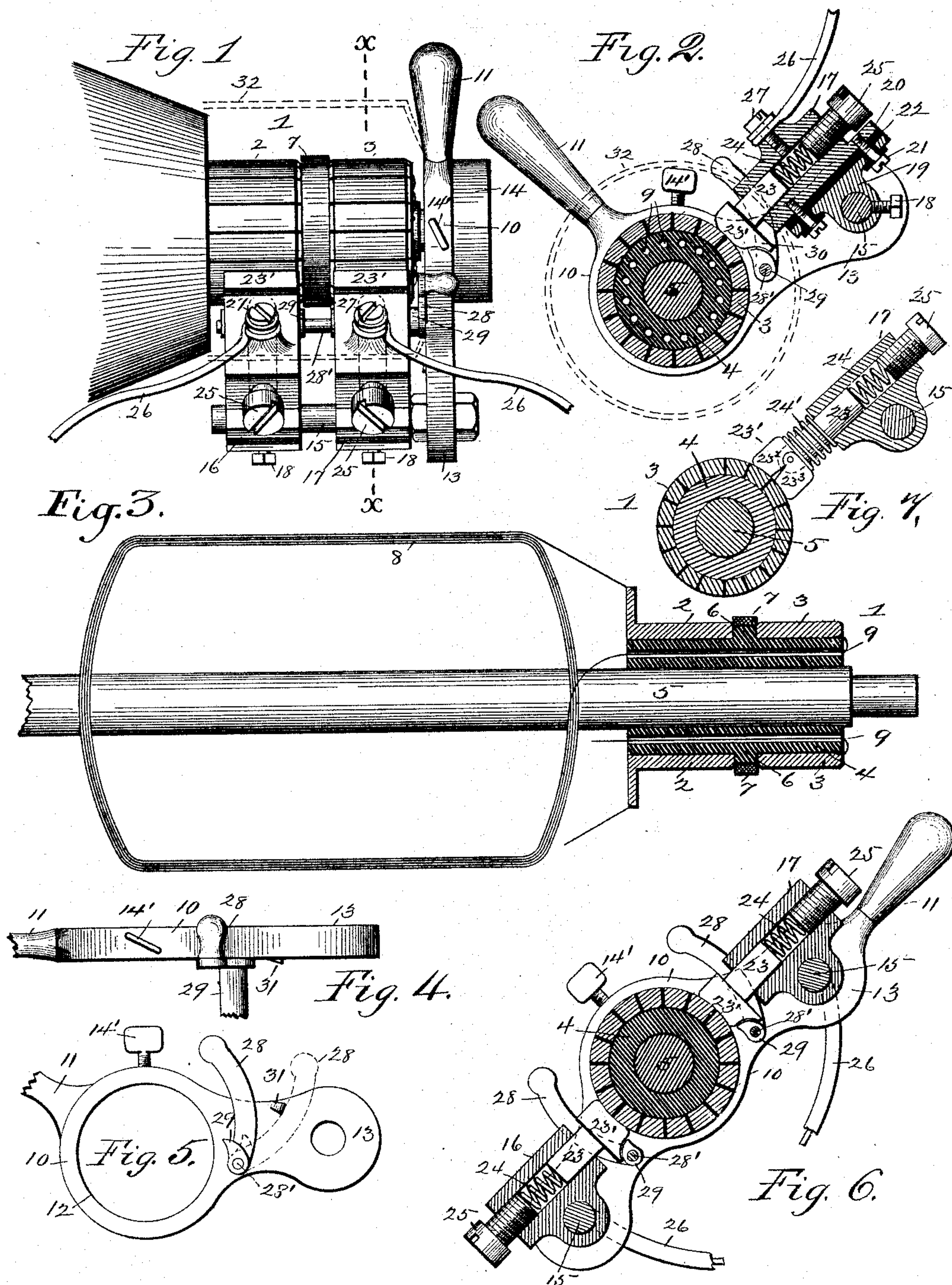


(No Model.)

J. F. McLAUGHLIN.
COMMUTATOR BRUSH AND HOLDER.

No. 490,081.

Patented Jan. 17, 1893.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

COMMUTATOR-BRUSH AND HOLDER.

SPECIFICATION forming part of Letters Patent No. 490,081, dated January 17, 1893.

Application filed March 31, 1890. Serial No. 346,054. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Commutators, of which the following is a specification.

My invention relates to commutators for dynamo-electric machines, and its object is to provide a collector-brush for such commutators which shall combine with simplicity and durability of construction an effective contact surface for carrying the electricity generated and which will permit the rotation of the armature in either direction.

To this end my invention consists in a collector brush, comprising a block or blocks of conducting material hinged to a shank which moves in the line of a radius of the commutator cylinder, whereby the brush-block is yieldingly held against the commutator cylinder.

My invention also consists in a split brush-block having hinged sections yieldingly held together, in combination with means for yieldingly holding the block against the commutator cylinder, whereby the block will readily adapt itself to the curvature of the commutator cylinder, and afford all the advantages derived from the ordinary commutator brush, while discarding the usual disadvantages resulting from the employment of a laminated brush. And my invention further consists in such additional details of construction as will be referred to in the description and covered in the claims.

To enable those skilled in the art to fully understand my invention, I will now proceed to give a detailed description thereof, reference being had to the accompanying drawings, in which:

Figure 1, represents a plan of a commutator embodying my invention, and having the two collectors arranged side by side, and on the same side of the commutator cylinder; Fig. 2, a vertical transverse section of the same on line $x-x$, Fig. 1; Fig. 3, a longitudinal section of a commutator cylinder with one coil of an armature connected therewith, in diagram, showing the construction which may be used in connection with my inven-

tion; Figs. 4 and 5, a plan and side elevation, respectively, of the brush-carrying and adjusting lever; Fig. 6, a transverse vertical section showing the arrangement of my brush blocks at opposite sides of the commutator cylinder; and Fig. 7, a modified form of brush block embodying my invention.

Referring now more particularly to Figs. 1 to 5, the commutator cylinder 1, is there shown as built up of two series 2, 3, of segmental bars or contact strips, mounted upon an insulating body 4, fixed upon the armature shaft 5. The two series of segmental bars are separated from each other by a flange 6, formed on the insulating body 4, and a collar 7, also of insulating material, placed upon said flange, divides the commutator into two distinct sections, the segmental bars of which are connected with the terminals of the armature coils 8, in the manner shown.

In the present instance, the commutator is shown in connection with a Siemens armature, one coil of which is indicated in Fig. 3. The connection between the coils and the commutator is made by attaching one end of each coil to the inner end of one of the plates of the series 2, while the other end is drawn through one of the perforations 9, in the insulating body 4, and connected to one of the series of plates 3. I mount my collector or brush block with respect to the commutator cylinder in the following manner: A lever 10, having a circular bearing 12, a handle 11, and an arm 13, is mounted on the standard 14, in which one journal of the armature shaft 5, revolves, the circular bearing encircling a cylindrical boss thereon. A set screw 14', serves to keep the lever in position after having been adjusted.

Extending laterally from and parallel to the axis of the commutator is the cylindrical supporting rod 15, on which are mounted the two brush holders 16 and 17, one for each series of plates 2 and 3, said holders being journaled on the rod 15, and held firmly in position by the set screws 18, when once properly adjusted. These brush holders consist each of a casting 19, to which is attached the socket piece 20, by screws 21, or otherwise, and properly insulated therefrom, as shown at 22.

Within the socket-piece 20, is arranged the

shank 23, of a brush block, which, as shown, consists of a solid piece of suitable conducting material, and the head of which is a block 23', bearing upon the commutator cylinder 2, 3. The bearing face of the block 23', is shaped and finished so as to fit snugly against the commutator cylinder, to establish the necessary extent of contact. The brush-block thus constructed, is yieldingly held against the commutator cylinder by a spring 24, located in the socket of the socket-piece 20, between the shank 23, and a set screw 25, which serves to adjust the tension of the spring. The leading wires 26, are secured to the brush-holders in the usual way, by binding-posts or set screws 27.

Many advantages are due to my improved form of commutator. It is simple and cheap of construction, and the brush being made of a single piece of metal, the liability to become deranged or get out of order is entirely avoided, while any wear is readily taken up by the adjusting screw 25, which also enables me to regulate its pressure against the commutator cylinder, to a nicety. I am also enabled, by virtue of the form and nature of my brush-block, to arrange the same radially to the commutator cylinder, as shown, whereby it becomes possible to rotate the armature with equal facility in either direction. None of these advantages can be obtained from the old forms of laminated collector brushes, which are comparatively expensive and require great skill and nicety of manipulation in producing them; more especially does it require laborious fitting of the contact surfaces of the same to the surface of the commutator cylinder. Those laminated brushes become readily disarranged and useless, by the fraying of their ends, and any attempt to rotate the armature in an opposite direction at once destroys those brushes.

A lever 28, is fixed to a rock shaft 28', journaled in the adjusting lever 10, and extending parallel to the rod 15, and under the heads of the brush blocks. The rock shaft has secured to it two cams 29, 29, which bear under the lips 30, projecting out from the heads 23'. By turning this lever 28, into the position indicated in dotted lines, in Fig. 5, the brush blocks are forced away from the commutator cylinder, against the tension of the springs 24.

When the attendant, who has charge of the machine, is obliged to manipulate the commutator, for the discovery of defects, and for repairing the same, it is highly desirable that the circuit be broken; and since the switch for controlling the circuit is ordinarily located at a distance from the armature, as for instance on the yoke of the field magnet, several minutes are usually lost before the circuit can be broken after the discovery of the necessity for doing so. By my arrangement for lifting the brush-blocks, this delay is avoided, since the same enables the attendant, while inspecting the commutator, and without chang-

ing his position, to open the circuit, and by the same act to place the brush-blocks in position for dismounting, and more minute examination and repair. When the brush blocks have thus been forced out of contact with the commutator cylinder, they, together with the lever 28, are retained in that position by the catch 31, the lever 28, having sufficient resiliency to ride over the same.

When it is desired to gain more convenient access to the parts, a contingency arising very seldom, however, the set screw 18, may be loosened, and the entire holder 16 or 17, swung around and slipped off from the supporting rod 15.

As indicated in dotted lines, the commutator may be protected against dust, &c., by a housing 32, secured to the adjusting lever 10, and extending laterally over the commutator cylinder, a slot or opening being left for the passage of the brush blocks and adjacent parts.

In Fig. 6, I show a modified form of commutator which differs from that just described essentially, in the arrangement of the brush blocks and their holders, which here are located on opposite sides of the commutator cylinder.

Fig. 7, represents a somewhat modified form of my brush block. Here the same consists of two sections 23² and 23³, which are pivoted to the shank 23. They are forced together and against the commutator cylinder, by a spring 24', which is preferably weaker than the spring 24, which urges the brush block against the cylinder, but sufficiently strong to overcome any tendency to unduly spread the sections. In all other respects this construction may be the same as that shown in Figs. 1 to 6, it being understood that the two brush blocks are properly insulated from each other. This latter form of brush block has all the advantages of a laminated commutator brush, without the defects of the latter, that is to say, while it is simple and inexpensive, and not liable to get out of order, it possesses the pliancy of a laminated brush, readily adapting itself to commutator cylinders of different sizes.

By reason of the hinged connection between the shank and head of the brush block, the same need not be mounted absolutely radially with respect to the cylinder, so that no particular care in thus mounting the brush block is necessary.

Having now described my invention and what I consider the best embodiment of the same, what I claim and desire to secure by Letters Patent is:—

1. In commutators for dynamos and electric motors, the combination of a shank or support for the brush, elastically mounted so as to be movable radially with respect to the commutator cylinder, and a collector brush hinged to the free end of the shank, substantially as described.

2. A collector for commutators of dynamos and electric motors, consisting of a block composed of two sections of solid conducting material, hinged together, substantially as described.

3. A collector for commutators of dynamos or electric motors, consisting of a block composed of two hinged sections of solid conducting material, a spring tending to force the said sections together and another spring for forcing the block against the commutator cylinder, substantially as described.

4. A collector for commutators of dynamos or electric motors, consisting of a block composed of two hinged sections of solid conducting material, a spring tending to force the sections together, and another and stronger

spring for forcing the block against the commutator cylinder, substantially as described.

5. In a collector for dynamos or electric motors, the combination with a collector brush, and shank to which the brush is hinged, of a socket piece, into one end of which the shank extends, an adjusting screw entering a nut at the other end of the socket piece, and a spring confined in the said socket piece, between the screw and shank, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES F. McLAUGHLIN.

Witnesses:

HERBERT P. KER,
EDWIN F. GLENN.