Dec. 11, 1962 B. E. ANDERSON 3,067,673

STENCIL SHEET ASSEMBLY INCLUDING TOP FILM

Filed March 13, 1959

FIG. 1

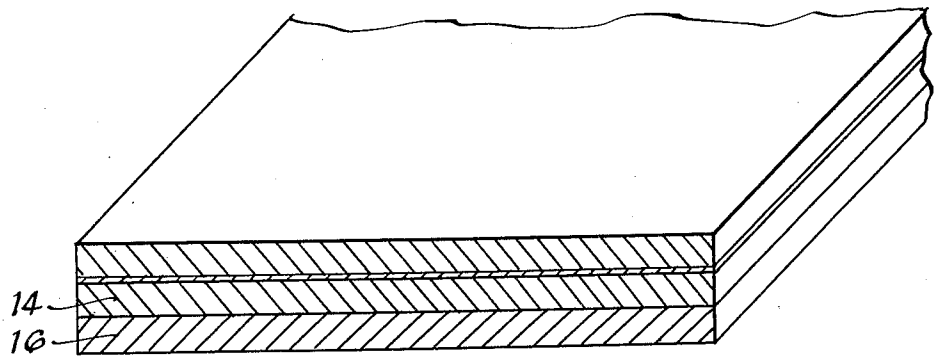



FIG. 2

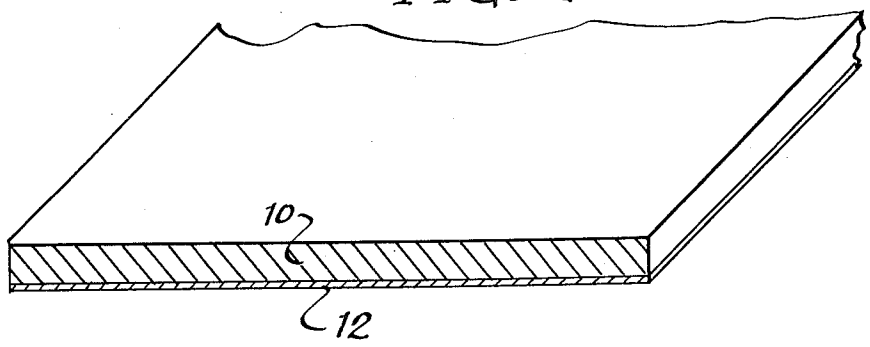
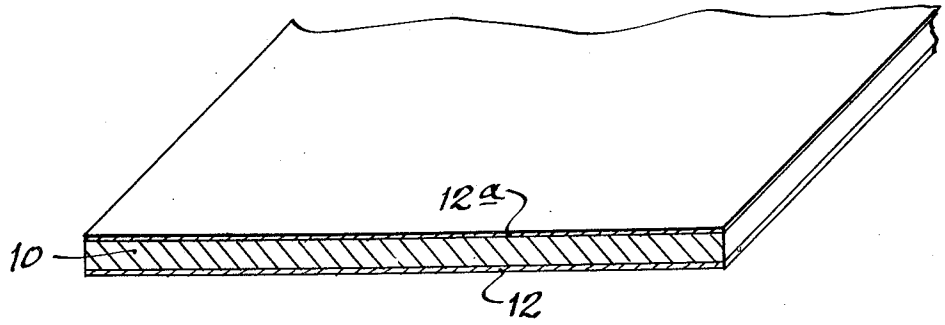



FIG. 3




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# STENCIL SHEET ASSEMBLY INCLUDING TOP FILM

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This invention relates to a stencil sheet assembly and more particularly to a top film used as a component thereof in the preparation of an image master for multiple copy work.

It is an object of this invention to produce and to provide a method for producing a stencil sheet assembly embodying improved characteristics for the preparation of copy and it is a related object to produce a new and improved top film for use in the stencil sheet assembly in the preparation of a stencil copy therefrom.

These and other objects and advantages of this invention will hereinafter appear and, for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawings, in which—

FIGURE 1 is a perspective view in section of a stencil sheet assembly embodying the features of this invention;

FIGURE 2 is a perspective view in section of a top film which may be used in the stencil sheet assembly of FIGURE 1; and

FIGURE 3 is a perspective view in section similar to that of FIGURE 2 showing a modification in the construction of the top film.

Stencil duplication constitutes one of the techniques used for the production of multiple copies, preferably in office copy work. In stencil duplication, use is made of a stencil sheet in which the image to be reproduced upon the copy sheets is outlined in the stencil as stencil openings through which ink may pass. Thus, when the prepared stencil is mounted upon an ink cylinder of a rotary duplicating machine, as in the conventional manner, ink can be forced through the stencil openings onto the surfaces of the copy sheet brought into contacting relation therewith to produce copies.

Stencil sheets capable of use in multiple copy process of the type described are well known. In its most common form, the stencil sheet comprises a base sheet of long fibers, such as abaca pulp, interfelted in an open mesh pattern for enabling the passage of ink thereto while permitting the fibers to extend across the stencil openings as a web to strengthen the sheet and to maintain the loop letters. The open mesh base sheet embodies a continuous layer of an ink-impervious material which is capable of displacement responsive to applied impact or pressure. Such materials applied onto the base sheet, as by impregnation or coating, are well known to the art as represented by the following issued United States patents and application:

U.S. Patent No. 2,693,426
U.S. Patent No. 2,732,795
U.S. patent application Ser. No. 719,442, filed March 5, 1958

Briefly described, a suitable stencil coating may be formulated of a nitrocellulose base softened with a substantial amount of a plasticizer or oil. Other systems are well known but the foregoing may be taken as representative.

In response to the application of force, as by means of a writing stylus, typewriter key, die impression or the like, the ink-impervious material is displaced in the base sheet to expose the fibers which remain as a network or web across the stencil opening that is formed and through which ink may pass.

As developed in earlier investigations and as later described in Heath Patent No. 2,203,280, there are a number of difficulties arising in some of the means of stencilization which can be effectively overcome by the use of a top film adapted to overlie the stencil during the application of force to produce the desired stencil openings. For example, the top film interposed between the typewriter keys and the coated stencil sheet prevents displacement of coating onto the keys of the typewriter, otherwise the keys would become filled and incapable of use. The top film uniformly distributes the force of the stylus, typewriter key, or die to protect the fibers against breakage whereby the loop letters are retained and more uniform and complete copy is secured.



For such purposes, it has been desirable to make use of a top film which is characterized by elasticity sufficient to enable deformation for transmission of the image responsive to the application of force thereby to effect displacement of the ink-impervious coating. The top film should also be characterized by strength sufficient to resist rupture for protection of underlying exposed fiber of the stencil base sheet and resilience sufficient for return of the displaced portion of the top film to enable additional use to be made thereof. These characteristics are present in such thin films as are formed of rubber hydrochloride (Pliofilm), polyolefins, such as polyethylene or polypropylene, polyvinylidine chloride copolymers, polyesters (nylon) and the like. Use can be made of other film forming resinous or polymeric materials or papers coated or laminated with such resinous or film forming materials.

When the top film, such as is formed of chlorinated rubber, is packaged in a stencil sheet assembly, it has been necessary to insert a grease-proof interleaver sheet between the coated stencil sheet and the top film to protect the top film from wrinkling due to the absorption of oils and from adhesion to the coated stencil. The use of interleaver sheet of the type described is most undesirable from the standpoint of the cost of the sheet, the need for additional collating equipment for incorporation of the additional sheet in the stencil sheet assembly, and the necessity for removal of the interleaver upon completion of the stencilization process and before the stencilized sheet is mounted on the ink cylinder for the production of multiple copies.

It has been found that the described interleaver sheet can be completely eliminated when, in accordance with the practice of this invention, the top film **10** is coated on at least the surface adjacent the coated stencil with a resinous or polymeric material **12** which is unaffected by the oils or plasticizers present in the coating composition on the stencil base tissue **14**. When, for example, the top film comprises a rubber hydrochloride, the coating **12** may be formulated of an unplasticized polyvinylchloride, polyvinylidine chloride or mixes thereof. Similarly other oil or greaseproof materials may be used as a protective coating on the rubber hydrochloride, polyolefin or other top film formed of materials which are caused to be wrinkled or softened by the oils or plasticizers present in the stencil coating.

While it is sufficient to provide the protective coating **12** on the stencil sheet side of the top film **10** in the stencil sheet assembly, it will be understood that the protective coating can be applied to both sides of the top film, as illustrated by the numerals **12** and **12A** in FIGURE 3 of the drawing. The latter is desirable when the stencils are packaged in a manner to bring the top film **10** in surface contact with a coated backing sheet **16** or the coated back side of the stencil **14**. The protective coating can be applied in coating weights of from 1 to 2 pounds per 3,000 square feet of surface but best results are secured when the coating weight is within the range of 1.2 to 1.5 pounds per 3,000 square feet of surface area

Application of the protective coating may be made

from an organosol or aquasol of the particular resinous material or may be made from solvent solutions or aqueous dispersions containing the resinous material in concentrations less than 100% by weight. The coating composition can be applied by conventional coating means, including spray coating, roller coating, dip coating, by an air coater or the like. Application of the coating composition in the described coating weight is followed either by air drying or by drying in an air-circulating oven at intermediate temperature. Instead of applying the resinous protective agent by way of a coating composition, the protective layer 12 may be incorporated in the form of a film laminated onto one or both sides of the top film of chlorinated rubber, polyethylene, polypropylene or other polyolefin top film. The following are representative of coating compositions which may be employed in the treatment of the top film to produce the desired coated film.

COMPOSITIONS

*Example 1*

10% polyvinylidine chloride
90% methyl ethyl ketone

*Example 2*

15% polyvinyl chloride
85% methyl ethyl ketone

*Example 3*

14% vinylidine chloride-vinyl chloride copolymer
86% methyl ethyl ketone

It will be understood that the concept of this invention may be practiced by the application of a protective coating onto the top film wherein the protective coating is formulated of other suitable materials which are film forming in character and which are inert to the ingredients present in the coated stencil. Additional changes may be made from the standpoint of formulation and application without departing from the spirit of the invention as especially defined in the following claims.

I claim:

1. In a stencil sheet assembly embodying a coated stencil sheet and a top film for use in combination with the coated stencil sheet, the improvement wherein the top film comprises a thin pliable base film of a synthetic polymeric material which is affected by the plasticizers and oils in the coating of the stencil sheet and a thin layer on the surface of the base film adjacent the coated stencil and formed of a synthetic polymeric film forming material which is unaffected by the oils and plasticizers present in the coating of the stencil sheet, said synthetic polymeric material of the base film being selected from the group consisting of rubber hydrochloride, polyethylene and polypropylene, said synthetic polymeric film forming material of the coating being selected from a group consisting of unplasticized polyvinyl chloride, polyvinylidene chloride and mixtures thereof and copolymers thereof.

2. A stencil sheet assembly as claimed in claim 1 in which the protective layer is present on both sides of the base film.

3. A stencil sheet assembly as claimed in claim 1 in which the protective layer comprises a thin film of the synthetic polymeric material which is laminated to the top film.

4. A stencil sheet assembly as claimed in claim 1 in which the protective layer comprises a coating on the top film present in coating weights of from 1 to 2 pounds per 3,000 square feet of surface area.

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