

No. 691,739.

Patented Jan. 28, 1902.

E. BATAULT.
ELECTRICAL COMMUTATOR.

(Application filed Aug. 9, 1900.)

(No Model.)

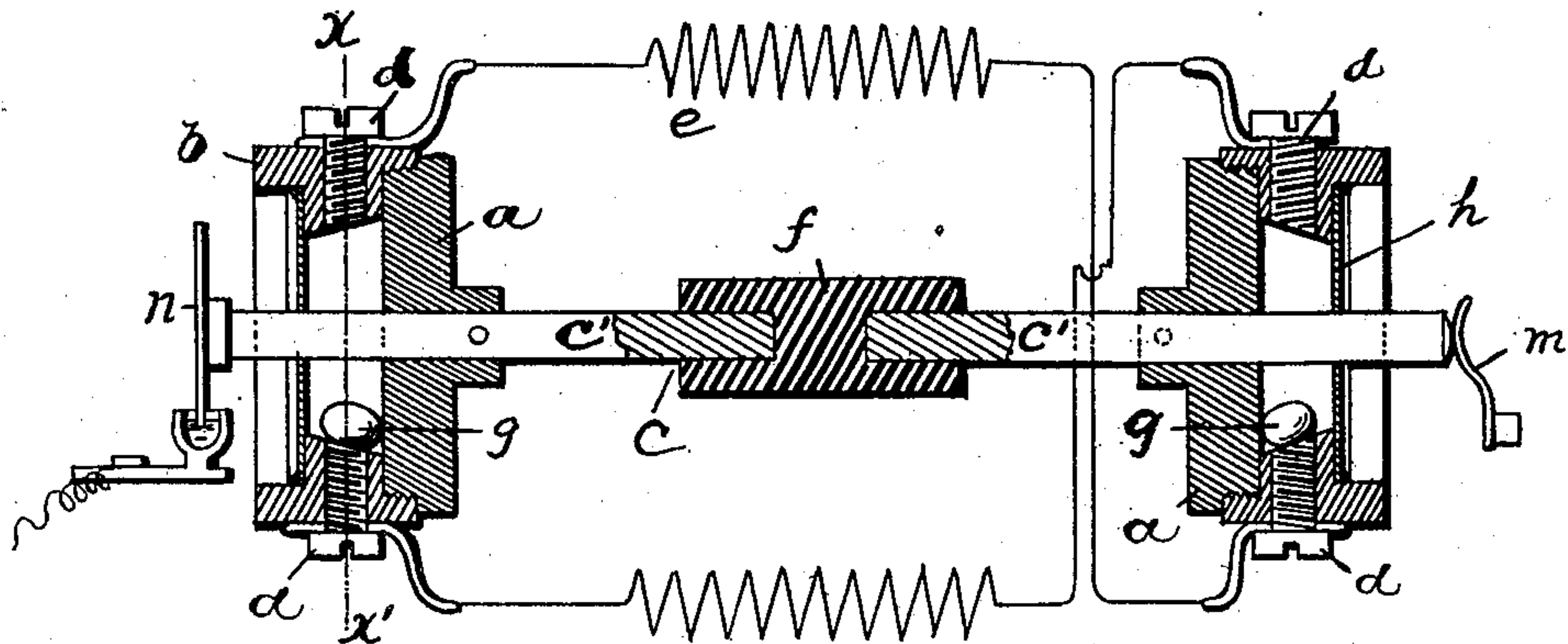


Fig. 1.

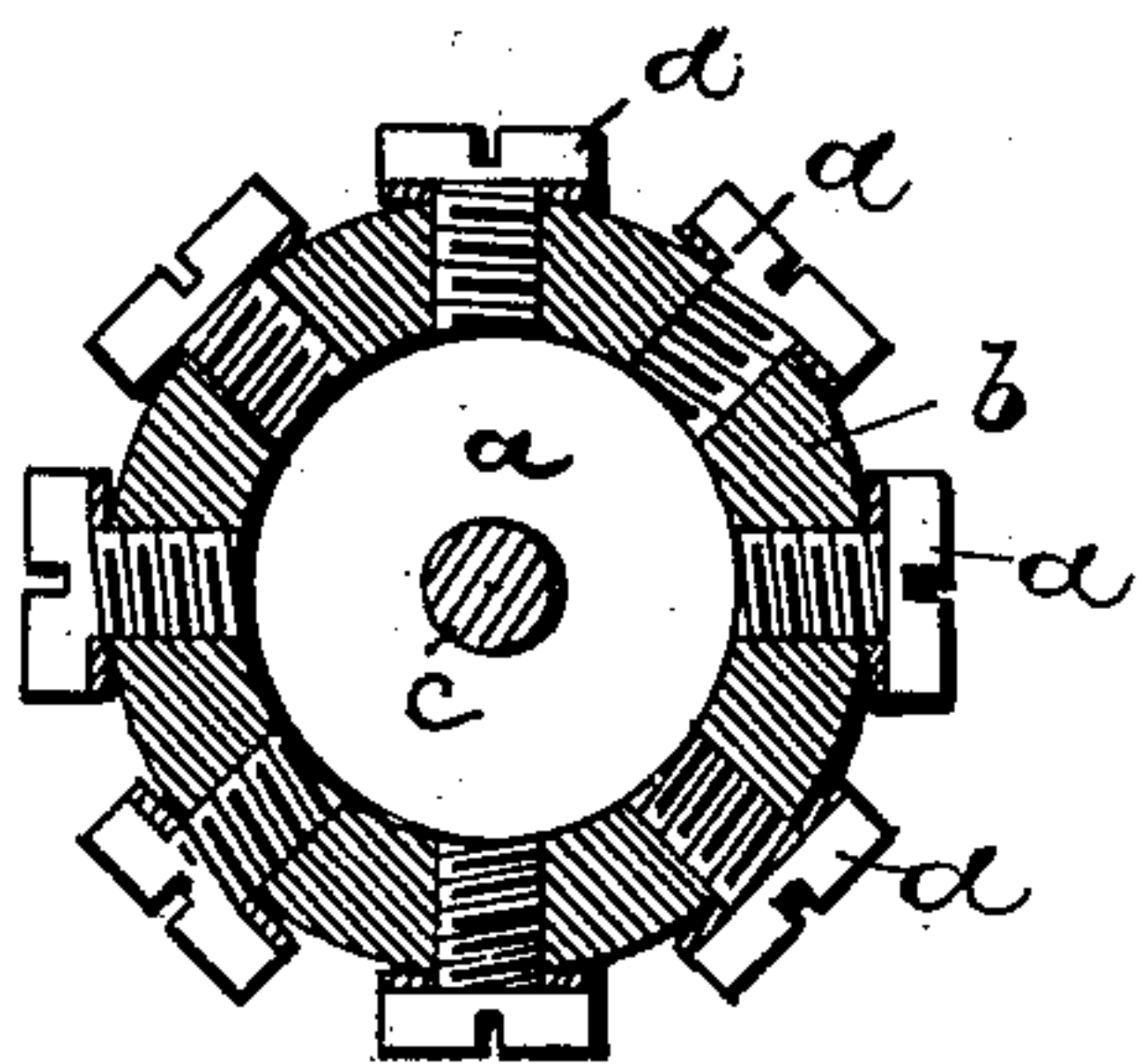


Fig. 2.

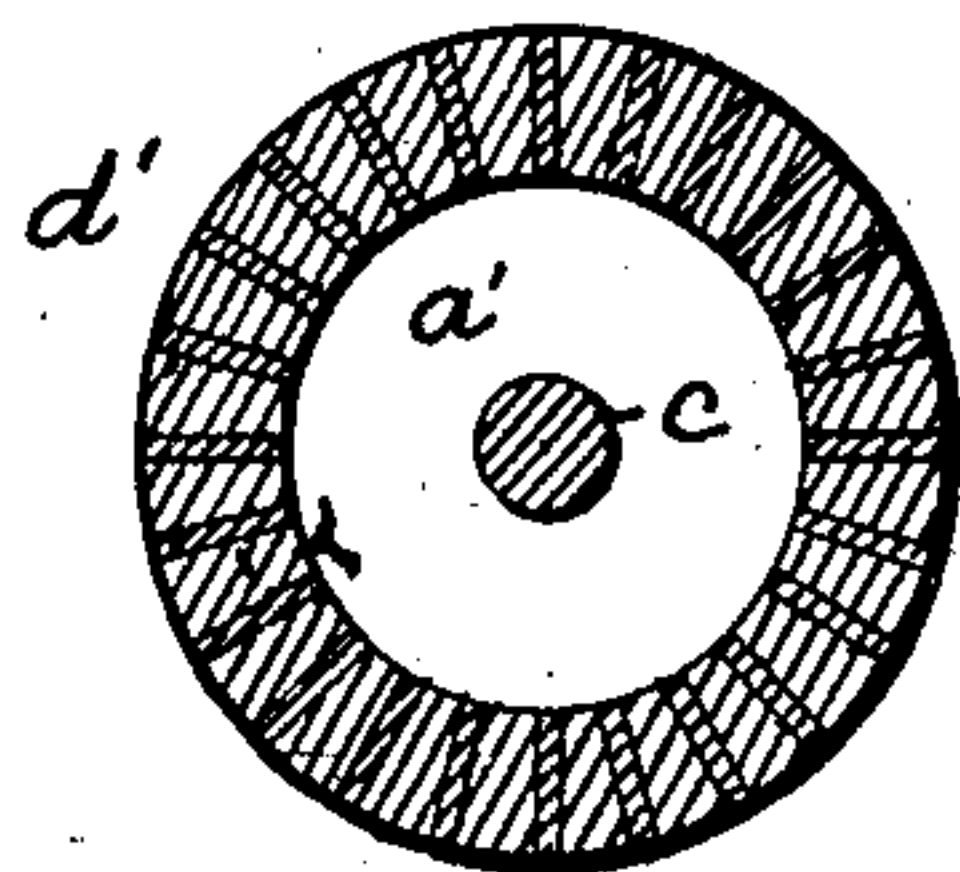


Fig. 4.

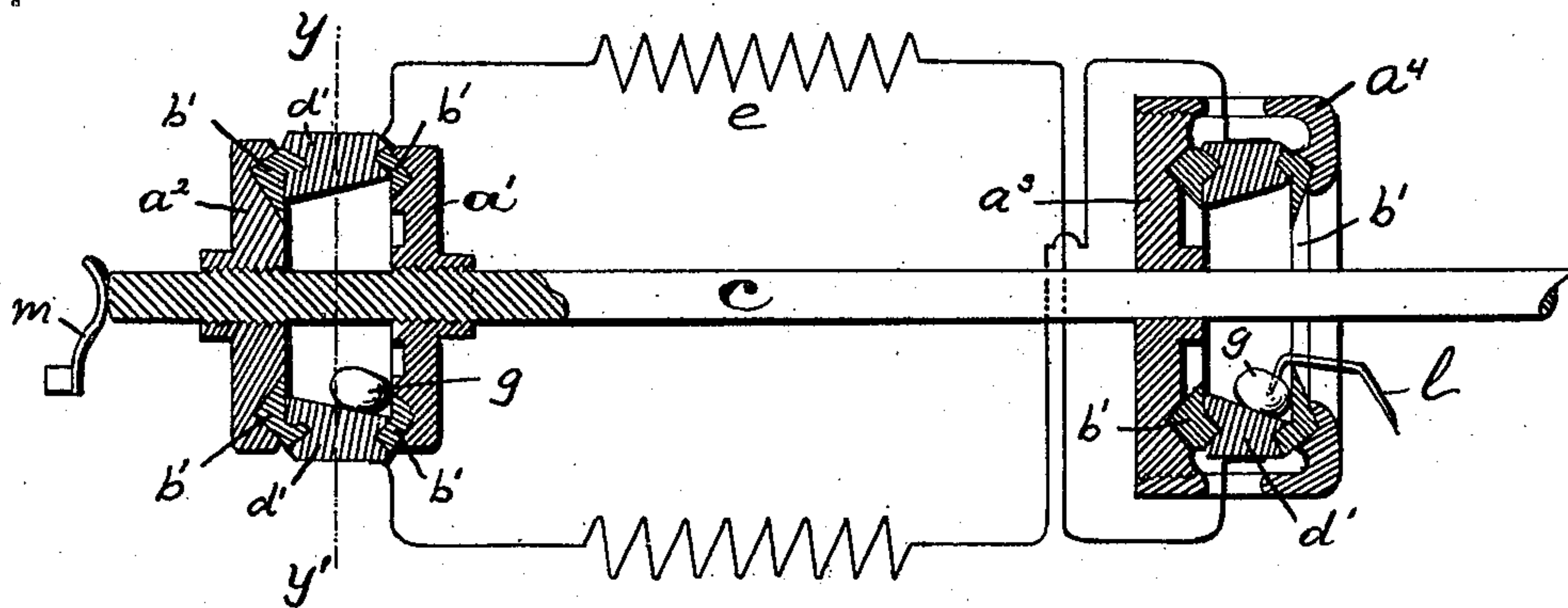


Fig. 3.

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ELECTRICAL COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 691,739, dated January 28, 1902.

Application filed August 9, 1900. Serial No. 26,346. (No model.)

To all whom it may concern:

Be it known that I, EMILE BATAULT, a citizen of Switzerland, residing at Geneva, in the canton of Geneva, Switzerland, have invented certain new and useful Improvements in Electrical Commutators; and I 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to avoid the objections to the brushes commonly employed in electrical machinery held mechanically against the commutator-blades and to secure the advantages due to the employment of a free-rolling conducting-body maintained in a determined position by gravity, and which, like the said mechanically-held brushes, will supply the electric current to the revolving members of the armature.

A more specific object is to avoid to the greatest possible extent the wear and frictional resistance due to the fixed brushes.

This invention is especially valuable in small dynamo-electric machines, where the frictional resistance due to the sliding contact of the brushes is quite appreciable, and is particularly adapted for use on machines running at a moderate rate of speed.

The invention consists in the improved commutator or collector and in the arrangements and combinations of the parts thereof, all substantially as will be hereinafter more fully described, and finally pointed out in the claims.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts throughout the several views in which they occur, Figure 1 shows diagrammatically a longitudinal section of a two-pole continuous-current dynamo-armature and its commutator. Fig. 2 is a sectional view of the improved commutator, taken on line $x x'$ of Fig. 1. Fig. 3 is a view similar to the one represented in Fig. 1, but showing somewhat-modified forms of commutators; and Fig. 4 is a section taken through line $y y'$ of Fig. 3.

The commutator shown in Fig. 1 comprises two principal parts $a b$, of which a is formed of a conductor of electricity—such as copper, brass, iron, or the like material—and b is an insulating substance, such as hard rubber or other non-conductor. The part a is fixed upon or integral with the armature-axle c , forming a disk-like flange thereon, and the annular part b is screwed upon the periphery of the flange or disk a in such a manner that these two parts together form a round box with an electricity-conducting bottom and non-conducting annular wall, the latter lying around and concentric with the shaft c . In the part b are screwed radial pieces d , which extend from the outside to the inner surface of the said annular piece of insulating material.

In the box $a b$ is located a movable contact g , such as a spherical or cylindrical body or a drop of quicksilver. This body tends by gravity to occupy the lowest part of said box, rolling on the interior wall as the latter turns, with the shaft.

The hollow or cavity in the box $a b$ is of conical shape, the part a forming the base of the cone in such a manner that the movable conducting-body, globule, or drop of quicksilver hugs the flange and is continually in electrical contact with the same.

If the machine is a two-pole dynamo, as is generally the case, the different wires or members of the revolving armature are properly connected to the screws d of the two commutators set upon opposite ends of the armature-axle, so that the current will always flow in the proper direction. The armature-axle is then made of two parts $c' c'$, insulated from each other by a non-conducting socketed coupling f .

The connections with the exterior circuit can be made through the axle-bearings or by means of a spring m , pressing against the end of the armature-axle by a disk n , dipping into mercury by a conductor l , Fig. 3, held in direct contact with the globule of mercury g , or in any other appropriate manner.

The commutators or collectors shown in connection with Fig. 3 differ in construction from those shown in Fig. 1. The contact-making parts d' of the commutator are secured between two insulating-rings b' , and

the whole is held together by two disks a' a^2 or by means of a disk a^3 and an annular cover a^4 .

It will be advantageous to close the cavity of the commutator by a plate h , of glass or any other appropriate material, in order to protect the contact-making parts from dust and to prevent the movable body g from falling out in transportation.

By aid of the foregoing description it will be easy to understand the function of such a commutator in operation. The current arrives by way of the armature-axle to the disk a and movable contact g , from whence it passes through the different parts d and corresponding armature-windings e to the collector upon the other end of the armature-axle, and from thence, in the same manner, through the roller or ball g to the exterior circuit. As the commutators revolve with the armature the movable contact-making bodies g roll upon the annular walls, and thus successively and automatically bring the different armature-windings into electrical circuit. The rolling motion of the freely-movable contact-making body g introduces no appreciable frictional resistance, and the wear upon the different parts is reduced to a minimum, especially where the rolling piece is fluid, as in the case of quicksilver or mercury.

Having thus described my invention, what I claim as new is—

1. In a commutator or collector for electrical purposes, a free-rolling body held in relation to the movable contact-making parts of the commutator in a determined position simply by gravity in such a manner that it will automatically roll upon itself and successively enter in electrical contact with the said parts as they move along, substantially as set forth.

2. In a commutator or collector for electrical purposes, a free-rolling contact-making body maintained in a determined position by gravity in such a manner that it will automatically and successively insert the differ-

ent armature-windings in the electrical circuit in the same manner as do brushes usually employed for this purpose, substantially as set forth.

3. In a commutator or collector for electrical purposes, a movable contact-making globule of mercury maintained in a determined position in the commutator by gravity, a circular chamber in the commutator or collector to receive said globule of mercury which, upon rotation of the commutator, rolls and thus automatically and successively enters into electrical contact with the different members of the armature-windings, substantially as set forth.

4. In a commutator or collector for electrical purposes, several free-rolling contact-making bodies maintained in a determined position by gravity in such a manner that they will automatically and successively insert the different armature-windings in the electrical circuit in the same way as do brushes, substantially as set forth.

5. In a commutator, the combination with the shaft c , having a cup-like appendage movable therewith and comprising a conductive part, a non-conductive part having conductive contacts d , and a free-rolling part held within the cup-like part and adapted to electrically connect the contacts d , and the first-mentioned conductive part, substantially as set forth.

6. In a commutator, the combination with the shaft, c , having a conductive flange and a non-conductive annular part having contacts on its inner sides, of a fluid-conductor contained within said annular part and adapted to electrically connect said contacts and flange, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of July, 1900.

EMILE BATAULT.

Witnesses:

JULES LIVEY,
EDWARD P. MACLEAN.