Oct. 11, 1960 H. BOGDONOFF 2,955,531

STENCIL MASTER FORMATION

Filed May 2, 1956

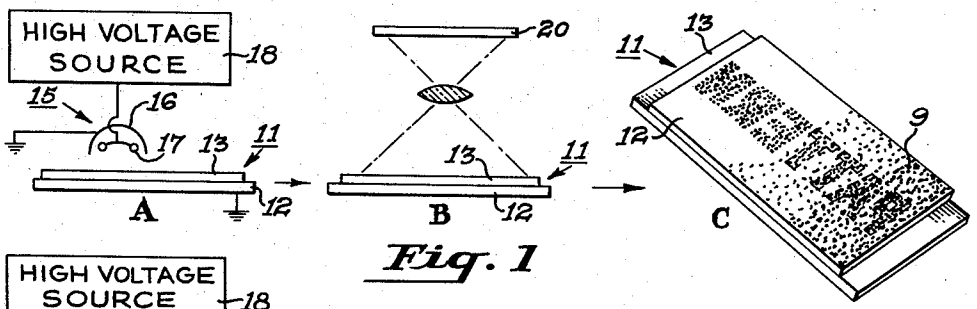


Fig. 1

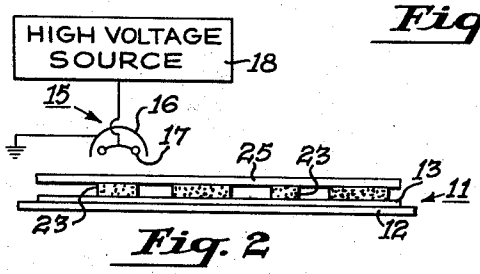


Fig. 2

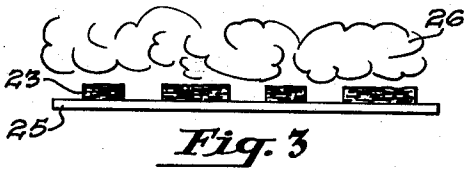


Fig. 3

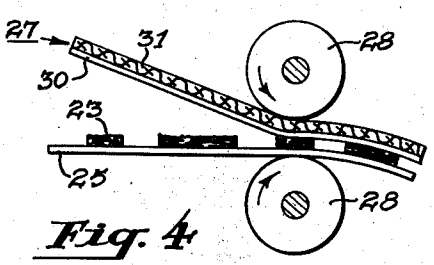


Fig. 4

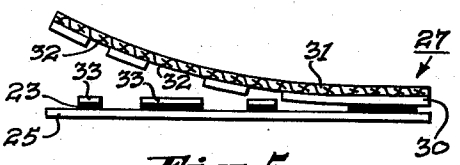


Fig. 5

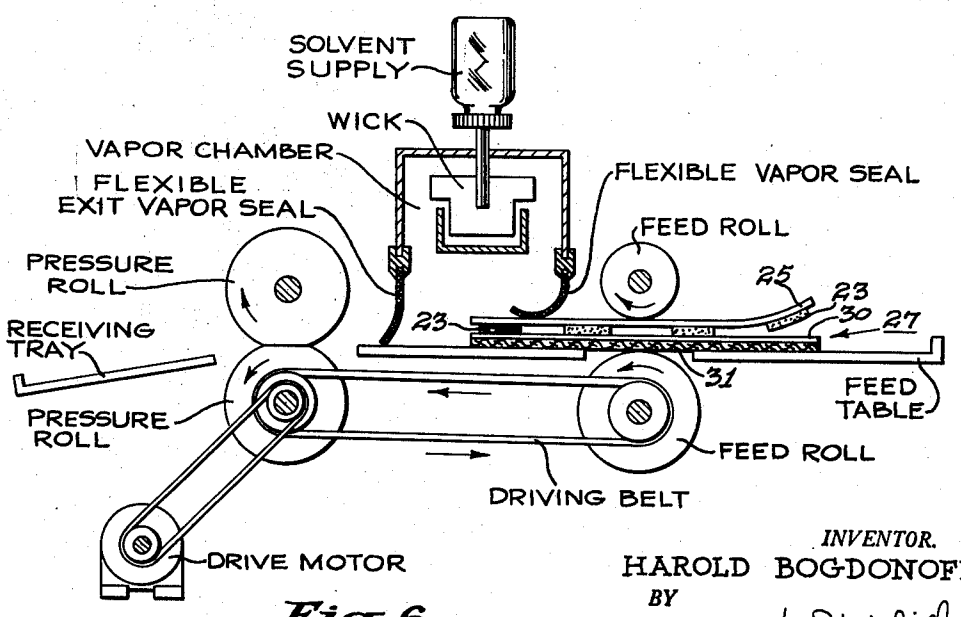


Fig. 6

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2,955,531

Patented Oct. 11, 1960

2,955,531

STENCIL MASTER FORMATION

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Filed May 2, 1956, Ser. No. 582,197

4 Claims. (Cl. 101—128.2)

This invention relates in general to master making for duplicating processes.

At present the method used for producing stencils for the stencil duplicating process involves the cutting of a stencil master. The stencil master generally comprises a porous tissue or the like impregnated and coated on both surfaces with a wax or waxlike material, and cutting of the stencil master involves the removal of wax from image areas by pressure to permit passage of an aqueous or oil base ink directly from a reservoir of ink to the final copy through the porous tissue in areas of the master from which the wax or waxlike material has been removed. Areas of the master which remain impregnated and coated with the wax or waxlike material prevent passage of the ink to the copy paper, and there is thus formed copy conforming to the cut areas of the stencil master.

Analogous processes have been evolved for the graphic arts wherein a silk screen is blocked by a manually applied binder or by a photographically controlled gelatin layer. The screen is then used to control the flow of ink, paint, varnish, or the like from an applicator to the paper or other final support.

Photochemical processes also exist whereby masters for duplicating processes may be prepared. However, in order to make use of these processes a high contrast photographic positive is necessary, and the master is exposed generally to the photographic positive while clamped in close contact therewith.

Now, according to this invention, a method is disclosed and described whereby duplicating stencils may be prepared xerographically. In particular, xerography is used to create a reproduction in powder resin form of an original. The powder image is made tacky and pressed against a master sheet for the duplicating process. While in contact with the master sheet the tacky image is allowed to solidify. The master sheets used, according to this invention, carry a coating, such as wax or a waxlike material, for the stencil process, substantially on one surface of the support member whether it be tissue or a silk screen base. Following solidification of the tacky image, the master sheet is separated therefrom and, on separation, the solidified image removes on itself portions of the coating from the master. Thus, following separation, there remains a master with image portions removed which then may be used according to the usual techniques to produce copies. As will become more obvious in the more detailed discussion of this invention which follows, the techniques of this invention allow for the use of existing documents as original copy to produce masters for duplication processes using an optical exposure system to produce an exact duplicate and, thus, there is eliminated the disadvantages of manual preparation as, for example, typing, drawing, cutting, or the like, and there is included the advantage of photographic accuracy.

Accordingly, it is an object of this invention to devise new methods of forming a master for duplicating processes.

It is a further object of this invention to devise novel techniques for forming masters through the use of a tacky image corresponding to an original.

It is a still further object of this invention to devise novel xerographic techniques of master making.

Additional objects of this invention will in part be obvious, and will in part become apparent, from the following specifications and drawings, in which:

Figure 1, A, B, and C, illustrates an embodiment of xerographic steps which may be used to form a powder image corresponding to copy being reproduced;

Figure 2 illustrates transfer of the powder image;

Figure 3 diagrammatically illustrates an embodiment of tackifying the powder image;

Figure 4 illustrates pressing of a tacky image against the master sheet carrying a coating substantially along one surface thereof;

Figure 5 illustrates stripping of the image carrying surface from the master sheet; and

Figure 6 illustrates schematically an embodiment of a device to tackify and bond the image for master making according to this invention.

For a better understanding of this invention, reference is now had to Figure 1 wherein the xerographic steps of powder image formation are illustrated. It is to be realized that, although the powder image is formed xerographically in the figures, other techniques of photographically forming the image are intended to be encompassed herein and the figures included are for illustrative purposes only.

The steps illustrated in this figure are: Figure 1–A, charging or sensitizing of the plate; Figure 1–B, exposure of the sensitive plate made sensitive in Figure 1–A; and, Figure 1–C, development of the exposed plate. The plate which is generally used in xerography, which in this figure is designated generally **11**, is composed of a photoconductive insulating layer **13** overlying a conductive backing member **12**. The photoconductive insulating layer may be any of a number of materials as, for example, sulphur, vitreous or amorphous selenium, zinc oxide in a binder, or the like. Functionally, it may be described as a material able to retain an electrostatic charge for a sufficiently long period to allow exposure and development of the electrostatic charges on its surface and as a material which, on exposure to activating radiation, rapidly dissipates charge.

In Figure 1–A the charging or sensitizing step is illustrated using a corona discharge electrode generally desinated **15** which comprises a grounded shield **16** and corona discharge wires **17**. The corona discharge wires **16** are connected to high voltage source **18** which supplies a potential in the order of from 6,000 to 10,000 volts. The voltage may be direct current, positive or negative, or alternating current. Techniques of control exist for causing deposition on the surface of the photoconductive insulating layer **13** which relate to the particular type of high potential used and which allow the use of alternating or direct current. Generally, the surface to be charged is charged to from 100 to 800 volts either positively or negatively. The corona grid **15** is, in this figure, illustrated as moving in the direction of the arrows and, desirably, relative movement should take place between the grid and the plate being charged when the grid covers only a portion of the plate surface. Movement may be brought about manually, or a screw drive connected to a motor or the like may be used.

During charging, the backing member **12** of plate **11** may be grounded and, generally, charging is carried out in darkness.

Figure 1–B represents and illustrates the exposure step.

In this figure, copy 20 to be reproduced is projected through lens 21 to the charged surface of photoconductive insulating layer 13 overlying backing member 12 of plate 11. The backing member 12 of plate 11 need not be grounded during exposure but may, if desired, be held at a ground potential. Exposure causes dissipation of charge in those areas struck by light resulting in a charge pattern of electrostatic charges on the surface of the photo-conductive insulating layer 13.

Figure 1–C illustrates one form of development which may be used to make visible an electrostatic charge pattern on the surface of photo-conductive insulating layer 13 overlying conductive backing member 12 of plate 11. The particular technique illustrated in this figure is generally known in the art as "cascade development." In cascade development a combination 9 of carrier and toner particles or developer particles is passed over the image bearing surface. The toner or developer particles adhere to the carrier particles due to opposite electrostatic charges existing on their surfaces. However, the electrostatic fields of force of the image overcome the bond between toner and carrier and draw the toner or developer particles to the plate and away from the carrier particles. The carrier particles are generally sufficiently large in size and of sufficient mass to prevent their deposition in accordance with the electrostatic latent image and thus there results an image of deposited toner or developer particles in conformity with the charge pattern. There is thus formed following the steps of Figures 1, A, B, and C, a powder image on a surface conforming to an original.

Although particular steps are illustrated in Figure 1, it is to be realized that there is no intention to be limited thereto and that various modifications to accomplish the end purpose of a powder image optically formed conforming to an original as is known generally to those skilled in the art are intended to be included herein.

Further modification of the xerographic techniques are intended to be encompassed. Thus, and for example, although corona charging to sensitize the plate is illustrated in Figure 1–A, it is to be realized that other techiques of charging as, for example, a radioactive source, a modified corona discharge device such as the type described in Walkup application Serial No. 154,295, filed April 6, 1950, now U.S. Patent No. 2,777,957, for Charging Device, a stationary grid stationed over the surface to be charged, induction charging, or the like may be used.

Also, although a form of projection exposure is illustrated in Figure 1–B, it is to be realized that contact exposure, reflex exposure, or the like may be used, and such techniques of exposure are intended to be encompassed by this invention. It is also to be realized that there is no desire to limit this invention to cascade development as is illustrated in Figure 1–C. Powder cloud development, sheet development, loop development, magnetic development, or the like are also intended to be included herein.

In Figure 2 there is illustrated transfer of the powder image from the plate generally designated 11 comprising a photoconductive insulating layer 13 overlying a backing member 12. The powder image designated 23 is transferred to transfer sheet 25 in this embodiment through the use of electrostatics. Electrostatic transfer is carried out by placing an electrostatic charge on the surface of sheet 25 using corona grid 15 comprising grounded conductive shield 16 and corona discharge wires 18. Corona discharge wires 17 are connected to high voltage source 18 and may supply corona as described and discussed in connection with Figure 1–A. Generally, in the art of xerography if a surface is charged positively in the first instance, negatively charged particles will be used during development to deposit on the positive charges making up the image. Similarly, when the surface is originally charged negatively, positively charged particles will generally be used during development. The use of a corona charge on transfer sheet 25 corresponding in sign to the original charge used to sensitize the plate will cause transfer of the oppositely charged particles making up powder image 23. It is to be realized that various other techniques of image transfer may be used or, alternatively, the image transfer step may be omitted and the visible powder image 23 on the surface of plate 11 may be carried through the remaining steps of this invention.

Generally, in xerography a plate is reusable and, thus, it is desirable to remove the powder image from its surface by transferring the image to a new support prior to carrying out the remaining steps of this invention. If, however, the plate is considered expendable, as, for example, paper backed plates now known in the art, the image may remain in place on the plate surface during subsequent steps in carrying out this invention.

In Figure 3 there is illustrated tackification of powder image 23 on the surface of sheet or web 25. Tackification is accomplished in this embodiment by exposing the powder image to solvent vapors 26 for the image material.

Tackification of the dry toner image is accomplished when the powder image becomes a more liquefied adhesive unit. Although it is not desired to limit this invention to a particular mode of operation, it is now thought that tackification takes place due to the effect of vapors on the viscosities and surface tensions of the material making up the image.

It is believed that exposing the image to proper vapors causes the surface tensions of the material to decrease, thereby making particles more adhesive. This will cause the particles to stick to one another and at the same time cause the image itself to become adhesive. It is thought in general that solvents for image materials or, more particularly, vapors soluble in the image materials cause a lowering of surface tensions. Exposure to vapors also causes the viscosity of the materials making up the image to fall, thereby allowing the particles to flow more readily. Exposure to vapors causes the image to reach this tacky state by decreasing the viscosities and surface tensions of the materials comprising the image, thereby producing a more liquefied adhesive single image body.

The image should be composed of materials which can be reacted on by the proper vapors. The various image materials which have been tried are the usual and commercially available xerographic developer materials. Such materials are available under the trademark "XeroX" and are sold as "developer" and "toner" by The Haloid Company, of Rochester, New York. There are also disclosed valuable developer materials to be used in connection with this application in Walkup United States Patent 2,618,551 and Walkup and Wise United States Patent 2,638,416.

Although tackification has been described in terms of vapor tackification, it is also to be realized that heat tackification and the like are intended to be included herein. For example, applying heat to the toner image will also react on the viscosities and surface tensions of the materials making up the image. Thus, applying the proper amount of heat will cause tackification of the image when the image materials are such that they will be reacted on by heat. Heat tackification by radiation and conduction are also intended to be included herein.

When vapor tackification is used, the particular tackifying vapor will depend on the nature of the particular image material or powder. Various solvent vapors may be used as, for example, trichloroethylene, various halogenated lower hydrocarbons having at least one fluorine per molecule commercially available under trade names such as the Freons, Genetrons, and the like, chloroform, carbon tetrachloride, various chloromatic solvents, aromatic and aliphatic hydrocarbons such as benzene, toluene, gasoline, and gasoline fractions, oxygenated solvents

such as ethanol, acetone, ethyl acetate and other alcohols, ketones, esters, and the like. In all cases, the particular solvent or solvent vapors should be appropriately selected to operate empirically with the particular image material or compositions of material being employed.

In Figure 4 there is illustrated pressing of the tacky image 23 on base 25 against a master sheet generally designated 27. The base 25 is pressed against sheet 27 while the powder image 23 is in a tacky state and, optionally, if sheet 25 or master 27 is porous to the particular vapors being used to tackify the image or will allow the passage of heat, as is often the case, then the tackification step and the pressing step may be combined. Rollers 28 bring pressure to bear on the assembly as they are rotated in the direction indicated by the arrows, and the use of rollers is an illustration of one embodiment of pressing master sheet 27 comprising wax or waxlike coating 30 on porous base 31 such as a porous tissue for stencil duplicating, against the tackified image 23 on sheet 25. Other techniques may be used as for example, pressing between two flat surfaces, rolling a roller across the assembly while the assembly rests on a flat and relatively hard surface, electrostatic tacking, or the like.

When the image is not transferred to a transfer base but is instead allowed to remain on the plate then 25, which in this figure represents the transfer sheet, will instead represent the plate. After the master 27 has been pressed against the tacky image 23, the image is allowed to fuse or solidify while in contact with both master sheet 27 and transfer sheet 25 following pressing, and the master sheet is then stripped from transfer sheet 25.

The coating 30 on base 31 of master sheet 27 being intended for duplicating processes is generally an easily releasable coating. When the tacky image becomes fused in contact with coating 30 of master 27 a firm bond is formed between the image and areas of the coating in contact therewith, and when sheet 25 is separated from master 27 the releasable coating adheres with greater tenacity to the fused image and is thus removed from master 27 to the upper surface of image 23.

In Figure 5 there is illustrated stripping or separation of master 27 from transfer sheet 25. Master 27 comprising coating 30 and base 31 is shown in this figure being removed from contact with image 23, and the release of portions 32 from coating 30 on base 31 to fused image 23 illustrated as coating 33 on the image portions is also shown. Preferably, and to assure adhesion of tacky image 23 to transfer sheet 25 during the separation step illustrated in this figure, the surface of transfer sheet 25 should be one to which the tacky image readily adheres. The principle of operation in removing image areas or portions 33 to image 23 is that of binding firmly the fused image to both coating 30 on support base 31 and to transfer sheet 25. Since coating 30 is a releasable coating, separation accomplishes release as is indicated by areas 32, thereby forming coating 33 on image 23, which remains fused to both sheet 25 and the coating portions in image areas. Since coating 30 is releasable from base 31 and from adjoining areas of the coating and since it is released in image areas on separation, there is created following separation a master usable in the stencil or silk screen duplicating processes.

In Figure 6 there is illustrated a device to accomplish tackification and bonding of the image while positioned between a support sheet 25 and a master 27. The assembly is inserted in the device shown in this figure and automatically moves through the device for controlled tackification and pressing so that when it has exited from the device and, following a momentary delay, separation of sheet 25 from master 27 may be accomplished to form a cut master for duplicating processes as has been illustrated in the previous figures.

As is illustrated in this figure, the leading edge of the assembly is positioned between a pair of feed rolls. The feed rolls are friction rolls and engage the assembly and move it therethrough. They are, in addition, resiliently mounted to allow separation of the rolls to allow an assembly to move therebetween while sufficient pressure is applied causing the rolls to engage and hold the assembly in position as it moves therethrough. These rolls are rotated at a consistent but slow peripheral speed and serve to push the leading edge of the assembly beneath a flexible vapor seal and into a vapor chamber while that portion which has not entered the feed rolls remains resting on the feed table. The chamber is thoroughly saturated with vapor of a solvent for the developer particles which is obtained from the solvent supply which feeds into a vaporizing wick located in the vapor chamber. As the assembly passes through the vapor chamber, the solvent vapor progressively permeates through to the powder particles of the image and, thus, progressively tackifies the image material. By a proper selection of drive motor speed which acts to drive the driving rollers through the driving belt, the progression of the assembly through the vapor chamber is controlled to be completed when the powder particles arriving at the flexible exit vapor seal are in the proper condition of tackification for bonding against the master surface and the support sheet. This condition may be described as that degree of tackification allowing the image to fuse completely and uniformly throughout while bonded to both surfaces. Immediately after passage through the flexible exit vapor seal, the leading edge of the assembly is engaged by a pair of pressure rolls that rotate at a peripheral speed equal to or slightly in excess of the peripheral speed of the feed rolls. The pressure rolls are preferably constructed of a sufficiently resilient material and are urged into contact by an external clamping device to thereby form a broad pressure applying area. The pressure rolls serve to pull the assembly through the vapor chamber and at the same time press the opposed surfaces of the master and the support sheet into intimate contact with the tackified image so that the tackified powder particles are slowly forced to flow into the interstices of the opposed surfaces. As the image continues to fuse, the image bonds itself to both surfaces. By the arrangement illustrated in this figure, successive portions of the tacky image are maintained in contact with the opposing surfaces for a period of time sufficient to form a firm bond between the respective layers. After the assembly has passed through the pressure rolls, it slides into a receiving tray wherein it is allowed to stand momentarily to permit the tackified powder particles to completely solidify or fuse. When the image is completely solidified the support sheet 25 is separated from master 27 either by stripping apart or by sliding the rear surface of one of the layers over a rod or the like whereby the bonded particles cleanly remove wax coating from the surface of master 25.

The device of Figure 6 is a schematic illustration of a device which, automatically and in a controlled fashion, will accomplish tackification and bonding according to this invention. It is to be realized, however, that various modifications and embellishments may be included within a device of this type to accomplish the same end purpose, and it is to be understood that such modifications and embellishments are intended to be included within the scope of this invention. A fuller disclosure of the type of device which may be used to accomplish the purpose of solidification and bonding according to this invention is found in co-pending patent application No. 479,454, and the various modifications and principles involved in the device of that co-pending application are included by reference.

A stencil master formed according to the techniques of this invention may be attached to a normal stencil duplicating machine for a normal stencil run. The ink is fed through the stencil pad and then through the porous areas of the tissue. The areas from which the coating material was transferred will allow passage of ink and, thus, there will be printed the original. In the instance

when the master is used for silk screen processes, ink or paint is applied through the porous areas to the copy sheet and, again, a reproduction of the original will be reproduced.

The time necessary to tackify the powder image is dependent on a number of factors such as, for example, whether heat or vapor is being used, the particular vapor if vapor is being used, the temperature applied when heat is being used, whether heat or vapor contacts the powder image directly or through a sheet, humidity and other atmospheric conditions, and the like.

The amount of pressure necessary to accomplish sufficient bonding will vary also depending on many factors such as the particular coating on the master, the conditions of the tackified image, the particular toner material employed, the delay before placing the softened and tacky toner image into the pressure assembly, humidity and other atmospheric conditions, and the like.

In experimentation carried out in accordance with the techniques of this invention, the xerographic powder image comprising the commercial XeroX toner previously mentioned was electrostatically transferred as is illustrated in Figure 2 to the grained surface of a XeroX Trans-Positive sheet, which is a commercial sheet product available from The Haloid Company, Rochester, New York, and comprises an acetate layer. The image on the acetate layer was fused for 3 seconds by exposure to trichloroethylene vapor. The image in this instance was fused although fusing is not necessary in the usual case. The image, in this instance, was solidified only to prevent smudging during experimentation by permanently bonding the image to the acetate layer. If solidification had not been accomplished, the image would continue to hold its position due to electrostatic forces, and if the techniques of this invention are being carried out in the usual sequence, the image in an unfused condition would be fed as an assembly into the vapor chamber for fusing against both the master sheet and the support sheet. However, in the laboratory work done immediate fusion and bonding to both the support sheet and master sheet was not convenient and, accordingly, the image was temporarily fused to prevent smudging and the like until the assembly was ready for further processing.

A master sheet or stencil master was next prepared for the bonding and cutting steps. As has been previously noted, the master sheet used in connection with this invention is a porous sheet coated substantially on one surface. In the experimentation carried out, a commercially available stencil master was carried through preparatory steps and was then used in the process. Various masters have been carried through the preparatory steps and all have worked well in this invention. The special preparation involved is to soak a commercially available master sheet in perchloroethylene. Although the time allowed to soak does not appear critical, in the experimentation carried out, the master sheet has generally been allowed to remain in the bath in the range from 15 seconds to 4 minutes. The bath has the apparent effect of removing the wax coating from one side of the stencil master sheet. The surface of the master sheet continuing to hold coating was then placed against the image on the grained acetate layer. The assembly was then run through apparatus of the type illustrated in Figure 6 and described in theory and in greater detail in co-pending patent application Serial No. 479,454, entitled "Method and Apparatus for Pattern Reproduction," filed on January 3, 1955 by Gundlach, Mott, Sabel and Albrecht. The stencil master sheet was positioned as the upper layer as the assembly passed through the device. Thus, the stencil master sheet primarily was exposed to the vapor chamber and allowed the vapors to filter through to reach the image. The solvent liquid used in this experiment was trichloroethylene, and the speed of movement of the assembly through the device was 0.125 inch per second which allowed a total exposure of any portion of the image to the vapors in the chamber of 32 seconds. The pressure applied by the pressure rolls was in the neighborhood of 15 p.s.i. Following movement of the assembly out of the device as illustrated in Figure 6 and a delay of about 3 seconds, the master sheet and the acetate sheet were peeled apart and the toner image remained adhering to the acetate sheet and removed upon itself areas of wax conforming to the image from the wax or waxlike coating. The cut master sheet was then placed on a commercially available stencil duplicating machine with the wax or waxlike covered surface away from the inking pad.

A comparison was made between masters specially prepared for the process described in this invention and commercially available masters cut in the normal manner to determine whether the ink pad of the stencil duplicating machine would affect the substantially bare porous surface of the stencil master. The comparison showed that no deterioration in addition to normal deterioration, if the usual stencil were used, took place.

The normal amount of stencil copies were prepared using masters cut according to this invention.

It is to be realized that, although a particular technique was used to prepare the stencil for cutting according to this invention, various other techniques exist. For example, stencil master sheets have been prepared to be used in this invention by positioning porous tissue paper around the surface of a cold drum. The temperature of the drum was in the neighborhood of 40° F. The drum carrying the paper was then rotated through a trough of molten material generally used for stencil coatings and the tissue paper became coated on substantially one surface only. It is believed that the cold surface of the drum against one surface of the tissue prevented the passage of the liquid wax through the tissue paper and prevented a full coating from forming on the surface against the drum; whereas, sufficient wax was picked up on the other surface of the tissue to form a proper one-sided coating. The thickness of coating following such a procedure may be varied by the speed of rotation of the drum or the like, and it is to be realized that modifications will in general not affect the process of this invention but may require, due to the different coatings obtained, different speeds through the tackifying and bonding devices or the like.

Another technique used to form a substantially one-sided coating on a tissue layer involves rotating a warm (not hot) drum through a supply of molten wax to cause a coating of tacky wax to deposit on the surface of the drum. A tissue is then pressed against the deposited coating of wax. The wax released easily from the drum surface to the tissue material and solidified thereon. The drum in this instance was composed of a smooth surfaced material to facilitate easy release of wax coating.

Various mixtures of wax or waxlike materials may be used in the coating processes described in forming a substantially one-sided wax coating on the tissue material. Two examples of mixtures follow:

Example I

20.8% carnauba wax (refixed, F. B. Ross Co., Inc.)
20.8% paraffin wax (Bioloid, embedding, Will Corp.)
20.8% petrolatum (white, USP Pureline—Sherwood Ref. Co., Inc.)
20.8% micro wax (Amprol 24, Atlantic Refining Co.)
16.8% calcium carbonate (Purecal M. Wyandotte Chem. Co.)

Example II

25% carnauba wax (same specifications as above)
25% paraffin wax (same specifications as above)
25% petrolatum (same specifications as above)
23% micro wax (same specifications as above)
2% calcium carbonate (same specifications as above)

Both of these coating compositions are reduced to a molten state at a temperature of about 900° C.

Although emphasis has been placed in the description of experimentation carried out on stencil master making, it is to be realized that the same principles apply to forming silk screen masters for the silk screen process and, accordingly, the cutting of silk screens according to the method steps of this invention are also intended to be included herein.

While the present invention as to objects and advantages, as has been described herein, has been carried out in specific embodiments thereof, it is not desired to be limited thereby, but is intended to cover the invention broadly within the spirit and scope of the appended claims.

What is claimed is:

1. The method of forming a cut stencil master for the stencil duplicating process comprising forming a tackifiable powder image on a first sheet, tackifying the powder image, pressing the tackified image against a porous stencil master sheet coated substantially on one surface only, said image being pressed against the coated surface of the master sheet, solidifying the image while in contact with the coated side of the master sheet and said first sheet, and separating the first sheet from said master thereby removing image portions of the coating from the master sheet on the fused image which adheres to said first sheet and thereby forming ink permeable areas in the otherwise ink impermeable stencil master sheet.

2. The method of forming a stencil master for the stencil duplicating process comprising forming on an image support base an electrostatic charge pattern corresponding to an original, developing the charge pattern with finely divided tackifiable electrostatically charged powder particles to form a powder image corresponding to the electrostatic charge pattern, tackifying the powder image, pressing the tackified image against a porous master sheet carrying a waxlike coating substantially on only one surface thereof, said image being pressed against the coated surface of said master sheet, solidifying the powder image while in contact with the coated side of the master sheet and said support base, and separating the image support base from the master sheet to thereby remove on the image which remains adhering to the image support base, image portions of the waxlike coating from the master sheet in image areas and thereby forming ink permeable areas in the otherwise ink impermeable stencil master sheet.

3. The method of forming a duplicating master comprising forming a tackifiable powder image on a first surface, positioning in contact with the image a porous master sheet, said master sheet carrying a coating substantially on one surface thereof and said coated surface being positioned in contact with said powder image, progressively tackifying successive portions of the powder material to cause adherence of the material to said first surface and to said master sheet, progressively pressing successive portions of the first surface and the master sheet into intimate contact in timed relation to the tackification, maintaining pressure for a sufficient period of time to permit the tackified powder material to solidify and bond to said first surface and to said master sheet, and separating said surface from said sheet whereby image portions of the coating are removed from the master sheet thereby forming a duplicating master.

4. The method of forming a cut stencil master comprising forming a resin powder image on a first surface, positioning in contact with the image a porous stencil master sheet, said master sheet carrying a waxlike coating substantially on one surface thereof and said coated surface being positioned in contact with said powder image, progressively tackifying successive portions of the powder material in a resin solvent atmosphere to cause adherence of the material to said first surface and to said stencil master sheet, progressively pressing successive portions of the first surface and the master sheet into intimate contact with the tacky powder image positioned therebetween in timed relation to the tackification, maintaining the pressure for a sufficient period of time to permit the tackified powder material to solidify and bond to said first surface and to said stencil master sheet, and then separating said first surface from said master sheet whereby image portions of the wax-like coating are removed from the stencil master sheet onto the solid image fused to said first surface thereby forming a cut master for the stencil duplicating process.

References Cited in the file of this patent

UNITED STATES PATENTS

2,073,033	Szasz	Mar. 9, 1937
2,616,961	Groak	Nov. 4, 1952
2,738,727	Dorman et al.	Mar. 20, 1956
2,808,777	Roshkind	Oct. 8, 1957