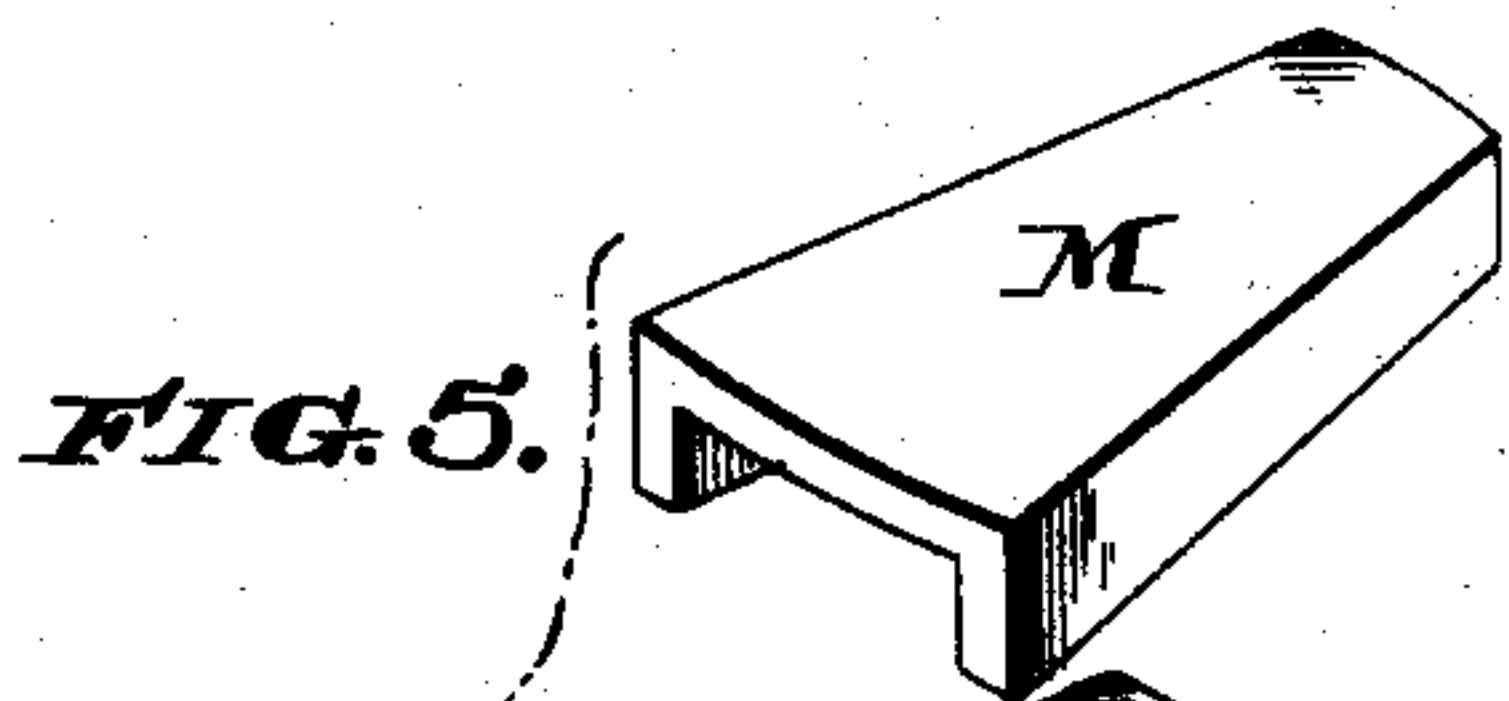
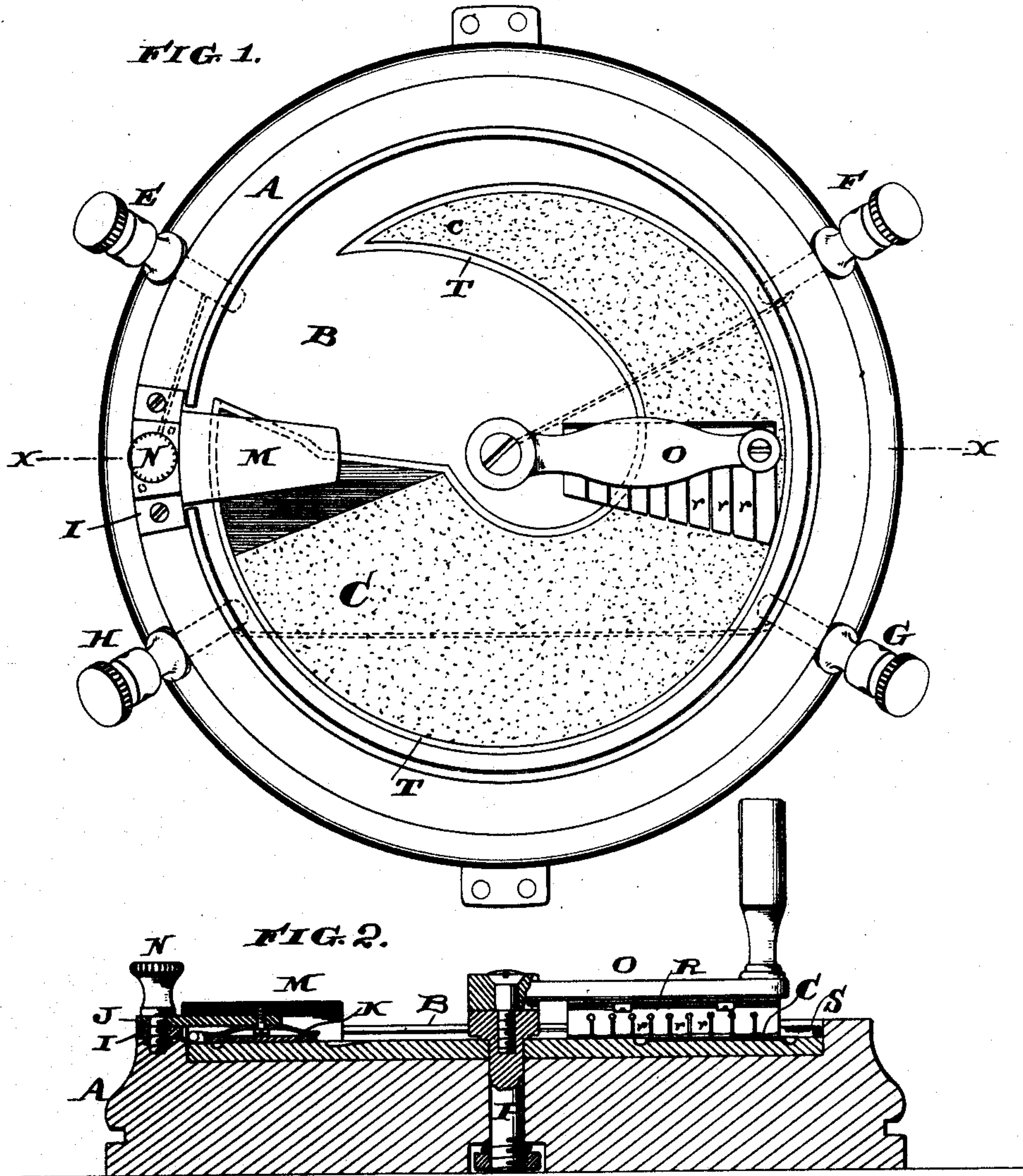


(No Model.)

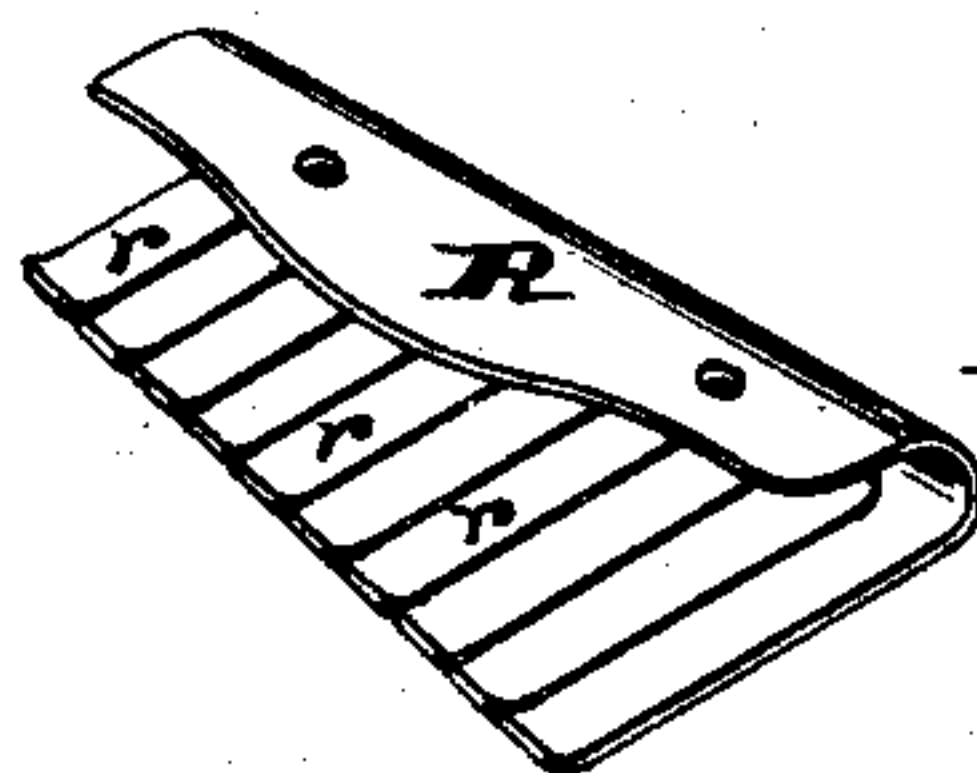
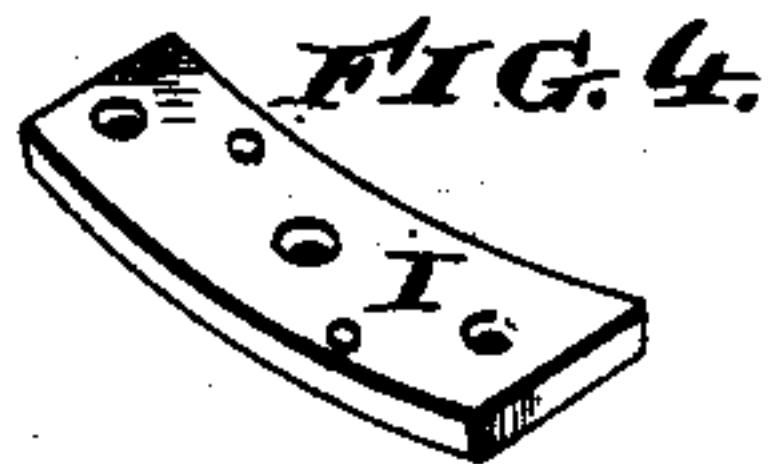
O. FLEMMING.  
CURRENT REGULATOR OR RHEOSTAT.

No. 432,131.

Patented July 15, 1890.



Witnesses:  
*Henry Dwyer*  
*Walter Jamariss*



Inventor:  
*Otto Flemming*  
By *W. A. [Signature]*



# UNITED STATES PATENT OFFICE.

OTTO FLEMMING, OF PHILADELPHIA, PENNSYLVANIA.

## CURRENT-REGULATOR OR RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 432,131, dated July 15, 1890.

Application filed March 27, 1890. Serial No. 345,478. (No model.)

*To all whom it may concern:*

Be it known that I, OTTO FLEMMING, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Current-Regulators or Rheostats, of which the following is a specification.

My invention has reference to current-regulators or rheostats; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

In carrying out my invention I employ a surface of conducting material, over which a contact is moved for the purpose of increasing or decreasing the resistance in an electric circuit between the source of power and the translating or current-consuming device. The conducting-surface is deposited upon a smooth surface of insulating material, one end of which is connected with one of the conductors, while the other conductor is in circuit with the switch or contact which is adapted to move over the said surface. The contact I prefer to make with a series of spring-fingers to accommodate itself for any inequalities in the surface of the rheostats. At one end of the conducting-surface I make a deposit of metal—such as silver or nickel—whereas the remaining portion of the conducting-surface is preferably formed of carbon or graphite.

The details of the rheostat or regulator are fully set forth in the accompanying drawings, in which—

Figure 1 is a plan view of my improved rheostat or current-controller. Fig. 2 is a cross-section of same on line  $x x$ . Fig. 3 is a perspective view of the contact-brush removed, and Figs. 4 and 5 are perspective views of isolated parts.

A is a circular frame or disk of wood, the upper part of which is recessed, in which is set a disk of porcelain B, which is held in place in any suitable manner—as, for instance, by the metal ring S. The upper surface of the porcelain disk B is made flat, and is grooved by shallow grooves T to form an outline like a hooked tooth or sickle arranged about the center, and the surface bounded by said groove consists of two parts, one C making up the great-

er portion and coated with a conducting material—such as carbon or graphite—which is preferably more dense toward the part marked D than toward the point marked C, and the part D, which is coated with a metal—such as silver or nickel—preferably deposited upon the surface of the porcelain by electrolysis or otherwise. It is evident that this metal portion may be cast and set into the body of the porcelain.

E is one binding-post for receiving the current, and is connected by a wire with a plate I, secured upon the rim of the frame A, and upon which is clamped a plate J, having upon its under surface a contact-spring K, which presses upon a plate L, resting upon the surface D, and thereby insuring a good electrical connection between the binding-post E and said surface D. A hard-rubber cap M is secured over these parts where they project over the porcelain disk, so as to insulate them with reference to the contact-lever O when moved around. It is evident that any other connection between the binding-post E and the contact-surface D might be employed. By loosening the screw N the parts J, M, K, and L may readily be removed if it is desired to remove the plate B. The contact-lever O is pivoted to a central post P, connected electrically with the binding-post F, and is provided upon its under surface with a removable contact-piece R, having a series of independently-movable spring-fingers  $r$ , as clearly shown in Fig. 3, which fingers are independently pressed upon the contact-surfaces D and C, so as to insure a positive contact throughout the entire transverse springs of the parts C and D.

H and G are two binding-posts connected as shown for convenience in coupling the remaining wires of the circuit.

By employing the metallic surface D the lever O may be moved around, so that the spring-fingers  $r$  rest upon the surface of the metal, and thus practically cut out all material resistance, allowing the full current to flow, and by moving the lever to the left more or less resistance can be thrown into circuit, controlling the flow of the current. The decreasing of the area of the surface C and D to  $c$  is but decreasing the conducting-path for the current and accomplishes in a



the density of the carbon deposited upon the surface C and D to c.

I do not confine myself to the mere details of construction, as they may be varied in various ways without departing from the spirit of the invention.

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

1. In a current-regulator or rheostat, the combination of a surface of non-conducting material coated with a conducting substance and in which the conductivity decreases from one place upon the surface to another, means for connecting a conductor with a portion of the conducting material of greatest conducting power, and a movable contact device movable over the contact-surface and formed with a series of flexible fingers resting upon said conducting material.

2. In a regulator or rheostat, the combination of a non-conducting plate having its surface coated partly with a metallic substance and partly with a material of less conductivity, such as carbon or graphite, means for connecting the circuit with the metal coating of the plate, and a movable contact device movable over said two conducting substances of the plate successively.

3. In a regulator or rheostat, the combination of a non-conducting plate having its surface coated partly with a metallic substance and partly with a material of less conductivity, such as carbon or graphite, means for connecting the circuit with the metal coating of the plate, and a movable contact device movable over the said two conducting substances of the plate successively, consisting of a frame carrying a series of flexible fingers.

4. In a regulator or rheostat, the combination of a frame having a surface of non-conducting material, two portions of which are covered with a metal and carbon or graphite, respectively, a binding-post connected with the metal covering, a pivoted contact adapted to be moved over said metal and carbon or graphite covering, and a binding-post connecting with said movable contact.

tion of a frame having a surface of non-conducting material, two portions of which are covered with a metal and carbon or graphite, respectively, a binding-post connected with the metal covering, a pivoted contact adapted to be moved over said metal and carbon or graphite covering, consisting of a series of spring-fingers pressing upon the surface, and a binding-post connecting with said movable contact.

6. In a regulator or rheostat, the combination of a frame having a surface of non-conducting material, two portions of which are covered with a metal and carbon or graphite, respectively, and bounded by a groove to separate them from the non-conducting surface, a binding-post connected with the metal covering, a pivoted contact adapted to be moved over said metal and carbon or graphite covering, and a binding-post connecting with said movable contact.

7. In a regulator or rheostat, the combination of a frame having a surface of non-conducting material, two portions of which are covered with a metal and carbon or graphite, respectively, a binding-post connected with the metal covering by a detachable spring-contact, a pivoted contact adapted to be moved over said metal and carbon or graphite covering, and a binding-post connecting with said movable contact.

8. In a regulator or rheostat, the combination of a frame having a surface of non-conducting material, two portions of which are covered with a metal and carbon or graphite, respectively, a binding-post connected with the metal covering by a detachable spring-contact shielded by an insulating-guard, a pivoted contact adapted to be moved over said metal and carbon or graphite covering, and a binding-post connecting with said movable contact.

In testimony of which invention I have hereunto set my hand.

OTTO FLEMMING.

Witnesses:

ERNEST HOWARD HUNTER,  
S. T. YERKES.