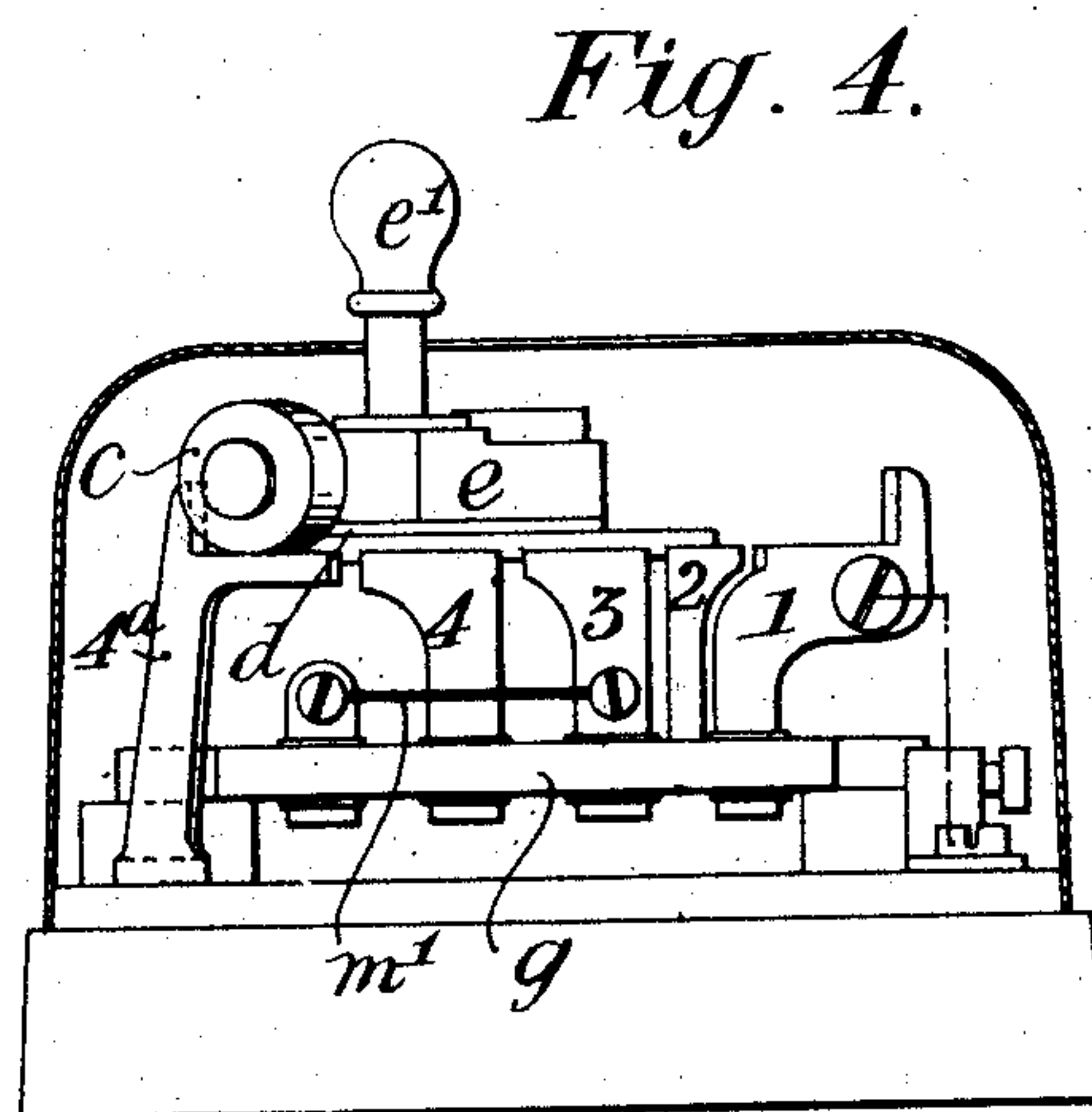
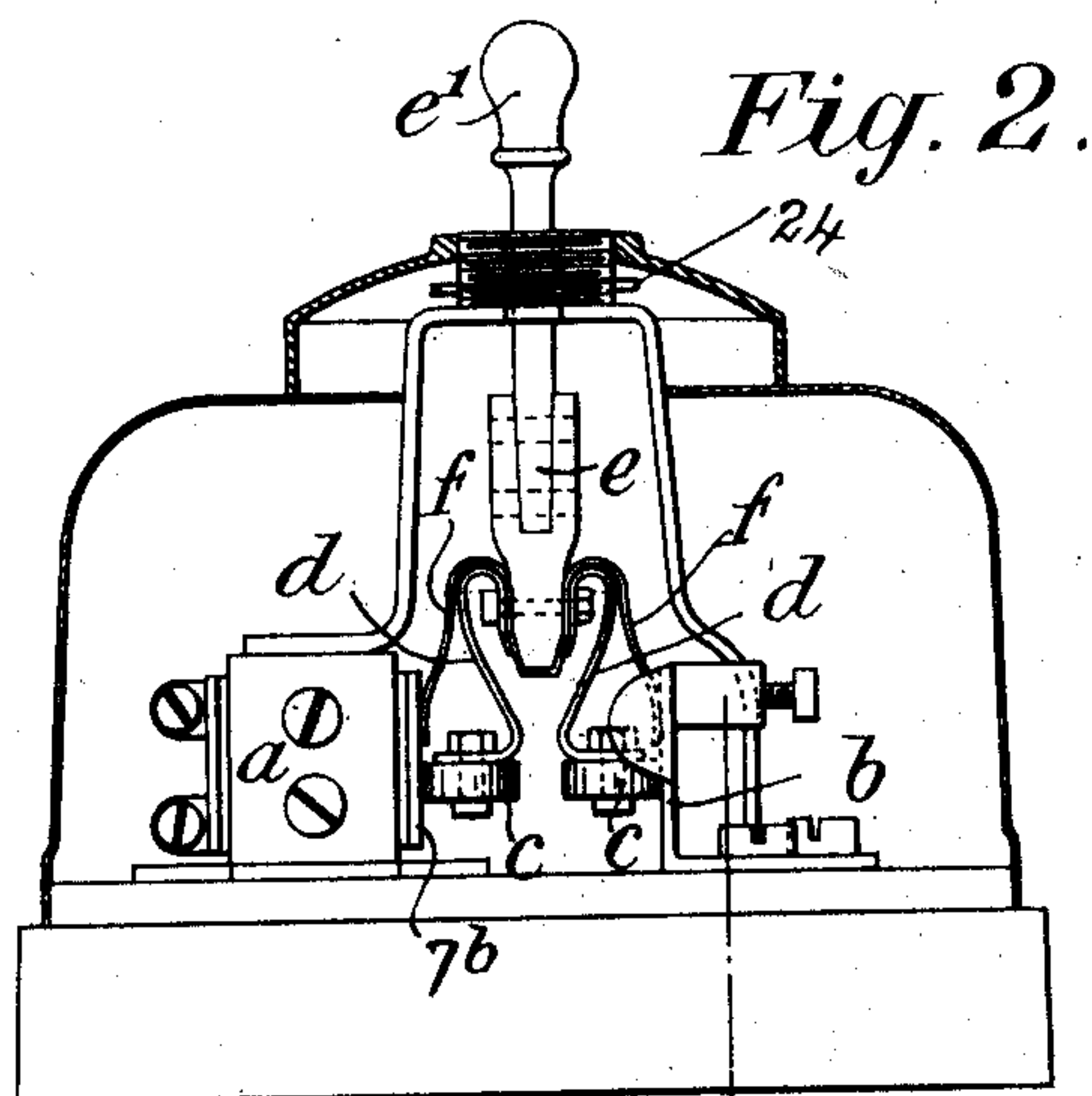
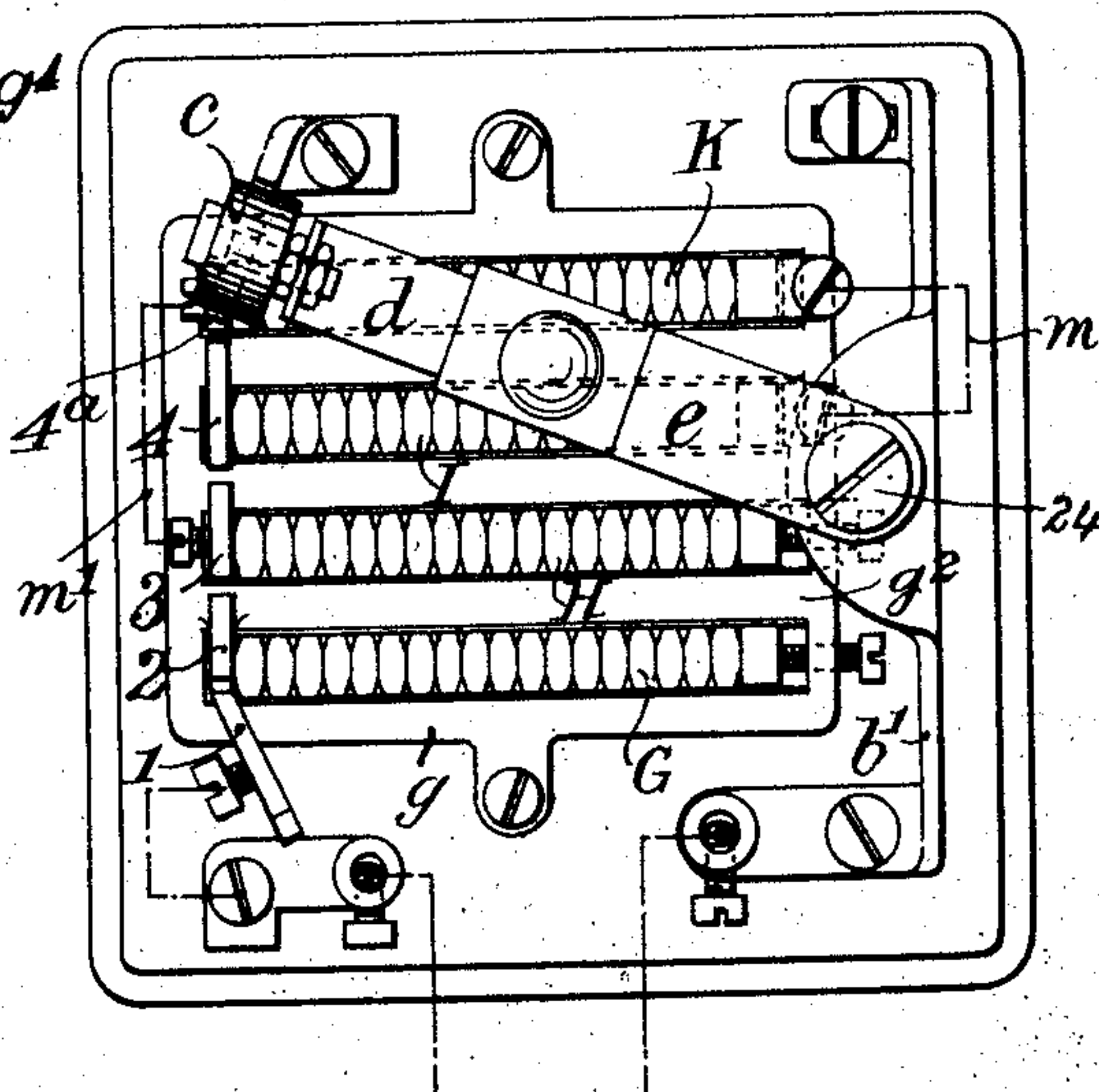
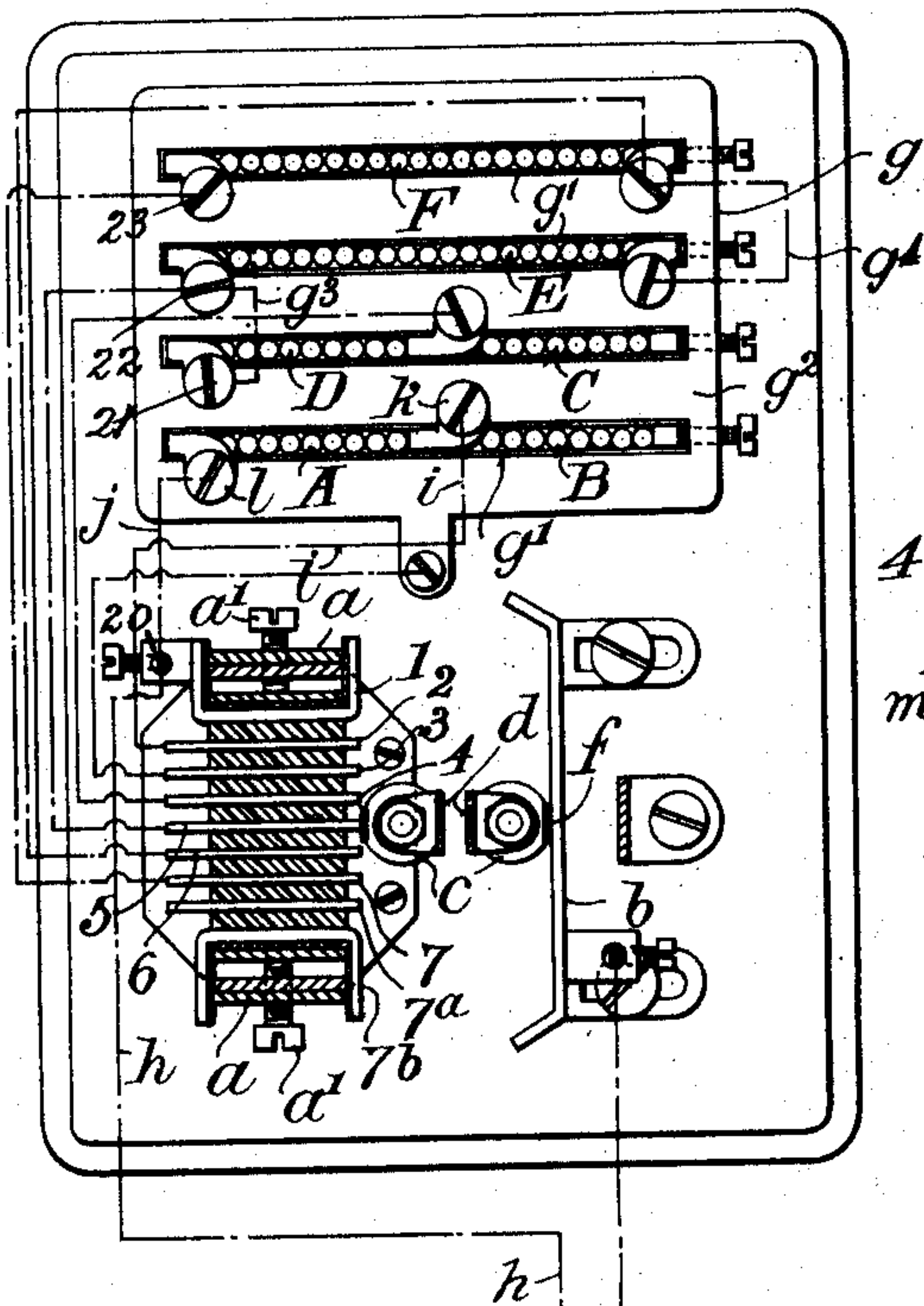


APPLICATION FILED JUNE 13, 1910.

Patented Feb. 7, 1911.



Witnesses:  
J. M. Myster  
L. B. Middleton

Inventors  
Jacob Mathkinson, and  
Albert E. Payne.  
by Herbert W. Jenner.  
Attorney.



# UNITED STATES PATENT OFFICE.

JACOB WATKINSON AND ALBERT E. PAYNE, OF LONDON, ENGLAND.

APPARATUS FOR REGULATING OR CONTROLLING THE PRESSURE OF THE CURRENT  
IN AN ELECTRIC CIRCUIT.

983,414.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed June 13, 1910. Serial No. 566,579.

*To all whom it may concern:*

Be it known that we, JACOB WATKINSON and ALBERT EDWARD PAYNE, residing at 138 Cambus road, Canning Town, London, Eng-  
land, have invented certain new and useful  
Improvements in Apparatus for Regulating  
or Controlling the Pressure of the Current  
in an Electric Circuit; and we do hereby  
declare the following to be a full, clear, and  
exact description of the invention, such as  
will enable others skilled in the art to which  
it appertains to make and use the same.

This invention relates to an improved ap-  
paratus for regulating or controlling the  
pressure of the current in an electric circuit,  
of the kind wherein a switch arm is adapted  
to be moved over a series of contacts con-  
nected to a group of resistance devices each  
consisting of cells, or groups of blocks of  
graphite or other material. In apparatus  
of this kind hitherto made it has been pro-  
posed to employ a switch arm having mem-  
bers which were pressed on to the contacts  
by spiral springs but it is found in practice  
that such devices are unsatisfactory and are  
liable to burn out with high pressures.

The object of the present invention is to  
provide improved means for obtaining an  
efficient and safe contact between the mov-  
able and fixed parts, and also to provide an  
apparatus of generally improved construc-  
tion.

The invention consists in the combination  
with a series of resistances composed of  
separate pieces of graphite or similar ma-  
terial clamped together in groups and suit-  
ably connected to contacts, of a pivoted  
switch arm carrying a roller or rollers or  
blocks mounted on resilient arms, which  
rollers or blocks are adapted to bear upon  
the contacts, the said switch arm being also  
provided with flat spring arms to further  
insure an efficient contact.

The accompanying drawings illustrate  
two forms of the improved apparatus made  
in accordance with the invention.

Figure 1 is a part sectional plan of one  
form of the improved apparatus with the  
cover removed. Fig. 2 is an elevation. Fig.  
3 is a plan with the cover removed, of a  
modification, and Fig. 4 is an elevation of  
Fig. 3.

As shown, this device comprises essen-  
tially a series of resistances electrically con-  
nected as hereinafter described to a switch

comprising a series of contact plates or  
strips 1, 2, 3, 4, 5, 6, 7, 7<sup>a</sup> and 7<sup>b</sup>, insulated  
one from the other and packed within a  
suitable casing *a* and rigidly secured by an  
adjusting screw or screws *a*<sup>1</sup>. A common  
contact plate *b* is provided connected to  
one of the main circuit wires as shown and  
contact is made as desired between any one  
of the plates or strips *a* and the common  
contact plate *b* by means of rollers *c c*  
mounted on spring arms *d d* carried upon  
the pivoted switch arm *e* provided with an  
ordinary operating handle or knob *e*<sup>1</sup>. The  
switch arm *e* also carries flat spring mem-  
bers *f* adapted to bear upon the contact *a*  
and *b* to insure an efficient contact. The  
rollers *c c* are made of sufficiently large  
diameter to prevent the contact being broken  
when the switch arm is moved from one  
contact strip to another.

A, B, C, D, E, F, are resistances each  
composed of a series of blocks or pieces of  
graphite or other material of circular sec-  
tion, disposed in cells or recesses in a com-  
mon plate or frame *g*, and insulated as at  
*g*<sup>1</sup>. The resistances B and C at one end are  
not insulated and are thus coupled together  
by part *g*<sup>2</sup> of the frame and the resistances  
D and E, and E and F, are connected to-  
gether as at *g*<sup>3</sup> and *g*<sup>4</sup> respectively. The  
wire *g*<sup>3</sup> is coupled to the binding posts 21  
and 22 at the left hand ends of the resist-  
ances D and E. Plate 5 is coupled to post  
22, and plate 6 is coupled to wire *g*<sup>4</sup> which  
connects the right hand ends of resistances  
E and F. Plate 7 is coupled to post 23.

In operation, assuming that the switch  
arm is in position so as to complete the cir-  
cuit through the contacts *b* and 1, the cur-  
rent will pass direct to the lamp or other  
main by the binding-post 20 and the con-  
nection *h*. If now contact is made with the  
part 2 the resistance A is brought into cir-  
cuit through connections *i* and *j* and bind-  
ing screws *k* and *l*, the circuit being from  
plate 2, through wire *i*, binding-post *k*, re-  
sistance A, binding-post *l*, wire *j*, binding-  
post 20, to wire *h*. Upon again moving  
the switch arm on to contact 3, resistances  
A and B are in circuit, and so on, until the  
last contact 7 causes all resistances to be in  
circuit. The strip 7<sup>a</sup> is disposed interme-  
diate of the "off" contact 7<sup>b</sup> so as to insure  
the switch arm resting either on the last  
contact 7 or completely "off". The strip



7<sup>a</sup> is adjustable longitudinally the same as the other strips, but the contact-plate 7<sup>b</sup> is not adjustable. The strip 7<sup>a</sup> prevents an imperfect contact from being made through the strip 7, which might occur if the roller *c* could bear on strip 7 and plate 7<sup>b</sup> simultaneously, and pass direct from one to the other, without passing over a neutral strip 7<sup>a</sup>.

10 Figs. 3 and 4 show a modified construction wherein only four resistances are employed, G, H, I, K. In this form the switch arm *e* is disposed horizontally upon a bridge piece *b*<sup>1</sup> forming the common contact above the resistance frame *g* so as to economize space, and the arm *e* is provided with a flat spring arm *d* carrying a roller *c* as before. In this form the graphite blocks forming the resistances are of flat section with curved or beveled sides to prevent undue heating. 1, 2, 3, 4 are the contacts disposed directly upon the frame *g* and 4<sup>a</sup> is the "off" contact. In the form shown the switch is shown at the "off" position.

25 In use when the roller *c* is upon the contact 1, the circuit is completed without passing through any of the resistances. Upon moving the roller *c* to the contact 2 the current passes through resistance G. When

the roller rests on the plates 2 and 3 the current passes through resistances G and H, through the frame *g*<sup>2</sup> *g* to plate 1. When the roller rests on contact-plate 4, the current passes from the roller *c*, through resistance I, wire *m*, resistance K, wire *m*<sup>1</sup>, resistance H, frame *g*<sup>2</sup> *g*, to plate 1.

What we claim is:

The combination, with a series of resistances each provided with a separate contact-plate, of a pivoted switch arm constantly included in the circuit, a spring secured to the said arm at one end, a revoluble roller carried by the free end portion of the said spring and adapted to roll over the ends of the contact-plates and to include the said resistances in the circuit one after another as set forth, and a second spring also secured to the said arm at one end and having its free end portion arranged to bear on the ends of the contact-plate adjacent to the said roller.

In testimony whereof we affix our signatures, in presence of two witnesses.

J. WATKINSON.  
A. E. PAYNE.

Witnesses:

C. ERIC CLOUGH,  
SYDNEY R. TAYLOR.