H. G. REIST & J. E. NOEGGERATH.

COLLECTOR BRUSH.

APPLICATION FILED JULY 28, 1904.

929,492. Patented July 27, 1909.

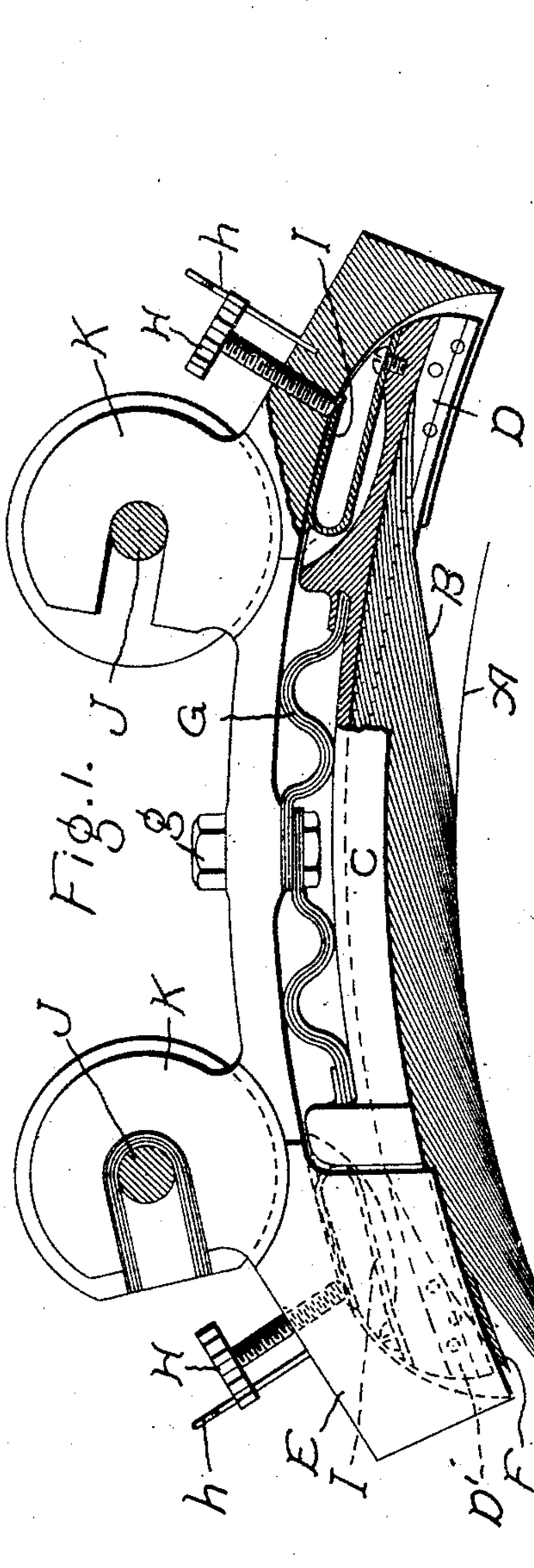

Fig. 1.

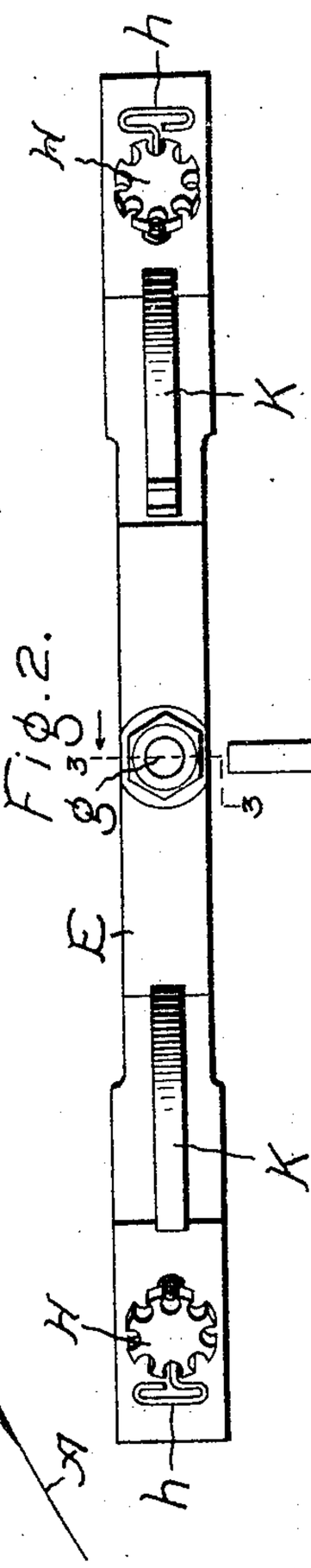

Fig. 2.

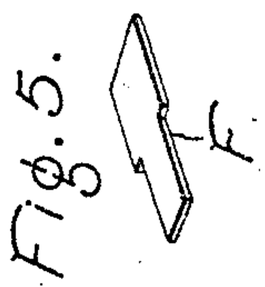

Fig. 5.

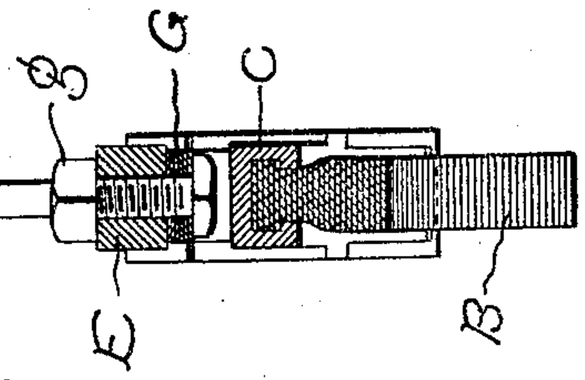

Fig. 3.

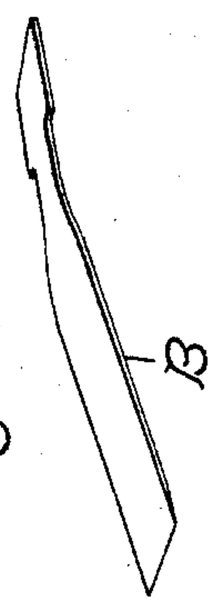

Fig. 4.

Witnesses:
Marcus L. Byng.
Allen Dyford

Inventors:
Henry G. Reist,
Jakob E. Noeggerath,
by Albert G. Davis
Atty.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY G. REIST AND JAKOB E. NOEGGERATH, OF SCHENECTADY, NEW YORK, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

COLLECTOR-BRUSH.

No. 929,492. Specification of Letters Patent. Patented July 27, 1909.

Application filed July 28, 1904. Serial No. 218,518.

To all whom it may concern:

Be it known that we, HENRY G. REIST and JAKOB E. NOEGGERATH, citizens of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Collector-Brushes, of which the following is a specification.

Our invention relates to collector brushes, and its object is to provide a novel form of brush especially adapted for collecting large currents from collector rings revolving at high speeds.

The collection of large currents necessitates a large bearing surface between the brush and the ring. Furthermore, the bearing surface of the brush should be yielding, for otherwise unevenness of the surface of the collector ring will greatly vary the effective contact between the brush and the ring, thereby producing heating and sparking, which, by increasing the irregularities of the surface of the ring, is cumulative in its effects. This evil is increased as the speed of the collector ring is raised.

By our invention we provide a current collecting device comprising a plurality of flexible conductors, such as thin conducting leaves, each of which is reduced in width near its upper end and is supported in a slot in a box by engaging overhanging portions thereof, which partially close the slot. These leaves are pressed against the collector ring. With this arrangement the bearing surface can be as large as required, while a perfectly flexible brush, responding readily to any irregularities on the surface of the collector ring, is obtained, and the friction losses for a given effective bearing surface are reduced to a minimum. In order to make the pressure of all the flexible conductors on the ring the same, all the conductors are made of the same length from the ring to the point of support of the conductor. In order to render the pressure of the leaves upon the collector ring readily adjustable, we mount the support for the leaves adjustably within a second stationary support, and to further increase the flexibility of the brush, we insert between the two supports a spring or set of springs by which the pressure is transmitted from the adjustable support to the stationary support.

Our invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows a side view of a collector-brush constructed in accordance with our invention, a portion of the adjustable support or box being shown broken away; Fig. 2 shows a plan view of the stationary box; Fig. 3 shows a cross-section of the brush; Fig. 4 shows a detail of one of the conducting leaves; and Fig. 5 shows a detail of a filler by means of which brushes of different contact surface are adjusted to the same box.

In the drawings, the line A A represents the bearing surface of a collector ring. Bearing upon this surface are the flexible conducting leaves B B. One of these leaves is shown in detail in Fig. 4. It will be seen that a portion of the leaf near its upper end is reduced in width. The upper portions of the leaves are contained in an arc-shaped slot in the box C which is bored out from end to end and has overhanging portions so as to form a partially closed slot as shown in Fig. 3. Each leaf is supported by the box by its engagement with the top wall and the overhanging portions of the box. When the upper end of a leaf B is inserted in one end of the slot in box C, the narrow portion of the leaf passes through the partially closed side of the slot, so that the leaf may be moved longitudinally through the slot.

By closing one end of the slot by the piece D shown in Fig. 1, the leaves may be slipped into place one after another, assuming the position clearly shown in Fig. 1. The slot is formed parallel to the surface of the collector ring so that the lengths of all the leaves between the ring and slot are the same, so that the leaves all exert equal pressures on the ring. Since the slot in the box C forms an arc of greater radius than the radius of the collector-ring, it is evident that if the leaves were straight throughout their length, their upper ends would fit loosely when their lower ends were brought close together. In order to make the leaves pack closely at their upper ends, each leaf is bent as shown in Figs. 1 and 4, so as to give it a smaller slope at its upper end. Theoretically the leaves should be bent on an involute, but a bend such as shown in the drawings is sufficient for practical purposes.

After the proper number of brushes are inserted in the slot to give the requisite contact

surface for the amount of current to be collected, the remaining portion of the slot may be filled by the fillers indicated at F in Fig. 1 and shown in detail in Fig. 5. The end of the slot is then closed by the piece D′ shown in dotted lines in Fig. 1. By the use of the fillers, the same size of box may be used for brushes of different current capacity.

It is evident that by supporting the several leaves as shown and described, a greater flexibility is obtained than if the leaves were all riveted or otherwise fastened rigidly together for a portion of their length, as in the structures heretofore employed, and, owing to the greater flexibility, the friction for a given effective bearing surface is reduced to its minimum value, while the equal length of the leaves makes the pressure even over the whole bearing surface.

In order to make the pressure of the brush on the collector-ring readily adjustable, the box C, instead of being secured to the frame of the machine, is mounted adjustably within a second box E to which it is connected electrically by the flexible conductors G and bolt *g*. Set-screws H H are provided for the purpose of adjusting the position of box C within box E, and in order to further increase the flexibility of the brush, the springs I I are inserted between the two boxes receiving the thrust of the set-screws H H. The set-screws H H are provided with locking pins *h h*. The outer box E is provided with slotted lugs K K adapted to engage the studs J J on the frame of the machine. Either or both of these studs may be used as the conductor to lead the current from the brush.

Many changes may be made in the construction and arrangement of parts and we aim in the appended claims to cover all modifications which are within the scope of our invention.

What we claim as new and desire to secure by Letters Patent of the United States, is,

1. A current collecting device comprising a box having overhanging portions so as to form a partially closed slot, and a plurality of conducting leaves, the upper portions of said leaves being contained in said slot, each leaf being reduced in width near its upper end and supported by the overhanging portions of said box.

2. A current collecting device comprising a box having overhanging portions so as to form a partially closed slot, and a plurality of conducting leaves, each leaf being reduced in width near its upper end, the upper end being contained in said slot and engaging the top wall and the overhanging portions of said box.

3. In combination with a surface from which current is to be collected, a current collecting device comprising a box having an arc-shaped slot of greater radius than that of said collector surface, and a plurality of flexible conducting leaves contained in said slot, the ends of said leaves entering said slot being bent to form a compact mass.

4. In combination with a surface from which current is to be collected, a current collecting device comprising a box having an arc-shaped slot of greater radius than that of said collector surface, and a plurality of flexible conducting leaves contained in said slot, the ends of said leaves being bent to pack closely within said slot.

5. In a current collecting device, a fixed member, a box adjustable relatively thereto, means for adjusting said box and a plurality of flexible conducting leaves, each leaf engaging said box and having two separate points of support therein.

6. In a current collecting device, a fixed box, a second box partially inclosed thereby and adjustable relatively thereto, means for adjusting said box and a plurality of flexible conducting leaves, each leaf engaging said second box and having two separate points of support therein.

7. In a current collecting device, a fixed member, a box flexibly supported thereby, a flexible conductor connecting said box to said member and a plurality of flexible conducting leaves engaged and supported by said box.

8. In a current collecting device, a fixed box, a second box partially inclosed thereby and flexibly and adjustably supported thereby, means for adjusting said second box and a plurality of flexible conducting leaves, each leaf being engaged by said second box and having two separate points of support therein.

9. In a current collecting device, a slotted box, a plurality of flexible conducting leaves, each leaf engaging said box and having two separate points of support therein, said leaves occupying a portion of the length of the slot, and shorter leaves filling the remainder of said slot.

10. In a current collecting device, a fixed box, a second box adjustably supported therein, means for adjusting said box, and a plurality of flexible conducting leaves superposed directly upon each other, each leaf being engaged and supported at two separate points by said second box, said leaves being inclined to the direction of rotation of the surface from which current is to be collected.

11. In a current collecting device, a box having an arc-shaped slot parallel to the surface from which current is to be collected, and a plurality of flexible conducting leaves contained in said slot, each of said leaves being adapted to engage said box and having two separate points of support therein.

12. A current collecting device comprising a box having an arc-shaped slot, and a plurality of flexible conducting leaves, each of which having two separate points of sup-

port in said box and being inclined at an acute angle to the direction of rotation of the surface from which current is to be collected, the ends of the leaves entering the slot being bent to form a compact mass in said slot.

13. A current collecting device comprising a box having overhanging portions so as to form a partially closed slot, and a plurality of flexible conducting leaves contained in said slot, each of said leaves being supported by the overhanging portions of said box and being inclined at an acute angle to the direction of rotation of the surface from which current is to be collected.

14. A current collecting device comprising a box, and a plurality of superposed flexible conducting leaves, each leaf having two separate points of support therein and being inclined at an acute angle to the direction of rotation of the surface from which current is to be collected, the ends of the box being shaped to give the desired inclination to said leaves.

In witness whereof, we have hereunto set our hands this 26th day of July, 1904.

HENRY G. REIST.
JAKOB E. NOEGGERATH.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFORD.