming part of Letters Patent No. 490,762, dated January 31, 1893.

Application filed November 19, 1892. Serial No. 452,594. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. BENTLEY, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Electric-Circuit Breakers, of which the following is a specification.

My present invention relates to an electric circuit breaker provided with convenient and effective means for extinguishing any arc which may form thereat. Its essential features comprise a circuit breaker, one member at least of which is movable, and an air pump or compressor actuated by the moving member of the circuit breaker, by which a stream of air or other insulating fluid is forced across the spark gap at the terminals upon rupture of the circuit. The principle underlying my invention, it will thus be seen, is to make the movement of the circuit breaker the intermediary through which is applied the necessary energy for bringing into action the arc interrupting mechanism.

The invention may be embodied in many forms, but that illustrated in the accompanying drawings consists of a switch lever arranged to travel over a series of fixed contacts insulated from one another, and carrying an air pump of small capacity, the piston of which makes a forward stroke automatically upon each change of position of the lever, thereby compressing the air within the cylinder which is permitted to escape through a valve which is opened at or about the instant that the lever moves from one contact to the next in the series.

Figure 1 is a view of such a construction, the compressor appearing in section. Fig. 2 is an edge view of the circuit breaker and compressor, and Fig. 3 is a section taken on line $x-x$ of Fig. 1.

The circuit breaker shown consists of a series of fixed insulated contacts A arranged in a row upon a suitable support B. These contacts form one terminal of the electric circuit, and may, if desired, be connected together through resistance coils as would be done in an ordinary rheostat. The other terminal of the circuit is a traveling lever C pivoted at D.

Upon the lever C is mounted an air pump E of moderate capacity, comprising a cylinder F, and a piston G having flap valves H which open on the return stroke of the piston. The outer end of the cylinder is open to the air, and at its other end there is a spring controlled escape valve I having a stem a projecting a slight distance into the cylinder so that when the piston is at or near the forward limit of its throw, the valve is automatically opened, and the air or other fluid which has become compressed during the forward stroke of the piston is allowed to rush out through a funnel J shaped so that its mouth is almost directly opposite the insulation space between two adjacent contacts when the lever has passed from one to another into the position shown in Fig. 2.

It is an essential part of my invention that some means be provided for causing a forward or compressing stroke of the piston upon movement of the lever, and a preferred construction for the purpose consists of a cammed segmental rack-bar K having a series of inclined raised teeth or portions L in the path of movement of the piston rod M or some part connected therewith. In Fig. 3 an arm N is attached to the piston rod, and the arm has a spring joint at b so that when traveling over the teeth L in one direction it is rigid, but folds up readily into the dotted line position when the lever is thrown in the opposite direction. A spring O is connected to the piston rod and to the lever to move the piston back after the completion of its forward stroke.

The operation of the invention will be sufficiently clear from what has already been said. Suppose that it be desired to move the lever from the position shown in Fig. 1 onto the next contact to the left. As soon as the arm N rides over the tooth d the piston is retracted by the spring and a fresh supply of air passes into the cylinder. When the arm again rides up the next tooth e , the piston is thrown forward, the air in the cylinder is compressed, and at or about the instant that circuit through contact A' is broken, the escape valve I is opened and a puff of air passing out through funnel J will blow out any arc which

may have formed thereat. This operation is repeated each time the lever is moved from one contact to another.

What I claim as new and desire to secure by Letters Patent is:

1. The combination of an electric circuit breaker having at least one moving member, with a compressor, and means controlled by the movement of the moving member of the circuit breaker for actuating said compressor and delivering a jet of insulating fluid across the arcing space, as set forth.

2. The combination of an electric circuit breaker having at least one moving member, a compressor actuated by said member a valve controlling the delivery of a jet of air or other insulating fluid across the arcing space, and means controlled by the moving member of the circuit breaker, for opening said valve at or about the instant the circuit is broken, as set forth.

3. The combination of an electric circuit breaker having a traveling arm or lever as one member, with a compressor moving with the arm and automatically delivering air or like insulating fluid across the arcing space at or near the instant the circuit is broken, as set forth.

4. The combination of a circuit breaker having a traveling arm or lever as one member, with a compressor moving with said arm, a cam or tappet causing a forward stroke of said compressor when the lever is thrown to break the circuit, and an escape valve allowing a puff of air to escape across the arcing space when the circuit is broken, as set forth.

5. The combination of an electric circuit

breaker having a traveling arm as one member, a compressor moving with the arm, a cam fixed in the path of the movement of the arm for moving the piston forward automatically, and a valve controlling the escape of the compressed air, and opened automatically when the piston is at or near the forward limit of its stroke, as set forth.

6. The combination of a pivoted traveling arm adapted to sweep over and make contact with a series of insulated contacts, with a compressor moving with the arm and means automatically causing a forward stroke of the piston of the compressor as the arm passes from one contact to another and thereby delivering a jet of air or like insulating fluid across the arcing space, as set forth.

7. The combination in an electric circuit breaker, of a traveling arm and stationary row of contacts, with a compressor on the arm and the rack bar with alternate raised or depressed portions in the path of movement of the compressor, and giving a forward stroke to the piston of the same as the arm moves from one contact to the next, as set forth.

8. The combination in an electric circuit breaker, of a traveling arm and compressor, with the actuator bar K and the hinged arm N connected with the piston of the compressor and rigid in one direction but not in the other, for the purpose described.

In witness whereof I have hereto set my hand this 9th day of November, 1892.

EDWARD M. BENTLEY.

Witnesses:

N. L. HAYES,
FLORA A. DALY.