

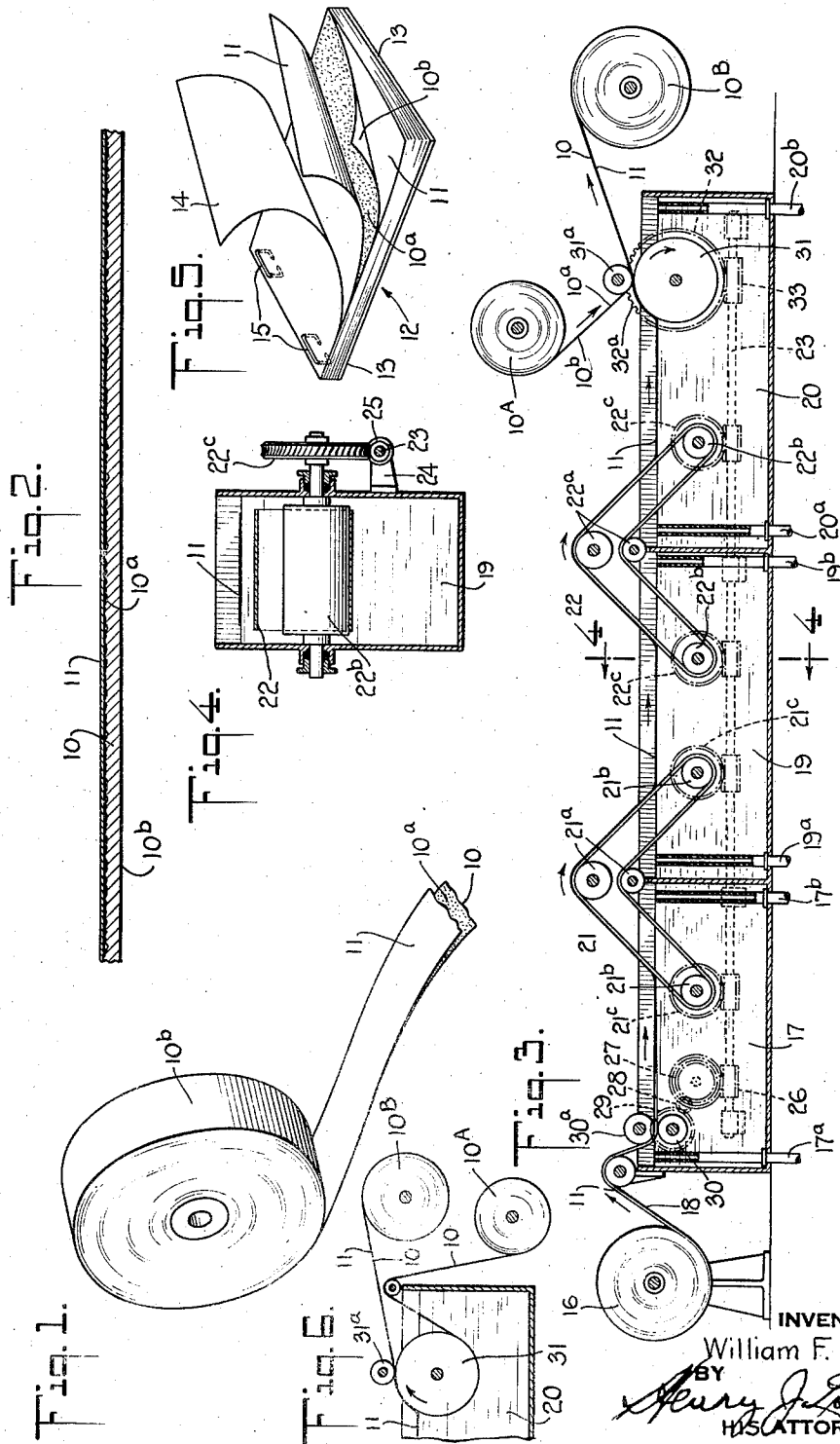
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METHOD OF MOUNTING A METALLIC FILM ON A CARRIER

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METHOD OF MOUNTING A METALLIC FILM  
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4 Claims. (Cl. 154-2)

My present invention relates to the method of mounting a film of gold or other metallic foil on an indefinite length of paper serving as the carrier.

5 My invention is particularly directed to gold in film form, that is to say, having a thickness of that of beaten gold, viz., of approximately one two-hundred-and-fifty thousandths of an inch.

10 By the term gold I include alloys of gold or other suitable metal or other mixtures of gold and/or of other suitable metal or metals.

An object of my invention is to provide a continuous film of gold which is freely mounted on an indefinite length of paper or equivalent carrier, such free mounting including the support of the film upon the carrier by free mechanical or equivalent contact therewith.

15 As instances of embodiments of the present invention, the metallic film is supported on the paper or other carrier as by employing a paper strip having its one face calendered or otherwise relatively smooth and its opposite face relatively rough for attaining relative adherence to the film; or rouge or other smoothness imparting medium may be applied to one face of a paper strip, the opposite face being free of such rouge or other smoothness imparting medium, and the like; or a relatively roughened face for attaining adherence to the film may be had by means of oil or the like deposited upon such face.

20 By the present invention, the indefinite length of gold film thus freely supported on the paper strip or other carrier is made available for application in such arts as sign decoration, sign painting, decoration of china and other objects of vitreous surfaces or material, and the like, the transfer being effected by treating the glass, china or other surface to be embellished or ornamented with a sizing or the like and employing the paper or other carrier as a conveyance of the gold film to the sized surface, the transfer of the gold film from the paper or other carrier to the treated surface being had by the greater adherence of the applied film to the sizing or the like as compared with the adherence of the gold film to the paper or other carrier.

25 The indefinite length of the gold film is produced electrolytically, as for example as is disclosed in the Demel U. S. Patent #1,512,825, dated October 21st, 1924, and/or #1,513,696, dated October 28th, 1924, and/or in my copending application Ser. #725,583, filed May 14th, 1934, pursuant to which, generally, the film of gold,

or gold alloy, or other suitable metallic film is electro-deposited upon a strip serving as a cathode. Such composite strip of deposited film and the theretofore cathode material is treated for the removal of the theretofore cathode material, the film being suitably released upon a strip of paper or other medium to serve as the carrier, the proper face of the carrier being suitably presented to receive the released film.

By the above stated electrodepositing procedure, the gold film is produced continuously, thus affording continuous subsequent treatment for the removal of the theretofore cathode material and the continuous mounting of the thus released metallic film upon a continuous strip of paper or other carrier.

The thus or equivalently derived paper mounted continuous film may be rolled. Such rolls may be severed into component rolls of desired width or widths. Such rolls are applicable for use in any suitable roll leaf feeder or attachment, as in tipping machines, stamping machines and the like.

25 If desired, the thus derived paper mounted film may be severed at uniform lengths, and the severed lengths assembled or otherwise mounted in the manner of a pad or book, preferably a pad or book of the nature disclosed in my aforesaid copending application Serial #725,583, filed May 14th, 1934.

30 In the electrodeposition of gold upon silver or other suitable cathode material, the quality of relative brightness or lustrousness of the two faces of the gold film is dependent upon a number of factors, such as the degree of refinement of the bath, the degree of refinement of the silver or other cathode material, the relative amount in the electrodepositing solution, of metal other than gold, the temperature of the bath, amperage of the electrical current employed in the deposition, etc. Accordingly, the procedure of mounting the film upon a paper strip or other suitable carrier is determined by the relative location of the brighter or more lustrous face of the depositing film and by the desired mounting of the film, after the release by the releasing medium, upon the paper or other carrier.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawing, in which

Fig. 1 is a perspective view typifying one embodiment of a paper mounted gold film, pursuant to my invention.

Fig. 2 is a transverse section of the paper

mounted gold film, on a greatly enlarged scale.

Fig. 3 is a diagrammatic view, in vertical section, indicating successive steps of continuous treatment of a gold-silver or equivalent composite strip for the removal of the silver or equivalent and the mounting of the released gold or equivalent upon a continuous carrier.

Fig. 4 is a detail sectional elevation on line 4—4 of Fig. 3, on an enlarged scale.

Fig. 5 is a perspective view of one form of pad composed of superposed lengths of carrier mounted film.

Fig. 6 is a detail side elevation showing a modification of feeding the carrier strip relative to the released film.

The roll illustrated in Fig. 1 comprises a carrier 10 of paper having its opposite faces 10a, 10b, see also Fig. 2, of suitable nature or suitably treated, the film 11 of gold being supported by the face 10a.

For example, the face 10a of the paper strip may be uncalendered or otherwise relatively rough, as compared with its opposite face 10b, which may be calendered. Or the relatively roughened face 10a may be formed by spraying or otherwise depositing oil or other suitable procedure.

The face 10b of the paper strip may be rendered smooth by applying rouge, French chalk or the like.

Such or equivalent manufacture or treatment of the paper strip having the gold film supported on its face 10a may be rolled as is indicated in Fig. 1, without being subject to spoilage of the gold film adhering to such face 10a. Upon unrolling the paper strip 10, the gold film 11 is simultaneously and to corresponding extent unrolled and properly supported by the paper carrier.

In the circumstance that the gold film is had by electrodepositing, one face of the deposited film is brighter or more lustrous than the opposite face. I prefer to mount the gold film upon the paper or other carrier to present its less bright or less lustrous face; by such mounting, the brighter or more lustrous face of the gold becomes the exposed face of the gold when applied in sign painting, and other decorative arts, by the procedure of first treating the glass, china, etc. with sizing and applying the gold film to the sized surface, the paper or other carrier being employed in the transfer as a support and means of conveyance.

If desired, the strip 10 of paper or equivalent and the supported co-extensive film of gold or equivalent may be severed into lengths, and bound into a book, as is indicated in Fig. 5.

Preferably such book 12, see Fig. 5, is constructed as is disclosed in my aforesaid co-pending application Ser. #725,583, filed May 14th, 1934, the essentials of which are that the bottom or lower back 13 is of relatively stiff material as compared with its top or upper back 14. Such severed lengths of paper mounted film constitute the "pages" of the book 12, and are bound together with the back 13 and the top 14 by staples 15, or equivalent.

Such or like form of book 12 serves also as a pad in the stage of transfer of the respective films 11 to the "work", the stiff back 13 functioning to receive the pressure applied by the hand or hands of the operator and the interposed leaves of paper as a cushion. The successive gold films are exposed by turning back the respective paper leaves.

If preferred, the gold film 11 may be mounted on the paper strip 10 to present the brighter or more lustrous face of the gold.

One suitable procedure of deriving a paper or equivalent supported film of indefinite coextensive length is indicated in Figs. 3 and 4, the applied arrows showing the paths of travel.

The coiled roll 16, see Fig. 3, represents a coiled composite strip of, say, gold adhered to silver, such as is derived by the stated electrodeposition method. Such roll 16 is unwound to present the gold upwards and the silver downwards; thus 11 represents the gold or upper face of the composite strip fed into the indicated bath 17, of suitable silver-removing agent, such as dilute nitric acid. 18 represents the silver or lower face of the composite strip.

The succeeding bath 19 is desirably water, serving to remove any residue of nitric acid from the released gold film 11. It is highly efficient to employ a succeeding step for the removal of water from the released gold film 11, viz. by treatment with alcohol, as in a bath 20 of alcohol.

A preferred detail process of releasing the gold film 11 and mounting the same upon a paper carrier 10 comprises positively feeding the composite gold-silver strip 11—18 at a substantially constant rate in the respective baths 17, 19, 20, including the transits 21, 22, from bath 17 to bath 19, and from bath 19 to bath 20, and further including the feeding of the paper 10 from its indicated roll or equivalent to and with the released gold film at the terminus of the bath 20, as is indicated in Figs. 3 and 4.

Also, as is set forth in the aforesaid Demel Patents No. 1,512,825 and No. 1,513,696, it is advantageous to "float" the composite film 11—18 on the surface of the nitric acid bath 17, and similarly to "float" the released gold film on the surface of the water bath 19 and the alcohol bath 20.

Preferably, the respective baths are continuously replenished by feeding in the respective solutions at regulated strength and/or purity as by inflow pipes 17a, 19a and 20a or equivalent. 17b indicates an outflow pipe, for withdrawal of the bath 17, the pipe 17b being advantageously disposed in vertical position to thus regulate and maintain the level of the bath 17. Similarly, for the respective baths 19 and 20, 19b represents the outflow pipe for the water bath 19, and 20b for the alcohol bath 20.

The transfer 21 may comprise an endless belt, as indicated, passing over the idlers 21a, the belt being positively driven by the pulleys 21b, the shafts of which extend through suitable gaskets in one side of the tanks, to which shaft gears 21c are secured. Similar parts are correspondingly designated for the transfer 22.

The said gears 22b and 21b are positively driven by any suitable driving means, such as a driving shaft 23, suitably mounted in bearings 24. The intergearing of the shaft 23 with the gears 22b, 21b may be had by worms 25, in which instance the gears 22b, 21b are skew gears, or worm wheels.

The positive feeding of the composite gold-silver strip 11—18, may be effected by the worm 26, see Fig. 3, which meshes with the skew gear or worm wheel 27, in turn meshing with the worm 28 and the skew gear or worm wheel 29, to the shaft of which is secured the roll 30. The roll 30a cooperates with the roll 30 to positively feed the composite strip 11—18 at a uniform rate to the level of the bath 17 of nitric acid.

The positive feed of the paper 10 is had by 75

similar positive drive, as by means of the roll 31, the shaft of which is secured to worm wheel 32, driven by the worm 33, secured to the driving shaft 23. The cooperating roll 31a is driven positively by a suitable gear 32a, of the roll 31, and accordingly the paper 10 is positively fed at the regulated uniform speed to the concurrently transited water-freed film 11 at the terminus of the alcohol bath 20, and the thus paper mounted gold film is positively withdrawn, as by reeling the same as a roll, as indicated in Fig. 3.

The roll 31a may be heated, as by means of an embodied electrical resistance for the purpose of expediting the removal of alcohol and/or other liquid from the gold film and/or paper strip.

The manner of positioning of the gold or other metallic film relative to the supporting paper is carried out in any suitable manner. Pursuant to the embodiment of this phase of my invention as illustrated in Fig. 3, the positioning of the film in contact with the relatively rough face or the relatively smooth face of the carrier is controlled by the manner of feeding the carrier strip to the released film. Thus, referring to Fig. 3, and assuming that the face of the gold film immediately adjacent the cathode material to be brighter or more lustrous than the opposite face of the deposited film, the carrier 10 is fed from the feed-out roll 10A shown in Fig. 3 with the smooth face 10b of the carrier facing downwardly, whereby upon reeling the carrier and supporting film to form the roll 10B, see Fig. 3, the greater adherence of the gold film to the roughened face of the carrier effects the desired relative position of the film with respect to the carrier, namely to locate the bright or more lustrous face of the gold film in adherence with the relatively roughened face of the carrier.

To attain the reversed face relationship of the film and the carrier by the procedure illustrated in Fig. 3, the feed-out roll 10A of the carrier is fed with its roughened face downward, at substantially the speed of the released film, thus obtaining a reeled roll 10B presenting the dull or less lustrous face of the film upwards, by reason of the greater adherence of the relatively roughened face of the paper strip to the thus positioned brighter or bright face of the film. In the circumstance that the dull or less lustrous face of the film is that adjacent to the cathode material, the immediately stated procedure attains the locating of the dull or less lustrous face of the film upwardly when mounted on the carrier.

By referring to Fig. 3 it will be noted that the continuously moving carrier strip is located in immediate adjacency to a portion of the continuously moving metallic film while that portion of the metallic film is in transit in the immediate vicinity of the surface of the third bath.

Fig. 6 indicates an alternative method of feeding the carrier to the released metallic film at the terminus of the bath 20, or equivalent, the roll 10A representing the feed-out roll of paper and the roll 10B, similarly as above, the reeled roll of gold film supported by the carrier 10. In the procedure illustrated in Fig. 6, the carrier 10 is passed through the bath 20 lowerly about and in contact with the roll 31, and is thus brought under and at substantially the speed of the released film 11 "floating" on the level of the bath 20, whereby the released film is supported by the carrier 10 in the desired relationship. Assuming, again, that the brighter or more lustrous face of the film is the face adjacent the cathode ma-

terial, to position such brighter or more lustrous face of the gold film adjacent the relatively roughened face of the carrier, the strip 10 is fed from the feed-out roll 10A to position its roughened face lowerly, whereby upon its transit about the roll 31, such lower face, in this instance its roughened face, is brought in contact with the bright or more lustrous face of the gold film, to which face of the carrier the film maintains adherence when rolled into the roll 10B, and similarly subsequently when unwound from such roll, as indicated in Fig. 1.

In the instances above disclosed, wherein the carrier material is submerged under a fluid, such as water, alcohol, etc., or passed through fluid, or otherwise subjected to the action of a fluid, the material is selected of such character to be unaffected by the fluid, inclusive of absence of expansion or contraction due to the fluid, as will be understood by those skilled in the art.

Similar procedure is carried out in the use of a carrier having one face treated with oil or other adherence imparting medium.

Similar procedure is had in the use of a carrier having one face treated with rouge or other smoothness imparting medium.

It will be observed that the positioning of gold or other metallic film having one face relatively bright and its other face relatively dull, with respect to its supporting carrier, affords identification of the relatively bright face of the film, an advantage of marked importance in the trade use of the film as in sign painting and other decorative arts, in roll or book form, or in stamping, etc.

It is noted that the length of gold or other metallic film derived by electrodeposition is indefinite, whereas the maximum length of "beaten gold" produced by gold beaters does not exceed seven inches.

It appears, as above set forth, that my process affords the production of gold film mounted freely upon a suitable carrier, the length of the film appreciably exceeding that of beaten gold, the film preferably having a uniform thickness throughout its length.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. The method of producing an indefinite length of gold film having a thickness of the magnitude of that of beaten gold and having such thickness uniformly throughout its length, which comprises subjecting an indefinite length of metal suitable as a cathode to deposition of gold thereon as a film having the stated uniform thickness, thereafter subjecting under continuously uniform movement the resulting theretofore cathode metal bearing the deposited gold film to the action of a bath for removing such theretofore cathode metal and thereby releasing the gold film, then under the aforesaid continuously uniform movement passing the stated released gold film through a second bath for removing residue of such cathode-metal-removing bath, and passing the gold film through a third bath for removing traces of the material used in the second bath, and thereafter under the aforesaid continuously uniform movement positioning the resulting residue-free gold film upon a continuous carrier strip of indefinite length wholly by locating the continuously moving carrier strip in immediate adjacency to a

portion of the continuously moving gold film while said portion of gold film is in transit in the immediate vicinity of the surface of said third bath and positively continuously moving the carrier at the stated rate of continuous movement of the gold film.

2. The method of producing an indefinite length of gold film having a thickness of the magnitude of that of beaten gold and having such thickness uniformly throughout its length, which comprises subjecting an indefinite length of metal suitable as a cathode to deposition of gold thereon as a film having the stated uniform thickness, thereafter subjecting under continuously uniform movement the resulting theretofore cathode metal bearing the deposited gold film to the action of a bath for removing such theretofore cathode metal and thereby releasing the gold film, then under the aforesaid continuously uniform movement passing the stated released gold film upon the surface of a second bath for removing residue of such cathode-metal-removing bath, and passing the gold film through a third bath for removing traces of the material used in the second bath, and thereafter under the aforesaid continuously uniform movement positioning the resulting residue-free gold film upon a continuous carrier strip of indefinite length wholly by locating the continuously moving carrier strip in immediate adjacency to a portion of the continuously moving gold film while said portion of gold film is in transit upon the surface of said third bath and positively continuously moving the carrier at the stated rate of continuous movement of the gold film.

3. The method of producing an indefinite length of gold film having a thickness of the magnitude of that of beaten gold and having such thickness uniformly throughout its length, which comprises subjecting an indefinite length of metal suitable as a cathode to deposition of gold thereon as a film having the stated uniform thickness, thereafter subjecting under continuously uniform movement the resulting theretofore cathode metal bearing the deposited gold film to the action of a bath for removing such theretofore cathode metal and thereby releasing the gold film, then under the aforesaid continuously uniform movement passing the stated released gold

film through a second bath for removing residue of such cathode-metal-removing bath, and passing the gold film through a third bath for removing traces of the material used in the second bath, and thereafter under the aforesaid continuously uniform movement positioning the resulting residue-free gold film upon a continuous carrier strip of indefinite length wholly by locating the continuously moving carrier strip in immediate adjacency under a portion of the continuously moving gold film while said portion of the gold film and said carrier strip are in transit upon and through respectively, said third bath and positively continuously moving the carrier at the stated rate of continuous movement of the gold film.

4. The method of producing an indefinite length of gold film having a thickness of the magnitude of that of beaten gold and having such thickness uniformly throughout its length, which comprises subjecting an indefinite length of metal suitable as a cathode to deposition of gold thereon as a film having the stated uniform thickness, thereafter subjecting under continuously uniform movement the resulting theretofore cathode metal bearing the deposited gold film to the action of a bath for removing such theretofore cathode metal and thereby releasing the gold film, then under the aforesaid continuously uniform movement passing the stated released gold film through a second bath for removing residue of such cathode-metal-removing bath, and passing the gold film through a third bath for removing traces of the material used in the second bath, and thereafter under the aforesaid continuously uniform movement positioning the resulting residue-free gold film upon a continuous carrier strip of indefinite length while positioning its original cathode contacting face downwardly relative to the carrier strip wholly by locating the continuously moving carrier strip in immediate adjacency to a portion of the continuously moving gold film while said portion of gold film is in transit in the immediate vicinity of the surface of said third bath and positively continuously moving the carrier at the stated rate of continuous movement of the gold film.

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