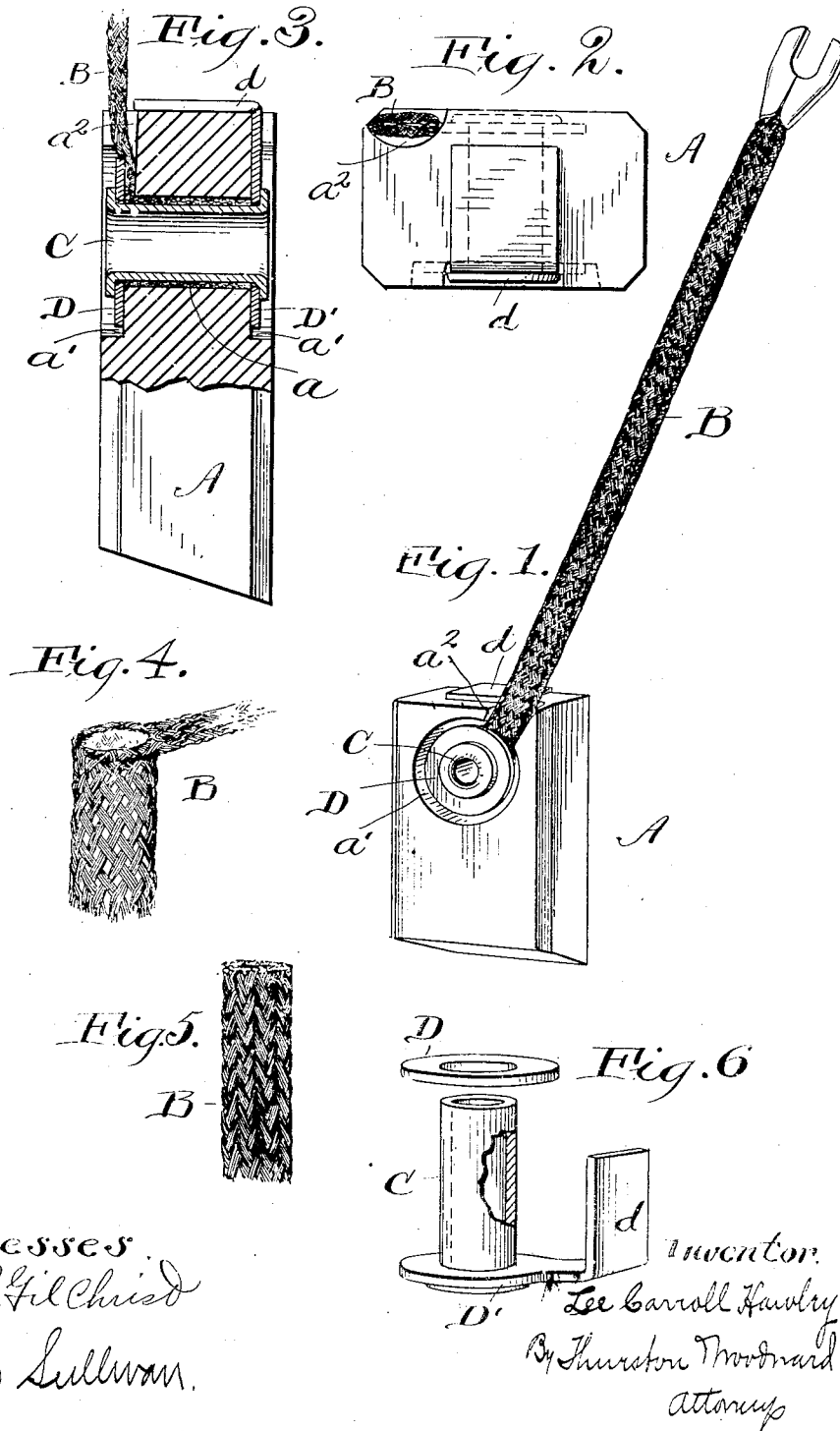


903,972.

Patented Nov. 17, 1908.



Witnesses:
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UNITED STATES PATENT OFFICE.

LEE CARROLL HAWLEY, OF CLEVELAND, OHIO, ASSIGNOR TO NATIONAL CARBON COMPANY,
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PIGTAIL-BRUSH.

No. 903,972.

Specification of Letters Patent.

Patented Nov. 17, 1908.

Application filed February 13, 1906. Serial No. 415,660.

To all whom it may concern:

Be it known that I, LEE CARROLL HAWLEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Pigtail-Brushes, of which the following is a full, clear, and exact description.

This invention is an improvement upon the class of electrical brushes, known to the trade as pig tail brushes, which include a brush made of carbon or some analogous material and a flexible metallic conductor commonly called a "pig-tail" permanently connected therewith.

The primary object of the invention is to so connect the flexible conductor or "pig-tail" with the carbon brush that the resistance to the passage of the current from the brush to the "pig-tail" will be practically eliminated.

Another object is to reduce the cost of thoroughly efficient "pig-tail" brushes.

In the drawing, Figure 1 is a perspective view of a brush embodying the present invention. Fig. 2 is a top end view thereof. Fig. 3 is an edge view partly in section. Fig. 4 is a view of that part of the tubular braided "pig-tail" which is to be inserted in the brush, and it shows the condition of said end after it has been manipulated into the form adapted to receive the tubular rivet. Fig. 5 is a view of the flattened tubular pig-tail, before its end has been expanded as shown in Fig. 4. Fig. 6 is a perspective view of the tubular rivet and its associated washers.

Referring to the parts by letters A represents the brush which is preferably made of carbon or some analogous material. Near its outer end a transverse hole a is made through the brush from one face to the other,—said faces being recessed as at a' around the ends of the hole so as to receive the parts now to be described and prevent them from projecting beyond the faces of said brush. The notch a^2 is formed in one face of the brush from the recess in that face to the end of the brush.

B represents the connector or pig tail. It differs from any pig-tail which has been heretofore used for this purpose in that it is a tube of fine braided copper wire.

C is a hollow rivet which is to be tightly embraced by one end of this tubular pig-tail

and to project from one side thereof through a hole made therein by working the braids of wire apart. In fact, the preferable way of introducing this rivet into the tubular pig tail is to manipulate said pig-tail into the form and conditions shown in Fig. 4. The tubular rivet is then passed into the tube through the hole in the side, and the part of the pig-tail then embracing the rivet is then drawn lengthwise so as to embrace it tightly. The rivet and its embracing tube are then passed through the hole a in the brush, which should be as small as possible to permit them to be so passed. The ends of the rivet project beyond the face of both of the recesses in the sides of the brush. The two washers D, D', are passed over these projecting ends, and the ends of the tubular rivet are upset tightly against these washers, as shown. The ends of the wires of the tubular pig-tail should project just a little beyond the face of the recess in the side of the brush so that when the washers are drawn in by the upsetting of the rivet, the ends of said wires will be pushed back into the hole a and thereby cause a slight expansion of the diameter of the tubular pig-tail within the hole a . This helps to make an intimate connection between said pig-tail and the surface of said hole. The upsetting of the rivet requires endwise pressure, and this, to a suitable degree, increases its diameter within the hole, and thereby the wires of the tubular pig-tail within said hole are forced into close and intimate contact with the walls of said hole. The projecting part of the pig tail, which is flattened, extends upward in the notch a^2 . One of the washers D has a tail piece d which is extended over and against the top of the brush, where it serves as plate against which a pressure device acts to push the brush endwise against the commutator.

Having thus described my invention, I claim:

1. The combination of a brush having a transverse hole through it from side to side, a rivet extending through said hole and projecting from both ends thereof, a braided pig tail which embraces the rivet within said hole and is thereby forced into intimate contact with the walls of said hole, and washers embracing the projecting ends of said rivet,—the ends of the rivet being upset against said washers.

2. The combination of a brush having a

transverse hole through it from side to side,
with a pig-tail made of fine wire braided
into tubular form which lies partly within
said hole and is therein distended into inti-
5 mate contact with the walls of said hole, and
-a rivet which passes through said hole and
through the tubular pig-tail therein, and
through a hole in the side of the pig-tail
formed by separating the strands thereof,
10 said rivet being of such diameter that it
presses the embracing pig-tail against the
walls of said hole, and the projecting ends
of the rivet being upset.

3. The combination of a brush having a
15 transverse hole through it from side to side,
a braided pig-tail made of fine wire braided
into tubular form which lies partly within

said hole and is therein distended into inti-
mate contact with the walls of said hole, a
tubular rivet which passes through said hole 20
and through the tubular pig tail therein and
through a hole in the side of the pig-tail
formed by separating the strands thereof,
said rivet being of such diameter that it
presses the embracing pig-tail against the 25
wall of said hole, and washers embracing the
projecting ends of the rivet, the ends of said
rivets being upset against said washers.

In testimony whereof, I hereunto affix my
signature in the presence of two witnesses. 30

LEE CARROLL HAWLEY.

Witnesses:

GEO. M. SMITH,
C. F. HASKINS.