

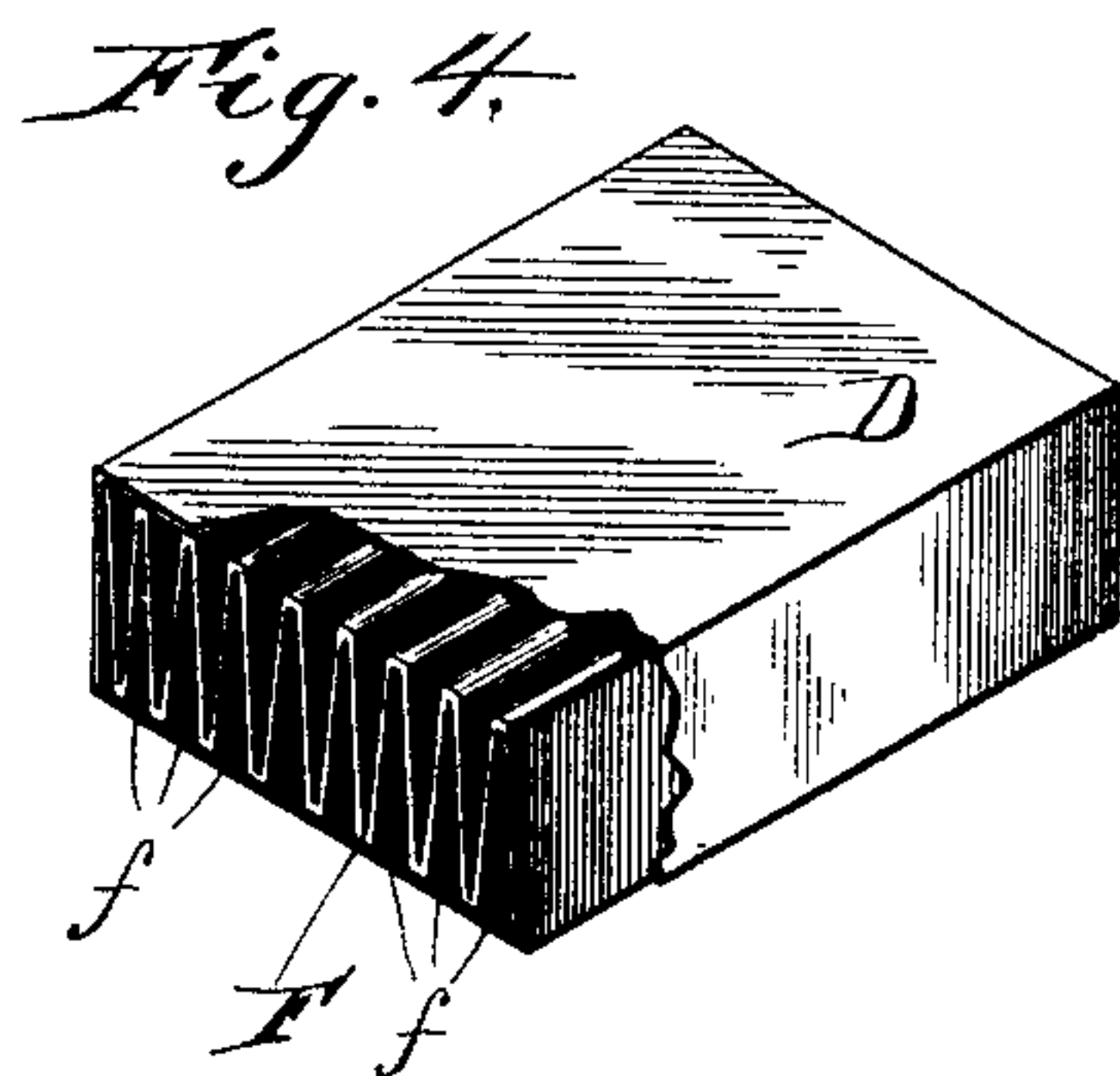
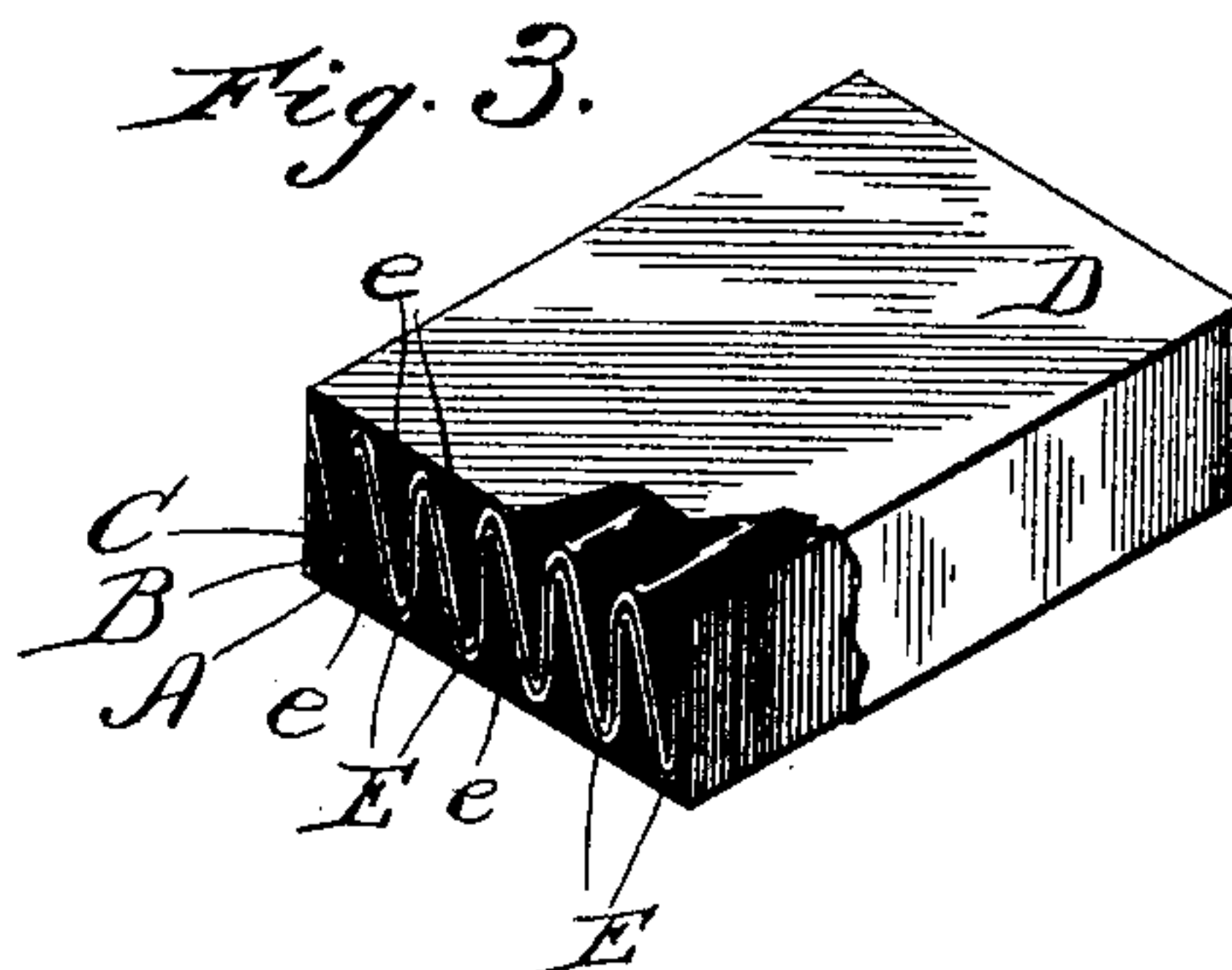
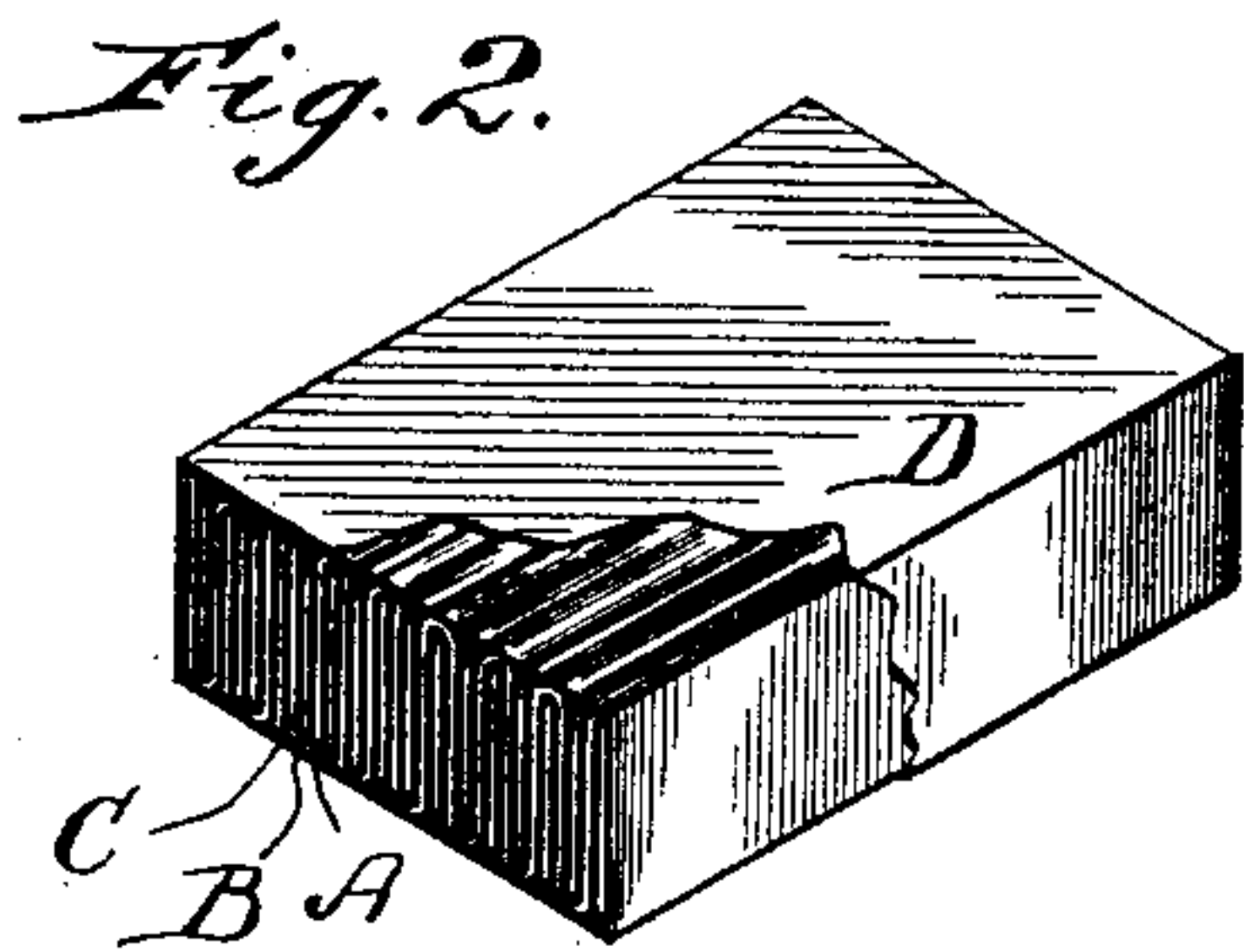
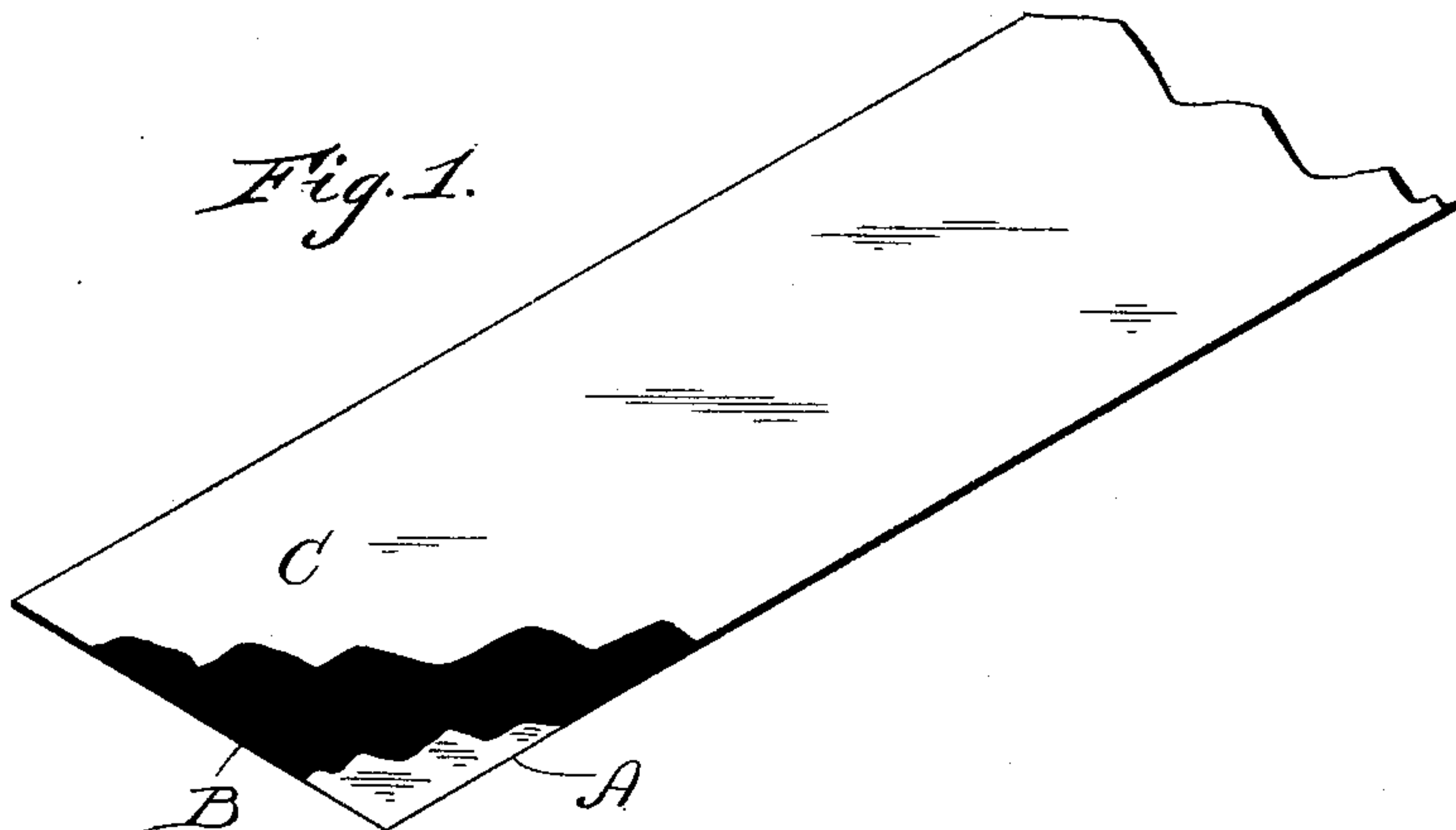
(No Model.)

2 Sheets--Sheet 1.

M. R. HIRSH.  
COMMUTATOR BRUSH.

No. 533,038.

Patented Jan. 22, 1895.



WITNESSES,  
*E. N. Hunt*  
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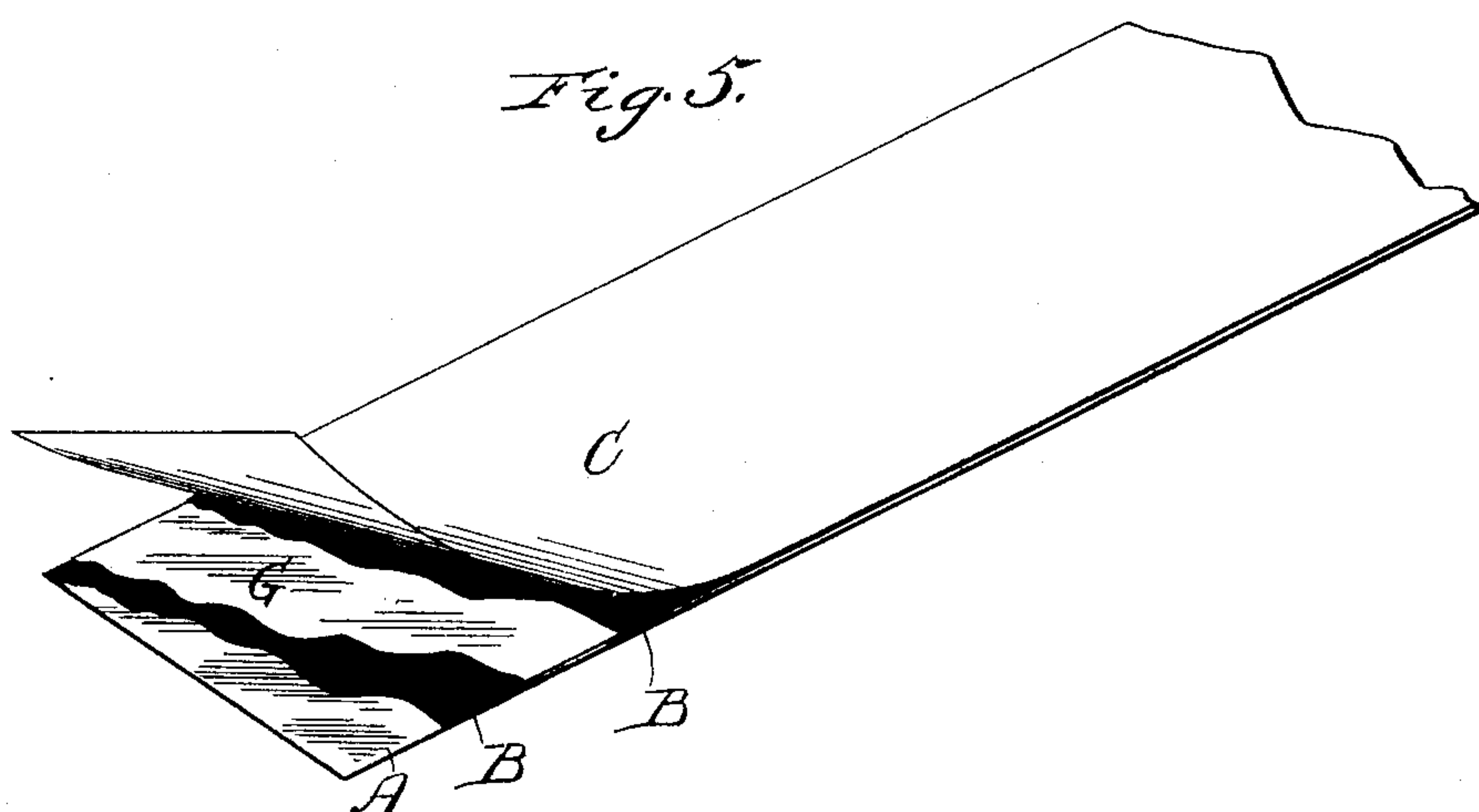
(No Model.)

2 Sheets—Sheet 2.

M. R. HIRSH.  
COMMUTATOR BRUSH.

No. 533,038.

Patented Jan. 22, 1895.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

MARIA R. HIRSCH, OF MILWAUKEE, WISCONSIN.

## COMMUTATOR-BRUSH.

SPECIFICATION forming part of Letters Patent No. 533,038, dated January 22, 1895.

Application filed May 31, 1894. Serial No. 513,031. (No model.)

*To all whom it may concern:*

Be it known that I, MARIA R. HIRSCH, a citizen of the United States, residing at Milwaukee, county of Milwaukee, State of Wisconsin, have invented a certain new and useful Improvement in Commutator-Brushes; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to new and useful improvements in the construction of commutator brushes, and consists in the matters hereinafter described and pointed out in the appended claims.

In the accompanying drawings illustrating my invention, Figure 1 is a perspective view of a sheet of prepared material from which one form of my improved brush is constructed. Fig. 2 is a perspective view of a commutator brush constructed from a sheet of material such as shown in Fig. 1. Fig. 3 is a perspective view illustrating a somewhat different form of my improved brush. Fig. 4 is a similar view illustrating still another form of my improved device. Fig. 5 is a perspective view illustrating still another form of composite sheet for the construction of my improved brush.

My invention consists primarily in the construction of a commutator brush from one or more sheets or films of metal which are repeatedly bent, corrugated or folded so as to form a block of the desired shape, and filling the interstices between the thicknesses or layers of said corrugated or folded sheets with a suitable lubricating material, such for instance as graphite, and finally uniting the layers or thicknesses by means of an exterior coating or layer of metal.

I may employ any one of several methods in the construction of my improved brush.

In Fig. 1 I have shown one form of the prepared sheet from which the block is formed, said sheet comprising a metallic film or layer A, upon which is located a film or layer B, of graphite or carbon, or combined graphite and carbon, as may be desired, and upon this layer B, is located a second metallic film or

layer C. This forms a composite sheet which is capable of being bent, corrugated or folded into any desired shape.

If desired, the thickness of the composite sheet may be increased to any desired extent by the addition of alternate layers of metal and the intervening material.

The composite sheet may be folded or corrugated in the manner shown in Fig. 2, so as to form a block of the desired shape, and the block compressed edgewise in such a manner as to firmly compress the corrugations and cause the thicknesses of the folded sheet to rest in close contact with each other. When the block has been thus formed, an exterior covering or sheath D of metal is applied in any convenient manner, as for instance, by electro-deposition, this exterior coating serving to firmly bind all of the thicknesses together, and securely retain the same in position.

In the particular form of construction shown in Fig. 3, the composite sheet is bent, folded or corrugated so as to form a block of the desired proportions, but the block is not compressed to the extent shown in Fig. 2, there being slight openings or spaces left between the thicknesses or corrugations E E, which are filled with a lubricating material, such as graphite as indicated in Fig. 3. The exterior covering or sheath D is applied in the same manner as before described, to secure the corrugated sheet in position.

If desired, the block might be made in the manner shown in Fig. 4, from a single sheet or thickness F, of metal, corrugated or bent to the desired shape, and the interstices f, between the corrugations thereof, filled with the lubricating material, as before described, and the whole bound together by the exterior coating or sheath D.

If desired, the lubricating material may be mixed with any suitable scouring or cleaning material, such as tripoli, finely pulverized ashes, whiting or the like, this scouring material serving to keep the commutator bright and clean.

If desired, when carbon as well as graphite or other lubricating material is required between the metallic layers, I find it convenient in constructing the composite sheet, to place upon the sheet or film A, a slight coating of



the lubricating material or combined lubricating and scouring material, then to place upon the lubricating material a sheet G of paper, to the upper surface of which is applied a coating of the lubricating or combined lubricating and scouring material, and finally to place upon the upper side of said lubricating material, a second sheet or film of metal. After the composite sheet has been thus formed, the paper layers between the metallic films may be carbonized by heating the composite sheet to a high temperature, or if desired, the composite sheet might be bent to the desired shape to form a block of the proper size and proportion, and the exterior coating or sheath D applied thereto, previous to heating the same, and carbonizing the paper.

By the described construction, the corrugated or folded sheet is continuous throughout the entire block which forms the brush, and thus affords greater conductivity than if the brush were made up of separate strips or wires, while by the application of the sheath or external coating D by electro-deposition of the metal, said sheath is rendered firmly adherent to the edges of all the corrugations, and any slight unevennesses between adjacent corrugations will be filled by the metallic deposit, thereby establishing perfect electrical contact with all the corrugations throughout the entire block.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A commutator brush comprising a metallic sheet corrugated, folded or bent so as to form a block of the desired shape and proportions, and having a filling of lubricating material located in the interstices between said corrugations, substantially as described.

2. A commutator brush comprising a metallic sheet corrugated, folded or bent to form a block of the desired shape and proportions, and having a filling of lubricating material located in the interstices between said corrugations, and a covering or sheath of metal, se-

cured to the outside of said block and in electrical connection with the edges of the corrugations of said sheet, throughout the block, substantially as described.

3. A commutator brush formed from a composite sheet consisting of alternate layers or films of metal and a lubricating material, and bent, folded, or corrugated so as to form a block of the desired shape and proportions, substantially as described.

4. A commutator brush formed from a composite sheet consisting of alternate layers or films of metal and a lubricating material, and bent, folded, or corrugated so as to form a block of the desired shape and proportions, and a covering or sheath of metal secured to the outside of said block, and in electrical connection with the edges of the corrugations of said sheet throughout the block, substantially as described.

5. A composite sheet for the construction of commutator brushes consisting of alternate layers or films of metal, and lubricating material substantially as described.

6. A composite sheet for the construction of commutator brushes, consisting of alternate layers or films of metal and combined lubricating and scouring or cleansing materials, substantially as described.

7. A composite sheet for the construction of commutator brushes, consisting of alternate layers or films of metal and lubricating material, and material capable of being carbonized, substantially as described.

8. A composite sheet for the construction of commutator brushes consisting of alternate layers or films of metal and combined lubricating material, scouring material and material capable of being carbonized, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MARIA R. HIRSCII.

Witnesses:

JOHN E. WILES,  
M. M. WILES.