United States Patent

Barouh et al.

[15] **3,669,019**

[45] **June 13, 1972**

[54] **DUAL PURPOSE HECTOGRAPHIC MASTER UNIT**

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[52] **U.S. Cl.** **101/470,** 101/463

[51] **Int. Cl.** **B41m 5/16,** B41m 5/18

[58] **Field of Search** 101/463, 468, 473, 470

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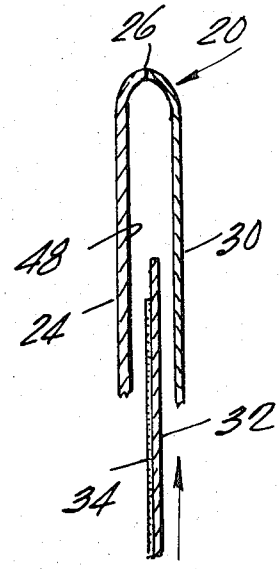
[57] **ABSTRACT**

A master unit for hectographic duplication comprising a folder including a top sheet joined to a bottom sheet forming a file. A transfer sheet is reversibly disposed between the top sheet and the bottom sheet and has a coating on one side thereof of a pressure and heat sensitive pigmented transfer material. The top sheet is of a relatively light weight heat transferable paper for receiving a thermographically reproduced hectographic mirror image thereon. The bottom sheet is a relatively heavy weight paper for receiving a pressure reproduced hectographic mirror image of pressure formed markings on the bottom sheet.

1 Claim, 9 Drawing Figures



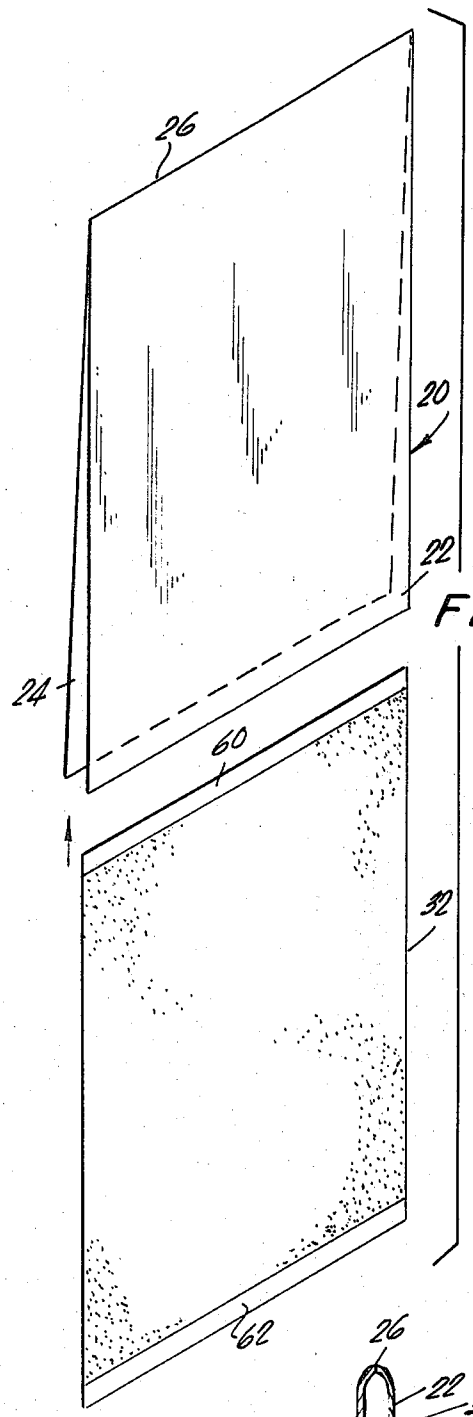


FIG. 1

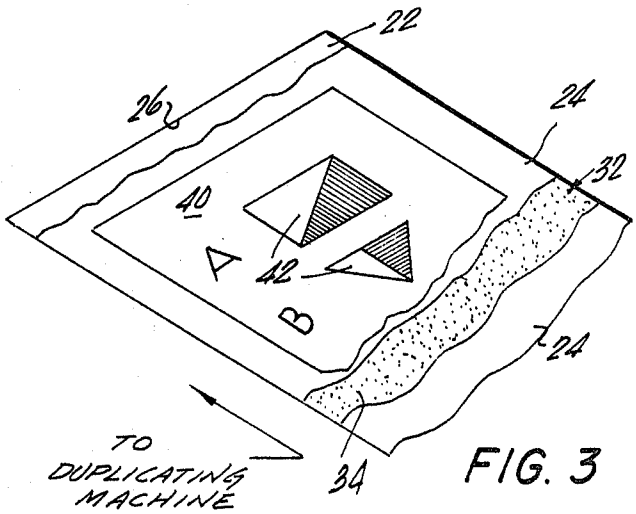


FIG. 3

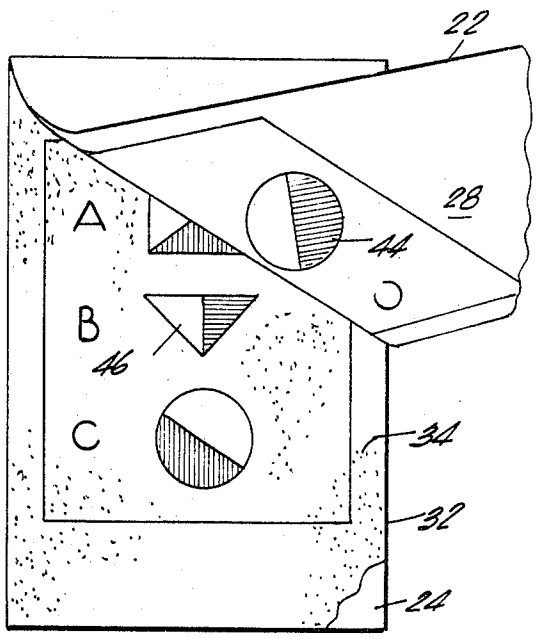


FIG. 4

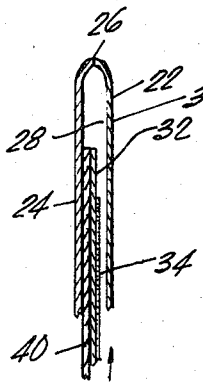


FIG. 2

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FIG. 5

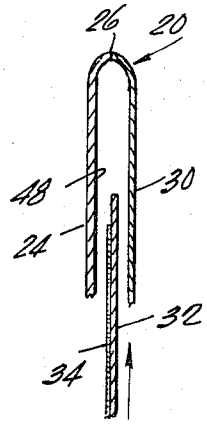
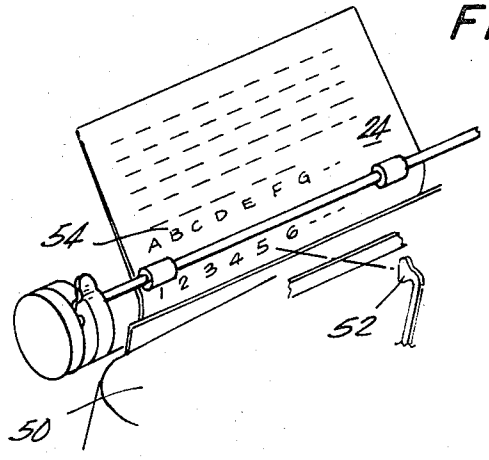


FIG. 6



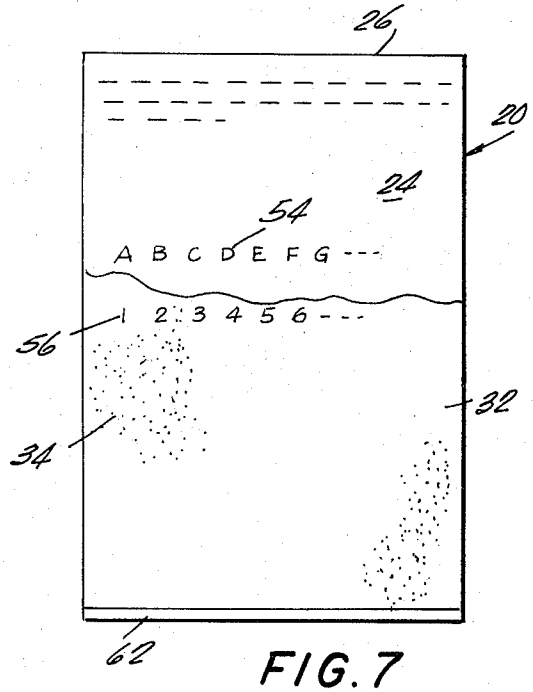


FIG. 7

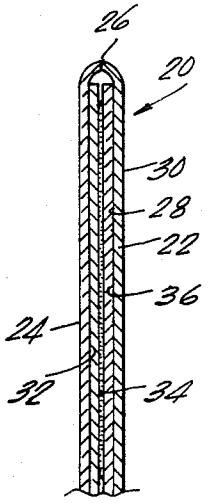


FIG. 9

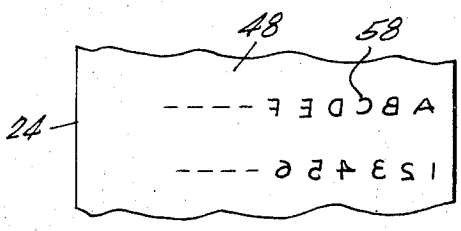


FIG. 8

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DUAL PURPOSE HECTOGRAPHIC MASTER UNIT

This invention relates to a dual purpose hectographic master unit of a type which is adapted for hectographic duplication of multiple copies either by thermographically imaging an original or by production of an original through hand or machine pressure.

In the past, systems for thermographically imaging copy sheets have been employed. Also many systems employing an original sheet having a transfer coating applied to the underside thereof and a copy sheet having an imaging receiving surface with copies being made by applying pressure by typing or writing on the topside of the original sheet so as to transfer the coating on the underside thereof to the copy sheet have been employed. However, none of the heretofore devised master units has provided convenient means for filing and safeguarding the hectographic copy and/or the original material in a convenient manner nor has a single master unit been devised which is adaptable for use for both pressure imaging and for thermographic imaging. The present invention provides for a single master unit which is adaptable for both pressure imaging and thermographic imaging while also providing a file folder for preserving partially used hectographic copy while also enabling additional multiple duplication of the original material formed by pressure imaging by allowing for the thermographic imaging of a previously pressure imaged original.

An object of the present invention is to provide a hectographic master unit having a reversible insert sheet of a transparent material provided with clear upper and lower edges and protected by interleaving so that the master unit may be used as a folder for facilitating the filing and preservation of the original material, partially used hectographic duplicating copy sheet, and the used transfer sheet which may be reusable for further imaging.

Another object of the invention resides in the provision of a hectographic master unit comprising a file folder having front and back sheets joined at only their top edges so as to facilitate convenient folding and detachment so that the relatively lightweight front cover can be used for thermographic imaging while the relatively heavyweight rear cover can be used for pressure imaging.

Still further objects and features of this invention reside in the provision of a hectographic master unit that is simple in construction, capable of being manufactured at a relatively low cost so as to permit wide distribution and commercial utilization, and which is easy to store and to merchandise.

These, together with the various ancillary objects and features of the present invention, which will become apparent as the following description proceeds, are attained by the hectographic master unit, a preferred embodiment of which is shown in the accompanying drawing, by way of example only, wherein:

FIG. 1 is an exploded perspective view of two main elements of the hectographic master unit including the folder and transfer sheet;

FIG. 2 is a partial vertical sectional view of the hectographic master unit shown with the material to be used for thermographic imaging positioned relative to the file folder and with the transfer sheet inserted in position for thermographic imaging;

FIG. 3 is a perspective view illustrating the manner in which the hectographic master unit with the original material to be thermographically imaged appears as it is inserted into a thermographic duplicating machine;

FIG. 4 is a perspective view illustrating the appearance of the transfer sheet and the thermographically imaged copy sheet formed on the top sheet of the file folder by way of a mirror reverse image;

FIG. 5 is a view similar to FIG. 2 but showing the manner in which the transfer sheet is positioned for pressure duplicating;

FIG. 6 is a perspective view illustrating the manner in which the file folder is arranged for pressure imaging employing a typewriter;

FIG. 7 is an exploded view illustrating the condition of the file folder after pressure imaging;

FIG. 8 is a partial elevational view showing the mirror reverse hectograph image that appears on the inside face of the bottom sheet after pressure imaging; and

FIG. 9 is a longitudinal detail sectional view through the hectographic master unit.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views reference numeral **20** is used to generally designate a file folder having a top sheet **22** and a bottom sheet **24** joined at the respective upper edges of the top sheet **22** and the bottom sheet **24**. This joining is by bonding through the use of suitable adhesive in edge to edge abutment so that the top sheet **22** and the bottom sheet **24** are easily reversible and detachable from each other.

The top sheet **22** is manifold paper which is hard sized and of a relatively light weight. This paper is preferably made of 100 percent cotton fibers and has a glazed finish on the under surface **28** thereof. It has a smooth finish on the outer surface **30** and is preferably of an 8 pound weight ($17 \times 22 - 500$). This relatively light weight top sheet **22** facilitates relatively rapid heat penetration while still retaining sufficient substance for handling.

The bottom sheet **24** is made from relatively heavy weight paper stock and is white and free of all coloring agents. Both sides of this paper are coated with any suitable conventional coating agent such as starch, casein or the like. The paper is of 100 pound weight ($25 \times 38 - 1{,}000$).

A transfer sheet **32** is provided which is made of a "Mylar" polyester film which is exceptionally strong, durable, transparent film having a highly tensile, tear and impact strength, and which is inert to water, moisture-vapor resistant and is unaffected by and does not transmit oils, greases and volatile aromatics. This material remains flexible and tough and retains its properties at raised temperatures from 80° F to over 300° F so as to be adapted to serve in thermographic imaging. The thickness is of commercial gauge 50 and is coated with a spirit coating **34** which is non-soluble in water and soluble in alcohol. The coating has a thermally responsive ingredient such as wax. The coating may be of a purple or any other color hectographic type ink and is adapted for thermographic imaging and pressure imaging.

An interleaving tissue **36** is disposed between the coating **34** and the file folder **20** and is a kraft tissue, the purpose of which is to prevent the ink on the transfer sheet or film **32** from bleeding or discoloring the file folder **20**. This interleaving may be a cylinder-type sheet having a basic weight from 10 to 20 pounds ($24 \times 36 - 480$).

The master unit for hectographic duplication has a dual purpose. It is adapted to be utilized for preparing a hectographic reproduction in mirror reverse image by thermographic process on the inside surface of the top sheet **22**, and to provide a hectographic reproduction in mirror reversed image through typewriting, writing or other pressure means on the inside surface of the bottom sheet **24**, or both.

In order to achieve thermographic imaging, an original sheet **40** having the material **42** to be reproduced thereon is positioned with the material **42** face up between the bottom sheet **24** and the transfer sheet **32**. The interleaving **36** is withdrawn and, as shown in FIG. 2, the transfer sheet **32** is arranged so that the coating **34** faces the under surface **28** of the sheet **22**. Then, as shown in FIG. 3, the hectographic master unit with the original **40** thereon is placed into a thermographic copying machine such as those sold under the trademark "Thermofax" or the like. The heat provided by the thermographic duplicating machine will be absorbed by the material **42** and transferred from the coating **34** to form a mirror reverse image **44** on the surface **28** of the sheet **22** as shown in FIG. 4. Of course, because of the meltable wax or other thermally responsive material containing formula for the hectographic spirit duplicating ink or coating **34**, an image **46** corresponding to the image **42** will be lifted from the transfer sheet **32**.

If it is desired to utilize the master unit folder **20** for pressure image, the transfer sheet **32** is reversed so that the coating

34 faces the inner surface 48 of the bottom sheet 24. Then, the folder with the transfer sheet positioned therein is inserted in a typewriter 50 and using the keys 52 of the typewriter, as is usual in hectographic duplicating, the original material 54 is typed on the outer face of the sheet 24. Of course, any suitable scriber may be used to pressure image subject matter such as a cartoon, sketch, map, or drawing, if such is desired. As shown in FIG. 7, the indicia 54 is typed on the file folder 20 and the material of the coating corresponding to the typed material 56 is lifted off the transfer sheet 34 to form a mirror reverse image 58 on the under surface 48 of the sheet 24, as shown in FIG. 8. With a suitable image formed on either the front sheet 22 or the rear sheet 24, the entire file folder is then reversed so that the inside surface is now outside exposing the imaged hectographic reproductions 44 and/or 58 outwardly, after which, with the image up, the file folder can be inserted in a conventional spirit duplicating machine and is ready to produce exact spirit duplicating copies.

It is recognized that the imaged hectographic reproduction is usually good for reproducing from 100 to 200 copies, and many times considerably less than the 100 to 200 copies are necessary. Therefore, when the file folder is removed from the hectographic spirit duplicating machine, it may be merely reversed to turn the imaged hectographic reproduction inside for convenient filing, storing and preservation. Additionally, the pressure produced original material on the outer surface of sheet 24 can be thermographically imaged for further copies. Further, the transfer sheet 32 is provided with uncoated strips 60 and 62 at the top and bottom thereof for facilitating handling and may be inserted with the uncoated side facing the partially used or used imaged hectographic reproduction for filing away for future use and/or reference.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features.

We claim:

1. A master unit for hectographic duplication comprising a folder including top sheet means and bottom sheet means, means joining one edge of said top sheet means to one edge of said bottom sheet means for enabling the changing of relative position inside out and for enabling the insertion into and removal from the space between said top sheet means and said bottom sheet means, said top sheet means being detachable from said bottom sheet means, a transfer sheet of a transparent fluid non-absorbent material reversibly disposed between said top sheet means and said bottom sheet means, said transfer sheet having a coating on one side thereof of pressure and heat sensitive pigmented transfer material, said top sheet means being a relatively light weight, relatively heat transferable paper for receiving a thermographically reproduced hectographic mirror image of a copy sheet when said coating on said transfer sheet faces said top sheet means, said bottom sheet means being a relatively heavy weight paper for receiving a pressure reproduced hectographic mirror image of pressure formed markings on said bottom sheet when said coating on said transfer sheet faces said bottom sheet means, and an interleaving tissue sheet removably disposed adjacent said pigmented transfer sheet between said folder and said transfer sheet.

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