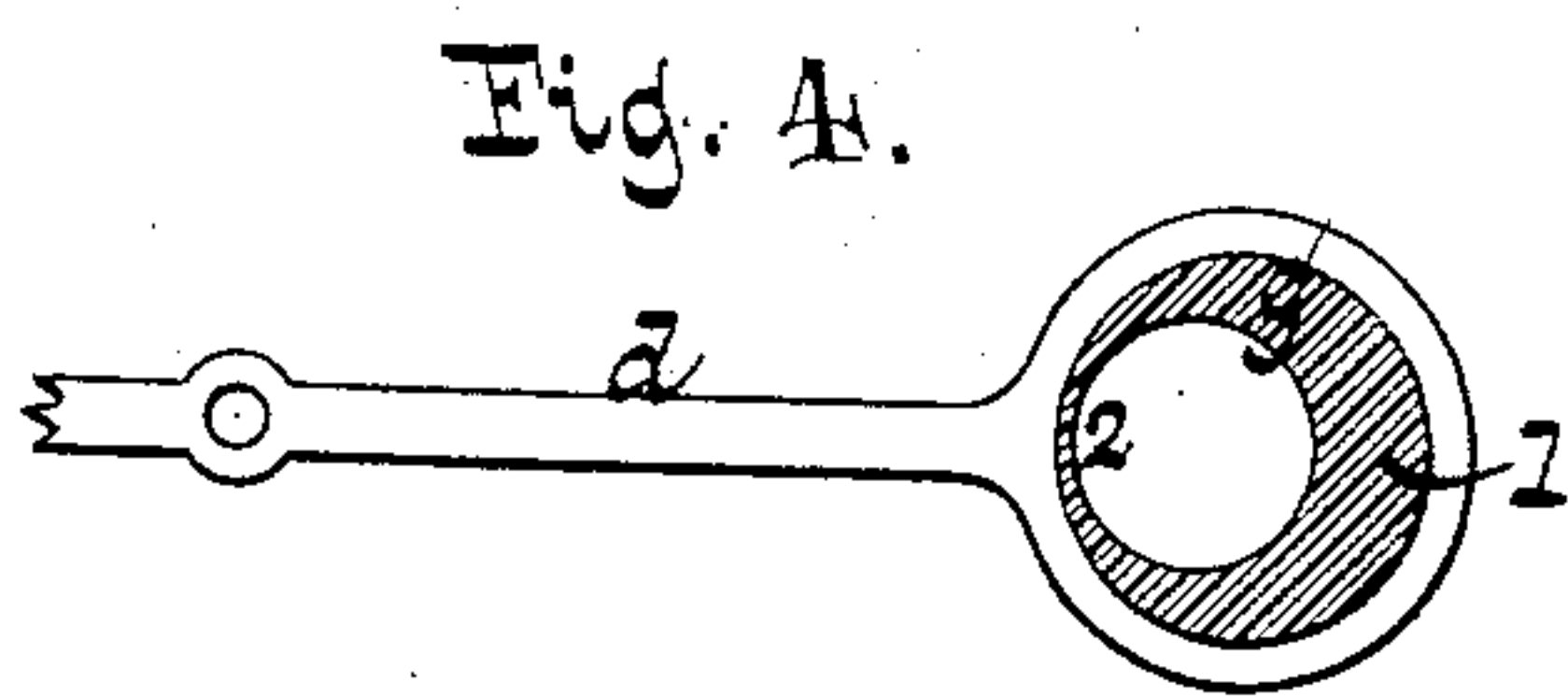
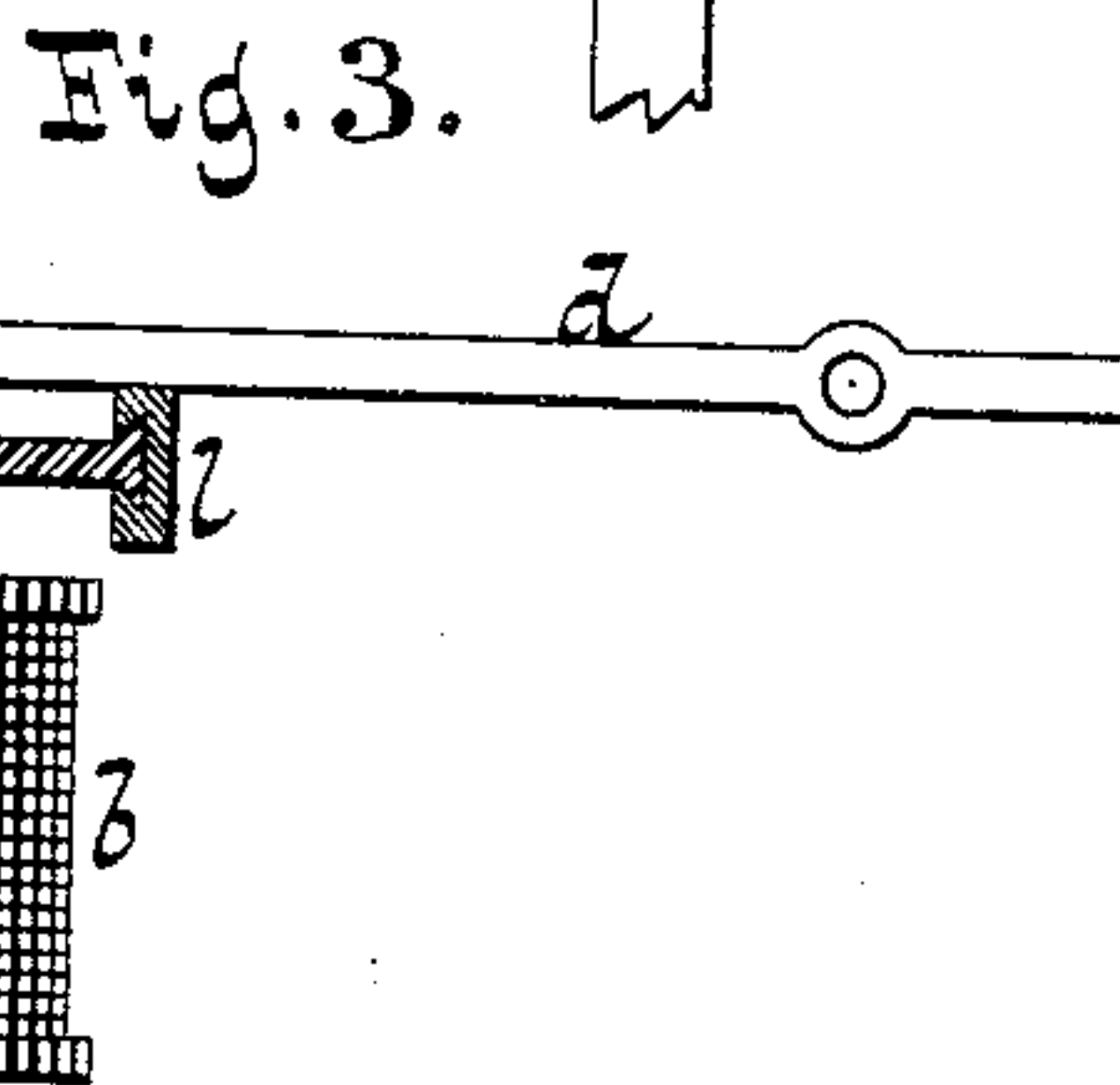
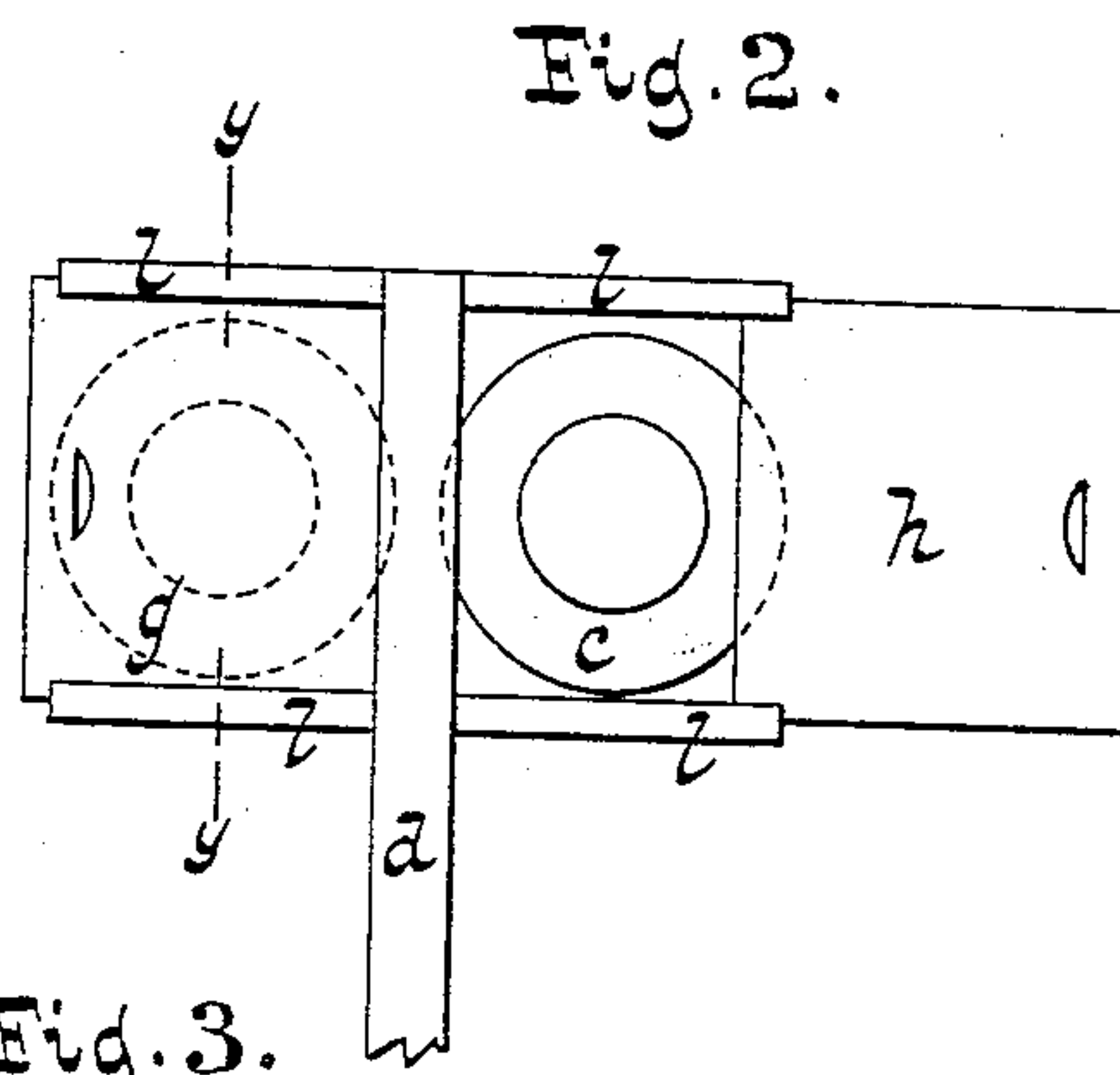
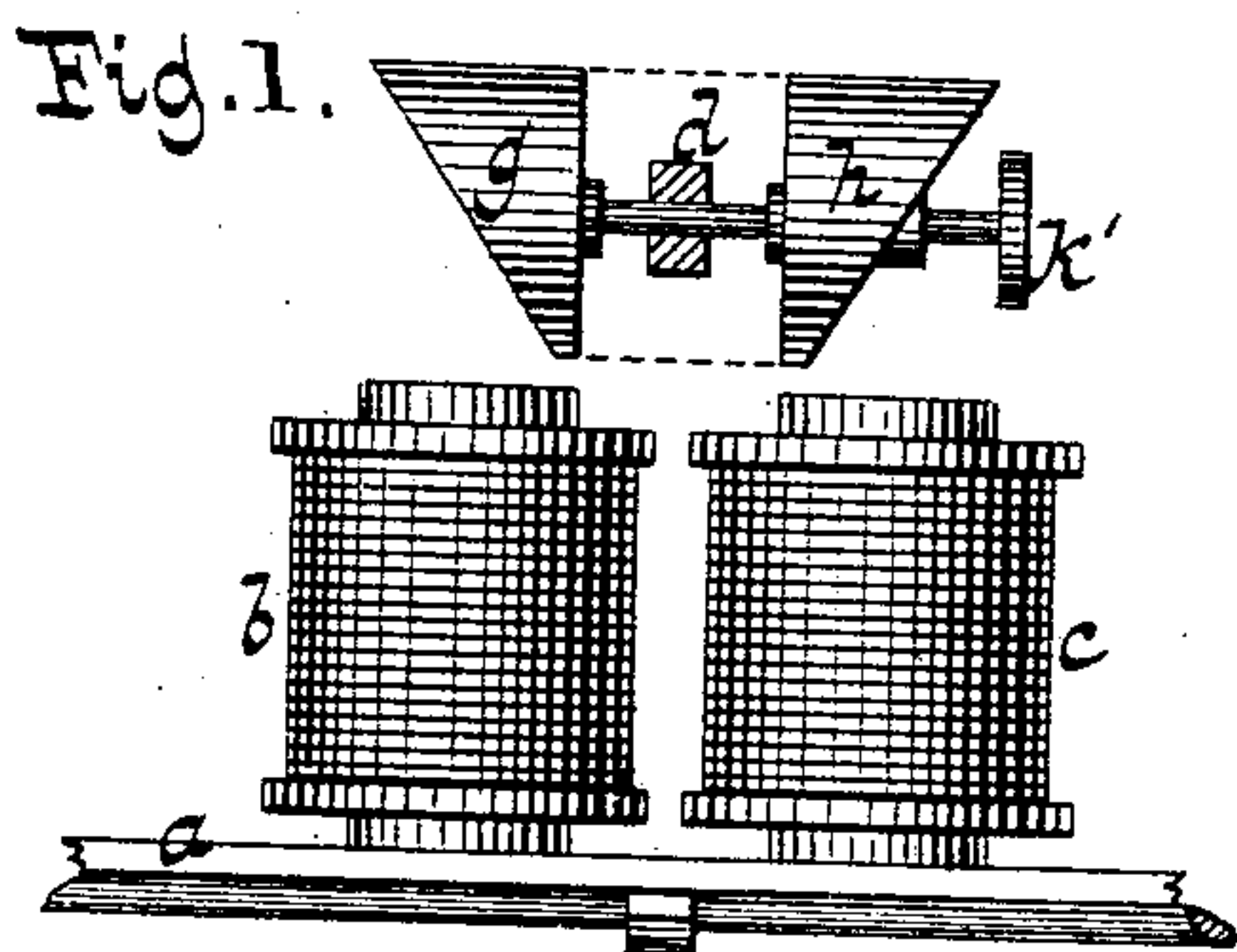


(No Model.)

T. COCHRAN.

Adjustable Armature for Electrical Apparatus.
No. 235,997. Patented Dec. 28, 1880.



Witnesses.
Chas. Wablers.
William Miller

Inventor.
Thomas Cochran.
by Van Santvoord & Lauff,
Attys.

UNITED STATES PATENT OFFICE.

THOMAS COCHRAN, OF BROOKLYN, NEW YORK.

ADJUSTABLE ARMATURE FOR ELECTRICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 235,997, dated December 28, 1880.

Application filed November 13, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS COCHRAN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Electrical Apparatus, of which the following is a specification.

This invention consists in the combination, with an electro-magnet, of an adjustable armature adapted by its adjustment to present varying proportions of its mass to the electro-magnet; also, in a cylindrical armature of unequal length or height arranged to be rotated on its axis to expose a greater or less surface of mass to the action of the magnets; further, in the combination, with an electro-magnet, of an adjustable armature adapted by its adjustment to present varying proportions of its mass to the electro-magnet, and a spring for retracting the armature from the electro-magnet.

This invention is illustrated in the accompanying drawings, in which Figure 1 is a front view of a magnet provided with an armature according to my invention, the armature-lever being shown in section. Fig. 2 is a plan view of a modification of my invention. Fig. 3 is a section on line *y y*, Fig. 2. Fig. 4 illustrates another modification.

Similar letters indicate corresponding parts.

The letter *a* designates the base-plate of the apparatus, on which rest the electro-magnets *b c*. The arm or lever *d* is arranged to swing in suitable standards, its motion being limited by suitable stops. To the lever *d* is secured the armature *g h*, which is attracted by the magnets *b c*, when the same are vitalized by the passage of the electric current. When the circuit is broken a suitable spring (not shown in the drawings) restores the lever *d* to its original position, and the armature *g h* is retracted from the magnets.

In the example shown in Fig. 2 the armature *g h* is made in the form of a cylinder with oblique ends or bases, so that the length of the cylinder is unequal, increasing at each end from its least length to its greatest length, and is arranged to be turned about its axis by means of a pulley, *k'*, as shown in Fig. 1, the said pulley being turned, if desired, by a belt leading from a thumb-wheel mounted on a

suitable fixed support. The mass of the armature presented to the magnets is thus made unequal, according to the portion of the circumference turned toward the magnets, so that when the current passing through the magnets is weak, and the attractive force of said magnets is consequently small, the armature may be turned so as to present its greatest mass to the action of said magnets, thus compensating for the weakness of the current. If the attractive force of the magnets is powerful, the armature is set so that its least mass is presented to the magnets. By these means uniformity in the action of the magnets on the armature is secured.

Of course the instrument may be varied in various ways without departing from my invention—as shown, for example, in Figs. 2 and 3, where the lever *d* is provided with lateral arms *l*, into which two or more sections of an armature can be slid, as at *g h*. When the attractive force of the magnet is great, the sections *g h*, which preferably consist of flat plates of metal, can be partly slid out of the arms *l*, thus exposing a smaller portion of their mass to such magnets; or one of such sections may be removed altogether, thus leaving only the other section to be acted on by the magnets *b c*. Suitable mechanism may be applied for adjusting the sections *g h*.

The arms *l* may be made of either a magnetic or non-magnetic material; and if they are made of the latter and the sections *g h* of the armature are moved apart, the magnetic circuit through two cores of the magnets is broken and the force of the electro-magnets is still further reduced.

In the example shown in Fig. 4 the armature *h* consists of a hollow rotating cylinder, the inner surface formed so that the cross-section of the cylinder is crescent-like, and if, for example, the part 1 of the cylinder is presented to the magnets, the maximum effect is obtained, while the minimum effect is obtained by presenting the part 2 to the magnets.

It should be remarked that the adjustable armature can be used either with or without a tilting platform, as shown in an application for patent which I have heretofore filed. Under certain conditions of the line-current it may be requisite to obtain a more delicate ad-

justment than is possible with either the adjustable armature or the tilting platform alone, and in that case it is advantageous to combine such two parts.

5 I do not claim in this application the herein-described method of regulating the action of the armature of an electric instrument by supporting said instrument on a tilting platform or other suitable device, whereby any inclination can be given to said instrument, such
10 claim forming the subject-matter of a prior application for a patent filed by me on the 6th day of September, 1880.

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

1. The combination, with an electro-magnet, of an adjustable armature adapted by its adjustment to present varying proportions of its mass to the electro-magnet, substantially
20 as described.

2. The cylindrical armature of unequal length or height, as above described, arranged to be rotated on its axis to expose a greater or less surface or mass to the action of the magnets, substantially as described. 25

3. The combination, with an electro-magnet, of an adjustable armature adapted by its adjustment to present varying proportions of its mass to the electro-magnet, and a spring for retracting the armature from the electro-magnet. 30

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

THOMAS COCHRAN. [L. S.]

Witnesses:

W. HAUFF,
E. F. KASTENHUBER.