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STENCIL SHEET ASSEMBLY AND CUSHION SHEETS FOR USE IN SAME

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Fig. 1

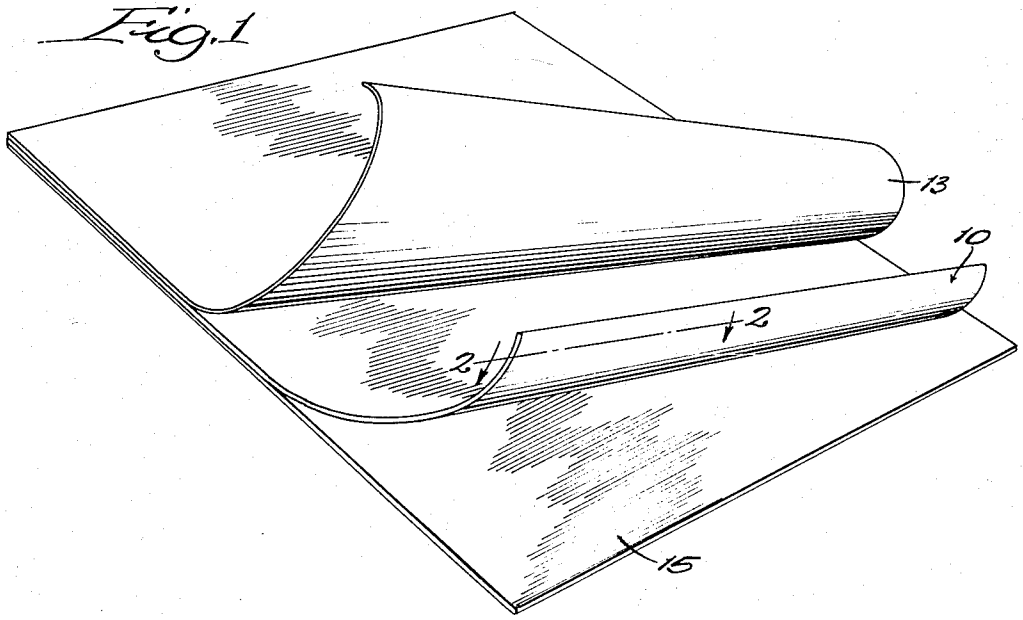
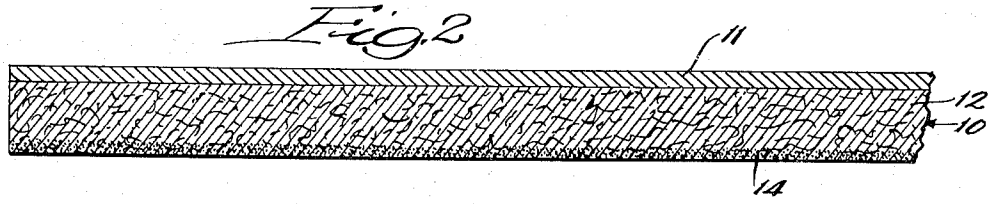


Fig. 2



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STENCIL SHEET ASSEMBLY AND CUSHION SHEETS FOR USE IN SAME

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5 Claims. (Cl. 101—128.2)

This invention relates to an improvement in the art of stencilization and it relates more particularly to a new cushion sheet for use in stencil sheet assemblies to improve the operation and the characteristics thereof.

With particular reference to stencilization as practiced in office copy work, it has been found desirable to make use of a cushion sheet interleaved between the stencil and backing sheet in a stencil sheet assembly. In the past, such cushion sheets have been formed of various fibers but best use has been made of tissue fabricated of such long fibers as Kozu fibers and the like. While stencilization was improved by the use of such fibrous tissues, correction was difficult because the displaceable stencil coating composition caused the stencil to adhere to the cushion sheet and smudging very often occurred with the result that a blurred and illegible image is formed on the stencil which makes readability and proofreading more difficult.

Thus it is an object of this invention to produce and to provide a method for producing a new and improved cushion sheet for use in stencil sheet assemblies whereby the objectionable characteristics heretofore existing in the use of fibrous tissue are substantially completely eliminated.

It is another object of this invention to produce and to provide a method for producing a cushion sheet for use in a stencil sheet assembly wherein write-off can be secured onto the backing sheet to produce a visible copy of the stencilized material.

It is a further object to produce a cushion sheet of the type described in which cut-out of the loop letters and cutting of the fibers in the stencil base sheet are minimized thereby to enable improved stencilization and the production of copy of good quality.

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 drawing in which—

Figure 1 is a perspective view of a stencil sheet assembly which makes use of a cushion sheet embodying features of this invention, and

Figure 2 is an enlarged sectional elevational view of the cushion sheet shown in Figure 1.

It has been found that by application of wax coatings onto cushion sheets of closed formation, e. g. ordinary waxing stock, many of the problems heretofore described are substantially completely eliminated, but a number of other problems are raised with respect to cut-out and the production of proof copy by write-off on the backing sheet.

As used herein, the term "cut-out" is meant to refer to the ability of the fibers in the stencil base tissue to resist severance while permitting the ink impervious stencil coating to be displaced upon impact, as by means of a typewriter key, by die-impression or the like, to provide corresponding openings through the stencil through which ink may pass but in which the fibers remain as a lattice-work across the openings to hold the loop letters in place and control the flow of ink through

the openings to produce copy of good quality. The term "write-off" is meant to refer to the function of the cushion sheet as a carbon sheet to reproduce the stencil openings as copy on the backing sheet.

When the top side of the base paper adjacent the stencil sheet is coated with a wax composition, sticking is minimized but when, at the same time, a similar wax or oily coating is provided on the underside of the base sheet for the purpose of giving write-off onto the backing sheet, as in a conventional carbon, excessive cutting of the fibers of the stencil base tissue occurs during stencilization with the result that the loop letters are lost and a proper lattice-work of fibers is not available across the openings to control the ink flow for the production of copy of good quality. It has been found that a coating in the form of an oil or a wax composition cannot be tolerated in amounts even as low as 1 pound per 3000 square feet of surface on the underside of the cushion sheet without causing this undesirable amount of cutting of the stencil fibers.

In accordance with the practice of this invention, the difficulties heretofore encountered in the manufacture of a cushion sheet **10** capable of good write-off onto the backing sheet **15** and decrease in the amount of fiber cutting, smudging and sticking are overcome by the fabrication of a cushion sheet **10** having a wax coating **11** on the side of the base paper **12** adapted to underlie the stencil sheet **13** while the opposite surface of the base sheet is provided with dry pigment **14** rubbed or brushed into the surface to prevent smearing. The wax coating on the top side of the cushion sheet is adapted to be pigmented to provide a contrasting color, such as white for blue or green stencils or black for white stencils whereby the visibility of the stencil openings that are formed is greatly increased with the result that the stencil is more easily readable.

The pigment which is incorporated without a carrier into the bottom side of the cushion sheet may comprise carbon black, lampblack, phosphotungstate green, phthalocyanine blue, iron blue or the like. When applied in the dry state, the pigment may be dusted onto the surface and then rubbed or brushed with a cotton pad, cotton covered roller, bristle brush or the like, not only to remove the excess pigment from the surface but to imbed the remainder into the interstices between the fibers to the end that a relatively high gloss is provided on the write-off side of the cushion sheet. The pigment is adapted to be present in amounts of about 1 pound per 3000 square feet of surface area but may be present in practice in amounts ranging from ½ to 3 pounds per 3000 square feet of surface area. After the excess is removed and the remainder is worked into the surface, the cushion sheet becomes relatively incapable of smearing or smudging but is able to produce good write-off onto the backing sheet. A pigmented carbon of the type described which is clean to the touch and which has no displaceable color coating is believed to be new in the art of manifolding sheets and particularly new in a cushion sheet of the type described. Instead of dusting the dry pigment onto the surface of the sheet, it is preferred to apply the pigment from a dispersion in a solvent system such as in trichloroethylene or alcohol or from an aqueous dispersion followed by elimination of the carrier to leave the dry pigment and removal of the excess by rubbing and polishing upon drying.

As the wax coating on the side of the cushion sheet adapted to underlie the stencil sheet, use may be made of natural waxes, coal tar waxes, mineral waxes and petroleum waxes of the type paraffin wax, carnauba wax, ozokerite, ouricury wax, candelilla wax, petrolatum and the like, alone or in admixture with oils or other plasti-

cizers to impart the desired softness to the coating. It has been found that polyethylene and other hydrocarbon polymers in amounts up to about 10 percent by weight of the coating composition may be incorporated as an ingredient in the wax base to toughen the coating and to make it more suitable for the purpose for which it was intended and to prevent smudging and sticking to the stencil.

Various pigments may be incorporated into the wax base to introduce the contrasting color whereby the formed stencil becomes more readable. With light colored stencils, black pigments such as carbon black, lampblack and the like may be incorporated and for dark blue or green stencils, the wax coating may be formulated to contain a white pigment such as titanium dioxide, lithopone, zinc oxide, lead oxide and the like. The amount of pigment or dye in the wax coating composition is not critical so long as a contracting color of sufficient intensity is developed.

In practice, the wax coating is applied onto the paper as by a roller coater in the form of a hot melt in weights ranging from 8 to 15 pounds per 3000 square feet of surface area. It is desirable to keep the wax coating from penetrating to the other side which is adapted to be treated with dry pigment.

The following will represent practice of this invention in the manufacture of a white coated cushion for use with blue stencils (Example 1) and in the manufacture of a black coated cushion for light colored stencils (Example 2):

Example 1

Composition:

18.8 percent paraffin wax
7.6 percent carnauba wax
6.3 percent ouricury wax
9.7 percent candelilla wax
23.1 percent white petroleum
6.0 percent polyethylene resin
28.5 percent titanium dioxide

The coating composition is applied by a roller coater or by other suitable coating means as a hot melt heated to a temperature of about 210° F. Application is made to provide a coating **10** onto one side of a base paper **11** in amounts ranging from 10 to 12 pounds per 3000 square feet of surface area.

Carbon black in amounts ranging from about 1 to 1½ pounds per 3000 square feet is dusted onto the opposite side of the base paper **11** before or after application of the wax coating layer **10**. The pigmented side is first engaged by a cotton covered roller to displace excess pigment and rub some of the pigment into the paper and it is then engaged by a series of rotating brushes which further removes excess carbon black and imparts a fairly high finish to the pigmented side **12** of the cushion sheet.

A cushion sheet of the type described is adapted to be positioned in a stencil sheet assembly **13** with the coated side **10** adjacent the underside of a stencil sheet **14** and the pigmented side **12** adjacent the underlying backing sheet **15**.

Example 2

Composition:

40 percent carnauba wax
40 percent dark petrolatum
20 percent furnace black

This composition is applied as a hot melt onto one side of a base paper to form a wax layer in amounts ranging from about 8 to 10 pounds per 3000 square feet of surface area.

Prior to application of the wax coating, the underside of the base paper is treated with phthalocyanine blue contained as a dispersion in trichloroethylene. After drying, the pigmented side is rubbed with a cotton pad and then burnished with a rotating bristle brush whereby excess pigment is removed from the surface and the remainder is rubbed.

It will be apparent from this discussion that a new and improved cushion sheet for use in stencil sheet assemblies is provided wherein good write-off is secured during stencilization without cutting the fibers of the stencil base tissue and with the elimination of sticking between the stencil and the cushion sheet as well as elimination of smudging which has heretofore resulted in the production of stencils of poor readability.

It will be understood that changes may be made in the details of application and formulation of the various compositions applied to the base paper, tissue or other open fibrous sheet stock in the formation of the cushion sheet without departing from the spirit of the invention, especially as defined in the following claims.

We claim:

1. In a stencil sheet assembly having a backing sheet and a stencil sheet formed of a base tissue having an ink impervious displaceable coating, a cushion sheet interposed between the stencil sheet and the backing sheet, said cushion sheet comprising a base paper having a wax coating on the surface underlying the coated stencil and dry pigment free of any liquid carrier and vehicle rubbed into the surface adjacent the backing sheet.

2. In a stencil sheet assembly having a backing sheet and a stencil sheet formed of a base tissue having an ink impervious displaceable coating, a cushion sheet interposed between the stencil sheet and the backing sheet, said cushion sheet comprising a base paper having a wax coating on the surface underlying the coated stencil and containing a pigment in the wax coating to provide a contracting color with the stencil sheet and dry pigment free of any liquid carrier and vehicle rubbed into the surface adjacent the backing sheet.

3. In a stencil sheet assembly having a backing sheet and a stencil sheet formed of a base tissue having an ink impervious displaceable coating on one surface thereof, a cushion sheet interposed between the stencil sheet and the backing sheet, said cushion sheet comprising a base paper having a wax coating pigmented to provide a contrasting color with the coated stencil on the surface of the base tissue underlying the coated stencil sheet and dry pigment free of any liquid carrier and vehicle in amounts ranging from ½ to 3 pounds per 3,000 square feet of surface area imbedded into the surface of the base paper adjacent the backing sheet.

4. A cushion sheet for use in a stencil sheet assembly comprising a base paper, a pigmented wax coating on one side of the base tissue and dry pigment particles free of any liquid carrier and vehicle imbedded in the other side of the base tissue in amounts ranging from ½ to 3 pound of dry pigment for 3,000 square feet of surface area.

5. The method of producing a cushion sheet for use in a stencil sheet assembly comprising the steps of coating one side of a paper base sheet with a wax composition in a manner to prevent excessive penetration, coating the other side of the sheet with a pigment dispersed in a solvent system, removing the solvent to deposit the dry pigment on the coated side of the base sheet, and then brushing the pigment coated base sheet to imbed the pigment particles in the base sheet and remove the excess thereof.

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