

(No Model.)

E. A. COLBY.
REVERSING KEY.

No. 442,800.

Patented Dec. 16. 1890.

Fig. 1.

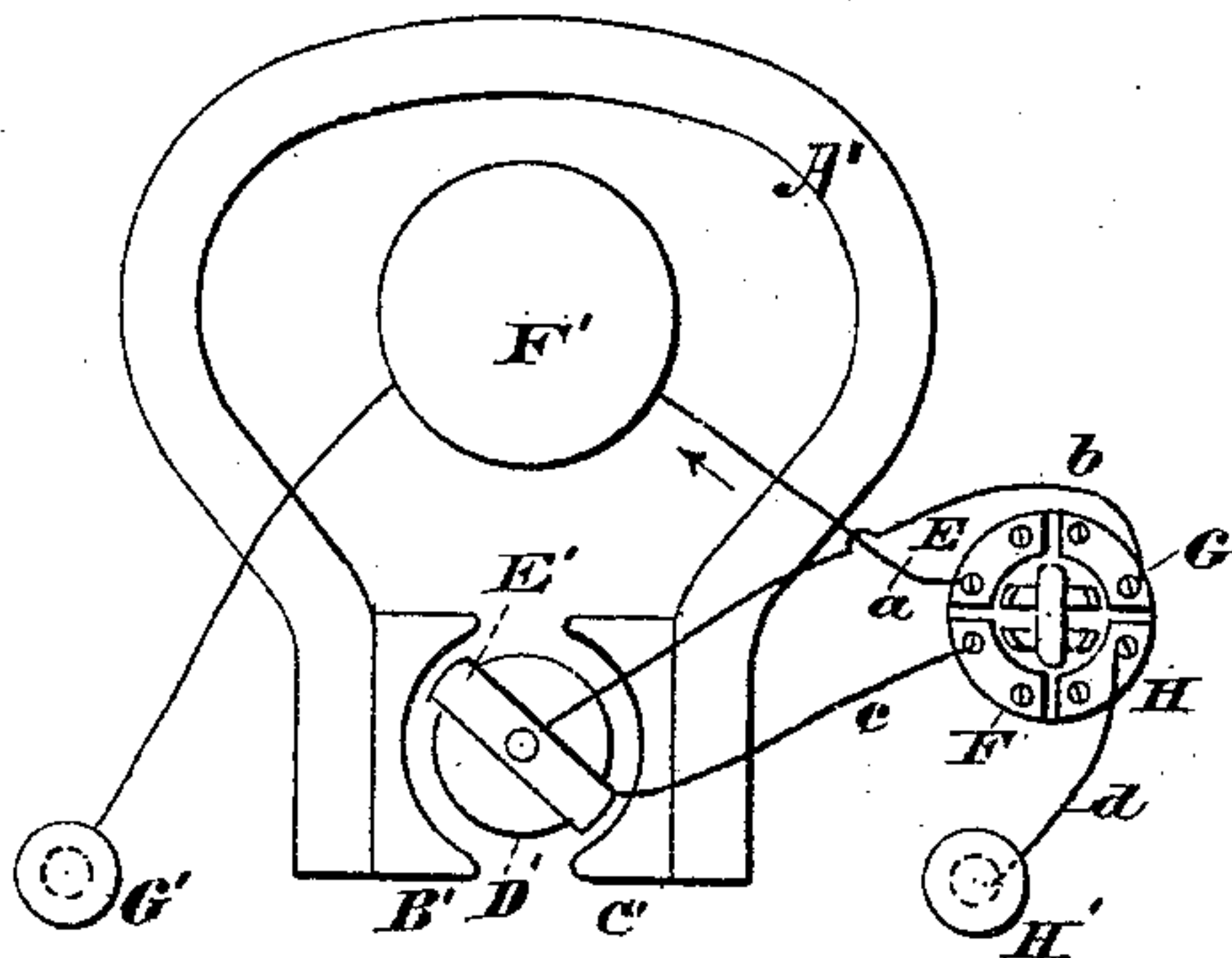


Fig. 2.

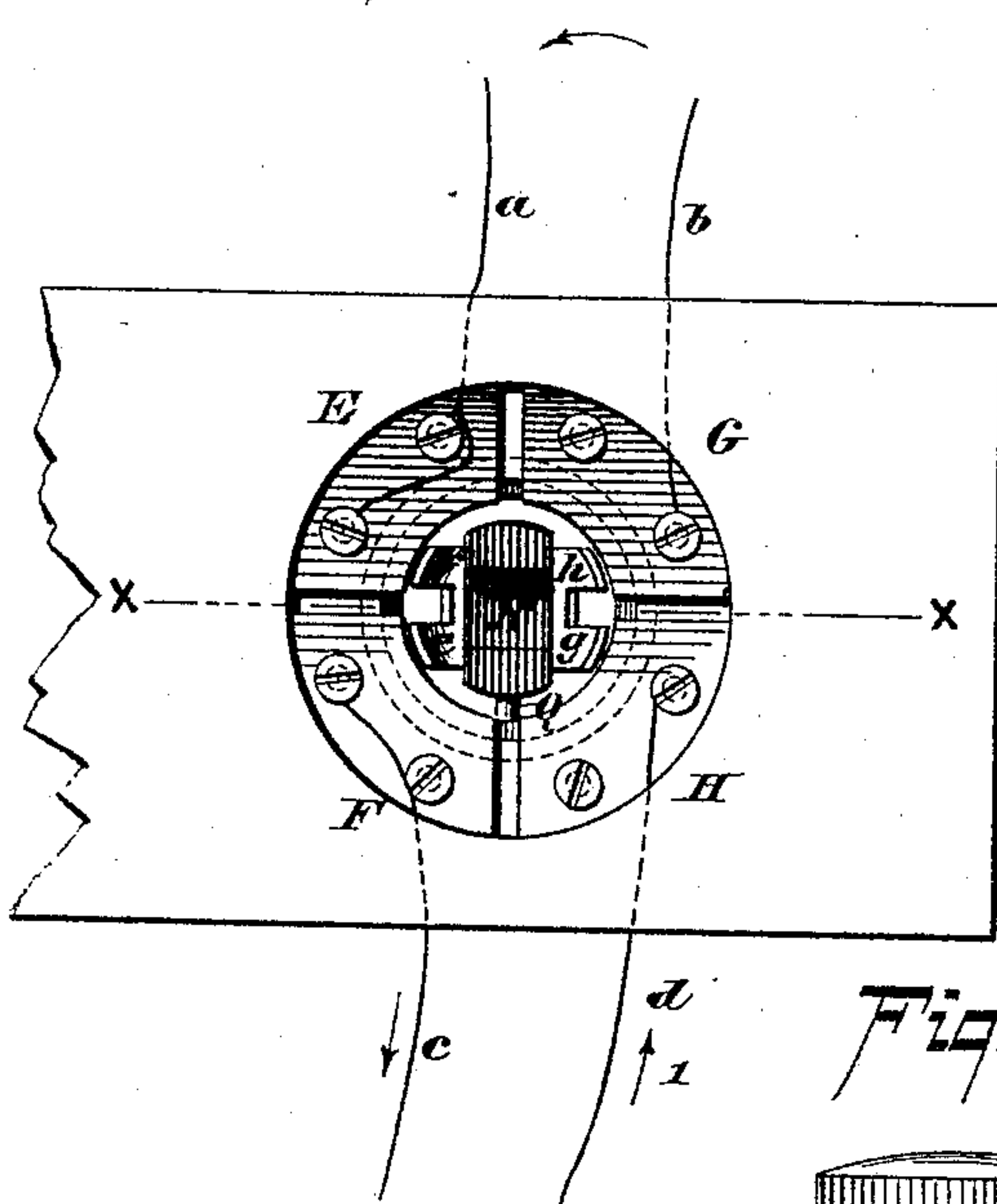


Fig. 3.

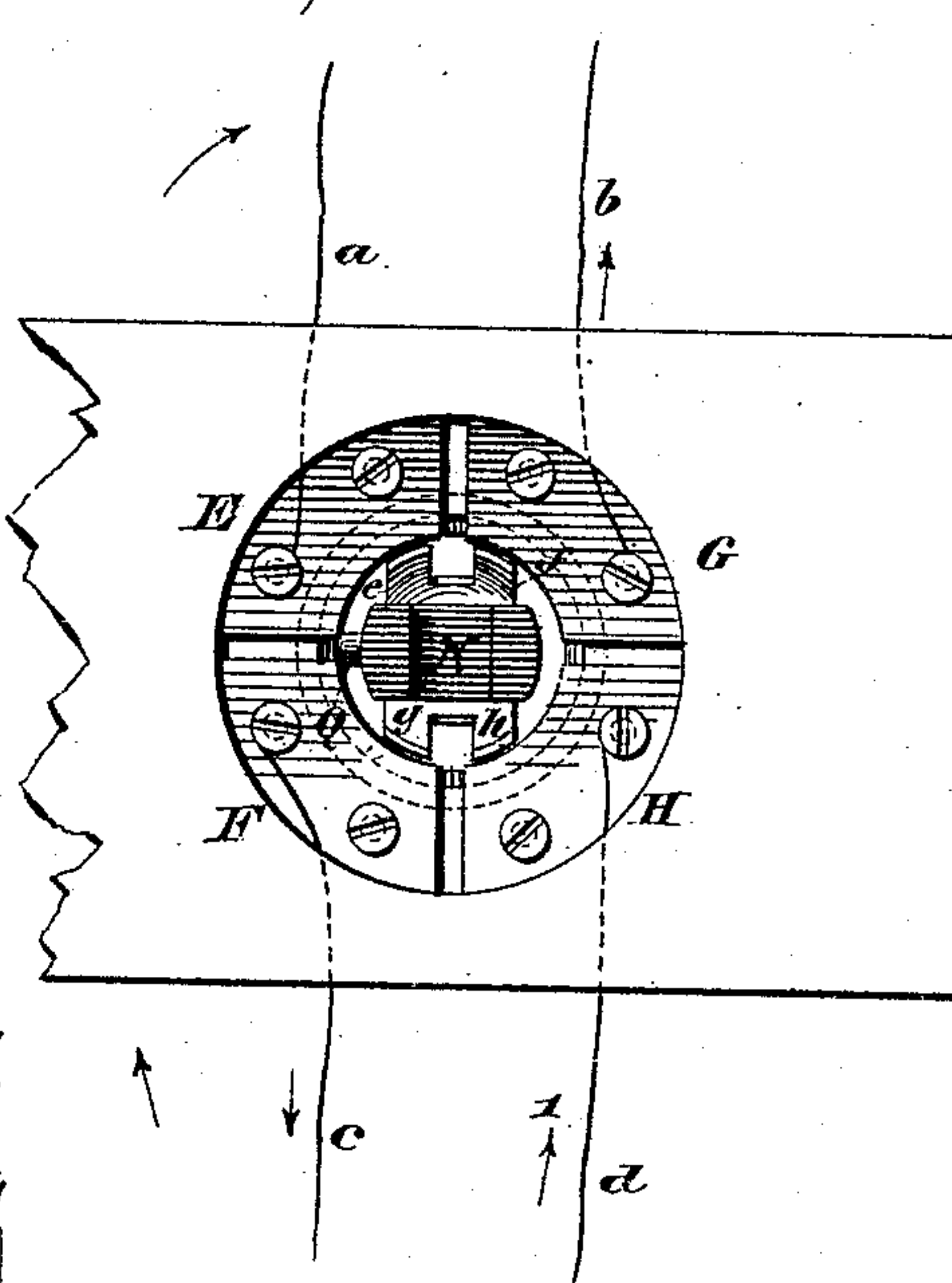
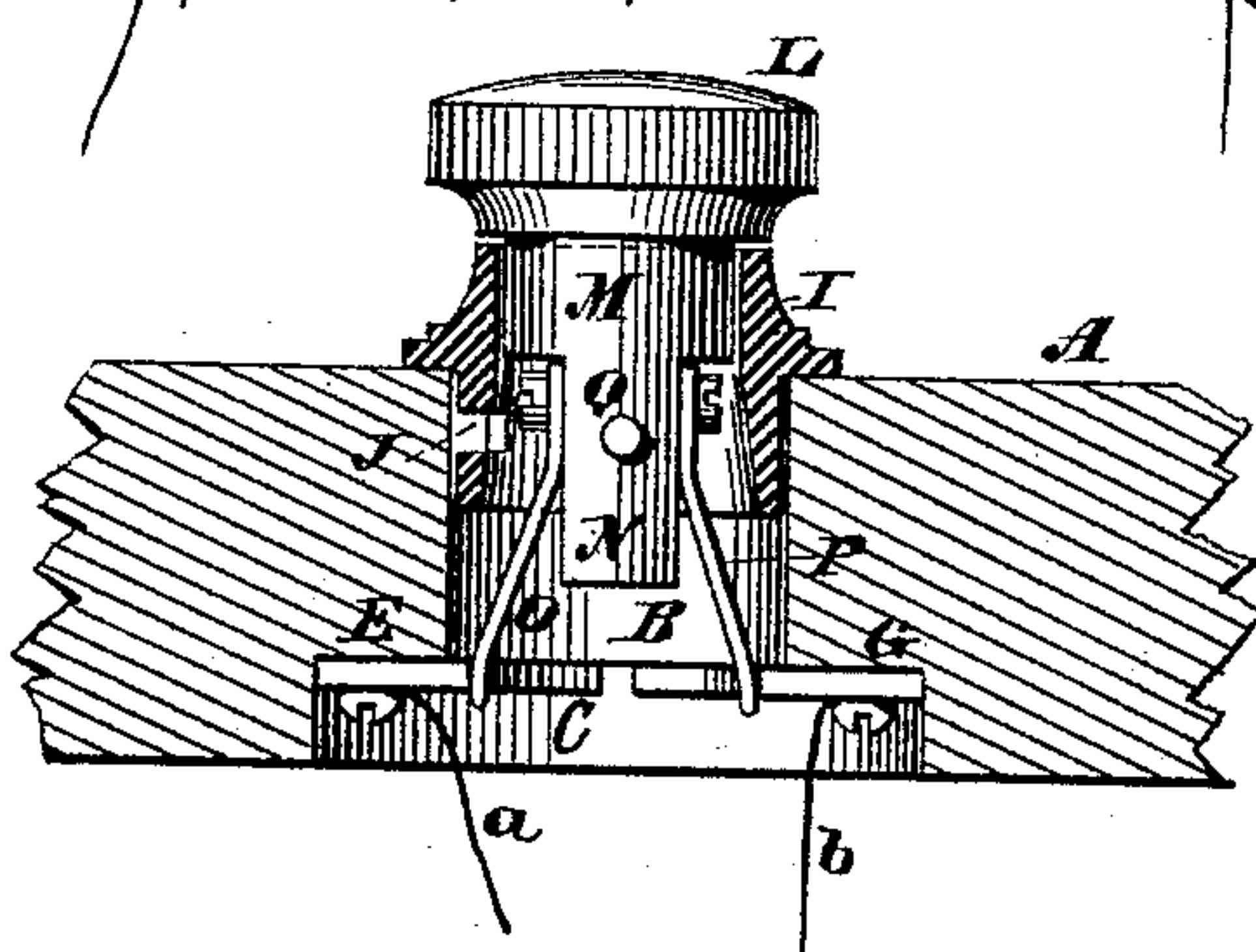


Fig. 4.



WITNESSES:

Gustave Nieverich

M. Brosch

INVENTOR

Edward A. Colby

BY

Frank Benjamin

his ATTORNEY.

UNITED STATES PATENT OFFICE.

EDWARD A. COLBY, OF NEWARK, NEW JERSEY.

REVERSING-KEY.

SPECIFICATION forming part of Letters Patent No. 442,800, dated December 16, 1890.

Application filed February 28, 1890. Serial No. 342,123. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. COLBY, of Newark, Essex county, New Jersey, have invented a new and useful Improvement in Reversing-Keys, of which the following is a specification.

My invention relates to a reversing-key or commutator for reversing the direction of an electrical current passing through a conductor; and it consists in the construction and arrangement of said key, and also in the combination of said key with an electrical measuring-instrument.

The form of measuring-instrument with which I here show my reversing-key combined is that patented to Edward Weston by Letters Patent No. 392,387, November 6, 1888, the said instrument being a voltmeter in which a coil of wire is suspended, so as to rotate between the poles of a magnet, and which coil, in accordance with well-known laws, takes certain angular positions, depending upon the electro-motive force of the current passing through it. By means of the combination of my key with the aforesaid instrument I am enabled to reverse the current through the rotating coil without effecting a corresponding change in the direction of the current through a fixed resistance-coil also contained in the instrument.

In the accompanying drawings, Figure 1 is a diagram illustrating the combination of my reversing-key with a measuring-instrument of the type above referred to. Fig. 2 is a bottom view of my apparatus, and Fig. 3 is a similar view showing the contacts when the key is in different positions. Fig. 4 is a sectional view on the line X X of Fig. 2.

Similar letters of reference indicate like parts.

A represents the base or support in which the key is arranged. Through said support is made a cylindrical opening B, which at its lower portion C is enlarged so that a shoulder is formed, to which shoulder are secured the four fixed segmental metal plates E F G H. These plates are insulated from one another, and to them respectively are connected the circuit-terminals *a b c d*.

In the cylindrical opening B in the support A is secured a flanged sleeve or bushing I of

insulating material, and in said sleeve is made a slot J ninety degrees in length.

L is the key in the form of a pin provided with a head or flange resting on the upper edge of the sleeve I, and having a shank M, with a downward projection N, to opposite sides of which are secured the forked contact-pieces O and P. The pieces O and P are spring-plates of metal, and each piece has two projections *e f* and *g h*, which projections bear against the inner edges of the fixed contact-pieces E F G H.

In the periphery of the shank M is a stop Q, which is received in the quadrantal slot J. The rotary motion of the key L is therefore limited, and cannot extend over a distance beyond ninety degrees, because the stop Q then meets the ends of the slot J.

Referring now to Fig. 2, it will be evident that when the pin is turned in the position there shown a current entering in the direction of the arrow *l* will pass first to plate H, to contact-arm *g*, to contact-arm *h*, to plate G, to wire *b*, and thence, if connection be made between wires *a* and *b*, to plate E, contact-arms *f e*, plate F, and wire *c*. If, however, the key be turned into the position shown in Fig. 3, then the current entering by the wire *d*, (indicated, as before, by the arrow *l*), will pass to plate H, to contact-arm *h*, contact-arm *g*, plate F, wire *c*, and then if wires *a* and *c* be connected to wire *a*, plate E, contact-arm *e*, contact-arm *f*, fixed contact-plate G, and wire *b*.

Referring now to Fig. 1, A' represents the permanent magnet of the apparatus set forth in the above-named patent to Edward Weston. B' C' are the pole-pieces. D' is the fixed cylinder. E' is the rotating coil moving in the annular space between the cylinder D' and the pole-pieces B' C'. F' is the fixed resistance-coil, and G' H' are binding-posts. Assuming the key to be in the position shown in Fig. 2 and the current to enter at the binding-post H', the current will then pass from plate H to plate G, through the wire *b* to the coil E', and thence back by wire *c* to plate F to plate E, and so by wire *a* to resistance-coil F', and thence to binding-post G'. If, however, the key be turned into the position shown in Fig. 3, then the current entering at binding-post H' will pass by wire *d* to plate H, to

plate F by wire *c* to coil E', and by wire *b* to plate G, then to plate E, and thence by wire *a* to resistance-coil F' and binding-post G'.

It will be seen from the foregoing that the direction of the current in the coil E' and wire *b c* is reversed, while in both cases it remains the same in direction through the wire *a* and resistance-coil F'.

The object of reversing the current only through the movable coil instead of through both movable coil and the resistance coil of the instrument is to make the difference of potential between the contact-plates of the reversing-key very small, so as to avoid the danger of short-circuiting due to the presence of metallic dust, for example, between said contact-plates.

In a measuring-instrument of the character illustrated the difference of potential between the terminals of the coil may be but three-quarters of a volt, while the difference of potential at the binding-post of the instrument, the resistance-coil then being included in the circuit, may be perhaps three hundred volts or more.

I claim—

1. The combination of the support A, hav-

ing an opening, a sleeve or bushing I in said opening and having the slot J, the key L, rotary in said sleeve and having projection N, stop Q on said key entering said slot J, bifurcated contact-pieces O P, insulated from one another and secured on opposite sides of said projection N, four fixed insulated contact-plates E F G H, disposed around said opening B, and circuit-terminals respectively connected to said plates, the extremities of said pieces O P making electrical contact with said plates.

2. In an electrical measuring-instrument, the combination of the vibrating coil E', contact-plates F and G, connected to the terminals of said coil, contact-plate E, a fixed resistance-coil F', having one terminal connected to said plate E, contact-plate H, (the said contact-plates being insulated from one another,) rotary key L, and bifurcated contact-arms O P on opposite sides of said pin, insulated from one another and making contact with said plates E F G H.

EDWARD A. COLBY.

Witnesses:

JAMES S. GREVES,
M. BOSCH.