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W. J. STOLLE ET AL

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IMPRESSION MEDIUM

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Fig. 1.

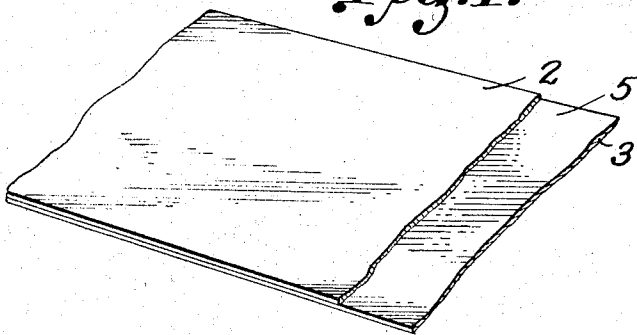
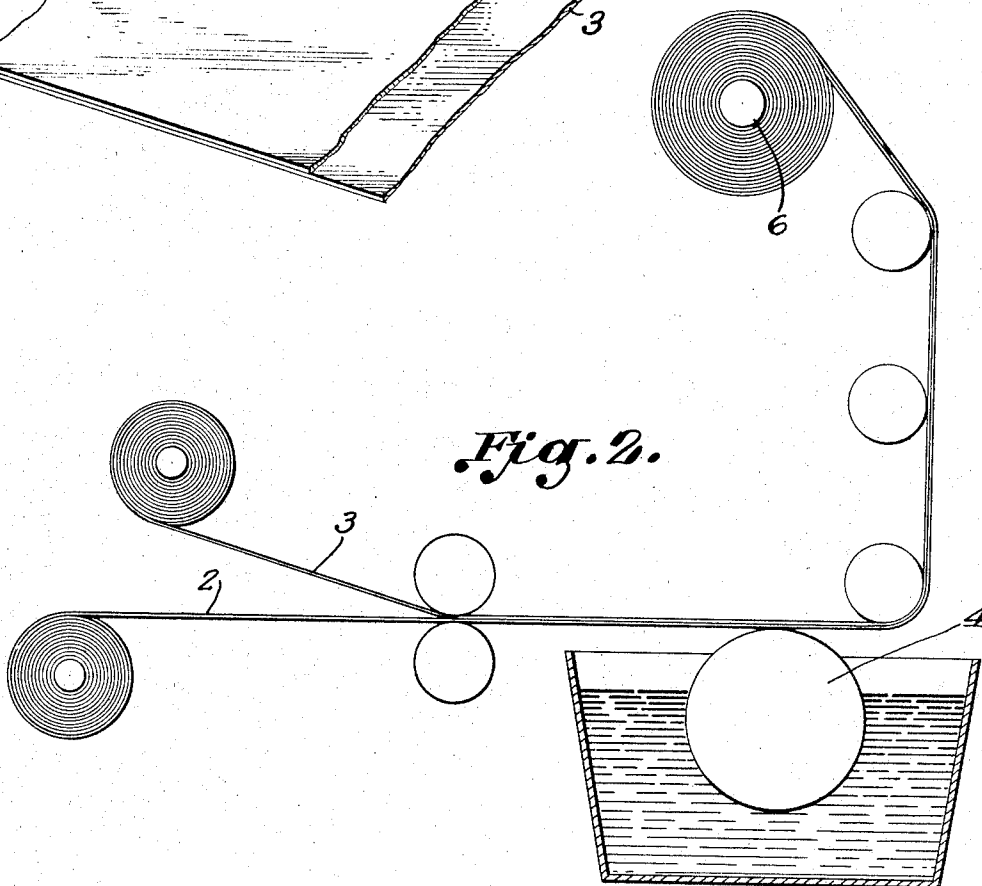


Fig. 2.



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IMPRESSION MEDIUM

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5 Claims. (Cl. 282—28)

For the making of photographically or lithographically produced representations of type-written matter, etc., there has been no very satisfactory means for making the original or master copy. If made with the customary typewriter ribbon the woven textile surface forms an impression which like the textile surface, is uneven, and it lacks sharp clean-cut outlines and requires extra exposure in making plates and the like, and reproduces poorly. If made with the customary carbon paper, again there are irregular diffused outlines, unsatisfactory for reproduction. In accordance with the present invention however, an impression medium may be had which gives sharp clean-cut outlines for original or master-copy work, or hectograph work, and which can also be used for multiplying copies, being outstandingly durable over known copying papers besides being clear.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawing, setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing: Fig. 1 is a perspective view, parts being broken away, showing a sheet embodying the invention; and Fig. 2 is a semi-diagrammatic side elevation showing a method of making the same.

With the customary carbon paper, the soft plastic coating being the surface which transmits the impact, comes off with a splash and cannot make a sharp clean-cut impression, but makes diffused outlines. A desirable copy should have sharp clean-cut outlines in exact duplication of the original. In consideration of the mechanical conditions involved, it is seen that a layer or coating of greasy or waxy yielding character inherently can not give other than a smudgy diffused impression. Furthermore, as well known, the greater part of the carbon coating comes off on the first stroke of the impacting typewriter type, or pencil or whatever instrument is being applied, and with successive strokes over the same area the copying material is rapidly transferred off, and the total life for the making of passable copies is very limited. In efforts to increase the life of copying sheets, it has been suggested to apply a woven textile fabric soaked with ink and having a paper backing. Such a product however is too thick, on account of the woven cloth layer, and besides the hard twisted cross threads of the warp and weft of the cloth do not effectively yield at the same rate as the paper layer, nor do they carry the ink effectively. Moreover, such a surface is roughly fuzzy and inherently precludes the mak-

ing of sharp outline copies. A further suggestion has been the provision of a layer of paper coated with carbon mixture and a gluing agent and a cover sheet of typewriter paper glued on. This again is a rough fuzzy surface product which precludes the obtaining of sharp outline copies. It also has been suggested to either paste an absorbent thin blotter-like layer or mold it directly to a backing of woven cloth in a paper making machine. Such a structure while having a very absorbent face is rough and fuzzy, and is unduly thick by reason of the cloth layer, and the face layer is so tightly united to the cloth as to be incapable furthermore of such yielding as to accurately follow the typewriter type or the like. All such copying sheets are seen to have rough fuzzy working surfaces. This inevitably results in rough fuzzy outline copies. It has been thought to be impossible to avoid such, if transfer of ink be obtained. In the requirements of a clear-cut exact duplication of impressions in copying, together with evenly-sustained feed of the ink and durability in the product, contradictory factors are involved, and as the art shows, various limitations have prevented the attainment desired. We have now found however, that it is possible to avoid such difficulties and attain products which are light and pliant and which have a working face providing the properties of accurately reproducing sharp outlines and of yielding accurately to the contour of the impressing typewriter character, pencil or other instrumentality applied, while at the same time being able to regulate a controlled feed of copy medium or ink, and have surprising long life.

We provide a structure with a working face having the peculiarities of being smooth, very thin, tough and pliant and of such capillary character as to feed ink through on pressure, the surface normally being dry and non-smudging, together with a backing, and carbon transfer composition or ink of customary or preferred composition between, such compositions involving for instance wax, non-drying oil and base pigment and color. In thickness such a sheet appears no thicker, and in fact thinner than the old style carbon paper, but its working surface is dry and capable of being handled without the customary smudging and off-setting. We have found that by making the working surface of a smooth thin pliant membrane having such capillarity as to transmit ink on pressure, the hitherto contradictory factors in copying sheets yield, and a surprising result is attained that clean-cut impressions can be had, with a sheet which is of dry surface, non-smudging, while such a sheet can produce several times the number of copies possible with the old products. The working surface membrane which we employ is a thin cellulose structure surfaced such that at

least the face which is to be exposed is smooth, while there is sufficient capillarity to provide passage of ink on pressure. Such membrane is tough and very pliant, capable of exactly following the contour of the impressing type or the like, and an ink reservoir is provided thereby between the backing layer, which may be of suitable light tough yielding character. That is, the sheet involves a surface membrane on a backing, with the ink composition between and extending into the membrane; and instead of being glued to or fixed to the backing by a gluing agent as in composite copy sheets heretofore, our surfacing membrane rests on and is adherent merely by the ink interposed on the paper backing. In a practical sense thus, the thin membrane, while held to the backing, floats thereon to the extent that its surface can yield and not be unduly restricted by over-rigid tension to the backing. For the surface membrane, a thin cellulose product of long fiber well diffused in the refining engine in the preparation of the "stuff," may be applied, and at least the one surface may be calendered or smoothed. Various long fiber stocks well refined and evenly laid and suitably smoothed may be employed in special make-up to the characteristics which we have pointed out; and in some cases we may employ a light stock of the so-called Japanese type or character, suitably calender-smoothed at least on the exposed face. For some uses we may apply a thin product of the character used in mimeograph sheets. The features and advantages of the invention may be realized in complete or in lesser degree, as the facing membrane embodies the characteristics which we have indicated foregoing. The backing may be paper or other non-textile material, plant, light and tough, such as paper, or in some cases "Cellophane," "Pliofilm," etc. We prefer paper stock of lighter weight than that commonly used for carbon paper.

In making up our product, with the materials we have specified in convenient web or roll form, we may run the backing web over an applicator roll applying the copying composition of wax or the like and coloring pigment ingredients, as noted, and the facing membrane web may be set down in place thereon as running through suitable assembling rolls; or conveniently the facing membrane web 2 (see drawing) may be run into assembly with the backing web 3 and then over an applicator roll 4 applying the inking composition 5, preferably at elevated temperature, to the membrane face in sufficient extent to pass therethrough and fill the interstitial spaces between the backing and the face membrane and leave the latter free from surface excess. Thence the product may be cooled and be wound up at 6. With a facing membrane of the characteristics provided, such ink gives the adhesion to the backing needed, without gluing means, and as above pointed out the facing membrane can have sufficient motility, floating on the capillary bed of the ink reservoir extending to the backing, to allow remarkable freedom in following the impressing type or the like. The product may be used in sheet or web form of suitable width, as desired.

As thus readily seen, our products, unlike the aforementioned laminated products of fabric or paper face, have a smooth non-fuzzy working face, and unlike prior products having rigid connection between a face sheet and a backing sheet, our products provide sufficient freedom for the facing to accurately conform to the impressing type

or the like. The results then are that instead of fuzzy blur-edged impresses, clear sharp outline impresses are obtainable, in sharp duplication of the original, and the working face of the sheet being dry allows handling without detriment. Furthermore, by peculiarities of its structure, a larger amount of ink composition per ream may be carried, and the ink reservoir between the backing and the face membrane is so controlled in the operation of the face membrane with its regulating capillarity, as to just feed through at each pressure and impact of the type caused by the type-bar stroke of a typewriter such ink as is requisite for that impression, without surplus; and the texture of the membrane being tough although pliant, together with its regulated control on the feed of the ink results in a working life of such copying sheet several times that customarily expected of such devices.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

We therefore particularly point out and distinctly claim as our invention:

1. An impression medium comprising a working face of a smooth surfaced thin pliant membrane transmitting ink on pressure to a surface to receive the impression, a non-woven self-sustaining cellulose backing layer, and an ink between said membrane and backing layer and filling the capillary interstices of the pliant membrane.

2. An impression medium comprising a working face of a smooth surfaced thin pliant membrane transmitting ink on pressure to a surface to receive the impression, a non-woven self-sustaining cellulose backing layer, and an ink between said membrane and backing layer and filling the capillaries of the membrane, said facing membrane adhering to said backing by the ink, the ink being the sole medium between said layers having an adhesive function.

3. An impression medium comprising a working face of a smooth surfaced thin pliant membrane transmitting ink on pressure to a surface to receive the impression, a paper backing layer, and an ink between said membrane and backing layer and filling the capillaries of the membrane, said facing membrane adhering to said backing by the ink without adhesive means.

4. An impression medium comprising a working face of a smooth surfaced thin mimeograph paper transmitting ink on pressure to a surface to receive the impression, a non-woven self-sustaining backing layer, and an ink between said paper and said backing layer and filling the pores of said paper, said facing membrane adhering to said backing by the ink without adhesive means.

5. An impression medium comprising a working face of a smooth surfaced thin Japanese type paper transmitting ink on pressure to a surface to receive the impression, a non-woven self-sustaining backing layer, and an ink between said paper and said backing layer and filling the capillaries of the thin paper, said facing membrane adhering to said backing by the ink, the ink being the sole medium between said layers having an adhesive function.

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