

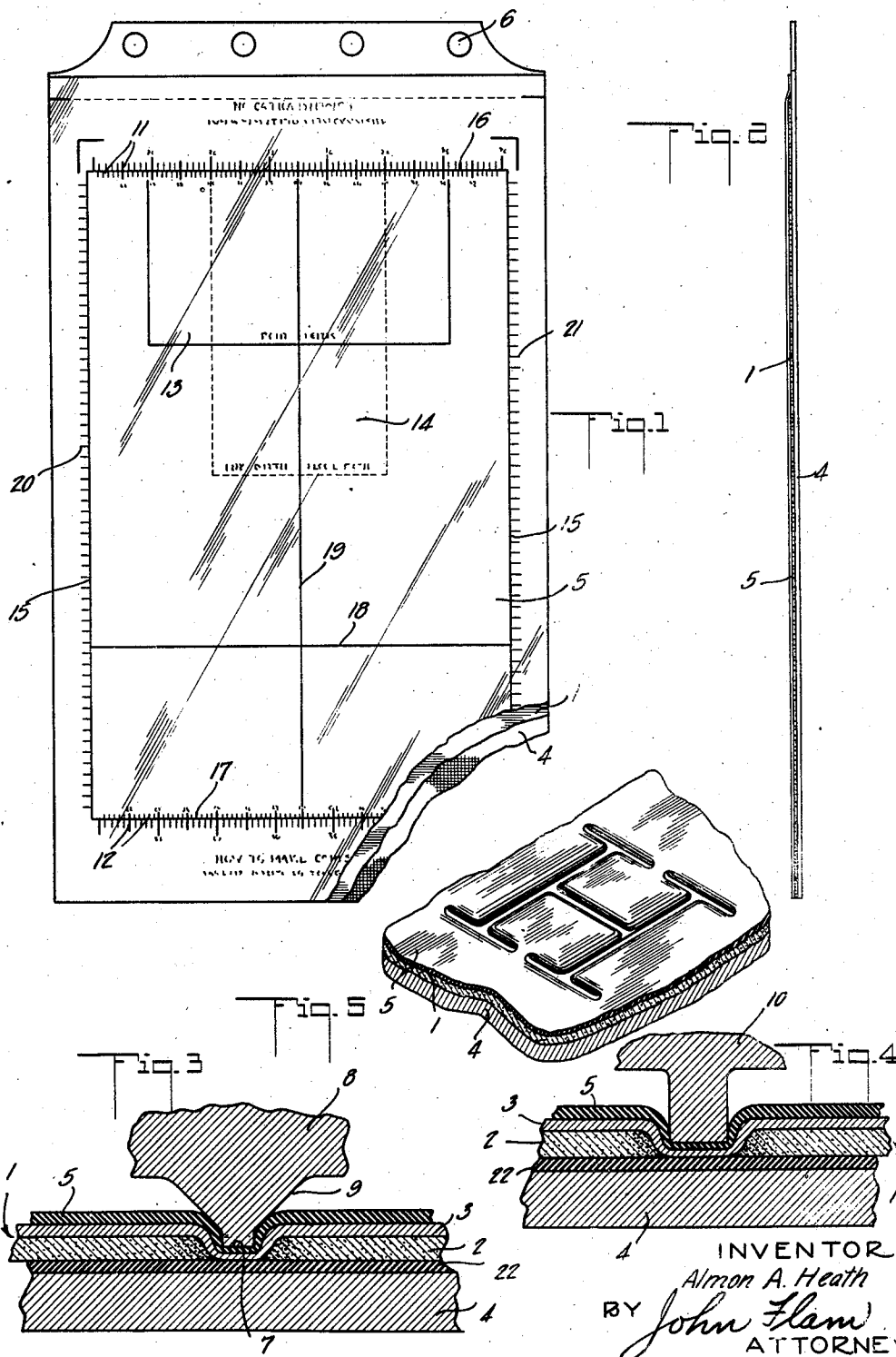
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A. A. HEATH

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STENCIL FILM

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STENCIL FILM

Almon A. Heath, Hawthorne, Calif.

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19 Claims. (Cl. 41—3.5)

This invention relates to the cutting of stencils of the type now commonly employed in duplicating machines, or for forming photographic negatives.

5 The stencil sheet is formed of a very thin tissue paper, commonly termed Japanese tissue or Yoshino. This paper is usually less than .001 of an inch in thickness, and is quite fragile and delicate. Over one face of this is applied a waxy coating which may partially penetrate into the paper. Now in order to form a printing stencil, the waxy layer is displaced at those places where the printing ink or light is intended to penetrate the stencil. This displacement is usually obtained by pressure exerted upon the tissue side of the stencil sheet. It is desirable to exert the pressure in such manner that the tissue of the stencil sheet is not punctured. The unpunctured tissue can then act satisfactorily to distribute the ink in a uniform manner through the stencil, or to pass printing illumination therethrough.

In view of the inherent weakness of the tissue, and its lack of resistance to rupture, it has been difficult to ensure that the tissue stay intact, and great care had to be exercised in the operation of exerting the "cutting" pressure.

It is one of the objects of this invention to reduce the degree of care required to prepare such stencils.

30 The application of the pressure to the stencil surface may be accomplished by manipulation of a stylus, which is especially adapted to free-hand work. The pressure may also be applied by typewriter characters, operated as in typing, the stencil sheet being placed in the typewriter. Or, a cast type plate or other printing plate placed in a press, may be used to impart the pressure upon the desired areas of the stencil sheet.

In order to protect the delicate stencil, supplemental sheets or film of thin flexible material have been used, interposed between the pressure applying device (stylus, type, or printing plate) and the stencil sheet. A form of film for this purpose is described and claimed in Patent No. 1,989,922, issued February 5, 1935, to A. A. Heath. Sheets of the character therein described are quite satisfactory for stylus work; and with ordinary care, may also be quite effectively utilized for type or plate impressions. However, there is some danger that the sharp edges of the type may cut through such a film.

It is therefore another object of this invention to provide an improved protector film of this general character.

55 In the choice of a protecting film for use on

stencil sheets upon which type is to be impressed, several factors should be considered; for example, the film must be thin enough to transmit the pressure to the stencil, and only over the area where the pressure is applied. This requirement is met by stencil sheet films such as described in the prior patent referred to hereinbefore. Furthermore, the thinner the film the more accurately does the area impressed correspond to the type or plate to be duplicated.

It has been found however that other considerations are quite necessary to obtain a sharp and uniformly impressed stencil. These considerations involve the problem of ensuring against applying unequal pressures upon the area of the stencil impressed by the printing type or plate; also, the ensuring that the face of the type or plate will not be worn unduly by the repeated contact and relative movement between the type and the film. It is accordingly another object of this invention to provide a stencil sheet structure such that will ensure against such undue wear of the type or plate, and at the same time, will ensure that the pressure transmitted to the sheet will be so uniform that the danger of puncturing or otherwise injuring the stencil is greatly minimized.

It is another object of this invention to provide a stencil protector film that also conveniently serves as a typing guide.

This invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown a few forms in the drawing accompanying and forming part of the present specification. These forms, which illustrate the general principles of the invention, will now be described in detail; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawing:

Figure 1 is a plan view, partly broken away, of an embodiment of the invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a greatly enlarged fragmentary sectional view, illustrating the operation of the stencil film incorporating the invention, when utilized in connection with typewriter type;

Fig. 4 is a view similar to Fig. 3, illustrating the use of the stencil film in connection with other forms of impression members, such as foundry type for the production of formagraph stencils; and

Fig. 5 is a perspective view of a fragment of the stencil structure having a letter formed thereon.

A stencil sheet 1, which includes the waxy coating 2, and the fine tissue 3, is shown in this instance as provided with a backing sheet 4. This backing sheet and the stencil 1 may be joined together as by an adhesive adjacent the top edge; and capable of being readily detached when the stencil is to be used. Backing sheet 4, for best results, may be made of a regenerated cellulose, gelatin, a resin derivative, cellulose acetate or other material having resilience. It is preferably approximately five-thousandths of an inch in thickness.

The protector film 5, to be described more in detail hereinafter, is shown in this instance, as completely overlying the stencil sheet 1 and may be attached to the backing sheet 4, as by a pressure sensitive adhesive at the top edge. The top portion of backing sheet 4 may further be provided with appropriate apertures 6, by the aid of which it may be supported in a well known manner in a duplicating machine, and this top portion may be arranged to be retained on the stencil sheet 1.

The film 5, which is preferably transparent or translucent, may carry printed marks defining margins and spaces. These may serve as guides; for example to facilitate appropriate centering or spacing of the typed or printed matter on the stencil. The lines 15 define the width of the duplicator and impose limits to the area to be utilized. At the top and bottom, lines 16 and 17 define a legal size space; and line 18 defines the lower edge of a letter size space. The scale lines 11 and 12 respectively at the top and bottom of the film, correspond to typewriter character spaces, both pica and elite. Center line 19 aids in centering laterally. Rectangles 13 and 14 may be marked to indicate post card sizes. Along each longitudinal edge, scale marks 21, 21 corresponding to the spacing of typewriter lines and spaces, may be provided. All these guiding marks render it easy properly to space the matter to be imprinted on the stencil.

The film 5 is chosen to fulfill certain definite requirements. In view of the fact that the blank stencil sheets may lay in stock for long periods before use, the film 5 should resist any deterioration or changes due to temperature, humidity, or light conditions. Furthermore, it should be inert, so as not to react chemically with the stencil sheet, nor should it warp or become permanently distorted. This latter requirement is especially necessary where the protector film 5 is inscribed with guiding lines for typing or the like; for under such circumstances, material deviation from accuracy of the spacings would be intolerable.

The film 5 should be so tenuous as to transmit accurately the pressure exerted upon its surface by an impressing member. The film for this purpose should be of the order of one one-thousandth of an inch (.001") thick. And, of course, the film should be at least partially resilient, and extensible.

The action of the film 5 as it transmits the pressure to the stencil 1 may be best explained in connection with Figs. 3, 4 and 5. In Fig. 3 the reference numeral 7 indicates the impression face of typewriter type, shown in the pressure exerting position. In this position, the wax coating 2 of the stencil has been displaced substantially entirely. The film 5 intimately contacts with the face 7 which may correspond to a line of a type

such as the oval line forming an "o". The film 5, being at least partially resilient, has considerable extensibility so that it can follow the impression formed by the type 8. It becomes thinner, due to the flexing of the film over the pressure area of the type face 7. The attenuation or thinning down, due to this stretch over face 7 ensures greater accuracy in forming the stencil. Furthermore, the film 5, after the pressure is removed, is free to return to its normal, flat condition, capable again over the same area of accurately transmitting the pressure to the stencil 1, as may be required for making corrections. For this purpose, the film 5 may readily be detached from backing 4 while the stencil is in the typewriter; and waxy correction material may be applied to the stencil area to be retyped. The pressure sensitive adhesive joining film 5 to the backing 4 permits ready removal and replacement of the film for this purpose, with respect to the backing.

Film 5 being conformable to the pressure applying face 7, provides a substantially fluent highly extensible medium the extensibility of the film being greater than any elasticity thereof for the transmission of pressure to the stencil sheet 1. The material of the film has inherently the property of malleability in that the material thereof undergoes a molecular distortion upon the application of force applied thereto and has no pronounced tendency to restore itself to the original dimension after the removal of the applied force. Any tendency toward restoration to the original dimensions of the film after the application of pressure is due to the slight resilient property of the material of the film. Being such a fluent medium, it equalizes the pressure over the entire pressure area. This is of considerable importance as it minimizes very materially the danger of puncturing the delicate stencil sheet, and also ensures that the resultant copies made by the aid of the stencil sheet will have uniform printing intensities.

Typewriter type such as illustrated by reference character 8 of Fig. 3 usually has sloping sides 9. In a case of foundry type utilized in formagraph stencil work, the type may have a form illustrated in Fig. 4. In this case the type 10 is shown as in pressure exerting position on the film 5, to form a pervious line upon the stencil sheet 1. Type of this character usually has abrupt faces.

Due to the tensile extensibility of the tenuous film 5, this film 5 does not have any tendency to blunt the edges of the type. The film simply flows around the edges without material rubbing effect. Accordingly, the type stays sharp and clear for a long period.

The inherent resilience of the film 5 thus provides a pressure transmitting medium which has no abrasive or wearing effect upon the edges of the type. In addition, as heretofore stated, the fluent quality of the film 5 ensures a more uniformly distributed pressure over the area upon which the pressures are exerted.

Fig. 5 illustrates on an enlarged scale the impression of the letter H, through the film 5, onto the stencil sheet 1. The areas are all clear and clean cut.

There are a number of materials that can be used effectively for the tenuous film 5, and which fulfill the important requirements outlined hereinbefore.

Several types of materials fulfilling these conditions are now well known. One of them is the material now on the market called "Plioform," which is a rubber derivative and may be more

aptly described as a rubber composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide. The composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide may be such as to incorporate a photo-chemical inhibitor, which ensures against deterioration under the action of light. This rubber composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide may be most conveniently formed as a partially saturated rubber hydrochloride having from 28 to 30.5% of chlorine. The manner in which this material can be manufactured is set forth in Patent No. 1,989,632 issued January 29, 1935, in the name of William C. Calvert; and also in Patent No. 2,139,647, issued in the name of the said individual on December 6, 1938.

Of course it is not at all essential that the film be a rubber derivative. Resinous compounds having equivalent properties may be utilized. These resinous compounds in the form of vinyl derivatives having rubber-like qualities are now also well known. For example, a polymerized vinyl halide compound can be used, such for example as described in U. S. Patent 1,929,453, issued October 10, 1933, in the name of W. L. Semon. Vinyl derivative films are offered on the market under the name of "Vinylite" or "Koro-seal."

The inherently advantageous properties of tensile resilience in extremely thin films utilizing materials of this character have been described in various publications. For example, in Industrial and Engineering Chemistry, vol. 26, page 123 of the issue of February, 1934, the vinyl and rubber derivative materials are generally described, as well as their physical properties, in an article entitled "Plioform—a new molding resin; chemical reactions of rubber and Plioform."

In the issue of June 1, 1933, of this technical magazine, further discussions of the various uses of the vinyl resin are set forth.

While only a few of the possible forms of materials have been specifically mentioned herein, equivalent materials having similar properties may be utilized.

The backing sheet 4, as heretofore described, is purposely made resilient so as to assist in the pressure equalization. This backing sheet may itself include if desired a thin top layer of material 22 of the same general character as film 5. This thin layer 22 may be adhered to the lower layer. This lower layer may be of comparatively thicker material, of cellulose acetate or the like, that has cushioning characteristics.

What is claimed is:

1. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film being made from material that serves as a fluent medium to transmit pressure to the sheet.

2. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film being capable of substantial attenuation when urged into the stencil sheet by the application of pressure.

3. In combination, a stencil sheet upon which pervious areas may be formed by application of

pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film being made from material that tends to equalize pressure transmitted through the film and exerted over the area to be affected.

4. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and capable of deformation upon application of pressure to be transmitted through the film, to conform closely to the operating areas of the pressure exerting element.

5. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film being made from material that transmits pressure to the sheet not only in the direction of the force applying the pressure, but in other directions as well.

6. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and made from a rubber derivative.

7. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and made from a composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide.

8. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and made from a partially saturated composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide.

9. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and made from a rubber hydrochloride having from 28 to 30.5 percent of chlorine.

10. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, and made from a composition chosen from the group consisting of rubber hydrochloride, rubber hydrobromide and rubber hydroiodide including a photochemical inhibitor.

11. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film made from a rubber-like vinyl derivative.

12. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film having a thickness approximating one thousandth of an inch.

13. In combination, a stencil sheet upon which

pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film made from a rubber-like composition.

14. In combination, a stencil sheet upon which pervious areas may be formed by application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film made from a polymerized vinyl halide.

15. In combination, a stencil sheet upon which pervious areas may be formed by the application of pressure, and without perforating the sheet, and a tenuous extensible film overlying said sheet having a large degree of permanent extensibility.

16. In combination, a stencil sheet upon which pervious areas may be formed by the application of pressure, and without perforating the sheet, a tenuous film overlying said sheet having a large degree of permanent extensibility, and a backing sheet below said stencil sheet and formed of extensible material.

17. In combination, a stencil sheet upon which pervious areas may be formed by the application of pressure, and without perforating the sheet, and a tenuous film overlying said sheet having a large degree of permanent extensibility, said film carrying guiding marks thereon, and made from material that resists permanent warping or distortion.

18. In combination, a stencil sheet upon which pervious areas may be formed by the application of pressure, and without perforating the sheet, a tenuous film overlying said sheet having a large degree of permanent extensibility, and a backing sheet below said stencil sheet and including a cushioning layer.

19. In combination, a stencil sheet upon which pervious areas may be formed by the application of pressure, and without perforating the sheet, a tenuous film overlying said sheet having a large degree of permanent extensibility and a backing for the sheet, said film being joined to the top of the backing by a pressure responsive adhesive.

ALMON A. HEATH.