

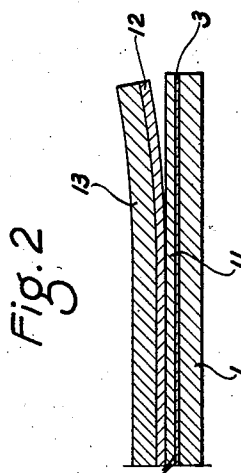
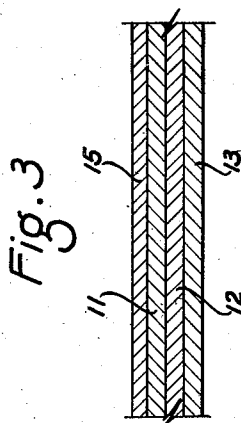
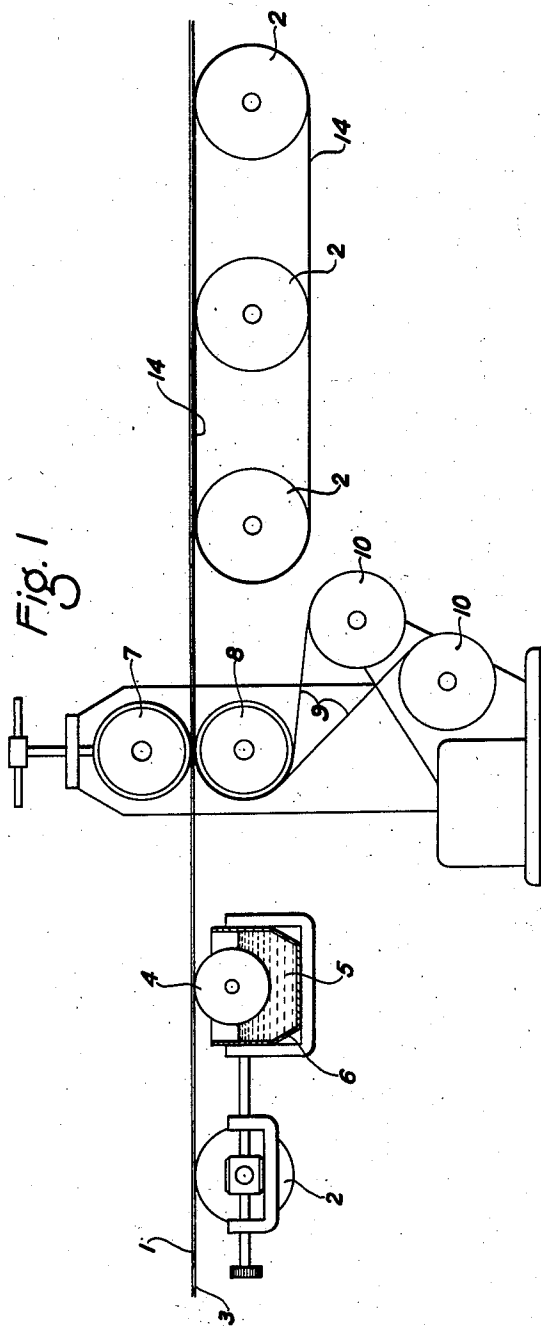
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METHOD OF SENSITIZING AND PROTECTING METAL PLATES

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METHOD OF SENSITIZING AND
PROTECTING METAL PLATES

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This invention relates to an improved method of applying a sensitized layer to a large and cumbersome metal or other rigid sheet and to the protection of this layer until used, and is of particular utility in the process described in the co-pending application of Gerould T. Lane and Clarence L. A. Wynd, Serial No. 407,959, filed August 22, 1941, which matured into Patent No. 2,303,942 on December 1, 1942, and in any other processes wherein it is necessary to apply a uniform photographic layer to a large rigid plate. These processes are particularly useful in the making of templates for the body, doors, fenders, wings and other parts of airplanes, automobiles and the like.

While it is possible to make photographic emulsions at the airplane or automobile plants, or to ship in from a photographic plant a supply of liquid or concentrated emulsion, the uniform application of this in a dark room by persons not previously skilled in photographic technique introduces many technical difficulties, while the shipment of the plates to the photographic plant for coating and their reshipment to the airplane or automobile factory is prohibitively expensive.

These difficulties may be overcome by furnishing at the photographic plant a stripping material in roll form comprising a support of flexible material having a stripping layer and a photographic emulsion layer, the stripping layer being permanently adherent to the support by stripping when dry from the sensitive layer. This is shipped as a roll to the factory where it is unrolled and applied to a large metal sheet to which the sensitive layer is made to adhere. The metal sheet is thus uniformly coated with a layer of the desired photographic properties and is stored until ready for use, when the dry stripping layer and the flexible support are together stripped off.

One of the forms of stripping film which I propose to use differs from those frequently used heretofore in that the permanent support which remains adherent to the sensitive layer is coated over the sensitive layer instead of under it. I propose to use such materials as are shown in the patent Nadeau and Starck No. 2,266,435, granted December 16, 1941, or the application of Lane, Serial No. 397,093, filed June 7, 1941, but differing therefrom in that the cellulose ester layers therein described as permanent are over instead of under the emulsion layer.

Reference will now be made to the accompanying drawing, where Fig. 1 is a sectional view showing in a formalized way the apparatus for applying the stripping paper to the metal sheet,

Fig. 2 is a section, on an enlarged scale, of a metal plate to which one form of stripping paper has been applied and from which the paper support is being stripped, and Fig. 3 is a section of another form of matte transfer paper that may be used in my process.

The metal or other rigid sheet material upon which the drawing is to be reproduced is first coated with a white reflective material against which the lines, when photographically reproduced, will be plainly visible. The particular composition of this is not material, and it will be applied by ordinary lacquering technique, such as the use of a primer coat and an ordinary white cellulosic lacquer containing, for instance, titanium dioxide in a vehicle such as cellulose nitrate, shellac and suitable solvents.

An adhesive is either applied to the emulsion surface of the stripping element before it is contacted with the support or, as shown in Fig. 1 of the accompanying drawing, to the plate 1. A large metal plate 1, previously lacquered, is advanced over a series of conveyor rolls 2, with its lacquered face 3 down. It passes over a cement applicator roll 4, which is rotated by the plate, and which conveys cement 5, from a trough 6. A suitable cement for use with a lacquer of the type mentioned is a 1% solution of nitrocellulose of the alcohol soluble type in methyl alcohol. The plate with the wetted lacquer surface down then passes between a pair of rubber covered rolls 7 and 8 resiliently pressed together. Around the lower roll 8 is conveyed a strip 9 of dry stripping paper from a supply roll 10. If the metal sheet 1 is, as is often the case, wider than strip 9, two such strips 9 are supplied edge to edge from two supply rolls 10.

In addition to the structure already suggested, the transfer or stripping paper may be made, for instance, by applying to a baryta coated paper 13 such as is commonly used for photographic paper a 5 per cent aqueous solution of hydrolyzed cellulose acetate (16 to 18% acetyl) such as is described in the U. S. Patent No. 2,129,052, For-dyce, granted September 8, 1938. The coating speed and thickness of this layer 12 are so controlled as to give a finished coating or spread of approximately 8 grams of cellulose ester per square meter of paper surface. Over this is then applied by ordinary technique a matte gelatino silver halide emulsion 11 having suitable photographic properties for the intended purpose. The details of this paper are not my invention but are disclosed in U. S. Patent, Nadeau, No. 2,326,058, granted August 3, 1943.

This paper is here shown as wound with the emulsion side in and is so applied to the lacquered metal sheet, with the emulsion side contacting the wetted lacquer surface, as it passes between the rolls 7 and 8, forming a permanent bond. A succession of metal sheets is fed through the machine, the paper being severed between successive sheets. Of course, the paper could be applied in the form of sheets of the same size as the plates. The cementing solvents evaporate in the course of several hours, from two to twenty-four, depending on the humidity and temperature conditions.

As the coated metal plate emerges from the presser rollers 7 and 8, it passes over another conveyor roll and thence over an extended smooth table 14. The weight of the metal plate pressing against the table tends to hold the freshly laminated structure firmly together and to smooth out any inequalities introduced by roughnesses in the presser rolls. The paper sheet 13 protects the emulsion layer from any possible abrasion from the table.

The table 14 may be formed by a belt or belts passing over the rolls 2 or by any other means.

The metal plates carrying the transfer paper are stored with the paper protective sheet in place until needed. The paper and the cellulose ester layer are then stripped off together as indicated in Figure 2, wherein the metal sheet is indicated as 1, the emulsion layer 11, the dry stripping layer 12 and the paper support 13. Stripping is started at one corner and takes place between the stripping layer and the emulsion. The sensitized metal sheet is then used in any desired way as in the processes described in the Lane and Wynd patent.

As proposed above, a layer 15 of a cellulose ester composition, such as cellulose nitrate or acetate, may be applied over the emulsion 11, a suitable subbing solution being first applied. When this is used, a solvent or cement is applied at 4 which will cause the layer 15 to adhere firmly to the lacquered plate, after the stripping off of the portion comprising layers 13 and 12, the metal plate remains with layers 11 and 15, the emulsion layer 11 being outermost.

Other forms of stripping material may be used. During storage the emulsion is protected

against dust, abrasion, atmospheric changes and, to a certain extent, from light if the flexible support is opaque or light retardant. While the sensitive sheet would be kept in darkness, small amounts of stray light might inadvertently be admitted to the storage room, and the adherent protective layer would constitute an additional precaution.

10 An added advantage in the use of a transfer of the type described is that the surface of the emulsion which is to be outermost is anchored to the temporary paper base which is relatively rigid and hence is not free to reticulate during curing.

15 Having thus described my invention, what I claim as new and desire to be secured by Letters Patent is:

1. The method of sensitizing a large rigid plate that comprises conveying said plate to presser rolls, applying an adhesive to the under surface of said plate as it approaches said presser rolls and at the same time bringing into contact with the same under surface a flexible dry stripping material including an unexposed photographic layer, and conveying the assembled sheets between said presser rolls under resilient pressure and across a table where the weight of the plate holds them firmly together during setting of the adhesive.

20 2. The method of sensitizing and protecting until used a large metal plate that comprises supplying a roll of flexible material comprising a temporary paper support, a dry stripping layer, a sensitive photographic layer, and a film support layer on said sensitive layer, the last two mentioned layers being strippable together from the first two layers when dry, conveying the large metal plate to presser rolls, applying to the under surface of said plate as it approaches the rolls an adhesive for the metal plate and the film support layer, and at the same time unrolling the flexible material and bringing the film support layer thereof into contact with the same under surface, and conveying the assembled sheets between said presser rolls and across a table where the weight of the plate holds them firmly together during setting of the adhesive

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