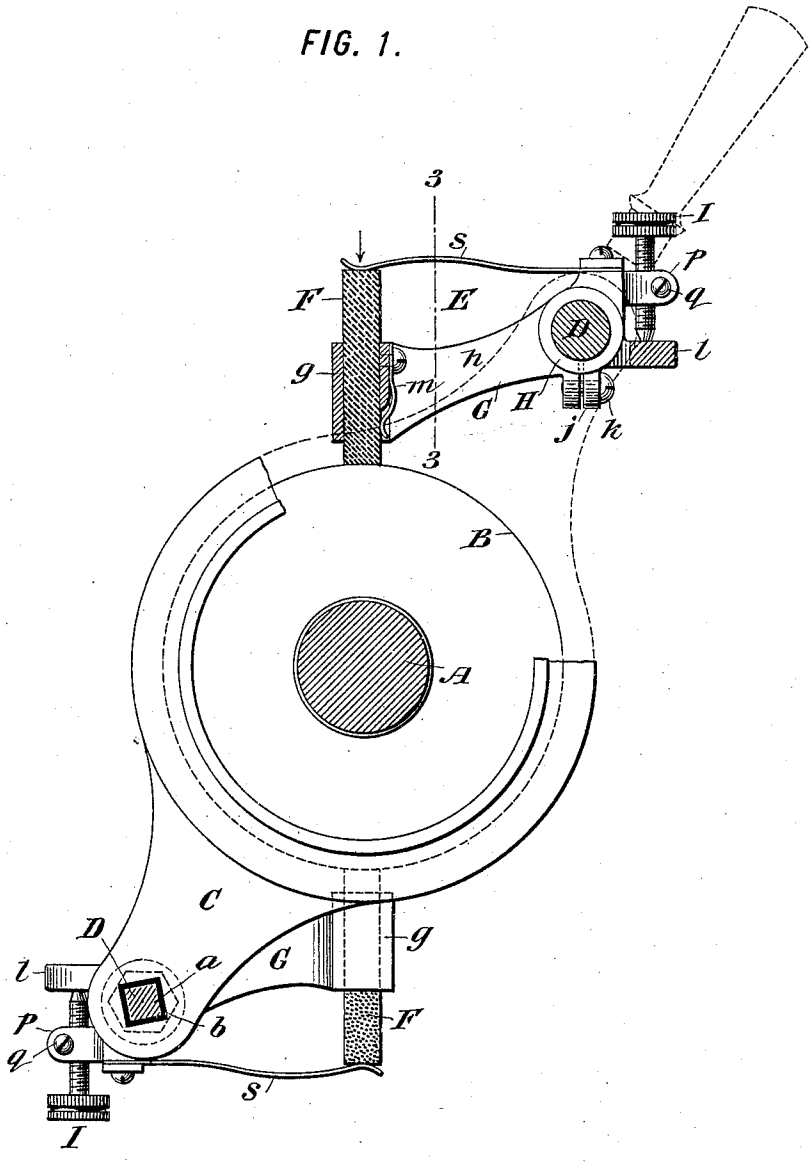
(No Model.) 2 Sheets—Sheet 1.

J. J. WOOD.

CARBON BRUSH HOLDER FOR DYNAMO ELECTRIC MACHINES AND MOTORS.

No. 486,656. Patented Nov. 22, 1892.

FIG. 1.



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INVENTOR:
James J. Wood,
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(No Model.) 2 Sheets—Sheet 2.

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FIG. 2.

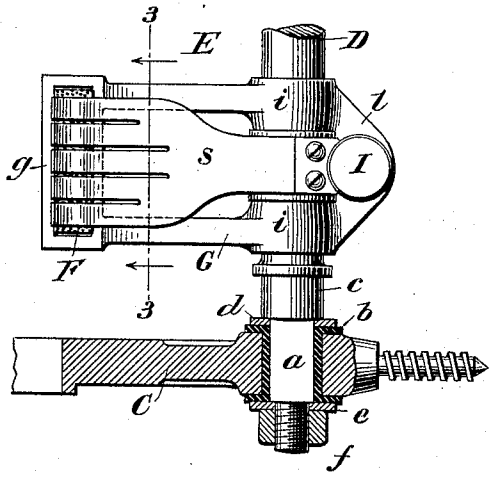


FIG. 3.

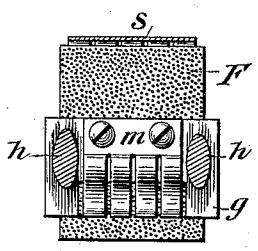


FIG. 4.

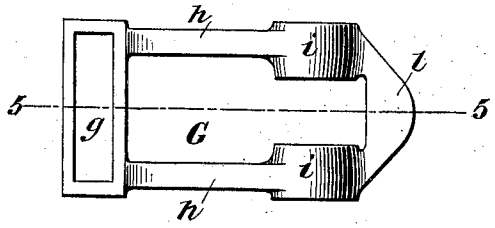


FIG. 6.

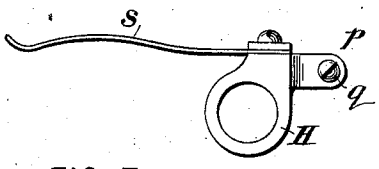


FIG. 7.

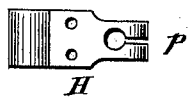
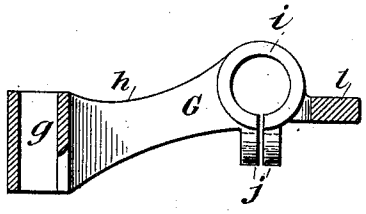


FIG. 5.



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UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA.

CARBON-BRUSH HOLDER FOR DYNAMO-ELECTRIC MACHINES AND MOTORS.

SPECIFICATION forming part of Letters Patent No. 486,656, dated November 22, 1892.

Application filed May 3, 1892. Serial No. 431,679. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Carbon-Brush Holders for Dynamo-Machines and Electric Motors, of which the following is a specification.

This invention provides an improved construction of holders for the carbon blocks or "brushes" employed for taking off the currents from the commutators of dynamo-electric machines or for conducting the currents to electromotors. In such carbon-brush holders the carbon block is commonly held in a guiding-frame, so as to be presented to the commutator in a plane approximately radial thereto and pressed toward the commutator by springs.

My invention provides improvements in the construction and mounting of such holders.

Figure 1 of the accompanying drawings is a side elevator of the commutator and brush-holder yoke and brush-holders of a dynamo-electric machine or electromotor, the lower part of the yoke and the lower-brush holder being shown in elevation, while the upper part of the yoke is broken away and the brush-holder, carbon brush, and stud are shown in vertical section. Fig. 2 is a plan of the upper-brush holder, showing a fragment of the yoke in section. Fig. 3 is a vertical transverse section of the brush-holder cut on the line 3 3 in Figs. 1 and 2. Fig. 4 is a plan of the fixed carbon-holding frame. Fig. 5 is a vertical longitudinal section thereof on the line 5 5 in Fig. 4. Fig. 6 is a side elevation of the spring and spring boss or carrier. Fig. 7 is a plan of the latter.

Referring to Fig. 1, let A designate the armature-shaft, B the commutator, and C the brush-holder yoke. The latter may be mounted in any known or suitable manner. From its opposite ends project brush-holder studs D D, as usual. These studs are preferably fixed in the yoke in the manner shown in Fig. 2, where the yoke is shown in section. The portion of the stud passing through the yoke is squared at *a* and insulated from the yoke by a bushing *b*. The neck *c* of the stud, being the part to which the terminal socket of the conducting-cable by which the current is carried to or from the stud is applied, is formed with a shoulder, and a washer *d* is engaged by this shoulder, the yoke being clamped through the medium of the insulating-bushing between this washer and a washer *e*, against which the retaining-nut *f* is screwed on the threaded end of the stud. Ordinarily brush-holder studs are made with round shanks where they pass through the yoke and are simply clamped thereto. By the squared construction shown the tendency of the studs to work loose by the jarring of the machine is obviated.

On each stud D is mounted a carbon-brush holder E, carrying the carbon block or brush F. The brush-holder is constructed with a stationary carbon-carrying frame or socket G, which is clamped fixedly on the stud D. This frame is shown separately in Figs. 4 and 5. It consists of a socket portion *g*, which makes a loose and free fit with the carbon block F and which is carried by arms *h h*, projecting from hubs *i i*, which are clamped upon the stud. Preferably these hubs are split on one side and provided with ears *j*, which are drawn together by a set-screw *k* to clamp the hubs fixedly upon the stud. The two hubs are connected by an integral plate or yoke *l*.

The carbon brush or block F is inserted in the socket *g*, its inner end being brought against the surface of the commutator. The socket is partially cut away at one side in order to make room for a leaf or plate spring *m*, which is fastened against the socket and the end portion of which is preferably slitted so as to be subdivided into fingers which independently press against the side of the carbon block, thereby forcing it into intimate contact with the opposite side of the socket. The purpose of this spring is twofold—first, to increase the electrical contact by pressing the block closely against the opposite side of the socket and by itself making intimate metallic contact with the block, and, secondly, to hold the block firmly but yieldingly in place, so as to prevent its vibration.

The carbon brush or block is pressed toward the commutator by a spring *s* acting against its outer end and serving not only to maintain it in close contact with the commutator, but also to feed it continually toward the latter

as it is reduced by wear. The tension of the spring is adjustable by a screw adjustment. The spring is constructed, preferably, as a flexible plate fastened at one end to a stationary but adjustable reinforce or carrier, while its other end is in engagement with and presses against the carbon block. The spring-plate is preferably slitted, so as to divide the latter end into separate fingers, each of which adjusts itself independently into contact with the carbon block, thereby securing an intimate and extended surface of contact therewith, so that the spring *s* serves, also, as a means of conducting the electric current to or from the carbon block. The stationary reinforce or carrier for the spring is preferably constructed as an oscillatory eye-block H. (Shown detached in Figs. 6 and 7.) It is bored out to make a free working fit with the stud D, and has the spring *s* screwed firmly against it on one side. It is also constructed with a projecting arm *p*, through which passes an adjusting-screw I, the end of which bears against the fixed plate or yoke *l* of the carbon-carrier G. The threads of the screw I engage internal threads in the arm *p*, so that by turning this screw the block or carrier H is caused to oscillate on the stud, and by turning the screw inwardly the spring-plate *s* may be caused to bear with increasing tension against the outer end of the carbon block. The carrier H and spring *s* constitute, in effect, a lever, of which the stud is the fulcrum, the screw I being the power acting upon the arm *p*, while the working thrust is exerted by the elastic arm *s*. The arm *p* is slotted and provided with a set-screw *q*, so that when the screw I has been brought to the proper adjustment it can be clamped fast by tightening the screw *q*.

In applying this brush-holder, the stud D being already firmly fixed to the yoke C, the carbon-carrier G and block H are put together and slid over the stud to the proper position, the carrier G being clamped fast to the stud, with the socket *g* at a suitable distance from the periphery of the commutator and arranged approximately radially thereof. The carbon block may be inserted before or after applying the brush-holder in place. The screw I is then turned to adjust the spring *s* to the requisite tension, and when the proper tension is attained it is set fast by the screw *q*. As the carbon block wears, the spring *s* presses it toward the commutator and the tension of the spring is thereby reduced, so that from time to time it requires to be set up by an adjustment of the screw I.

The construction shown may be modified in structural detail without departing from my invention. As shown, the oscillatory block H is kept from displacement along the stud by being confined between the two hubs *i i*—a construction which is convenient and effective, but might be substituted by some other means for accomplishing the same result. In similar manner the construction of the carbon-carrier G with two hubs *i i* is not strictly essential to my invention.

My invention is advantageous for use when the brush or carbon block is composed of several pieces or pencils of square carbon located side by side in the socket in place of one solid block, in which case the fingers of the springs at the side and end bear each against one of the several pieces. This construction is found to give a better contact between the brush and its holder and the commutator.

I claim as my invention the following-defined novel features and combinations, substantially as hereinbefore specified, namely:

1. The combination, with a stationary brush-carrying stud D, of carbon-carrier G, fixed on said stud and having carbon-socket *g* and arm *l*, a spring *s*, oscillatory block H, mounted freely on the stud D, and adjusting-screw I, engaging said block and reacting against said arm *l*, whereby the turning of said screw oscillates the block H and adjusts the tension of spring *s*.

2. The combination, with stud D, of carbon-carrying frame G, having carbon-socket *g* and two hubs *i i*, with spring *s* for pressing the carbon toward the commutator, oscillatory block H, mounted on the stud between said hubs, and adjusting-screw I, engaging said block for oscillating it to vary the tension of said spring.

3. The combination, with fixed stud D, of carbon-carrying frame G, having carbon-socket *g*, two hubs *i i*, fixed on said stud and connecting arm *l*, oscillating block H, mounted on the stud between said hubs, spring fixed on said block and pressing on the carbon, and adjusting-screw I, engaging said block and reacting against said arm *l* for oscillating the block to vary the tension of said spring.

4. The combination, with a brush-holder yoke and stud carried thereby, of a carbon-brush holder mounted on said stud, having a spring pressing the carbon against the commutator and reacting against the stud, so that it tends to twist the latter, and the stud where it passes through the brush-holder yoke being constructed with an angular shank *a*, fitted in an angular hole in the yoke, with an intervening angular insulating-bushing *b* and a clamping-screw for tightening it in place.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES J. WOOD.

Witnesses:
CHAS. C. MILLER,
CHAS. A. HARTMAN.