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CONTACT BRUSH AND METHOD OF MAKING SAME

Filed Oct. 28, 1922

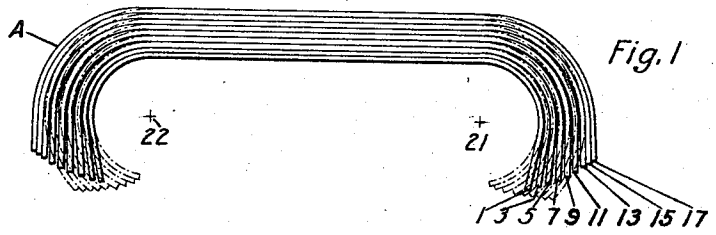


Fig. 1

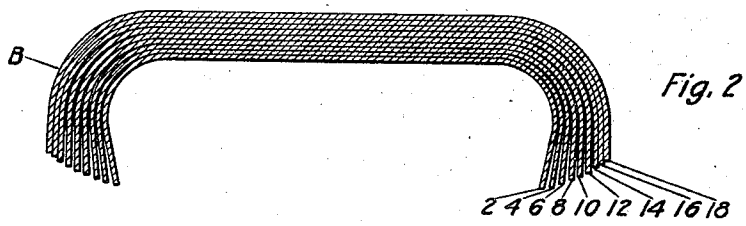


Fig. 2

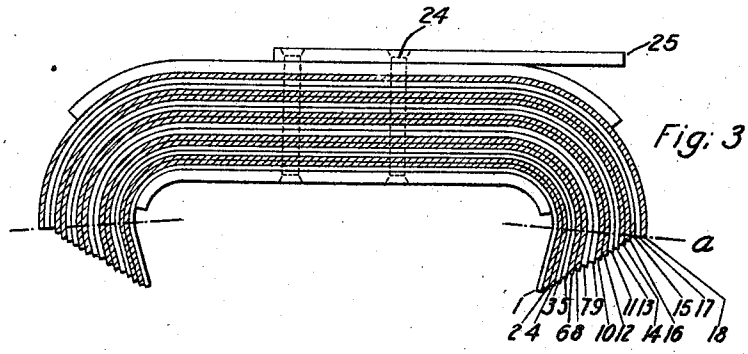


Fig. 3

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UNITED STATES PATENT OFFICE.

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CONTACT BRUSH AND METHOD OF MAKING SAME.

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My invention relates to such electrical contact brushes as are employed in connection with circuit breakers and to methods to making the same.

One object of my invention is generally to improve electrical brushes.

Another object of my invention is to provide an improved method for constructing such contact brushes.

It is also an object of my invention to provide a contact brush which has an inherent tendency to close itself and to prevent spreading between the ends of the several laminæ.

In contact brushes, as heretofore constructed, it has been customary to shape a large number of laminæ one at a time or to wind the lamination and then cut in two to make two brushes. In such a contact brush there is a tendency for the several laminæ to separate unless a strong spring is provided to hold the outer laminations against the inner ones. This tendency of the ends of the laminæ to separate, produces a poor electrical connection when the brush face is brought against a stationary contact member.

By my invention, I propose to so shape the several laminæ of my brush member that each lamina will have an inherent tendency to exert inwardly directed pressure upon its adjacent inner lamina. By this construction, I insure a good electrical contact at the face of the brush by reason of the tendency of the ends of each lamina independently to press against the fixed contact member.

Figure 1 is a side elevation illustrating, in dotted lines, the position assumed by a group of laminæ when being formed, and, in full lines, the position assumed by these laminæ upon the release of the bending pressure.

Fig. 2 is a view similar to Fig. 1, illustrating a group of laminæ similar to that shown by the full-line position in Fig. 1.

Fig. 3 is a side view of a contact brush made according to my invention.

In the manufacture of the preferred embodiment of my invention, I take a group A, comprising strips 1, 3, 5, 7, 9, 11, 13, 15, 17, of any suitable conducting metal, such as copper, and subject them to pressure.

The pressure which is directed by suitable tools, is continued until the ends of the laminæ are bent to approximately 145° to the main body portion of the group. This position is shown by dotted lines in Fig. 1. Upon the release of pressure, the laminæ tend to spread slightly and assume the respective full-line positions of Fig. 1.

It will be seen, however, that the ends of each lamina have assumed a fixed or set shape which is at least a right angle to the main body portion.

Points 21 and 22 of Fig. 1 indicate the axes about which the end portions are bent. It is to be observed that the radius of curvature of the inner lamina 1 is considerably less than the radius of curvature of the outer lamina 17. The intermediate laminæ have radii of curvature varying between the limits of laminæ 1 and 17, in accordance with their relative positions with respect to axes 21 and 22.

In Fig. 2, I have shown a group of laminæ B, similar to the group A of Fig. 1, which are shaded in order to distinguish from those of group A. These groups of laminæ are subjected to the same bending treatment and are similar in every detail. It is to be understood that I am not limited to the use of a pair of groups of laminæ, but I may employ as many groups as are made necessary by the size of the finished contact brush. In the case of very large brushes, certain of the groups may be initially bent on a slightly larger form than others, for reasons hereinafter to be described.

After the required number of groups of laminæ, A, B, have been prepared, I take lamina 1 from group A, and then fit laminæ 2 and 4, from group B, on the outside of lamina 7. I then place laminæ 3 and 5, from group A, outside lamina 2. I continue this alternate arrangement of the laminæ from the two groups in accordance with their radii of curvature until lamina 17 of group A is reached. Lamina 18, of group B, is then placed outside of lamina 17. It is to be understood that variations in the interleaving of the various laminæ may be made within the scope of this invention, as that shown is by way of illustration only.

The assembled laminæ are then fastened together by any suitable means, such as rivets 24, which may also serve to attach

the contact brush to a supporting member 25. The face of the brush is then trimmed along the line *a*—*a* of Fig. 3.

A contact brush made in accordance with this invention does not fray open at the contact face when its breaker is open because of the inherent set in each lamina, and, as the laminæ are assembled in relation to their progressively increased radii of curvature, each lamina exerts a pressure on its adjacent inner lamina. Because of this property, I am able to secure an inherent substantial initial pressure from the assembled brush member upon a fixed contact member in contact therewith, and, accordingly, it is necessary to exert mechanical pressure for a shorter distance on my brush than in those brushes heretofore constructed. By this construction I secure an adequate contact pressure with a very small brush deflection.

My invention is not limited to the particular structures or elements illustrated, as it may be variously modified without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim as my invention:

1. The method of making an electrical contact brush which consists in separately bending a plurality of groups of laminæ, interleaving laminæ from different groups and then securing the assembled laminæ together.

2. The method of making an electrical contact brush which consists in separately bending the ends of a plurality of groups of laminæ, interleaving the laminæ from different groups and then securing the assembled laminæ together.

3. A contact brush comprising a plurality of superimposed laminæ, certain of said laminæ possessing an inherent tendency to crowd the adjacent inner laminæ.

4. The method of constructing a contact brush which consists in bending a plurality of groups of laminæ about a mandrel, assembling the laminæ having the same radius of curvature into groups, then assembling the several groups in superimposed relation in the order of the magnitude of their radii of curvature.

5. The method of constructing an electrical contact brush which comprises separately bending the ends of a plurality of groups of laminæ, and then interleaving the laminæ of different groups.

In testimony whereof, I have hereunto subscribed my name this 9th day of October 1922.

WALTER M. AUSTIN.