

No. 846,691.

PATENTED MAR. 12, 1907.

G. E. PAINTER.
THERMAL CUT-OUT FOR ELECTRIC CIRCUITS.

APPLICATION FILED NOV. 13, 1906.

2 SHEETS—SHEET 1.

FIG. 1.

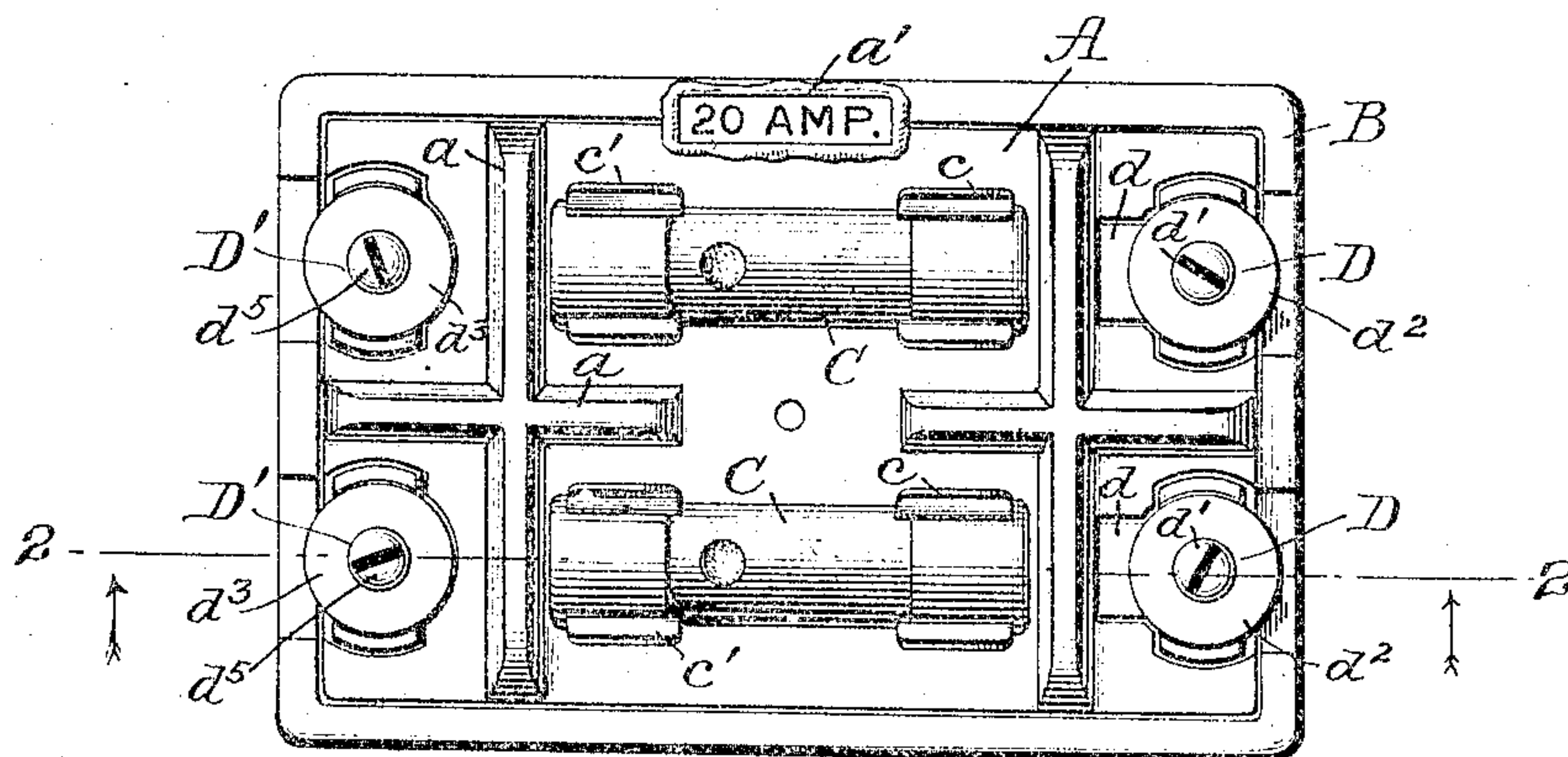


FIG. 2.

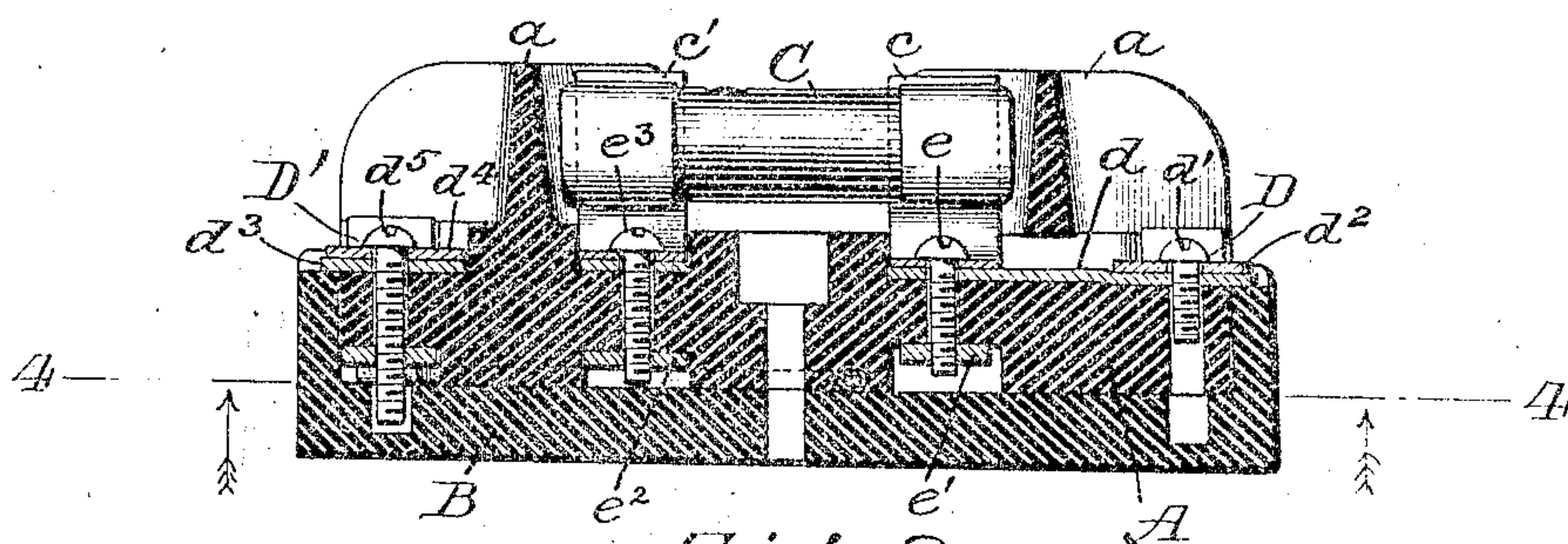
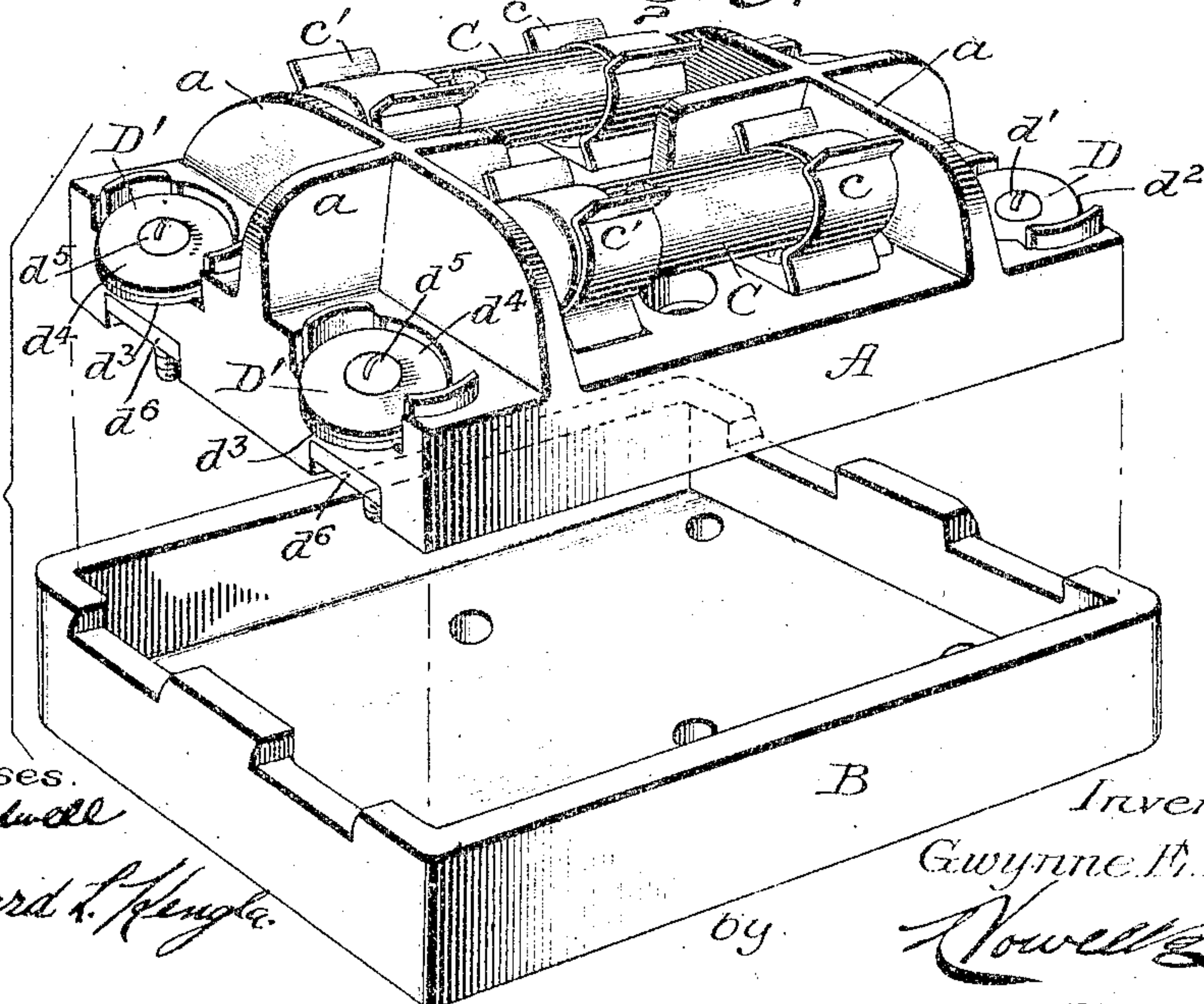


FIG. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

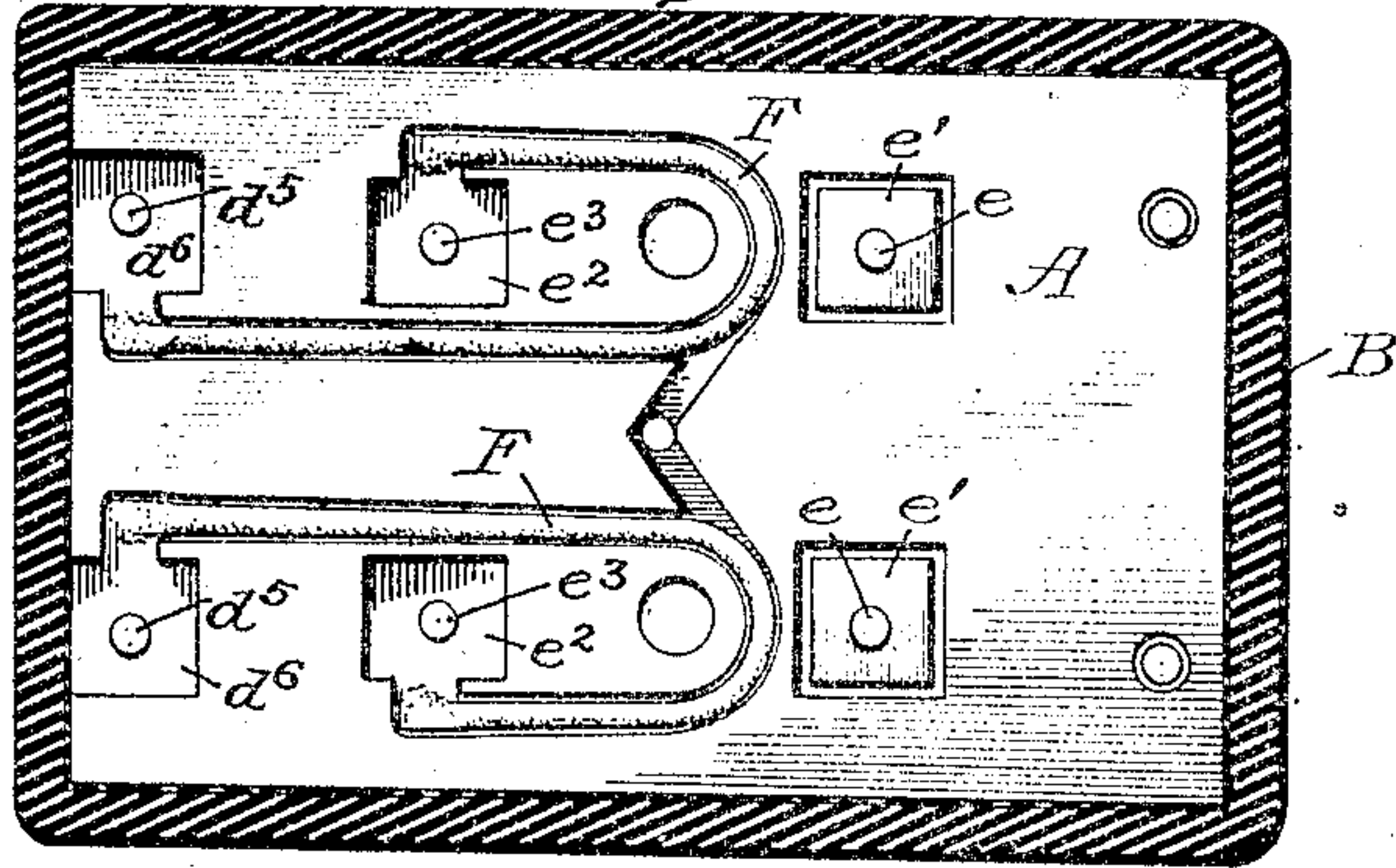


Fig. 7.

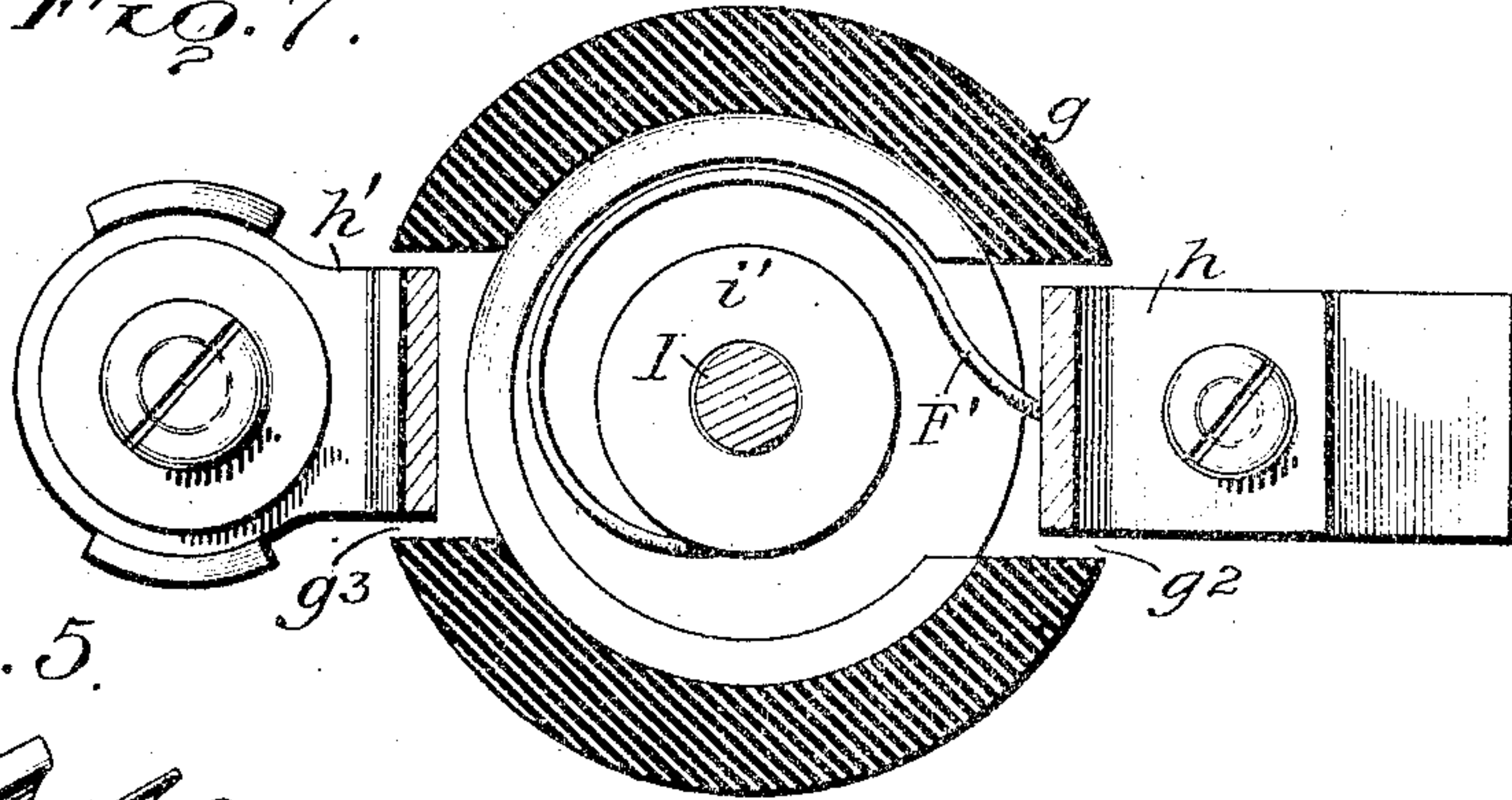


Fig. 5.

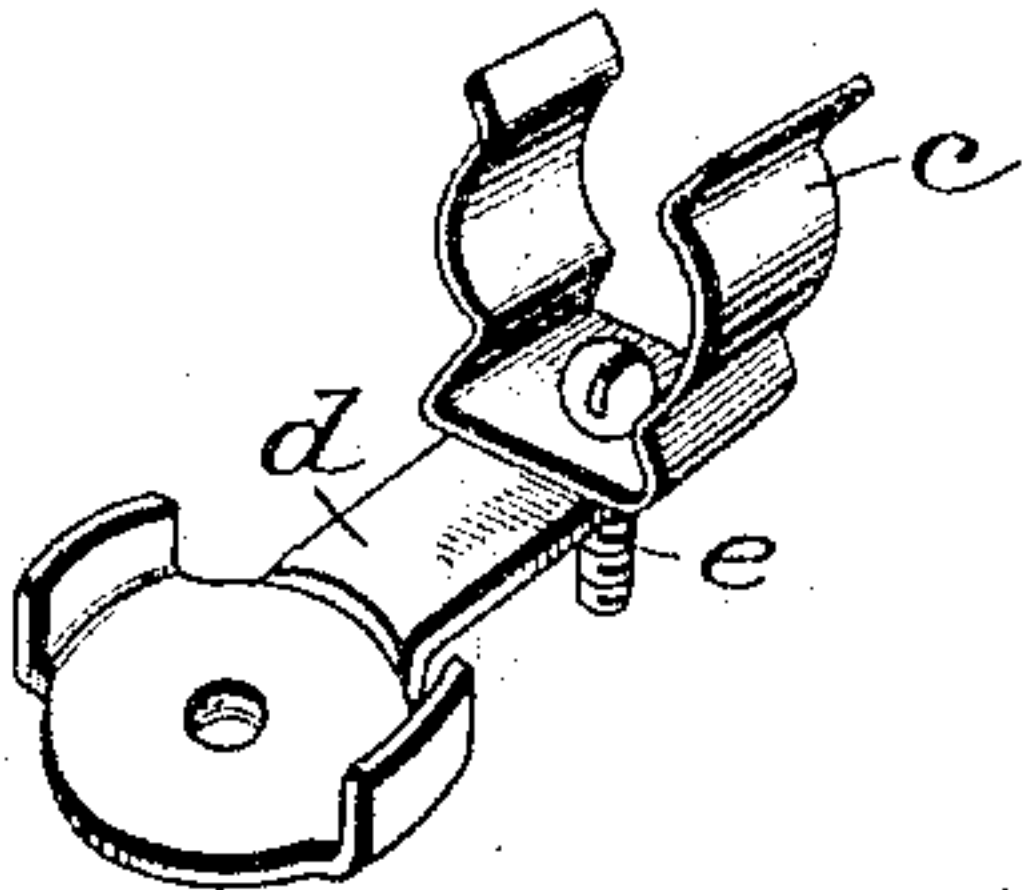
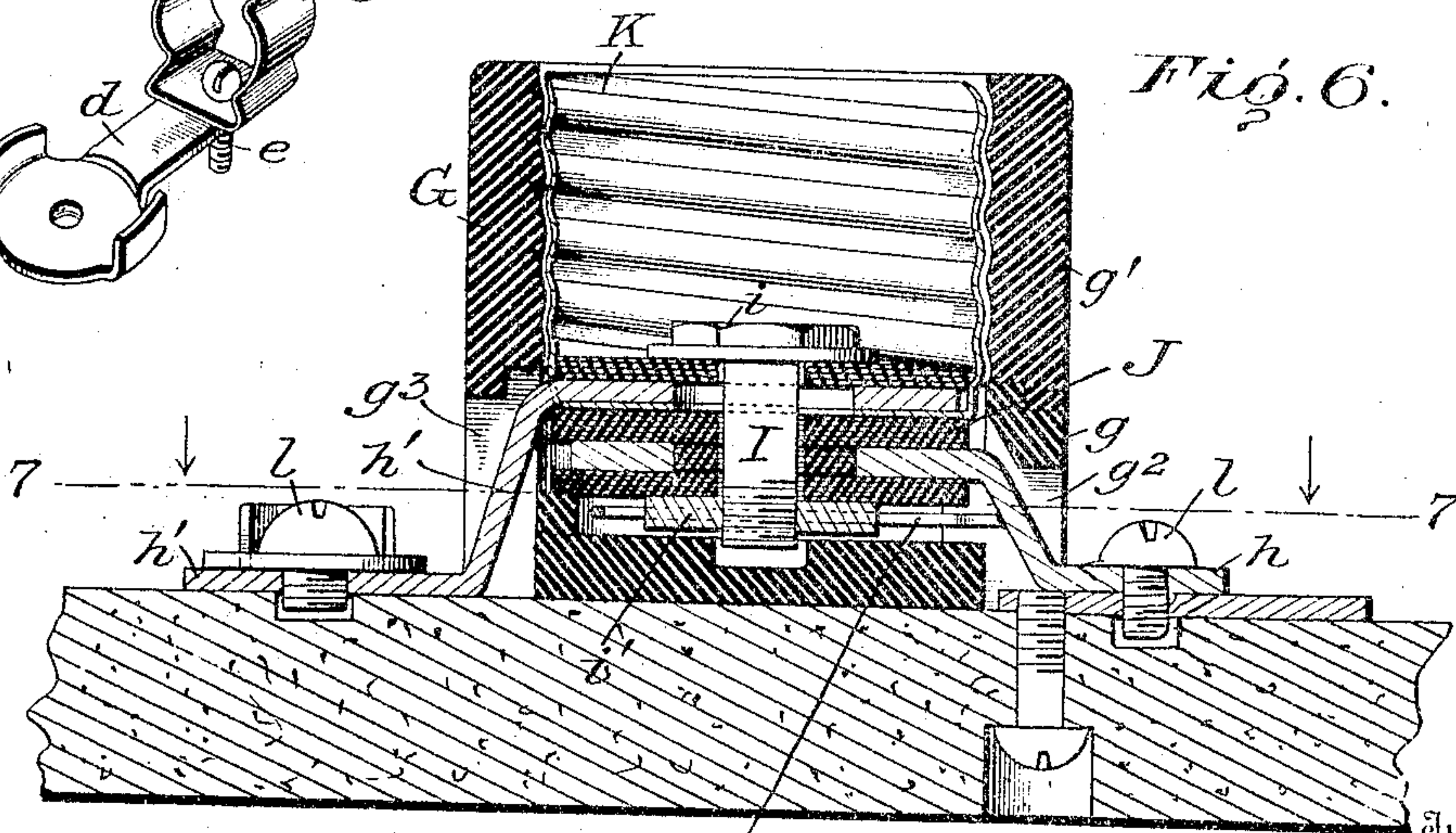


Fig. 6.



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UNITED STATES PATENT OFFICE.

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THERMAL CUT-OUT FOR ELECTRIC CIRCUITS.

No. 846,691.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed November 13, 1906. Serial No. 343,184.

To all whom it may concern:

Be it known that I, GWYNNE E. PAINTER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented new and useful Improvements in Thermal Cut-Outs for Electric Circuits, of which the following is a specification.

My invention relates to thermal cut-outs for electric circuits, the object being to provide means which will prevent a circuit from carrying more current than its designed capacity, even though the ordinary fuse with which electric circuits are usually provided be replaced by a fuse of greater carrying capacity or the fuse be bridged by a piece of wire, as is often done by persons desiring to avoid the necessity of replacing burned-out fuses.

Notwithstanding rigid inspection laws many fires result from fuses of too great carrying capacity which have either designedly or through ignorance been used to replace a burned-out fuse, and in many instances it has been found that fuses have been bridged by wire in such a manner as to avoid detection except by an electrical test of the circuit.

In order to more effectually limit the carrying capacity of a circuit, and thus afford better protection against fire, I provide the circuit with a "non-replaceable" fuse, which is preferably concealed from view and so sealed to prevent its removal from the circuit without detection. This non-replaceable fuse must not have a carrying capacity greater than the designed capacity of the circuit in which it is to be placed, and it is used in conjunction with a removable fuse of less carrying capacity, so that in case of a temporary overload the replaceable fuse will open the circuit without injury to the non-replaceable fuse. My non-replaceable fuse is designed to be used with any of the well-known forms of fuse now on the market and is perfectly inclosed in a casing or block which forms the support for the ordinary fuse.

In the accompanying drawings I have illustrated two embodiments of my invention; but it is to be understood that other forms of devices embodying the main features of my invention may be devised to suit particular requirements and that my invention is not limited to any particular form of fuse or to details of construction.

Referring to the drawings, Figure 1 is a plan view of a double-pole fuse-block provided with a non-replaceable fuse in accord-

ance with my invention. Fig. 2 is a vertical section thereof on line 2-2 of Fig. 1. Fig. 3 is a perspective view of the block with the base portion separated therefrom. Fig. 4 is a horizontal section taken on line 4-4 of Fig. 2, showing the back of the main section of the block with the non-replaceable fuses mounted thereon. Fig. 5 is a detail view of one of the spring-clips which holds the cartridge-fuse, and the terminal plate to which it is connected. Fig. 6 is a central vertical section of a socket designed for receiving a plug-fuse, said socket having a non-replaceable fuse secured therein; and Fig. 7 is a horizontal section taken on line 7-7 of Fig. 6.

The fuse-block illustrated in Figs. 1 to 4, inclusive, is preferably constructed of porcelain or some other fragile insulating material, and is made in two parts, or sections A and B, which are cemented or otherwise secured together. The part or section A constitutes the block proper, upon which the removable fuses C C and the terminals D D' are mounted, and said section is made to fit into the base or receiving section B, the latter serving as a cover for the non-replaceable fuses F F, which are mounted on the back of the block-section A. The block shown is of the double-pole type, adapted to removably support the two fuses C C, which may be any of the well-known cartridge-fuses. Said fuses C C are supported by means of spring-clips c c c' c' made in the usual form and mounted in the usual manner on the block-section A. The clips c c are each connected to a conducting-plate d by means of the screw or bolt e, which secures the clip to the block, said bolt passing through the base of the clip and through said plate d to the back of the block-section, where it is locked by a nut e', said nut occupying a recess in the back of the block-section, as clearly shown in Fig. 2. The conducting-plate d forms the terminal D of the block and is provided with a screw d' and washer d² for securing the circuit-wire thereto. The other terminal D' consists of a plate d³ and washer d⁴, which is secured to the block-section by means of a screw d⁵ and nut d⁶. Connection is made from the terminal plate d³ to the spring-clip c' by means of a fuse F, which in this instance consists of a piece of fusible wire having one end soldered or otherwise connected to the nut d⁶ and the other end connected in a similar manner to the nut e², which with the screw or bolt e³ hold the

spring-clip c' . The back of the block-section A is properly recessed to receive the fuses F and the nuts d^6 and e^2 , and as thus far described it will be seen that when the block is properly connected in an electric circuit current will pass from the terminal D' by way of the screw d^5 , to the fuse F and thence to the cartridge-fuse by way of the nut e^2 , screw e^3 , and spring-clip c' , through said cartridge-fuse to the clip c , and thence to the line-wire of the circuit through the terminal plate d . The fuse F, which I term the "non-replaceable" fuse, should be of such size and length as will carry a current equal to the designed capacity of the circuit in which it is to be placed and which will fuse when the current is increased beyond said designed carrying capacity. The removable fuse C should have a carrying capacity less than that of the fuse F, so that in case of a temporary overload the cartridge-fuse will burn out before any damage can be done to the fuse F.

If the removable or cartridge fuse C be replaced by another of greater carrying capacity or said fuse be bridged by a wire, the fuse F will operate to protect the circuit should the current be increased beyond the safety limit of the carrying-wires. The fuse F is rendered non-replaceable by the block-section B, made in the form of a receptacle, in which the block-section A is inserted. The two sections A and B are secured together by means of suitable cement, so as to render them practically inseparable, and being made of fragile material any attempt to separate them is liable to result in breakage of one or the other of said sections. When the fuse F burns out, the entire device must be replaced by another. Should either or both of the block-sections be broken, this would be evidence of an attempt to repair or replace the concealed fuse, in which case the inspector should require a new block to be inserted in the circuit.

I have provided the block-section A with projections or flanges a , which serve to separate the terminals D and D' from each other and from the removable fuses C C. These flanges are for the purpose of preventing the fuses from being bridged across the face of the block without showing the fact. Any wire which might be used to cut out the fuses would have to pass over or around the flanges a , and this could not be easily done without exposing the connection so that it can be readily detected by the inspector. The fuse-block should be marked in a manner to indicate the carrying capacity of the non-replaceable fuse, and this may be conveniently done by stamping the capacity on sealing-wax which may be placed over the joint between the two sections of the block, as shown at a' in Fig. 1.

In Figs. 6 and 7 I have illustrated a socket adapted to receive a plug-fuse. (Not shown.)

Said socket comprises a porcelain casing G, made in two sections g and g' . The base-section g is made in the form of a cup, having two openings or slots g^2 and g^3 at opposite sides thereof for portions of the terminal plates h and h' , which project through said slots and to which the terminal wires of the circuit are connected. The section g' of the casing is made to fit the upper edge of the cup-section g and is cemented or otherwise secured thereto to prevent separation without fracture. Within the cup-section g is a bolt I, having a head i at its upper end and a nut i' at its lower end, between which the two terminal plates h and h' are securely clamped, the bolt and plates being properly insulated from each other by means of mica or other insulating material J. Within the upper section g' of the casing is a screw-threaded cup K, adapted to receive the screw-threaded end of any of the well-known plug-fuses. (Not shown.) This cup K has its bottom clamped by the bolt I between the plate h' and the insulating material J, so that said cup is in electrical contact with the plate h' , but is insulated from the other metal parts of the device. Between the bottom of the casing-section g and the insulating material J is a piece of fusible wire F', having one end soldered or otherwise connected to the nut i' and its other end similarly connected to the terminal plate h , said fusible wire constituting the non-replaceable fuse.

In assembling the parts the terminal plates, insulating material, and the cup K are first secured together in proper relation by means of the bolt I and nut i' , after which the nut and bolt are soldered or locked together to prevent separation, and after the non-replaceable fuse is secured in place the whole is placed in the cup-section of the casing. It is to be noted that the slot g^3 in the cup-section of the casing opens through the edge of said section to receive that portion of the terminal plate h' which projects through said slot to the outside of the casing. After the parts have been properly placed in the cup-section of the casing the upper section g' is placed on top of the cup-section and cemented thereto, said upper section operating to close the slot g^3 of the lower section and prevent the removal of the metallic parts without fracturing the casing.

The terminal plates h h' are each provided with a screw l for connecting the device to the terminal wires of a circuit, and when properly connected current will pass from the terminal plate h to the fuse F' and thence through the nut i' and bolt I to the plug-fuse, (not shown,) thence through the metallic cup K to the terminal plate h' . In this form of device the fuses operate to protect the circuit in the manner heretofore described.

Other embodiments of my invention will

readily suggest themselves to those skilled in the art, the two devices illustrated being deemed sufficient for the purposes of this specification. I believe I am the first to protect a circuit by means of two fuses having different carrying capacities, the fuse of greater carrying capacity being so sealed as to prevent its removal from the circuit without showing the fact, and I do not intend to limit my invention to the particular arrangement of the fuses or to the manner in which they may be connected in the circuit.

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

1. Means for protecting an electric circuit comprising two fuses of different carrying capacities connected in series, and a fuse-block in which the fuse of greater carrying capacity is sealed against removal without detection.

2. A device for protecting an electric circuit comprising a fuse-block two series-connected fuses of different carrying capacities, means carried by said fuse-block for removably supporting the fuse of lesser carrying capacity, and means for sealing the fuse of greater carrying capacity to prevent its removal from said block without detection.

3. A fuse-block of fragile insulating material provided with suitable binding-posts for connecting it in an electric circuit, a fuse carried by said block, said fuse being sealed

against removal therefrom without fracturing said block.

4. A fuse-holder provided with means for removably supporting an electric fuse and having a fuse sealed in said holder and connected in series with said fuse-supporting means.

5. A device for protecting electric circuits comprising a fuse, a casing therefor composed of fragile material sealed against access, means for removably supporting a second fuse, and suitable connections between said means and said sealed fuse, for the purpose specified.

6. A device for protecting an electric circuit comprising a fuse, a two-part casing inclosing said fuse, said casing being sealed against access, and means for removably supporting a second fuse, said means being connected in series with said inclosed fuse.

7. An electric fuse-support comprising a sealed casing of fragile insulating material, a fuse inclosed therein, and means secured to the outside of said casing for removably supporting a fuse said means being connected in series with the first-mentioned fuse.

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

GWYNNE E. PAINTER.

Witnesses:

CHARLES W. NEWTON,
W. F. ACKERMAN.