B. J. SWEENEY.

COMPOSITE METALLIC SHEET AND METHOD OF MAKING SAME.

APPLICATION FILED SEPT. 25, 1919.

1,383,172. Patented June 28, 1921.

FIG. 1

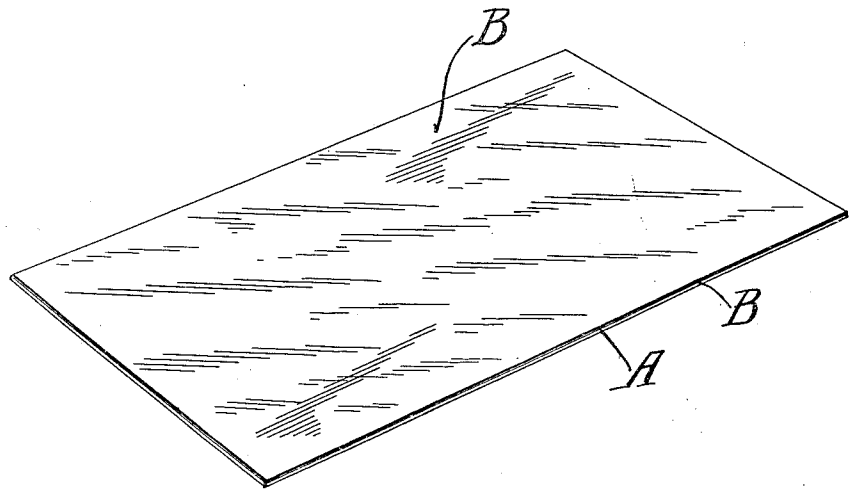
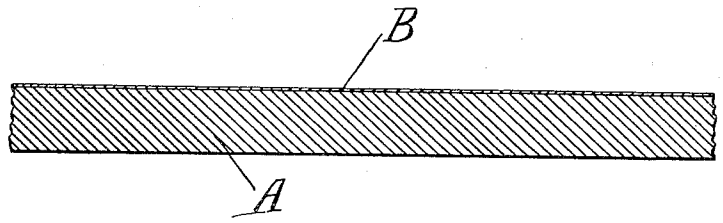


FIG. 2



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COMPOSITE METALLIC SHEET AND METHOD OF MAKING SAME.

1,383,172. Specification of Letters Patent. Patented June 28, 1921.

Application filed September 25, 1919. Serial No. 326,336.

To all whom it may concern:

Be it known that I, BERNARD J. SWEENEY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Composite Metallic Sheets and Methods of Making Same, of which the following is a specification.

This invention relates to a composite metallic sheet, and has particular application to a novel and peculiar impression-taking blank or sheet adapted especially for use in the electroplating art.

In the electroplating industry there is practiced what is commonly known as the "lead molding process" which consists in subjecting a sheet of pure lead to pressure against a positive plate or die usually composed of a hard metal such as steel. After the impression has thus been taken on the lead blank so that the elevations and depressions and details of the original plate or die are faithfully reproduced, the impressed side or matrix face of the lead blank is subjected to an electroplating copper bath, care being taken to keep the back or unimpressed face of the blank free from the copper solution. Of course the electroplating process produces the usual copper shell on the lead matrix, and after the process is completed the matrix with the imposed copper shell is removed from the bath, and the shell stripped from the matrix and suitably backed up thus forming an electroplate. One of the reasons for the employment of pure lead for the matrix blank is that this metal is relatively soft and possesses a certain amount of ductility so that when under pressure against the original plate or die it may be forced or worked into intimate contact with the face of the latter to accurately reproduce necessary depressions and elevations and the fine details. In this respect a pure lead blank will be found superior to the usual alloy of tin and lead, for example, because such alloy is too hard and not sufficiently ductile to produce satisfactory results under the relatively low pressure employed in the molding process. In addition such an alloy is relatively expensive when compared with the pure lead, and this factor of course is another element militating against the use of the alloy in this process of the electroplating art. On the other hand there are certain disadvantages incident to the use of the pure lead blank or sheet for this purpose. For example the faces of the lead blank present a dull appearance as contradistinguished from the bright or polished surfaces exhibited by certain other metals, such as tin. These faces of the lead sheet oxidize very rapidly so that in every electroplating establishment it is necessary to employ skilled workmen to clean the surface of the blank before it can be used in taking the impression against the original die or plate. This cleaning operation is usually performed by brushing the surface with a solution of benzin and beese wax and then polishing with graphite. All this is time consuming and expensive.

In the present instance I have provided a composite metallic sheet, for use in the electroplating art along the lines above indicated, wherein the disadvantages incident to both the pure lead blank and alloyed blanks are entirely eliminated. Preferably I form the impression face of my sheet of an exceedingly thin film or pellicle of tin although any other facing of a metal which will not oxidize in the manner of the lead sheet, but which will present a bright highly polished surface, may be employed. By the use of such a non-oxidizing face the brushing and cleaning operation may be entirely eliminated and the sheet may be used without any such preliminary treatment. However as the body of my composite sheet is composed of lead and as the non-oxidizing facing, for example tin, used on this body of lead is so exceedingly thin as to constitute a mere foil-like skin of minimum thickness, the pressure-opposing or resisting characteristics of tin are entirely absent and the composite sheet possesses a ductility, softness and flow substantially equal to that of a pure lead sheet of similar dimensions, so that the depressions and elevations and the fine details of the original die or plate may be reproduced to the highest degree under relatively low pressure. Furthermore as the back of the lead body of my sheet will rapidly oxidize, such oxidization will prevent the accumulation of the copper on the back when the sheet is in the bath, thus preventing a useless and expensive depositing of copper on the negative side of the matrix.

It is also my purpose to provide a composite sheet which may be manufactured and marketed at a cost substantially equal to that

of the ordinary pure lead sheet while possessing superior advantages in the respects heretofore recited.

With the above recited objects and others of a similar nature in view my invention consists in the composite sheet or blank and in the method of making the same set forth in and falling within the scope of the appended claims.

In the accompanying drawings:

Figure 1, is a perspective view of a composite blank embodying my invention,

Fig. 2, is a cross sectional view thereof.

The views in the drawing are shown when the thickness of the sheet is considered in an enlarged or exaggerated scale, for in actual practice the total thickness of an ordinary sheet is for example about one-sixteenth of an inch or even less.

Referring now to the accompanying drawings in detail, the letter A designates the body or base of my composite sheet and is composed preferably of a single thickness of pure lead. Imposed upon this base A so as to form a face thereof is a second sheet B of any suitable non-oxidizing metal, such as pure tin, to which I herein refer for the purpose of illustration. This facing sheet B, which subsequently forms the compression or matrix face and is adapted to be brought into contact with the original plate or die in forming the matrix, is so exceedingly thin that it constitutes nothing more than a pellicle or foil-like skin covering the lead body A. It is intimately united with the lead body A by continuous and repeated rolling until, through its entire area, this tin facing is to all intents and purposes made an integral part of the lead body. When this intimate union has been completed the composite sheet is ready for use for making an electroplate matrix in the manner hereafter described. The extreme thinness of the tin facing or pellicle will be appreciated when I mention that in actual practice the tin contents may constitute but one per cent. of the total of the composite sheet, that is to say that the proportion of tin to lead will be as of one per cent. to ninety-nine per cent. Of course these proportions may be varied somewhat but I have found those given are well adapted for my purpose. By making the tin facing of such extreme thinness I do not interfere with the ductility of the lead body nor its ability to stretch and work in the pressing operation, so that I retain the advantage of enabling the composite sheet to be manipulated to bring it into intimate contact with all the depressions and elevations of the original die or plate, thereby reproducing every detail, while at the same time I obtain a bright or polished tin face for the sheet, which will not oxidize and which does not require to undergo the costly and tedious process of brushing and cleaning. With such a sheet the matrix produced in the pressing operation heretofore mentioned may be made by the usual "cold process," that is to say the pressure may be applied to form the matrix without resorting to the use of heat.

I am aware of the fact that it has hitherto been proposed to apply a facing or layer of tin to a metallic base or body, but I know of no prior product having the peculiar attributes of my invention and capable of the use to which it is particularly adapted, that is to say to the facile taking of impressions under the molding pressure employed in reproducing the impression surfaces of printing plates and dies. In these prior structures the nature and dimensions of the tin facing, or the characteristics of the metallic base or body have been such as to render the prior combination useless for this impression-taking purpose. Therefore, I believe myself to be the first to have devised the combination of an exceedingly thin skin or pellicle of any non-oxidizable metal such as tin and a base or body of lead in such selected proportions as to enable me to obtain the accurate reproduction of an impression surface of a printing plate or die to the minutest detail, and this under the ordinary molding pressure employed in this art. And this desired purpose I accomplish by taking advantage of the ductility and capability of manipulation of the lead thereby compelling the thin non-oxidizing metallic surface to flex or bend in conformity with the movement of the lead under such low molding pressures.

While I have herein shown and described a preferred embodiment of my invention I wish it to be understood that I do not confine myself to the precise proportions, nor to the specific use, nor to the details herein set forth; as modification and variation may be made without departing from the spirit of the invention nor exceeding the scope of the appended claims.

What I claim is:

1. A composite sheet for the making of impression molds for use in the manufacture of printing plates comprising a relatively thick sheet of lead adapted to receive the impression and a facing therefor comprising an exceedingly thin pellicle or film of a non-oxidizing metal united with the lead sheet.

2. A composite sheet for the making of impression molds for use in the manufacture of printing plates comprising a relatively thick homogeneous sheet of lead adapted to receive the impression and a facing for one side thereof comprising an exceedingly thin homogeneous film of rolled tin.

3. A composite sheet for the making of

impression molds for use in the manufacture of printing plates comprising a homogeneous lead sheet and a homogeneous film of tin intimately united with and forming a facing for a lead sheet, the proportion to the composite sheet being approximately ninety-nine per cent. of lead to one per cent. of tin.

4. The herein described method of making composite sheets for use in the manufacture of impression molds for printing plates which comprises imposing an exceedingly thin homogeneous sheet of a non-oxidizing metal upon a body of lead adapted to receive the impression and subjecting the same to continuous rolling to intimately unite the imposed sheet to the lead, thereby forming a ductile composite sheet readily workable under low pressure.

In testimony whereof I have hereunto set my hand.

BERNARD J. SWEENEY.