F. LEISTER.

METHOD OF FINISHING THE CONTACT MEMBER OF A COMMUTATOR BRUSH.

APPLICATION FILED AUG. 11, 1920.

1,405,049. Patented Jan. 31, 1922.

Fig. 1.

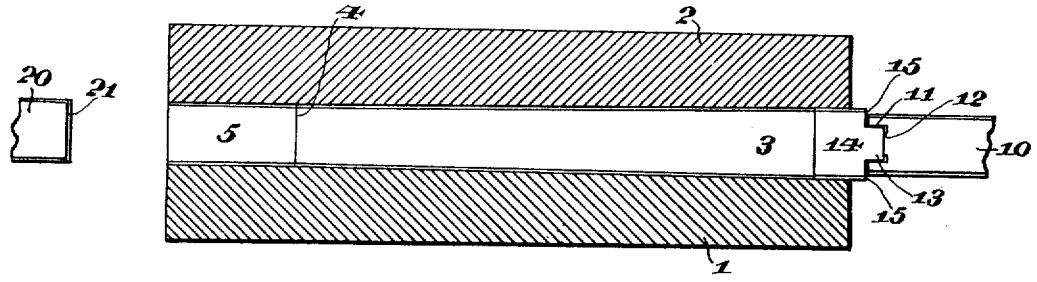


Fig. 2.

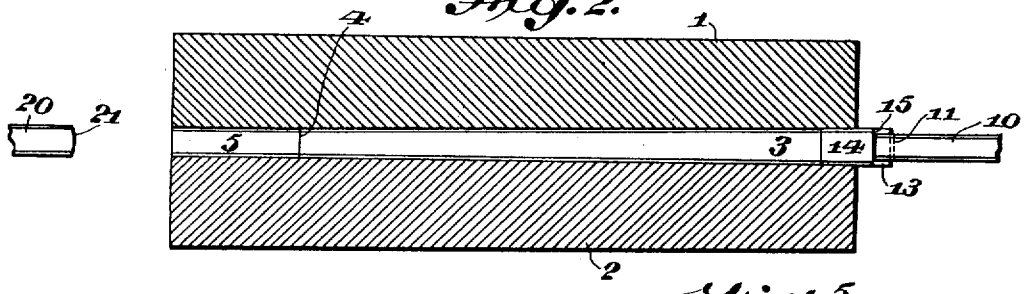


Fig. 3.

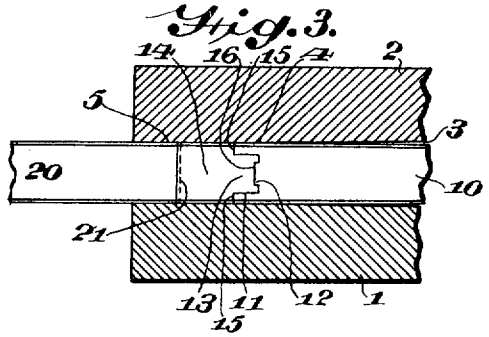


Fig. 5.

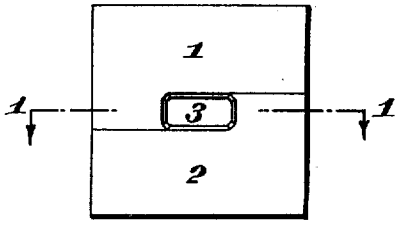


Fig. 4.

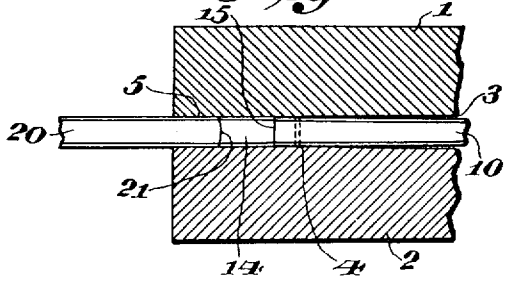


Fig. 6.

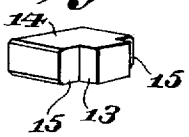
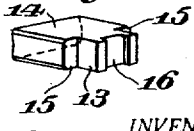


Fig. 7.



INVENTOR.

Fayette Leister

BY

Cyrus N. Anderson

ATTORNEY.

UNITED STATES PATENT OFFICE.

FAYETTE LEISTER, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF FINISHING THE CONTACT MEMBER OF A COMMUTATOR BRUSH.

1,405,049. Specification of Letters Patent. Patented Jan. 31, 1922.

Application filed August 11, 1920. Serial No. 402,902.

To all whom it may concern:

Be it known that I, FAYETTE LEISTER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented an Improvement in Methods of Finishing the Contact Member of a Commutator Brush, of which the following is a specification.

In one process heretofore employed in the manufacture of electrical contact members or elements for commutator brushes, a mixture of copper, lead and graphite in known proportions and in granulated or powdered form has been prepared and requisite portions thereof molded into the shape and form desired, these molded forms or parts being thereafter baked. It has been and is necessary after baking these parts to finish the same so as to bring them to the exact dimensions required and also so as to provide an accurate and exact contact surface thereon for contacting with a commutator ring. Heretofore the finishing of these contact parts has been effected by the use of cutting and abrading tools. This method of finishing these parts is expensive owing to the time required and, furthermore, does not always provide the smoothness and accuracy of finish desired.

It is the object of my invention to provide a process by the employment of which these partially completed contact parts or elements may be more economically finished into final form.

A further object of my invention is to provide a method or process of finishing the said contact elements or parts in such manner that the surfaces thereof will not only be polished and smooth but will be more condensed than is the case where the said parts or elements are finished or completed in accordance with the practice or method which heretofore has obtained and which at present obtains.

Although I have referred to only one process or method heretofore employed in the manufacture of contact elements or parts for commutator brushes, it will be understood that the method employed by me for finishing such contact elements or parts is not limited by the method by or according to which these elements or parts are shaped or formed or to the particular materials of which they consist.

The method embodying my invention may be employed in the finishing of such contact elements or parts without regard to the method or particular ingredients employed in their manufacture.

Other objects and advantages of my invention will be pointed out in the detailed description thereof which follows or will be apparent from such description.

In the accompanying drawing I have shown one form of device or apparatus by the employment of which the method of embodying my invention may be practised or carried out, but it will be understood that my invention is not limited to any particular form of apparatus.

In the drawing:

Fig. 1 is a longitudinal, sectional view of a device adapted for finishing a partially completed contact element or part of a commutator brush according to my invention, the said view being taken along the line 1—1 of Fig. 5;

Fig. 2 is a vertical sectional view taken at right angles to the view shown in Fig. 1;

Fig. 3 is a longitudinal sectional view of the left hand portion of the device showing the completion of an operation;

Fig. 4 is a vertical sectional view of the left hand portion of the device taken at right angles to the view shown in Fig. 3;

Fig. 5 is a view in elevation of the right hand end of the die shown in section in Figs. 1 and 2, the double lines associated with the opening therethrough indicating the different dimensions of the opening at the receiving and delivery ends thereof;

Fig. 6 is a perspective view of the contact element as shown in Figs. 1 and 2 of the drawing before being finished according to my invention; and

Fig. 7 is a similar view showing the said contact element or part after having been finished in accordance with my invention.

Referring to the drawing: 1 and 2 designate the co-operating elements of a two-part die provided with an opening extending therethrough. The portion 3 of said opening from the receiving end thereof to a transverse plane taken along the line 4 is tapered while the remaining portion 5 to the left of said

plane is of uniform cross section; that is to say, the opposing sides are parallel.

10 designates a plunger provided with a rectangular shaped notch 11 having a projection 12 in the bottom thereof. The portions of the end of said plunger on opposite sides of the notch 11 fit upon opposite sides of a projection 13 extending from the rear side of the main body portion 14 of the contact element.

The said element or member comprising the body portion 14 and the projection 13 from the rear side thereof as shown in Figs. 1, 2 and 6, is of the size and form prior to its subjection to the finishing operation. As shown in Figs. 1 and 2 the forward portion of the said contact element or member is shown as having just entered the receiving end of the opening of the die. It will be observed by reference to Figs. 1 and 2 of the drawing that when the forward end of the projection 12 is in contact with the outer end of the projection 13 the forward ends of the portions of the plunger 10 upon opposite sides of the notch 11 are slightly spaced from the surfaces of the shoulders 15 upon the contact element or member. The spaces between these shoulders and the ends of the portions of the plunger upon opposite sides of the notch 11 are of a width substantially equal to the height of the projection 12 in the bottom of the notch 11.

Although no attempt has been made to show exact dimensions in the drawing, in the construction of die as actually employed by me in the dimensions of the front or receiving end of the opening of the die are .381" x .760", while the dimensions of the opening at the delivery or finishing end of the die are .369" x .742". The width and thickness of the contact elements after having been molded and baked and before having been finished according to my invention are substantially the same as the dimensions of the receiving end of the die opening, while the width and thickness of the finished contact element or part are the same as the dimensions of the delivery end of the die opening as above stated.

It will be understood that these dimensions of the die openings and of the contact element or member may be varied or different from the dimensions above mentioned. Reference has been made to these dimensions merely for the purpose of indicating that by forcing the contact element through the tapered die opening it is compressed and condensed and reduced slightly in cross sectional area so that when finished it is of the exact cross sectional area desired or contemplated.

As the plunger 10 forces the contact element, comprising the body portion 14 and the projection 13 therefrom through the die opening the projection 12 presses into the metal of the projection 13 of the contact element so as to form the spring seat 16 therein, and the metal or other suitable material of the said contact element flows into the spaces upon opposite sides of the projection 12 to fill the same, as is clearly indicated in Fig. 3 of the drawing.

As the contact element or member is forced through the tapering portion 3 of the die opening the material thereof is not only compressed and condensed but simultaneously with such compressing and condensing the surfaces upon all four sides thereof are moving in contact with the inner surface of the sides of the die opening so that they are rendered very smooth. It will be seen, therefore, that by the employment of the method embodying my invention in the finishing of these contact elements or parts simultaneous condensing, smoothing and polishing of the surfaces thereof are effected.

After the contact element or member has been pushed by the plunger 10 into the portion 5 of the die opening the said plunger and contact element are allowed to come to a dwell or stop. During this dwell the plunger 20 is moved forward into the delivery end of the die opening in a direction opposite to that of the plunger 10. The surface of the end of the said plunger 20 is convex and cylindrical as shown at 21 and, when forced against the opposing end of the contact element or member with sufficient force, forms a groove therein which is concave and cylindrical. This concave, cylindrical surface constitutes the contact surface of the contact element. Immediately upon the formation of this concave cylindrical surface by the pressure of the end of the plunger 20 against the contact element or member, the said plunger 20 backs out of the die opening while the plunger 10 moves forward to push the contact element from the delivery end of the opening.

It will be seen that by my invention I have provided a method for finishing the contact elements or members of commutator brushes by the employment of which an economy in time is effected; but what is more important, a contact element or member is produced the material of which has been greatly condensed, and the contact and other surfaces of which are very smooth. The lateral or side surfaces of the contact element are condensed, smoothed and polished by combined pressure between the sides of the die and the said elements and relative movement between the said element and the said die, while the smoothness of the concave-cylindrical contact surface of said element is effected by pressure alone.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:—

1. The method of finishing the contact ele-

ment of a commutator brush which comprises the steps of laterally compressing the said element and causing simultaneous, relative movement between said element and the compressing means.

2. The method of finishing the contact element of a commutator brush which comprises the steps of laterally compressing the said element and causing simultaneous, sliding movement between the surface of said element and of the compressing means.

3. The method of finishing the contact element of a commutator brush which comprises the steps of compressing the same laterally and simultaneously polishing the sides thereof.

4. The method of manufacturing the contact element of a commutator brush which comprises the forming of the same to approximately the shape desired, and with dimensions slightly greater than the finished element, thereafter gradually reducing the cross sectional area of said element by pressure, and finally applying pressure to the contact portion of the element to form a contact surface thereon.

5. The method of manufacturing the contact element of a commutator brush which comprises the forming of the same to approximately the shape desired, and with dimensions greater than the finished element, baking the same, thereafter gradually reducing the cross sectional area of said element by pressure, and finally applying pressure to the contact element of said element to form a contact surface thereon.

6. The method of finishing the contact element of a commutator brush which comprises laterally compressing the same to reduce the cross sectional area thereof, and thereafter subjecting one end thereof to pressure to form a concave-cylindrical contact surface therein.

7. The method of finishing the contact element of a commutator brush which comprises laterally compressing the same, smoothing and polishing the sides thereof simultaneously with the compressing action, and finally subjecting one end thereof to pressure to form a concave-cylindrical contact surface therein.

8. The method of forming the contact element of a commutator brush which comprises the forming thereof to a size slightly larger than the finished element and thereafter subjecting the same to lateral and axial pressures to finish it.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand this 2nd day of August, 1920.

FAYETTE LEISTER.