(No Model.) 3 Sheets—Sheet 1.

L. DAFT.

ELECTRIC SWITCH.

No. 322,915. Patented July 28, 1885.

Figure 1.

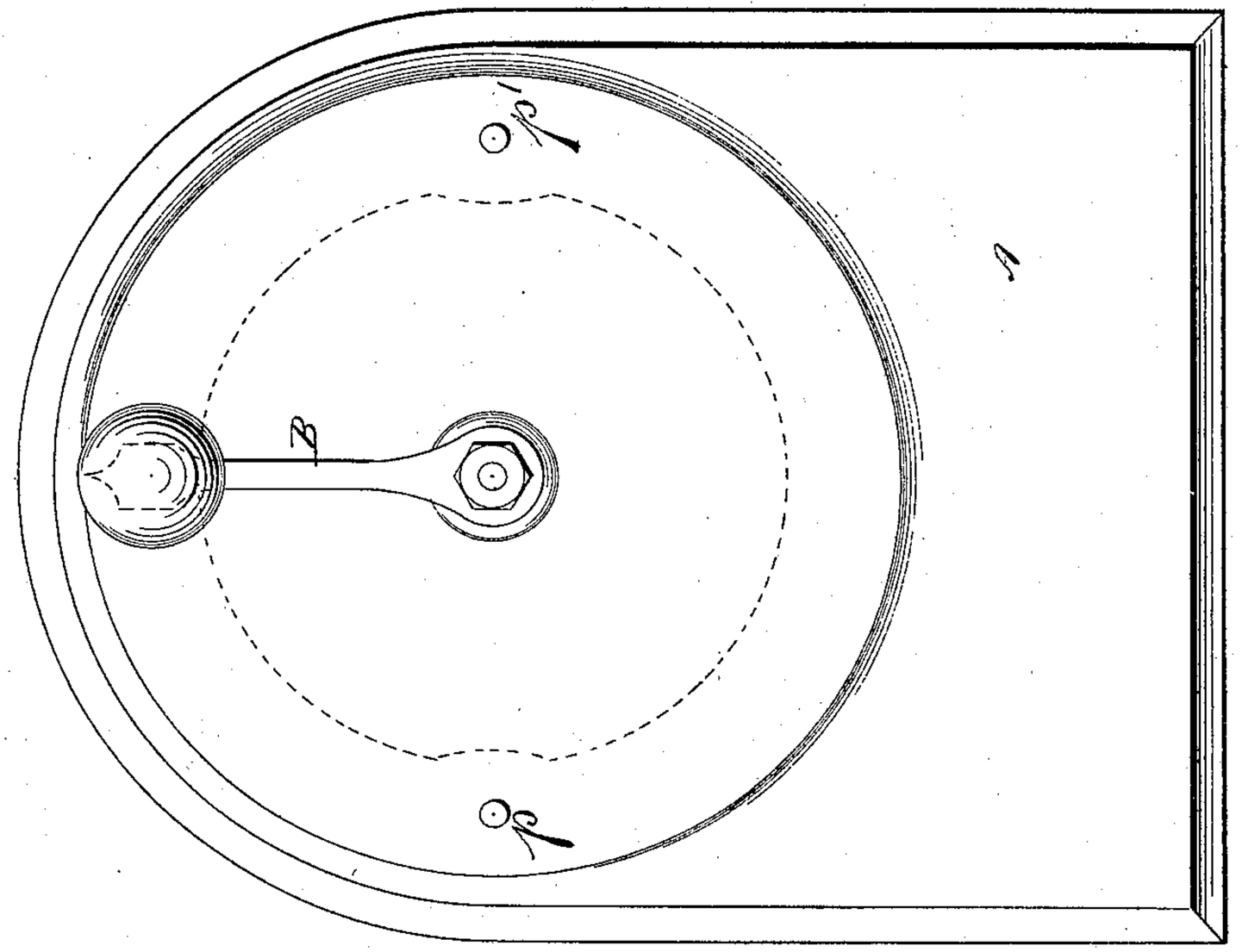
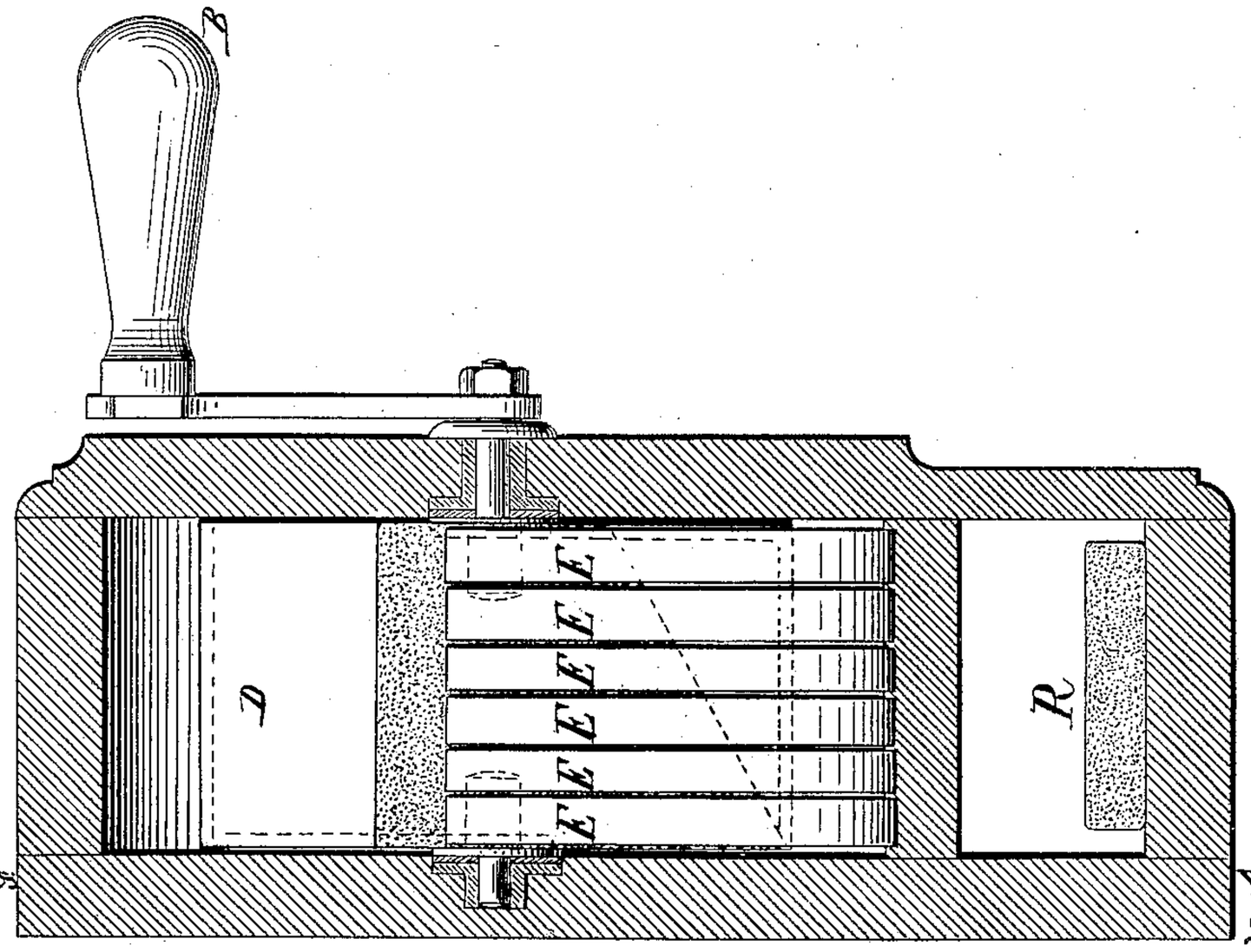


Figure 2.



Witnesses:
Wm. F. Jayers.
M. W. Blumenberg.

Inventor:
Leo Daft,
By his attorneys
Foster & Freeman

(No Model.) 3 Sheets—Sheet 2.

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Figure 3.

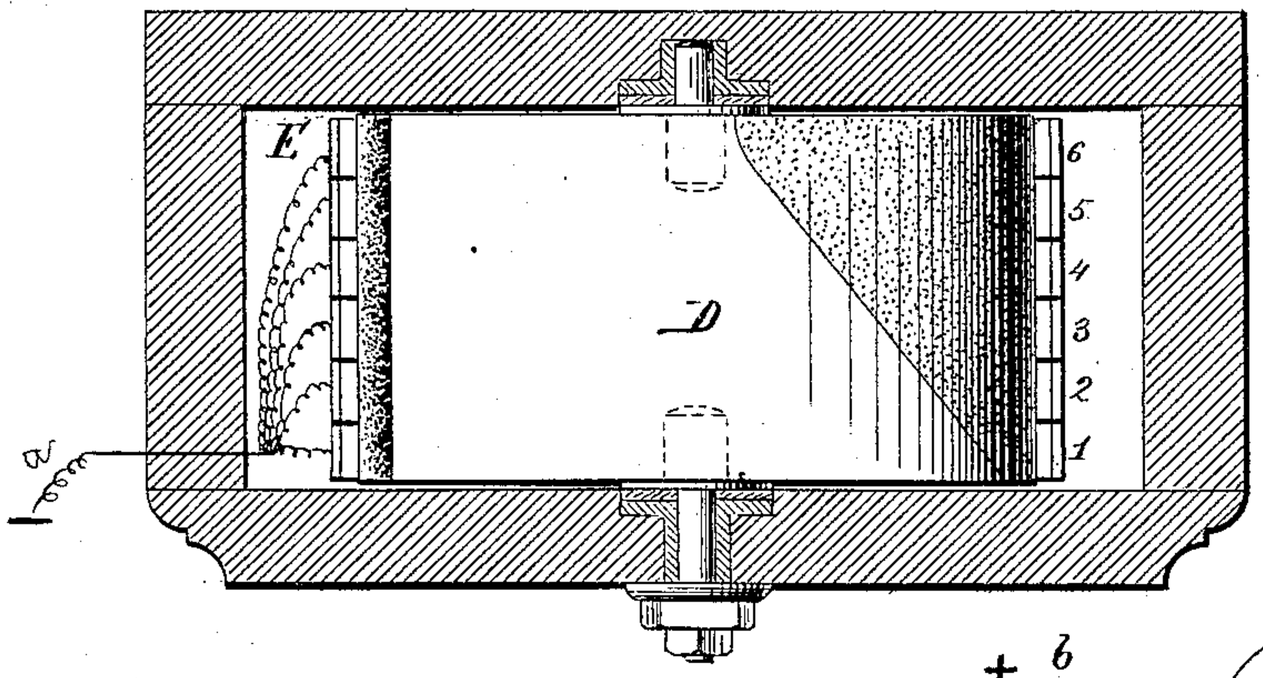
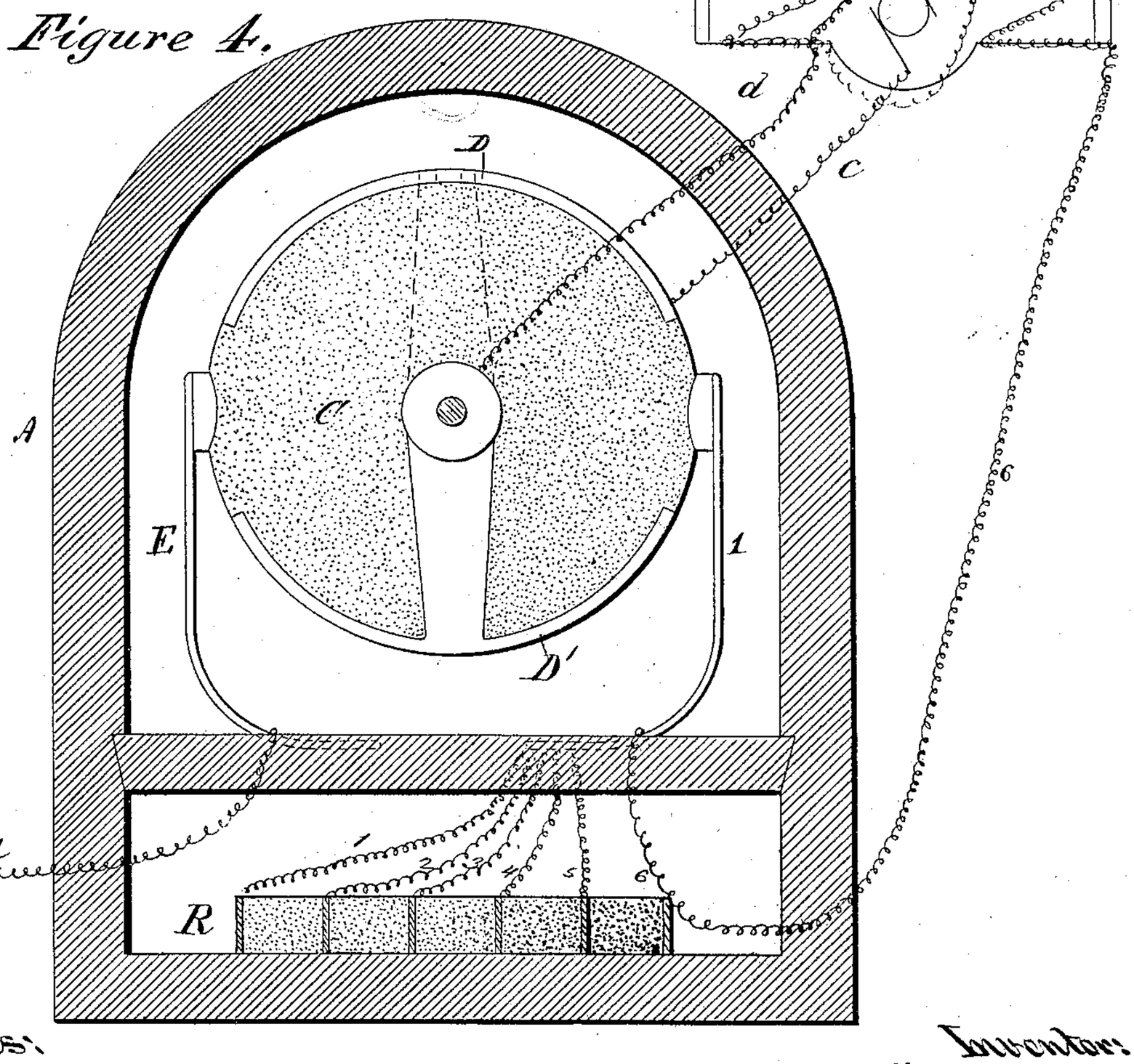


Figure 4.



Witnesses:
Wm. F. Sayers.
M. D. Blumenberg

Inventor:
Leo Daft,
By his attorney
Foster Freeman

(No Model.) 3 Sheets—Sheet 3.

L. DAFT.

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Figure 5.

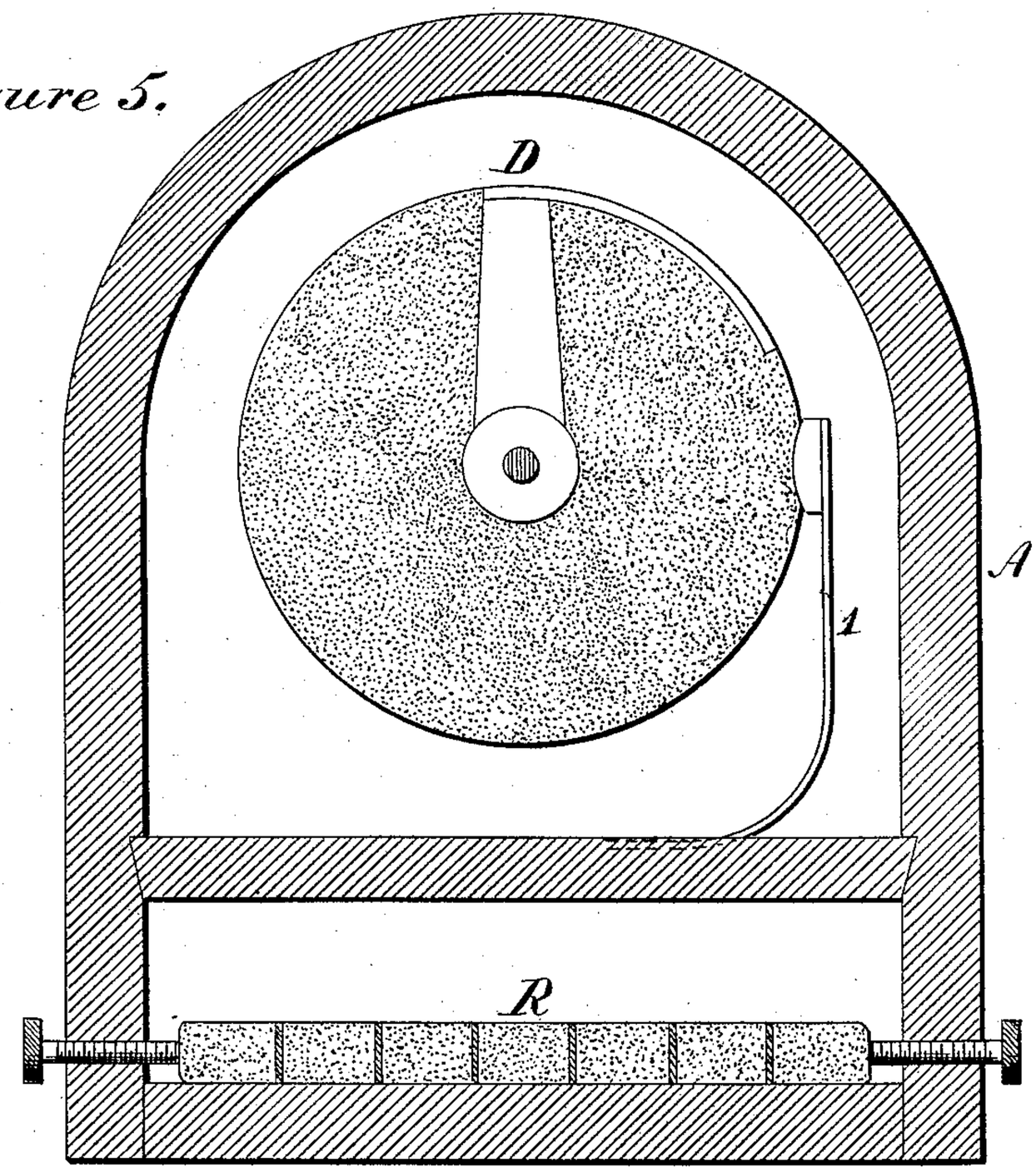

Figure 6.

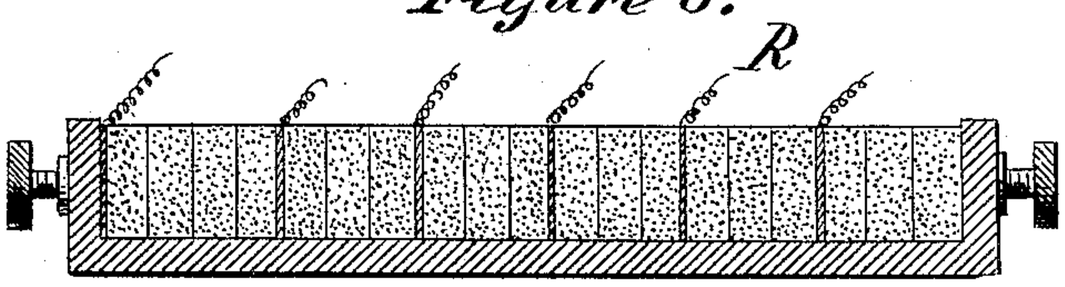

Figure 7.

Witnesses:
Wm. F. Sayers.
Wm. C. Blumenberg

Inventor:
Leo Daft
By his attorneys
Foster & Freeman

UNITED STATES PATENT OFFICE.

LEO DAFT, OF GREENVILLE, NEW JERSEY.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 322,915, dated July 28, 1885.

Application filed March 9, 1885. (No model.)

To all whom it may concern:

Be it known that I, LEO DAFT, a subject of the Queen of Great Britain, residing at Greenville, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Electric Switches, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

The object of my invention is to provide a switch for electric motors and electric-light currents which shall be capable of reversing the current quickly and readily, and at the same time occasion a comparatively gradual weakening of the current to the point of actual cutting off, so as to prevent shock being communicated to any person holding both line wires or rails from secondary discharge. This result I accomplish by gradually throwing in a resistance to the point of cutting out the current altogether, and gradually removing the same when the current is to be thrown out.

My invention will be readily understood from the accompanying drawings, in which Figure 1 represents an external elevation of my improved switch; Fig. 2, a vertical section through the case, showing a perspective view of part of my contrivance; Fig. 3, a plan and perspective view of the apparatus with the case broken away; Fig. 4, a vertical section through Fig. 1; Fig. 5, a view of a modification of my apparatus where reversal of the current is not desired; Fig. 6, a detail view of the method of arranging my resistances; Fig. 7, a view of a condenser, which I may use under certain circumstances.

My switch consists, generally, of a cylinder, C, provided with symmetrical plates D D′, above and below. On the left of the apparatus, as shown in Fig. 3, these plates have a straight edge, and on the right the edge presented to the conducting-switches, to be described, is angular, although, if preferred, both edges might be made angular. The spring or springs E are provided on the left of the apparatus, which normally rest on the insulating-surface of the switch between the plates D D′, as shown in Fig. 4. On the right six springs, 1 2 3 4 5 6, are shown, which normally rest upon the insulating material. In the base of the box, or any other convenient location, is arranged a rheostat or series of resistances, R. As shown, the said rheostat is represented as a carbon rheostat; but other suitable structures might be employed. A laminated carbon rheostat may be employed composed of a number of pieces of carbon plate having at intervals conducting-surfaces inserted so as to get practically a carbon rheostat of varying resistance, such variations to be determined at will according to the number of laminæ interposed between each conducting-surface. In some cases I prefer to use a solid cake of carbon or other suitable material, into which are placed in process of manufacture such conducting-surfaces, which I vary in superficial area according to the degree of resistance which I wish to employ. Suitable pigments having a low degree of conductivity may be used for this purpose; but I preferably employ compounds of carbon with silicate of magnesia for the higher resistance, and a compound of carbon and the golden sulphuret of antimony for lower resistances, and I vary these compounds according to the character of the current which I am employing.

By referring to Fig. 6 it will be observed that the laminated carbon resistances are arranged in a frame-work with adjustable screws at either end, so as to permit of a varying pressure being put upon the plates. The object of this is to admit of an almost infinite variation of resistance in the same rheostat by varying the pressure.

The method of connecting up my reversing-switch will be readily understood from Fig. 4. Supposing M to represent a motor the movement of which it is desired to reverse, and that the current to be reversed is received on the wires *a* and *b*, we will assume that the crank D, controlling cylindrical-switch E, is turned to stop pin *p*. (Shown in Fig. 1.) The spring E will then be in contact with the plate D, and the springs 1 2 3 4 5 6 will be upon the plate D′. These springs are connected in succession with the conductors interposed in the rheostat R, as plainly shown in Fig. 4. One of the brushes of the motor is connected by wire C to the plate D, and the other by wire *d* to plate D′. The last wire

thus connected with spring 6 is connected with one of the terminals of the field-of-force magnets. Now, as the handle D is swung upward, the spring 6 will pass upon the insulating surface, when the current will be compelled to travel through the last section of the rheostat, and thence by wire 5 to spring 5, bearing upon the plate D′. As the motion continues the sections of the rheostat will be one after the other thrown into circuit, increasing the resistance until the last spring, 1, leaves the conducting-plate D′. If entire absence of all residual discharge is required, an ordinary condenser—such as is shown in Fig. 7—may be connected between the wires *a* and *b;* but in most cases this is unneccessary. As the crank B is continued to be swung toward the stop P′, the spring 1 will press upon the angular surface of D, and the motion of the motor M will be thereby reversed, the relation of the brushes to the current having been reversed in the switch. As the motion of the crank D continues, one after the other of the sections of the rheostat R will be thrown out, until the spring 6, connected with the wire 6, bears upon the plate D, when all artificial resistance will be removed from the circuit.

In Fig. 5 the same arrangement is shown applicable to a switch, which is used where it is not desired to reverse the circuit. A single plate, D, and a single set of springs will only be required in this instance.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a cylindrical switch, provided with an angular conducting-plate embedded in insulating material, with a series of springs connected to successive sections of a resistance-coil, and adapted to be successively brought in contact with the angular edge of the conducting-plate, thereby gradually increasing or decreasing the resistance of the circuit, substantially as described.

2. The combination of a reversing-switch, having contact-plates and a series of springs arranged to connect therewith, a series of resistances, and the connection shown, whereby the current may be reversed in the switch, and the series of resistances simultaneously thrown into or out of circuit, thereby accomplishing the double result of reversing the current and avoiding secondary discharge, substantially as described.

3. The combination of the reversing-switch C, provided with angular plates D D′, with a series of springs adapted to bear against said plates and connected in succession to a series of resistances for the purpose of reversing the current and preventing secondary discharge, substantially as described.

4. The combination of the switch C, provided with plate D, and the series of springs, 1 2 3 4 5 6, with an adjustable rheostat connected to said springs, substantially as described.

LEO DAFT.

Witnesses:
GEO. H. EVANS,
WM. A. POLLOCK.