

No. 623,120.

Patented Apr. 11, 1899.

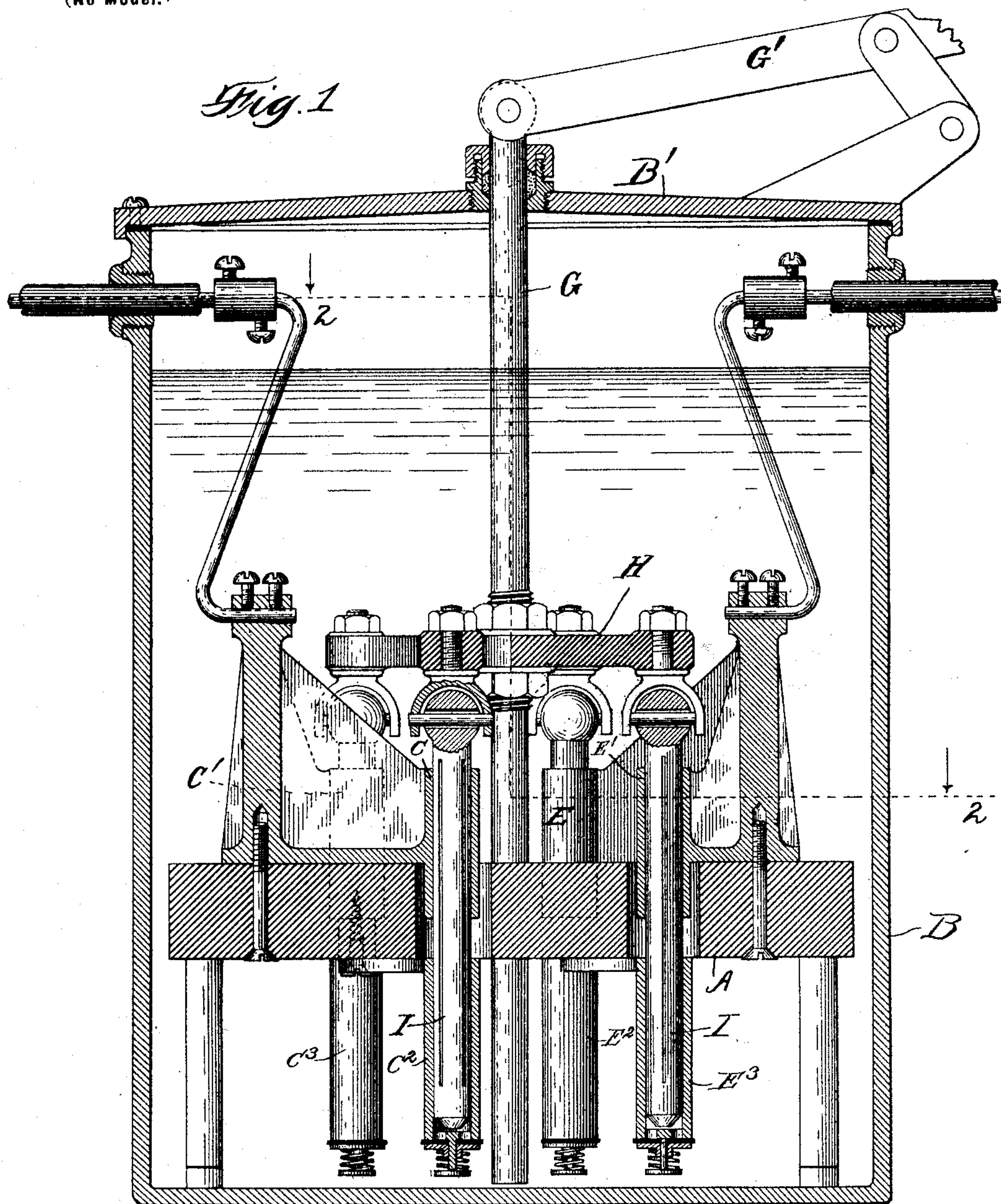
J. CLOOS.

SWITCHING APPARATUS AND METHOD OF COUNTERACTING ARCS.

(Application filed Feb. 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

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2 Sheets—Sheet 2.

Fig. 2.

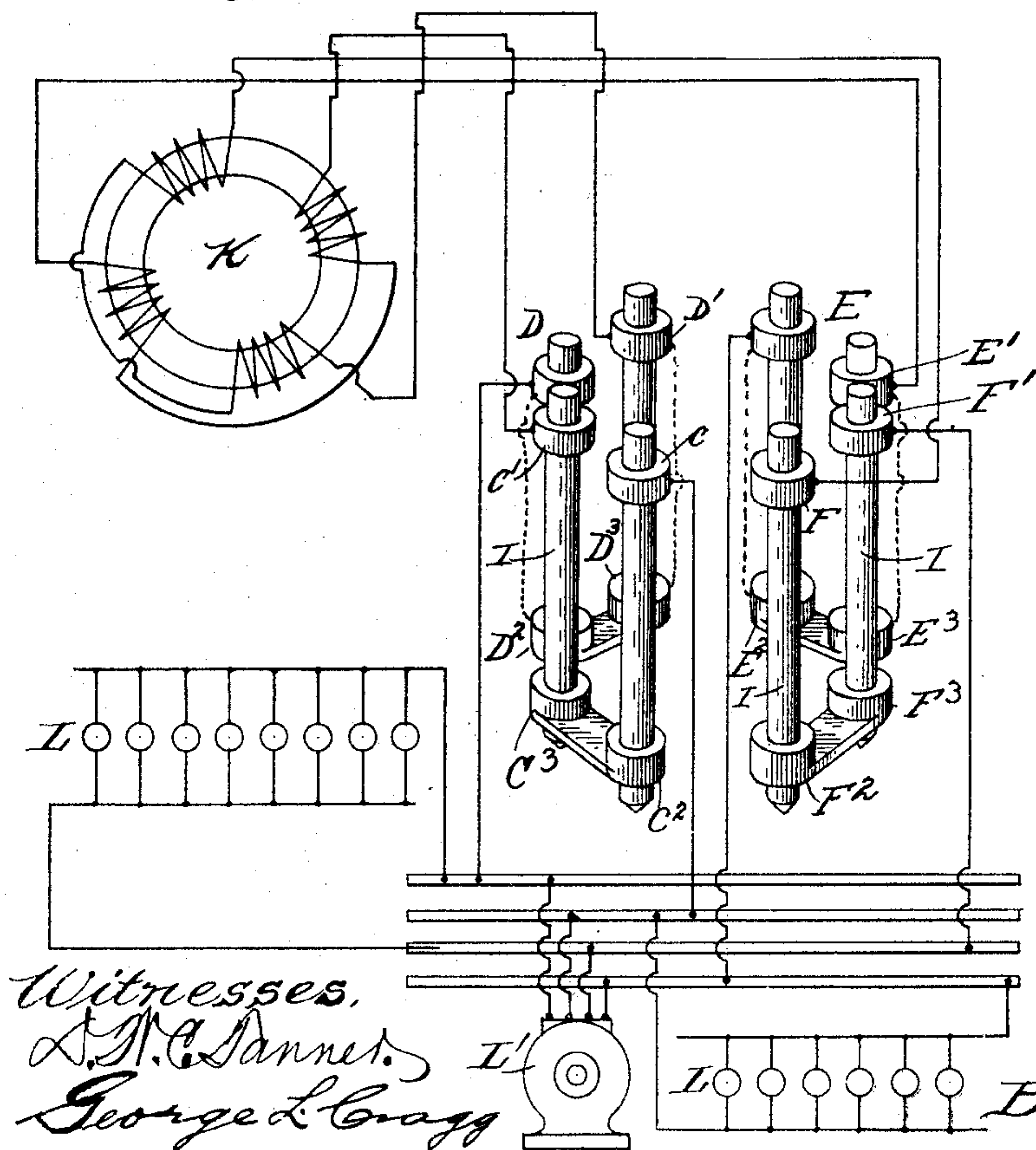
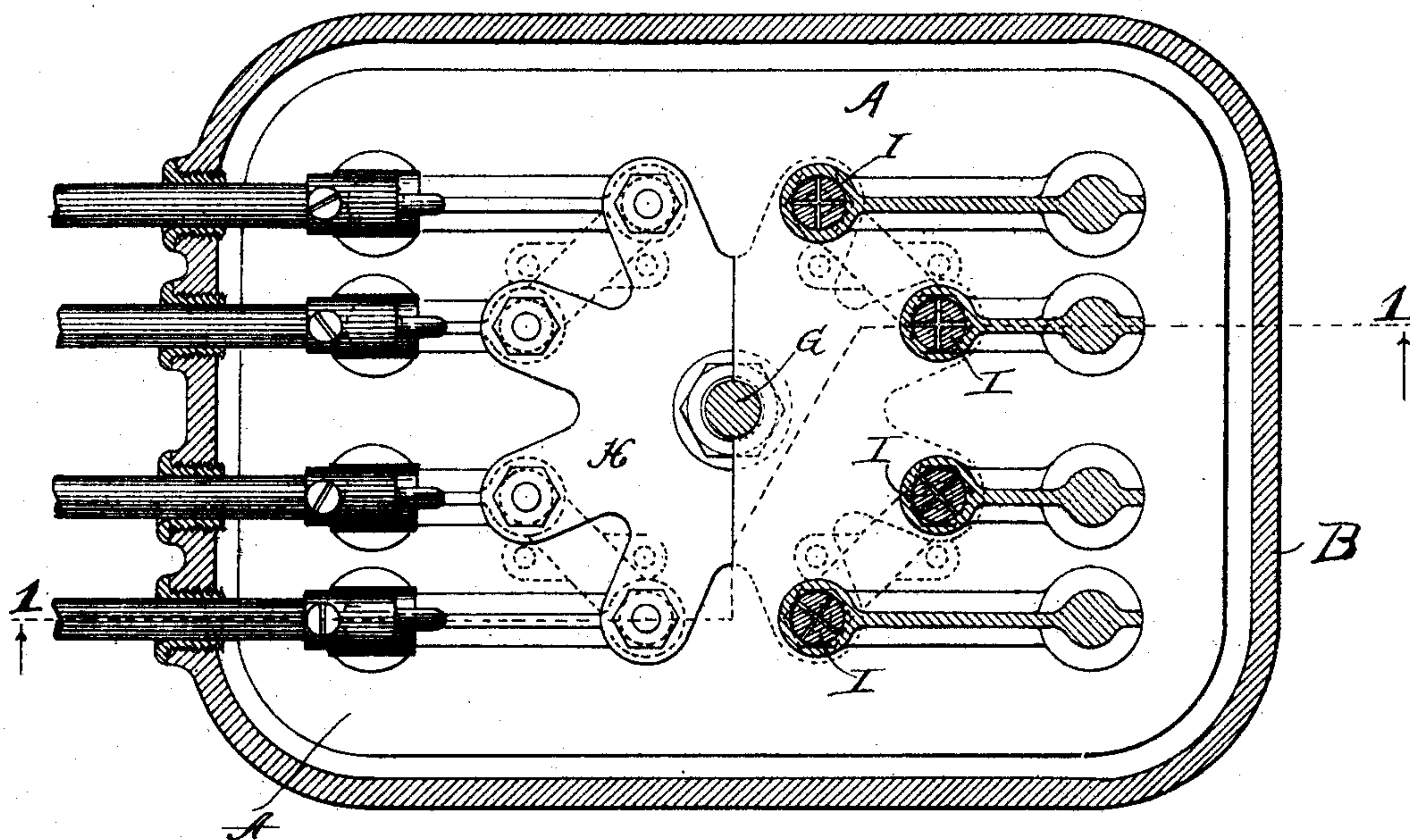


Fig. 3.

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UNITED STATES PATENT OFFICE.

JACOB CLOOS, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE CLOOS ELECTRICAL ENGINEERING COMPANY, OF SAME PLACE.

SWITCHING APPARATUS AND METHOD OF COUNTERACTING ARCS.

SPECIFICATION forming part of Letters Patent No. 623,120, dated April 11, 1899.

Application filed February 7, 1898. Serial No. 669,296. (No model.)

To all whom it may concern:

Be it known that I, JACOB CLOOS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Switching Apparatus and Method of Counteracting Arcs, (Case No. 4,) of which the following is a full, clear, concise, and exact description.

My invention relates to controlling-circuits and a method of extinguishing or counteracting arcs between contact parts.

The apparatus of the invention is primarily designed for use in controlling the distribution of multiphase currents, although it may be employed in other connections.

The invention has for its object the improvement in the construction of electric switches to secure a more perfect operation thereof and to prevent injury to the parts of the switch and the apparatus that may be associated therewith.

Generally speaking, in the preferred embodiment of the invention I employ a reciprocating support for switch parts and contact mechanism associated therewith, the apparatus being preferably disposed within a box containing oil in sufficient quantity to immerse the portions of the contact parts that are initially engaged with each other.

More specifically, the preferred embodiment of the invention consists in a reciprocating support upon which a plurality of plugs are preferably flexibly connected, a base upon which aligned thimbles are mounted, and a box containing the entire apparatus in which oil is preferably disposed for preventing injury between the contact members of the switch.

I also preferably provide means for producing a vacuum upon breaking engagement between contact parts, the oil or other suitable fluid being drawn into the vacuum as the contact parts separate, whereby arcs are prevented or extinguished.

It is desirable in controlling the distribution of multiphase currents that all of the circuits conveying these currents be broken and completed simultaneously in controlling their distribution. To this end I so relatively dispose and proportion the plugs and thimbles

that the various transmission-conductors including the same are simultaneously completed or broken. In order that the plugs may readily accommodate themselves to any irregularities in the engaging portions of the thimbles, I preferably flexibly mount the same upon their common support, as by pivotal or universal joints.

In order that my invention may be more fully understood, I will explain the same by reference to the accompanying drawings, illustrating the preferred embodiment thereof, in which—

Figure 1 is a sectional elevation of my improved apparatus on line 1 1 of Fig. 2. Fig. 2 is a sectional plan view thereof on line 2 2 of Fig. 1. Fig. 3 is a diagrammatic view showing the switch as associated with a system of distribution.

Like letters indicate like parts throughout the different figures.

The insulating-base A is mounted within a containing-box B, preferably hermetically sealed. The base supports thimbles or equivalent contact portions C C' D D' E E' F F' upon its upper face and thimbles C² C³ D² D³ E² E³ F² F³ upon its lower face. In the particular form of switch shown the thimbles C² C³, D² D³, E² E³, and F² F³ are electrically connected in pairs, as shown most clearly in Fig. 3, said thimbles being aligned respectively with thimbles C C', D D', E E', and F F'. The thimbles are preferably elongated, as shown. The base is provided with holes where the thimbles are disposed, which serve to freely admit oil to the working parts. The thimbles upon the upper face of the base are provided with suitable stems with which the circuit-conductors are connected. A vertically-reciprocating rod G extends through a stuffing-box in the cover B', suitable lever mechanism G' being provided for actuating said rod. A support H of insulating material is secured at an intermediate portion of the rod G, said rod passing through a hole in the base A, serving to guide the rod G in a rectilinear path. Plugs I I are flexibly suspended from the support H, preferably in the manner shown in Fig. 1. These plugs are preferably provided with longitudinal slits to cause the same to have spring-like engagement with

the thimbles. When the circuits are to be opened, the plugs are elevated to bring the same out of engagement with the lower thimbles, but not enough to disengage the same from the upper thimbles. The plugs thus constitute circuit-terminals.

Referring more particularly to Figs. 1 and 3, the switch in the form illustrated is especially adapted for use in controlling a plurality of circuits which convey multiphase currents. A generator K of biphasic current is illustrated. The thimbles and plugs are preferably so relatively disposed and proportioned that the conductors will be simultaneously opened or closed by the switch when operated.

The circuits may be readily traced by an inspection of Fig. 3, dotted lines being employed to illustrate the path afforded for current by the plugs where said plugs are obscured by other portions of the diagram. Translating devices, as lamps L and a motor L', are connected with the circuits.

The oil in the box serves to obviate or extinguish arcs. To reinforce this action of the oil, I preferably employ the construction shown in Fig. 3. The lower ends of the thimbles are perforated, leather-faced caps being preferably employed for normally sealing these perforations, springs being provided to normally maintain the caps or valves in a closed position.

The plugs snugly fit the interior boxes of the thimbles. As the plugs are elevated a vacuum is created in each thimble. As the plugs are removed from engagement with the thimbles oil rushes in at the top opening of each thimble to fill the vacuum therein, whereby arcing between the plugs and thimbles is most thoroughly counteracted.

While I have herein shown and particularly described the preferred embodiment of my invention, it is obvious that modifications may be readily made without departing from the spirit of the invention, and I do not therefore desire to be limited to the precise construction shown; but,

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

1. In a switch, the combination with a terminal-thimble, of a terminal-plug filling the bore of the thimble, and a valve in the thimble adapted to coact with the plug to produce a vacuum or partial vacuum in the thimble upon the withdrawal of the plug, to cause

the admission of fluid between the thimble and plug, substantially as described.

2. In an electric switch, the combination with a thimble, of a plug and a valve cooperating with the plug and thimble for the production of a vacuum between the switch-contacts, substantially as described.

3. In an electric switch, the combination with a thimble, of a terminal-plug, and a valve cooperating with said plug for the production of a vacuum in the thimble to cause the admission of fluid between the thimble and plug, substantially as described.

4. In an electric switch, the combination with a support, of a plurality of contact-plugs, each having a flexible connection with said support, each flexible connection being independent of the other, and a plurality of thimbles adapted for engagement with said plugs, said plugs and thimbles being relatively movable, the plugs by reason of their flexible connection with said support being movable toward or from each other, whereby the plugs may accommodate themselves to their thimbles independently of each other, substantially as described.

5. In an electric switch, the combination with one switch member comprising a plurality of contact portions in the form of plugs, of a second switch member comprising a plurality of contact portions in the form of thimbles, a support for the plugs, and a support for the thimbles, the contact portions of one member of the switch each having a flexible connection with its support, whereby the thimbles and plugs may be readily engaged with each other, substantially as described.

6. In an electric switch, the combination with a plug, of means controlled thereby for producing a vacuum or partial vacuum and a supply of insulating liquid, whereby arcs may be extinguished or prevented, substantially as described.

7. In a device for extinguishing or preventing arcs between contact-points, the combination with a supply of insulating liquid, of means for causing a vacuum or partial vacuum to effect a flow of said fluid between contact-points, substantially as described.

In witness whereof I hereunto subscribe my name this 31st day of January, A. D. 1898.

JACOB CLOOS.

Witnesses:

PAUL D. CARPENTER,
JULIA FAY SEAMANS.