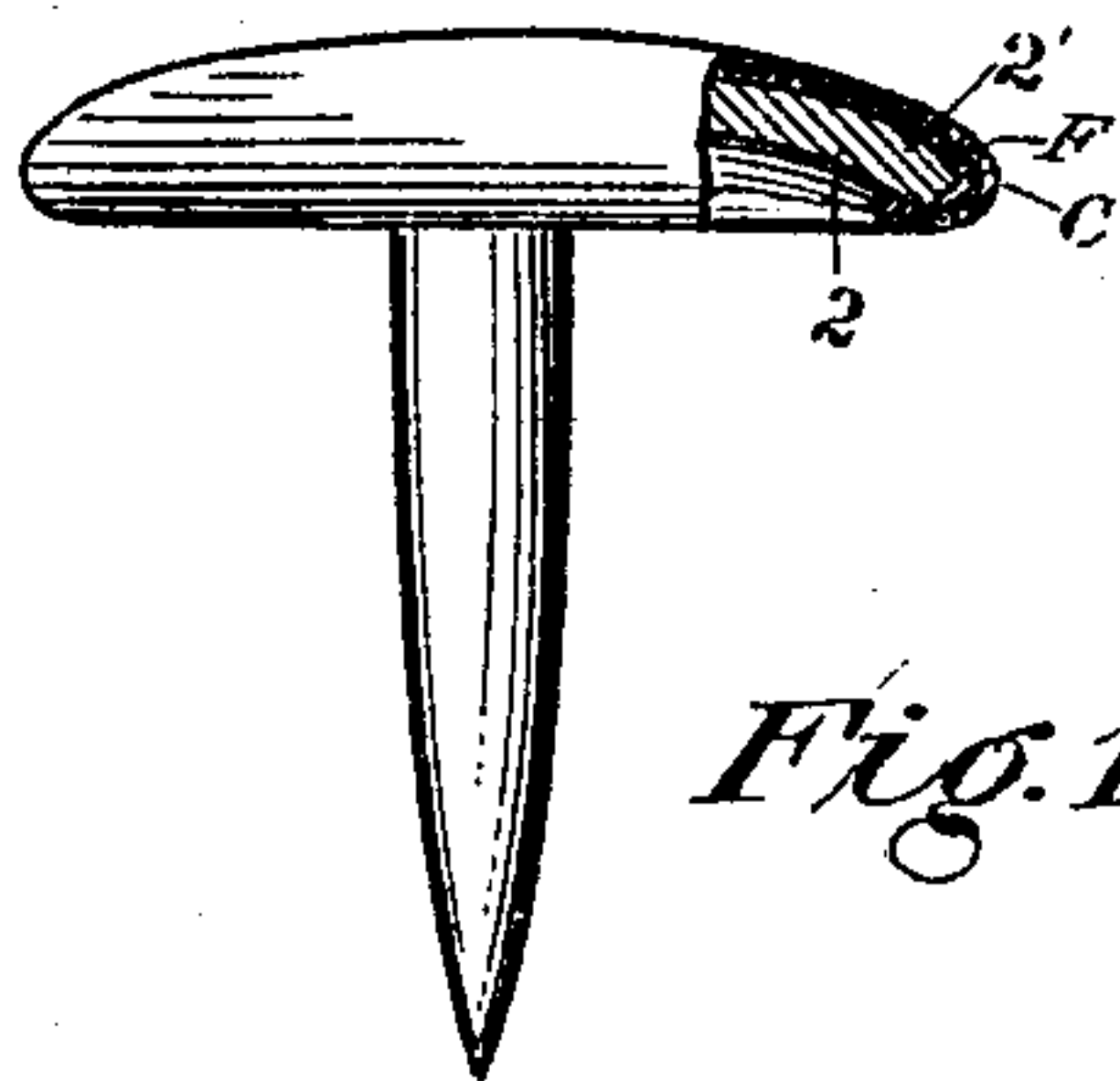
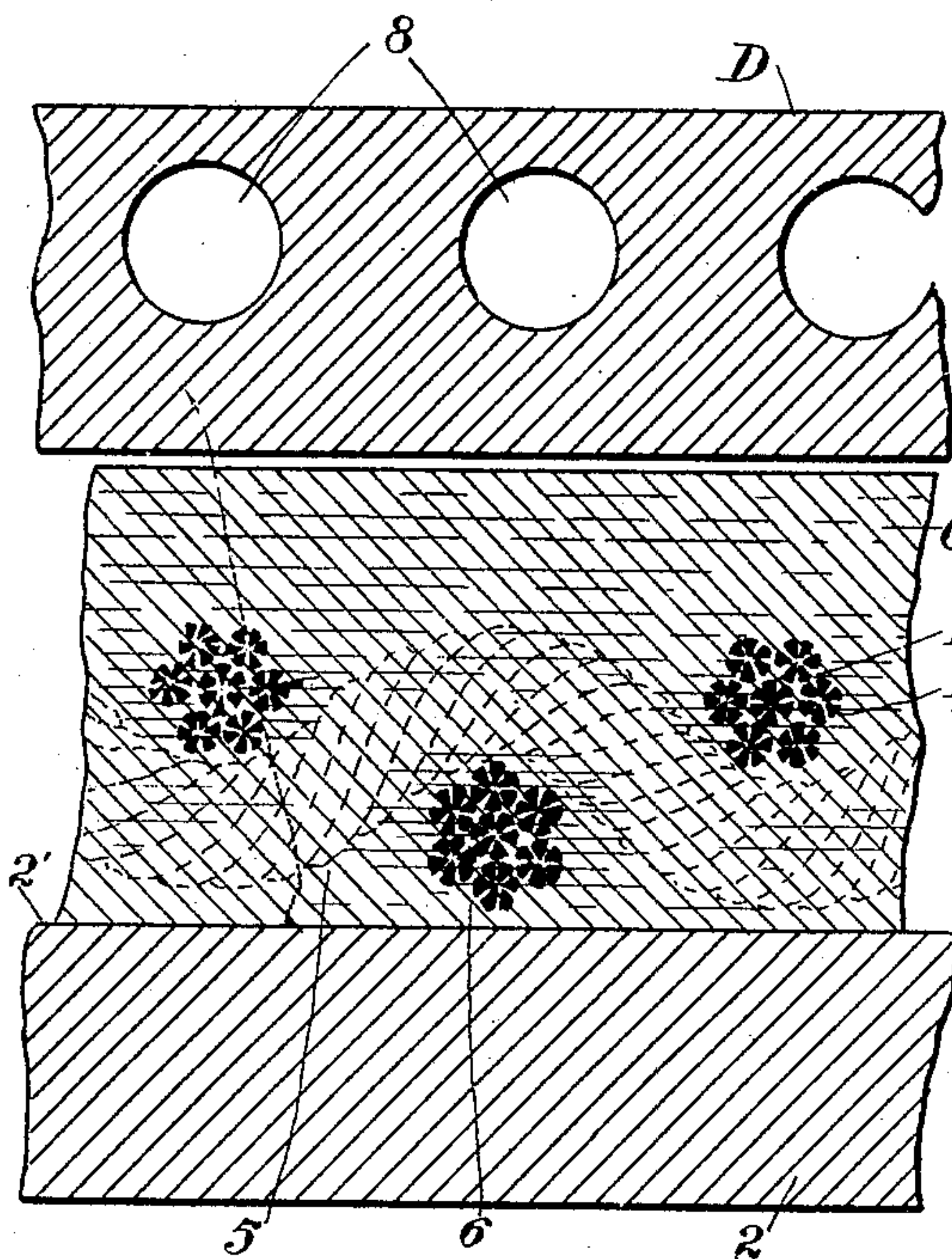
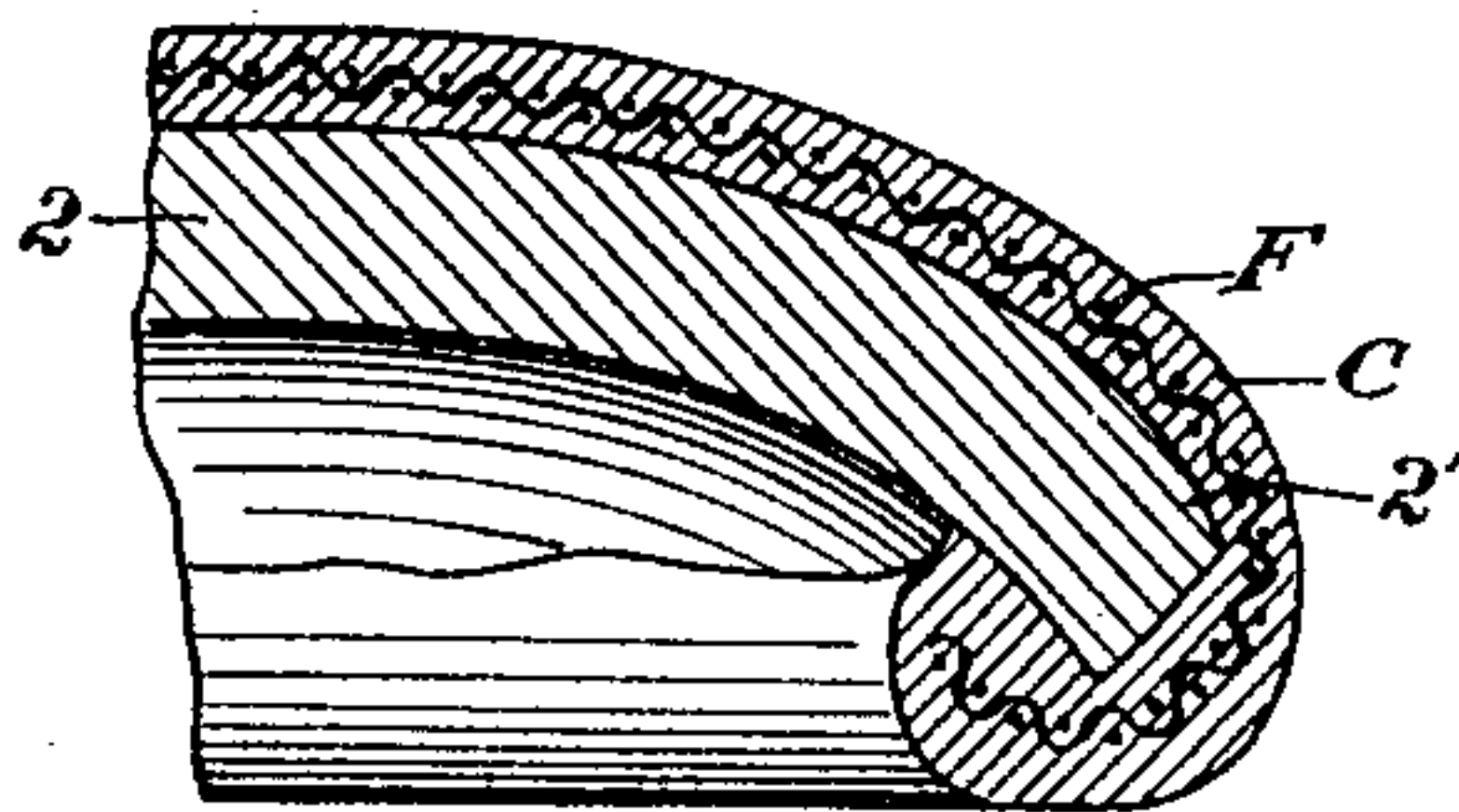


E. KEMPSHALL.  
ART OF COVERING METALLIC ARTICLES.  
APPLICATION FILED JAN. 20, 1902.

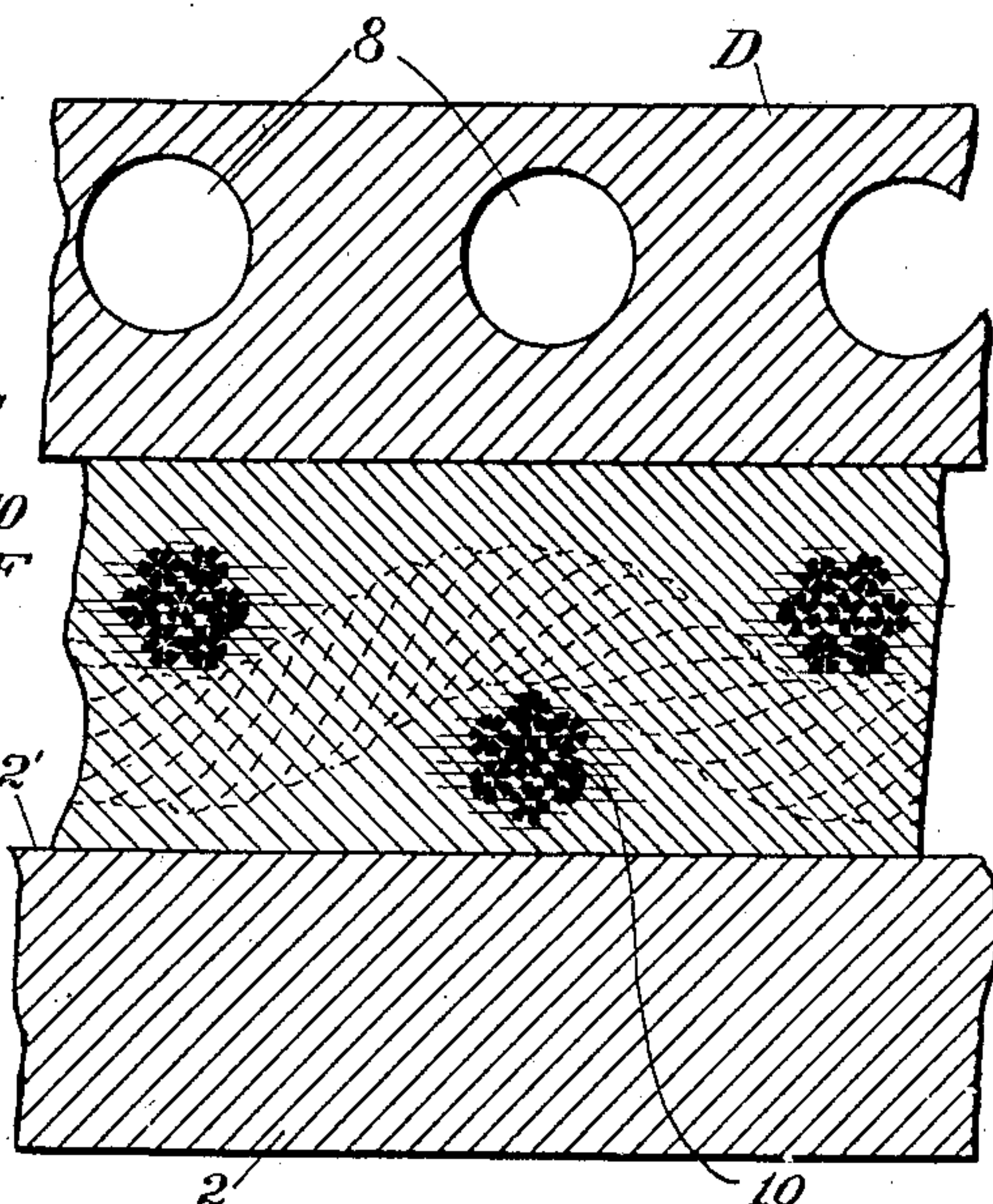


*Fig. 1.*

*Fig. 2.*



*Fig. 3.*



*Fig. 4.*

*Witnesses:*  
*Robert Head*  
*R. W. Pittman*

*Inventor:*  
*Eleazer Kempshall,*  
*By his Attorney,*  
*F. H. Richards.*



# UNITED STATES PATENT OFFICE.

ELEAZER KEMPSHALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO  
MANHATTAN MANUFACTURING COMPANY, OF PORTLAND, MAINE,  
A CORPORATION OF MAINE.

## ART OF COVERING METALLIC ARTICLES.

No. 805,470.

Specification of Letters Patent.

Patented Nov. 28, 1905.

Application filed January 20, 1902. Serial No. 90,443.

*To all whom it may concern:*

Be it known that I, ELEAZER KEMPSHALL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in the Art of Covering Metallic Articles, of which the following is a specification.

This invention relates to metallic articles combined with a facing of celluloid or like substance applied to the metal as a covering and as a wear-resisting surface or face; and it is one of the principal objects of the present improvements to furnish articles of this class in which the faced metal surface shall be provided with a limiting component for receiving the wear or attrition to which the article is subjected in actual use when the extreme outer surfaces of the original article shall have been slightly worn away and at the same time to provide means for such purpose of the character which will during the manufacture of the article secure certain advantages as regards the process of manufacture and certain important advantages as regards the article itself when completed.

It will be remembered that articles of the celluloidal class are ordinarily produced and formed into shape while the material is in a state of saturation to a more or less high degree with a solvent used in the original preparation of such substances, and which when any article is made therefrom is gradually dissipated, as by evaporation. Also it will be evident that such solvents as are employed in this art being of a volatile and highly efficient nature are increased in efficiency by the application of heat, and that when a piece of such prepared substance is put under pressure between inclosing dies (as generally required in making articles of the character referred to) the die-surfaces close in upon the substance in such a way as to prevent any further dissipation of the residue of solvent then remaining in the substance, which may be said to be for the time being hermetically sealed by and within the inclosing die or dies. Furthermore, in such manufacturing operations as applied to said class of materials when these are formed in contact with a metallic surface to be covered thereby the heat and pressure, each of a relatively large amount, necessary for the proper formation

and condensation of the substance operates to highly expand the residue of solvent within the article and also to force out such solvent to the surface or near to the surface of the layer or body of said substance, and by this means I apprehend the said residue of solvent tends to form between the mass of celluloid of like substance and the said metallic article upon which such substance may be applied a film or layer of the solvent, which is thus brought into immediate contact as a solvent with the said metallic surface, and thus by reason of the solvent filling the interstices of the material immediately upon the metal article prevents such material from adhering to the metal article both by reason of the intervening layer thus for the time being formed of the solvent and also by reason of the increased effect so for the time being produced of the solvent upon those particles or atoms of the substance itself which lie directly upon the metal surface.

It is one of the principal objects of my present improvements to provide means for overcoming these objections and at the same time by so doing secure a highly-improved result and produce a faced metallic article durable and efficient in character and adapted to be made with a minimum of material in the surface coating and the surface coating furnished with means for reinforcing and strengthening it and for more efficiently distributing the effects of wear and attrition over the entire article.

In carrying out my present improvements, which are applicable to metallic articles of a wide variety, including buttons, picture-nail heads, buckle-frames, and metal articles generally, I first prepare by suitable and well-known methods of manufacture a material of a celluloid class having a solvent substance distributed therein and subject this substance to seasoning or drying until the solvent is reduced to a relatively small amount insufficient to dissolve the material at ordinary atmospheric temperatures, and this material is then by means of heat and pressure treatment combined with and into a layer or sheet of fibrous material of the general character of a fabric, so that such "fabric" will be adjacent to one surface of the mass of the celluloid substance. This term, for convenience, I apply to the said class of materials generally.



In the accompanying drawings, illustrating my present improvements, Figure 1 is a side elevation, partially in section, of a metallic article made in accordance with my present invention and having on the metallic body or base portion of the article a facing layer. Fig. 2 is an enlarged view corresponding with the sectional portion of Fig. 1 and illustrates in a diagrammatic manner the construction of the faced metallic article and of the composite facing layer thereon. Fig. 3 is an enlarged and fragmentary view, somewhat diagrammatic in character, illustrative of the manufacture of faced metallic articles in accordance with my present improvements. Fig. 4 is a view corresponding to Fig. 3, but showing the faced layer subjected to compression upon the body or base portion of the article.

Similar characters designate like parts in all the figures.

In Fig. 1 the body-piece or base for a faced metallic article is designated in a general way by 2, and this base will of course be of such particular character in any given instance as may be suitable for the particular finished article to which the facing is to be applied. The fibrous component, which is preferably a woven fabric, having a mesh through which the celluloid substance may freely pass under heat and pressure treatment is designated in a general way by F. In practice the metallic base will of course be suitably supported by dies or like devices during the manufacture of the finished article; but in the accompanying drawings I have not deemed it necessary to illustrate such dies. In Fig. 3 the facing layer prepared for application to the metallic article 2 is shown resting against said article and with the fabric F located within the celluloid mass C contiguous to the surface of said metal portion 2. This diagrammatic view illustrates the celluloid substance passing between and among the intermeshing strands 5 and 6, respectively, of a fabric that is woven, this being formed of such fabric which I prefer to employ. For compacting and uniting the components of the facing-sheet C and at the same time embedding firmly onto the metal surface 2' of the body-piece 2 a suitable metal die, such as D, Figs. 3 and 4, may be employed, and for the purpose of heating and cooling said die, which will ordinarily be done alternately at each operation of making a faced metallic article, the die may be provided with openings, as 8, whereby the heating and cooling current may be circulated through the said die or instrumentality D; but in some cases other means of heating and cooling the dies may be employed. In Fig. 4 the die D is shown forced against the sheet C, thereby compacting and uniting the same and embedding the material thereof firmly against the metallic article 2. This operation evidently tends, as indicated diagrammatically in this figure, to compress the said strands

5 and 6 and at the same time to force the celluloid substance into these spaces, which lie between the outermost fibers of the material of the fabric strands.

In the drawings the fabric is represented as being a woven fabric made of strands of a combined or composite construction, and this fabric is shown in Fig. 3 (which is drawn on a greatly-enlarged scale) lying in immediate proximity to the surface 2' of the metal article 2. The mass of celluloidal substance is indicated at C, and by means of the shading and stippling of the figure of drawings I have roughly represented in a diagrammatic way the material forced more or less within the spaces of the strands which make up the cords which are woven into the said fibrous layer; but in said strands certain portions are represented unfilled, and in practice it will be found that the fibers of the fabric material and the cords made up of said fibers are adapted when the process of manufacture is carried out properly therefor, to retain within them some space, as 10, not entirely filled by the flowing in among the fibers of the said celluloid material. When the sheet C has been thus combined at one side thereof with and into the fibrous sheet or layer and this composite sheet is applied to the metal surface 2' and a forming-die, as D, is applied to the sheet C with heat and pressure, the material C will be forced upon the article 2, and by reason of the ductile and compressible character of said material C this will be forced upon the surface 2' of said article to accurately and completely conform thereto; but, as already pointed out, this operation hermetically seals for the time being the said body C between the faces of the article 2 and the die D, and so prevents for the time being a further escape of the solvent from the substance of the mass C, notwithstanding the tendency of the heat and pressure to very largely expand, and so drive out the said solvent and notwithstanding that the heat tends naturally to increase the power of the solvent upon the substance of the mass C. By reason of the interstices or spaces within and among the fibers and cords of the fabric, these being located in immediate proximity to the surface 2', these spaces are now able during the process as carried out as set forth to receive therein an essential proportion of the solvent that is at the same time squeezed out from among the atoms of the celluloid substance by the combined action of the heat and pressure, and by reason of this pressure being of a large amount, whereby the material is forced into an overdense form, which density will naturally increase with the expulsion of the solvent therefrom, more of the solvent naturally flows into the said fabric interstices or spaces, thus still further freeing the substance itself from the residuum of solvent which permeated the same at the beginning of the die action,



and by reason of the fabric lying close to the metal surface 2' naturally the said residuum of solvent will flow most directly into said interstices from that portion of the mass C which is in immediate contact with the surface 2'. By means of this organization of the several components of the complete article the fibers and cords of the fabric (when a woven fabric) lie immediately adjacent to the surface 2' of the article, and so constitute when the article is in use a limiting device or element for receiving the attrition and wear when the mass C shall have been worn off on its outer surface to any considerable extent. At the same time by reason of the mass C extending somewhat beyond the outer boundary of the said fabric material the outer surface of such mass is formed by the die action into a highly condensed and polished surface of beautiful appearance and perfectly adapted for receiving impressions and figures of various kinds, such as ornamental designs, &c., without interference from the fabric embedded therein. At the same time the strands and fibers of said fabric engage and interlock within the mass of the material, thereby assisting in holding the same in place even when the layer C has been subjected to bruising and abrasion to a very large extent, and when the article has thus been completed the strands and fiber of the fabric act after the manner of conduits for distributing and assisting in this final dissipation of the solvents which during the process of manufacture become stored within the interstices and spaces thereof, so that the fabric applied in connection with the other components of the article and in accordance with my present improvements in the manufacture of faced metal articles has numerous and important utilities, the leading features of which I have already alluded to.

It will of course be understood that the celluloid substance being naturally of a semigranular or semifibrous character, usually much pressure will be required to force it into very small spaces, whereas the solvent being substantially a gaseous material during the final operation will flow in among the interstices with greater freedom when the substance is subjected to sufficient heat under high pressure.

One feature of my present improvements relates to the preliminarily-prepared and partially-seasoned sheet material for the facing layer of the article, such sheet material having the fibrous strands contained within the celluloid substance, and such strands operat-

ing during the latter stages of the manufacture to limit the advance of the forming-die toward the metal face of the article, to thereby prevent the die from coming into actual contact with such portions of the metal face as may, by reason of any irregularity in the construction of the metal body-piece, extend beyond the true or proper position for such face. By this means the flowage of the partially-seasoned celluloid substance, when this is subjected to the heat-and-pressure treatment, is prevented from extending so far as to endanger the proper formation of the facing, and thus I substantially overcome any liability of such irregularity in the formation of large numbers of articles of a given kind as would cause any considerable percentage of the articles to be imperfectly formed, and so become a loss to the manufacturer. By this means also the uncovering of portions of the surface is prevented, due to gradual wear while the finished articles are in use.

Having described my invention, I claim—

1. As an article of manufacture, a faced metallic article comprising a metal body-piece and a facing covering a surface of such body-piece and composed of a celluloid substance which is plastic when subjected to heat and pressure and which has incorporated therein a fibrous structure with spaces unfilled with the celluloid substance and located within the mass of such substance in position for receiving some of the solvent remaining in such substance during the heat-and-pressure treatment whereby the facing is made into shape on the metal surface.

2. As an article of manufacture, a solid metallic portion combined with a facing layer composed of celluloid substance having distributed therein composite strands of fibrous material whose interior spaces are only partially filled with the celluloid substance.

3. A faced metal article consisting in a metallic portion faced with a composite facing layer comprising a plurality of sheets of celluloid substance free of the principal part of the solvent originally existing therein and an intermediate sheet consisting of a fabric incorporated with such celluloid substance having a larger portion of solvent, said several sheets combined into a single sheet and firmly seated on the metallic portion through subjection to heat and pressure.

ELEAZER KEMPSHALL.

Witnesses:

B. C. STICKNEY,  
JOHN O. SEIFERT.