

Jan. 15, 1952

M. H. LUSTBADER
HECTOGRAPH MASTER SHEET

2,582,932

Filed April 5, 1946

Fig. 1

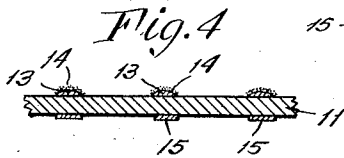
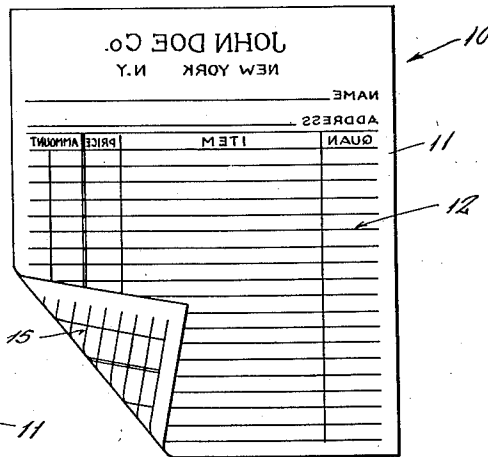


Fig. 2

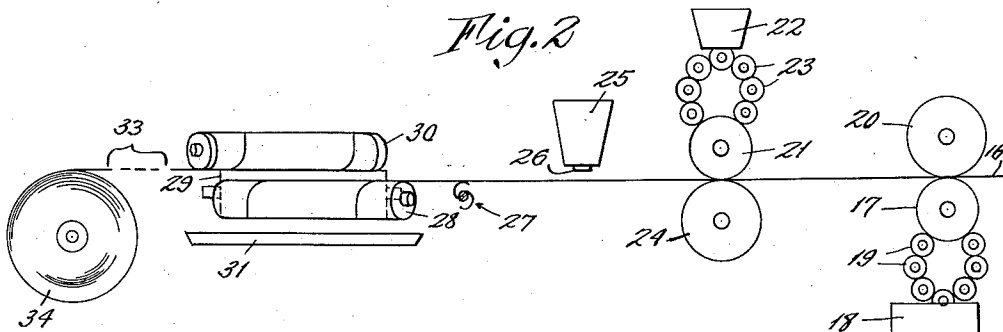
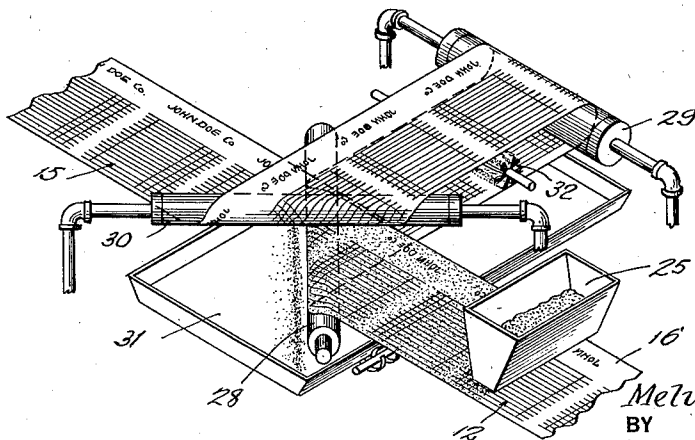


Fig. 3



INVENTOR
Melvin H. Lustbader
BY
Johnson, Kline and Hensel
ATTORNEYS

UNITED STATES PATENT OFFICE

2,582,932

HECTOGRAPH MASTER SHEET

Melvin H. Lustbader, New York, N. Y., assignor
to Autographic Register Company, Hoboken,
N. J., a corporation of New Jersey

Application April 5, 1946, Serial No. 659,919

7 Claims. (Cl. 101-149.4)

1

This invention relates to hectograph master sheets and a method for their manufacture.

In preparing master copies for hectograph duplication, it is customary to use hectograph "carbon" or transfer sheets, or hectograph ribbons, having on their entire surface a coating of hectograph composition which is transferred to the surface of a master sheet in contact therewith by applying pressure locally; for example, with type or other inscribing instruments. The components of transfer compositions used in making hectograph carbon sheets or ribbons are relatively expensive, and when employed in the aforesaid manner, only a small proportion of the composition is utilized, the remainder being discarded with the worn out ribbon or carbon. A substantial economy can be effected by applying hectograph transfer compositions directly to a master sheet so that the composition can be fully utilized in forming the image for reproduction. However, the materials used in such compositions do not lend themselves readily to incorporation in mixtures like printing inks. Moreover, use of printing equipment alternately for ordinary printing and for hectograph images would entail considerable inconvenience in change-over operations.

It has been suggested to avoid the use of hectograph transfer paper or ribbon by forming an image on a master sheet with an adhesive, and then depositing a powdered aniline ink on the surface of the sheet so that the powder adheres solely to the adhesive image, the excess being removed by brushing, or in any suitable manner. It has been suggested to use this procedure particularly for preparing master copies for use in the spirit hectograph process in which the image is formed in mirror reverse on the surface of the master. However, when powdered aniline dyes or inks normally supplied for hectograph purposes are used in this manner, excessive amounts of the dyestuff adhere to the surface of the master sheet intermediate the adhesive image-bearing portions, resulting in the formation of objectionably blotched and dirty copies. Moreover, when such inks are used, the aniline dyestuff is almost entirely removed by the first few copies, and subsequently attempts to obtain legible copies fail.

I have found that the foregoing difficulties can be obviated by dusting a master sheet bearing an image delineated thereon with an adhesive in active state, with a pulverulent mixture of a powdered dyestuff of the type normally employed for hectograph reproduction, namely, a spirit-

2

soluble dyestuff such as methyl violet, crystal violet, nigrosine or the like, in intimate mixture with a powdered solid carrier, in such manner as to cause the powdered mixture to stick to the adhesive image, and then removing the excess loose powder in the usual manner. When a pulverulent mixture in accordance with my invention is used, I have found that the resulting master sheet will produce numerous duplicate copies by the spirit hectograph process characterized by outstanding brilliance, legibility, faithful reproduction of the image in every detail and absence of coloration in the background. If small amounts of the powdered mixture cling to the non-image portions of the sheet, they are removed by the first two or three copies and thereafter the copies produced are clean and unsmudged.

The reasons for the improved results obtained by my method as compared with the procedure suggested heretofore, are not fully understood. However, while it is not intended to limit the invention to any special theory of operations, it appears that the particles of solid carrier employed in my process, when deposited on the adhesive in admixture with discrete particles of dyestuff, form a skeleton support for the dyestuff which acts like a sponge, releasing only the optimum amount of dyestuff for each copy during the printing process, and thus vastly increasing the number of copies which can be produced. Removal of loose dyestuff from the background portions of the sheet is also facilitated, possibly because of the tendency of unlike particles of dyestuff and carrier to cling together, forming larger aggregates which are more readily removed by mechanical means.

Similar results are not obtained when the dyestuff is incorporated with a carrier by methods impairing the discrete character of the particles of dyestuff and carrier, for example, by fusing a solid carrier with the dyestuff, or by incorporating either component with a solution of the other, evaporating the solution to dryness, and pulverizing the resulting solid. For instance, if equal parts of methyl violet and rosin are fused together, solidified, pulverized and applied to an adhesive image on a master sheet, and the resulting master used in the spirit hectograph process, substantially no legible copies are obtained, the impression being so faint as to be practically illegible. Similarly, if a pulverulent mixture of rosin and methyl violet is applied to an adhesive image on a master sheet, and the latter heated to fuse the dyestuff mixture, no

satisfactory copies can be obtained from the master.

The dyestuffs employed in preparing master sheets in accordance with my invention are spirit-soluble, and are generally basic aniline dyes, such as methyl violet, crystal violet, malachite green, nigrosine and the like.

The materials employed as carriers according to my invention are solid, finely pulverized or readily pulverizable substances, which retain their powdered form at ordinary temperatures without tendency to agglomerate or stick together, either alone or in admixture with the powdered dyestuffs used therewith. The carriers may be crystalline, or amorphous glassy materials, and are preferably of brittle nature so as to be readily pulverizable. Glassy, brittle resins are especially suitable, particularly rosin or manila gum copal. Other powdered solids, such as talc, as well as other inorganic or mineral materials can also be used, either alone or in conjunction with the resinous organic materials mentioned above.

The dyestuff and carrier can be mixed in varying portions. Good results have been obtained by using 3 to 5 parts by weight of a carrier to 5 to 3 parts by weight of dyestuff; equal parts by weight of the two components generally producing optimum results.

The components of the mixture can be ground separately and then mixed together in solid powdered form, or ground together in any manner avoiding fusion or agglomeration of the discrete particles composing the mixture, until a fine powder or dust is obtained, which powder is hereinafter referred to as a mixture of discrete particles of the dyestuff and carrier. For example, a suitable mixture which can be used in accordance with my invention is prepared by mixing together equal parts by weight of rosin and methyl violet, and grinding the mixture to an impalpable powder. The mixture can be passed through a 200-mesh screen to separate any coarse particles remaining therein. Instead of methyl violet, crystal violet may be used; and instead of rosin, manila gum copal. All or part of the rosin or manila gum copal can be replaced by a corresponding amount of talc.

The paper employed for preparing a master in accordance with my invention is of the type ordinarily used for this purpose. Such paper has a smooth surface, and preferably comprises a coating of a mineral filler such as china clay, and a binder such as casein, albumen or the like, to provide a microscopic tooth or grain adapted to receive and hold image-forming materials. The sheet is preferably smoothed by calendering so as to facilitate removal of excess powdered hectograph composition from its surface.

The preferred adhesive employed in forming the image according to my invention is a printing ink which remains wet or tacky for a sufficient length of time after its application to permit convenient application and adhesion of the powdered hectograph composition described above to an image formed by the ink on the master sheet; but also adapted to dry or set thereafter, so as to reduce or eliminate any tendency of the image to smear or smudge upon casual contact with other sheets or objects. Preferably, the ink employed is relatively tacky and viscous so as to avoid excessive penetration thereof into the sheet, and to leave a substantial layer of adhesive on the surface in condition to retain the powdered hectograph composition. Instead of printing inks,

printing varnishes or similar drying oil compositions can be used. Other adhesives such as wax or wax-containing compositions which remain more or less active for an indefinite period can be used, but these are less satisfactory in view of the relative ease with which the resulting image can be smeared upon contact with other objects. Adhesives having a strong solvent power for the dyestuff or carrier employed in the hectograph mixture are avoided, since these would destroy at least in part the pulverulent structure of the hectograph composition when it is applied to the adhesive image and thus impair the printing results.

The printing ink or other adhesive is applied to the sheet in such a manner as to form a mirror image of the matter to be duplicated. This can be readily accomplished, for example, by printing the sheet with the adhesive in an offset proof press, wherein a positive printing plate, coated with adhesive printing ink, is applied directly to the surface of the sheet. The powdered hectograph composition, described above, is dusted on to the sheet in any convenient manner, either manually or by suitable mechanical means. For example, the powder can be dusted on through cheese cloth, and the excess powder removed by tapping the sheet in a vertical position. The adhesive constituting the image is allowed to set or dry, yielding a master sheet ready for use in making duplicate copies.

For this purpose, the master is placed on a suitable platen, and copy sheets dampened with alcohol are pressed against its surface. The pulverulent hectograph mixture adhering to the surface of the image gives up small amounts of the dyestuff as a result of solution thereof in the dampening liquid applied to the copy sheets, and forms an accurate and brilliant reproduction of the matter to be duplicated.

The process for making a master sheet in accordance with my invention can also be carried out by mechanical means; and if desired, the master sheets can be prepared from continuous formed stationery.

The accompanying drawings illustrate a master sheet prepared in accordance with my invention, and a method for making the same. In the drawings,

Figure 1 is a plan elevation of the image-bearing side of a spirit hectograph master sheet for duplicating a business stationery form, made in accordance with my invention.

Fig. 2 is a diagrammatic view of an apparatus for continuous production of master sheets of the type shown in Fig. 1.

Fig. 3 is a perspective view of the portion of the apparatus shown in Fig. 2, in which powdered hectograph composition is applied to a master sheet, and the excess removed, in accordance with my invention.

Fig. 4 is a transverse cross section of an image-bearing portion of the master sheet shown in Fig. 1.

Referring to the drawings, the business stationery form 10 shown in Fig. 1, is prepared from a sheet or strip of paper 11 having a smooth, preferably coated, surface of the type ordinarily used for hectograph master copies.

The form matter 12 to be duplicated on the surface of the sheet 10 is in mirror reverse for duplication by the spirit hectograph process. As shown in Fig. 4, the image to be duplicated comprises a layer of printing ink 13 or other suitable adhesive, a layer 14 of pulverulent hecto-

5

graph composition of the type described above, adhering thereto. If desired, a positive reproduction 15 of the same form matter can be printed on the opposite side of the sheet 11.

The master sheet shown in Figs. 1 and 4 can be made continuously in an apparatus shown in Figs. 2 and 3. As shown in Fig. 2, a continuous strip of paper 16, backed by a platen 20, is printed in positive with form matter 15 by means of a printing roller 17 which receives printing ink from a fountain 18 by means of a series of distributing rollers 19. The strip 16 then passes under a printing roller 21, backed by a platen 24, the printing roller receiving an adhesive or printing ink composition from the fountain 22 by means of distributing rollers 23, the printing roller 21 imprinting a mirror image of the form matter to be duplicated on the upper surface of the strip. The strip 16 then passes under a hopper 25 containing the powdered mixture of hectograph dyestuff and solid carrier, described above, and having a sieve 26 at its base through which the powdered mixture is uniformly distributed on the surface of the strip. Substantially uniform distribution of the powdered mixture through sieve 26 can be secured for example by vibrating the hopper 25 or sieve 26 by vibrating means, not shown. An agitator 27 rotating in contact with the strip 16 serves to agitate the loose powdered hectograph composition on the surface of the strip so that the adhesive image thereon is saturated with a layer of the powdered material. The strip 16 then passes downward over diagonal roller 28, and outward toward a second roller 29, as shown in Fig. 3. The major portion of the loose powdered hectograph composition falls from the surface of the strip into a tray 31, and practically all of the remaining loose powder is removed by contact of the opposite surface of the strip with a rotary brush 32 which vibrates the strip intermediate rollers 28 and 29. Thus, when the strip reaches roller 29, the image-bearing surface thereof is substantially free of loose particles of hectograph composition. The strip passes upward around roller 29, then downward over a second diagonal roller 30, all of the rollers being arranged so that the image-bearing surface of the strip is on the outside and is not brought into contact with the rollers. After leaving roller 30, the strip passes through a drying zone 33 of sufficient extent to permit the adhesive ink forming the base of the image to dry. Thereafter, the strip 16 can be wound on a roll 34, or cut into forms as shown in Fig. 1.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. A master for a hectograph duplication, comprising a base sheet; an adhesive delineating an

6

image to be reproduced, on a surface of said sheet; and a mixture of discrete particles of a powdered spirit-soluble dyestuff with a pulverulent solid carrier adhering to the surface of said adhesive.

2. A master for spirit hectograph duplication, comprising a base sheet; an adhesive delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of a powdered spirit-soluble dyestuff with a pulverulent solid carrier adhering to the surface of said adhesive.

3. A master for hectograph duplication, comprising a base sheet; printing ink thereon delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of a powdered spirit-soluble dyestuff with a pulverulent solid carrier adhering to the surface of said printing ink.

4. A master for spirit hectograph duplication, comprising a base sheet; an adhesive delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of 3 to 5 parts by weight of a powdered spirit-soluble dyestuff with 5 to 3 parts by weight of a pulverulent solid carrier adhering to the surface of said adhesive.

5. A master for spirit hectograph duplication, comprising a base sheet; printing ink delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of 3 to 5 parts by weight of a powdered spirit-soluble dyestuff with 5 to 3 parts by weight of a pulverulent solid resin adhering to the surface of said printing ink.

6. A master for spirit hectograph duplication, comprising a base sheet; printing ink delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of 3 to 5 parts by weight of a powdered spirit-soluble dyestuff with 5 to 3 parts by weight of pulverized rosin adhering to the surface of said printing ink.

7. A master for spirit hectograph duplication, comprising a base sheet; printing ink delineating a mirror image of matter to be reproduced, on a surface of said sheet; and a mixture of discrete particles of about equal parts by weight of pulverized methyl violet and pulverized rosin adhering to said printing ink.

MELVIN H. LUSTBADER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
613,045	Pattberg	Oct. 25, 1898
1,631,524	Dufay	June 7, 1927
2,254,483	Hess	Sept. 2, 1941