United States Patent

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[54] **MULTIPLE INPUT COPYING APPARATUS**
5 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **355/6,** 271/44, 355/7
[51] **Int. Cl.** **G03g 15/00**
[50] **Field of Search** 355/6, 7; 271/44

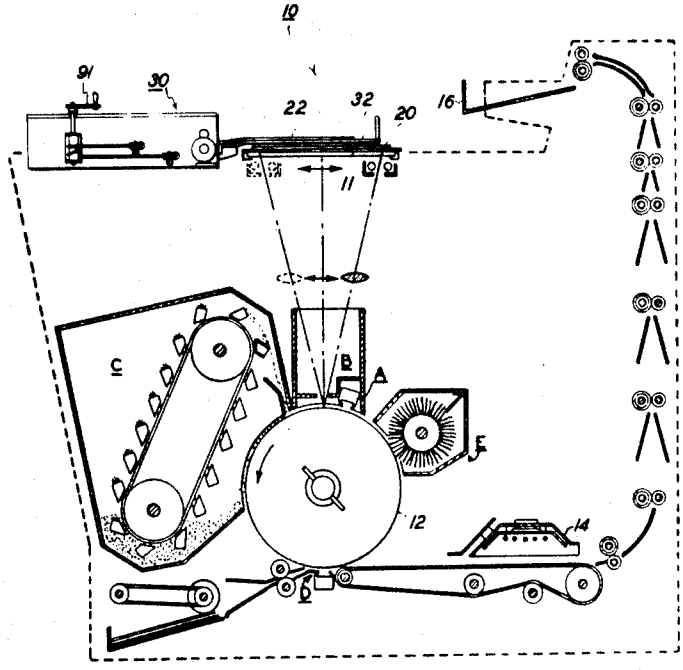
[56] **References Cited**

UNITED STATES PATENTS

2,889,758 6/1959 Bolton 355/6

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ABSTRACT: Apparatus for producing copy from simultaneously imaged multiple inputs including opaque card stock adapted to be removably positioned on the platen of a copying machine to present variable information as a composite image with a transparent document bearing fixed information. The apparatus comprises a platen on which the transparency bearing fixed information is supported, card handling means for advancing the opaque cards bearing other information in registration with a selected portion of the transparency along a first dimension and control means associated with said card handling means for moving said cards from a first to additional positions along the platen for projection with a selected portion along a second dimension of the transparency.



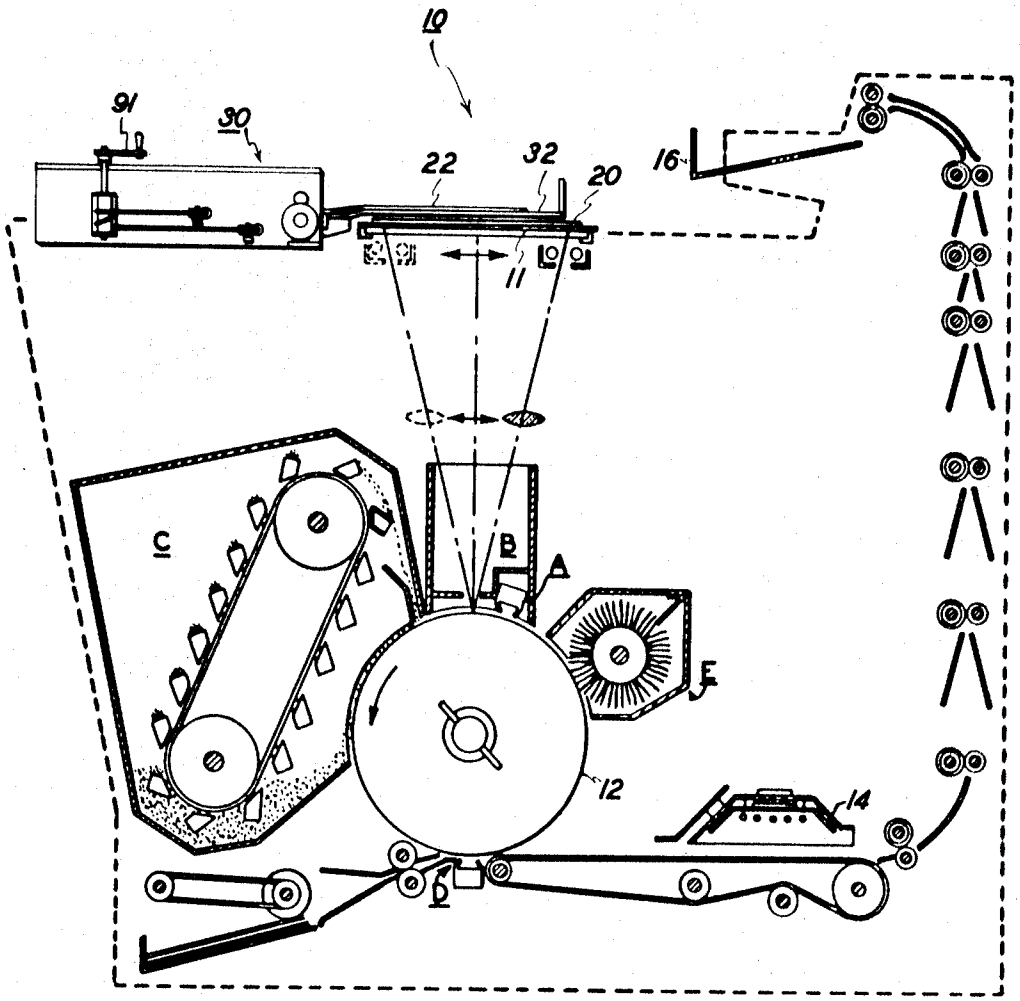


FIG. 1

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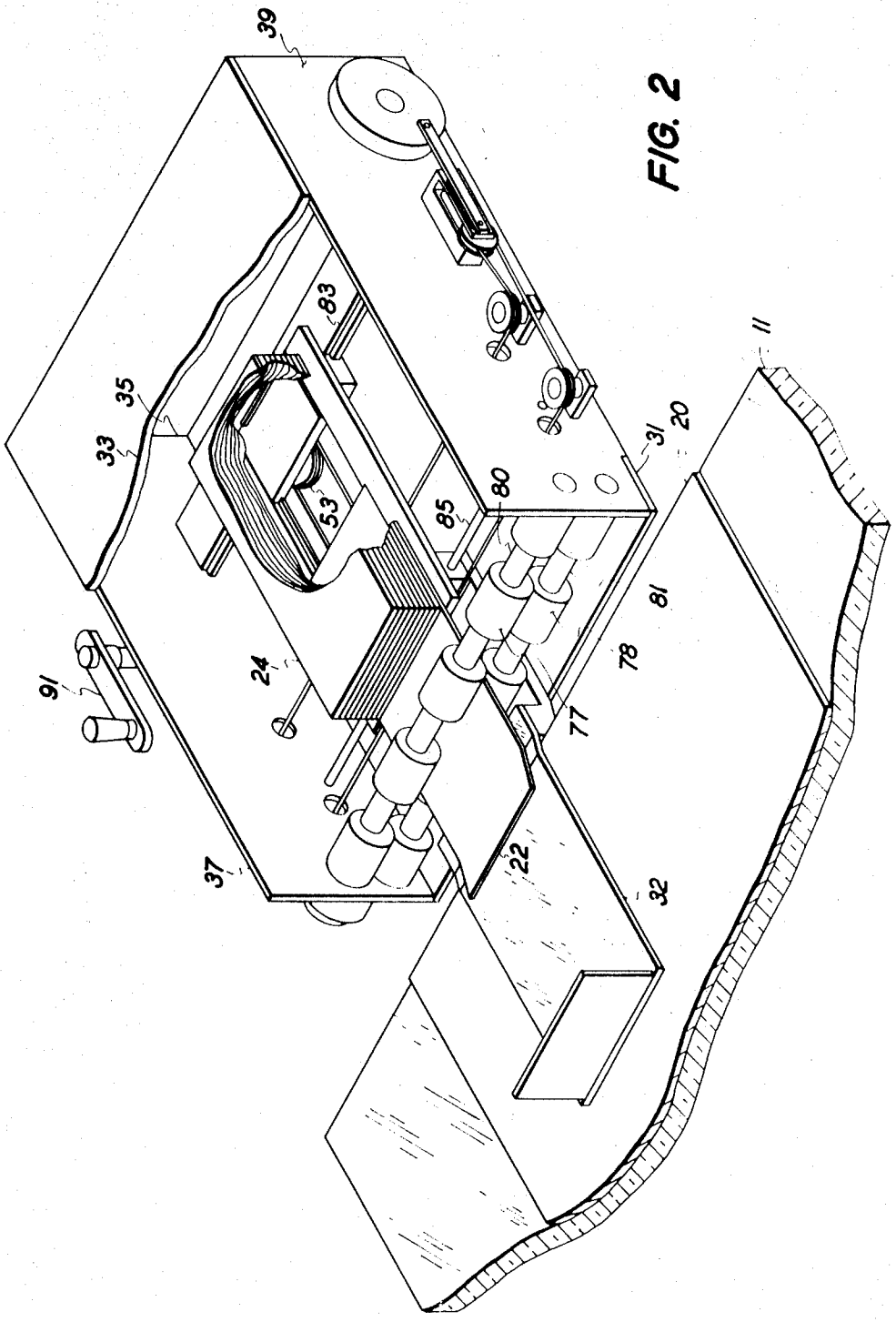
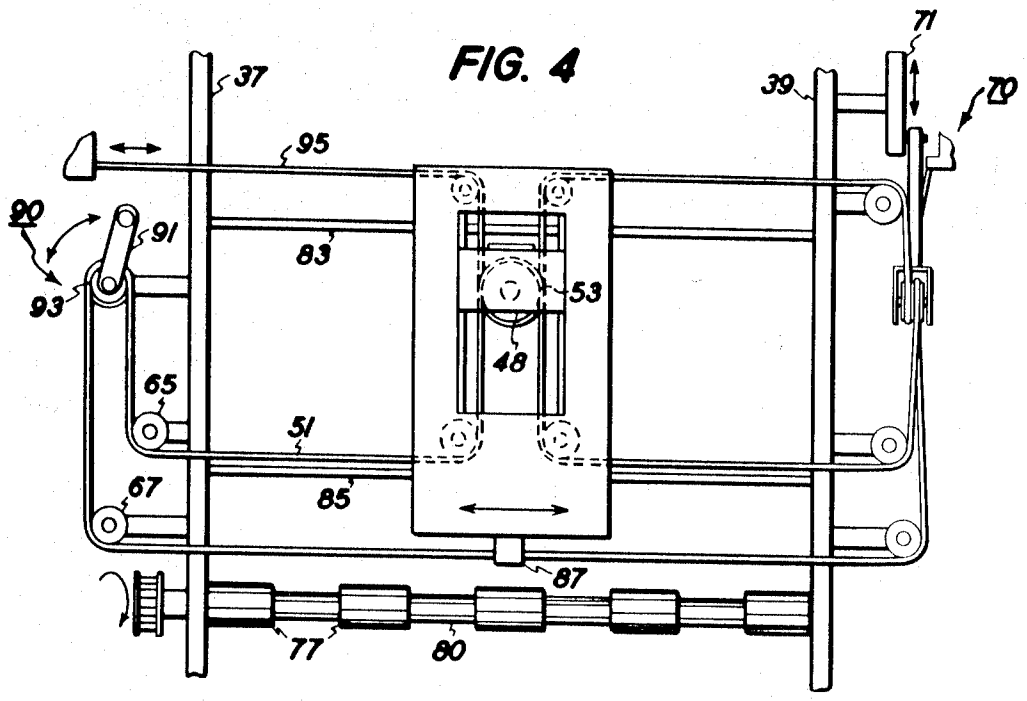


FIG. 2

FIG. 4


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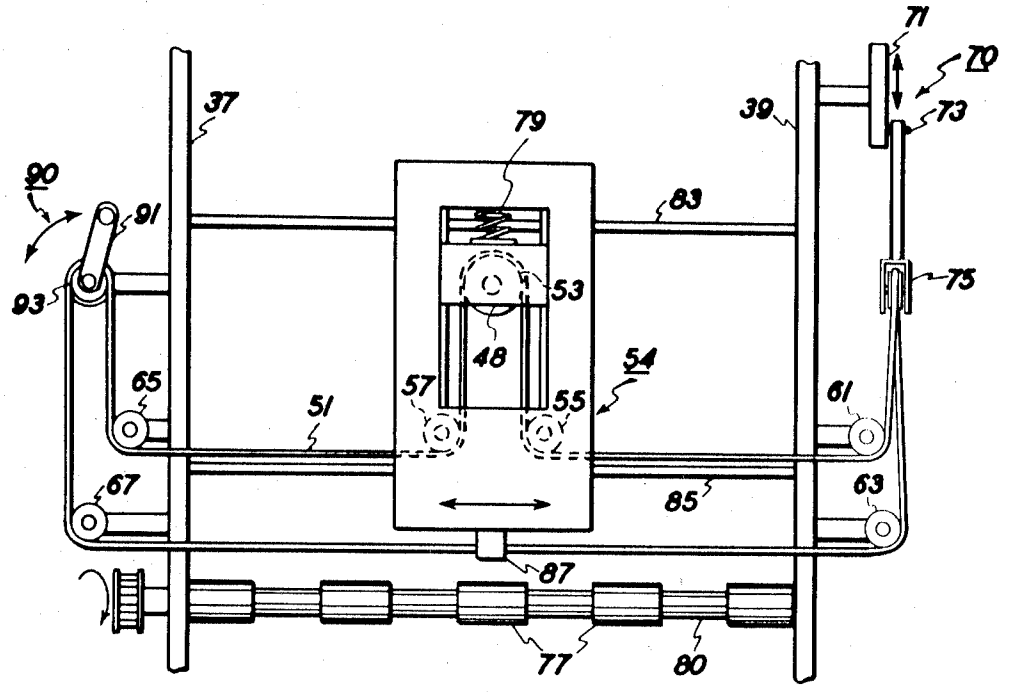

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FIG. 3

MULTIPLE INPUT COPYING APPARATUS

This invention relates in general to forms copying and, in particular, to improved apparatus for simultaneously imaging from multiple inputs. More specifically, the invention relates to an improved apparatus for causing multiple images to be formed from documents bearing fixed information, as in the body of a letter, placed on a platen together with variable information, for example, addressees arranged on card stock which are copied by reflection projection onto a light sensitive surface to form a composite image thereon.

Electrostatic copying encompasses the entire field of forming and utilizing latent electrostatic charge patterns to record and reproduce patterns in viewable form. Since electrostatic copying has been in use, a variety of machines and devices have been proposed to incorporate the electrostatic processes in a manner to form copies of documents on a commercial basis. For the most part, each of these such devices has been specifically designed to the solution of a particular reproduction problem, and for the most part, has been limited to the particular use intended. Thus, for example, machines are presently in wide commercial use for the continuous high speed enlargement and copying of microfilm and for reproducing from opaque originals. These machines are incapable, presently, of reproducing copies from information contained on an original document and then additional information which differs from copy to copy as in the case of different addressees to whom copies are to be sent.

One of the most commercially successful of the electrostatic copying machines is that disclosed in U.S. Pat. No. 3,062,109 to Mayo issued on Nov. 6, 1962. This machine has been commercially used for reproducing from opaque originals which are placed on a platen on its desklike top. As useful as this machine is, as evidenced by its commercial acceptance, it cannot be used to reproduce electrostatic copies from fixed and variable input simultaneously in conjunction with document information to be copied. The value of a machine capable of reproducing simultaneously from both inputs is manifest. Its use in such operations as addressing form letters, inserting variable information into standard forms, purchase orders, etc., show but a few of the many uses and needs for a copier with the capabilities that this invention enables such an apparatus to attain.

It is therefore an object of this invention to improve reproduction apparatus for reproducing composite images from simultaneously applied multiple inputs.

Another object of this invention is to improve machines for reproducing copies of both forms while easily inserting in a composite manner into said forms some selected variable information.

A further object of this invention is to provide an attachment for existing copiers to enable them to reproduce from multiple inputs simultaneously onto a single transfer copy sheet.

Yet another object of this invention is to employ inexpensive and easily fabricated equipment to reproduce electrostatically with high commercially satisfactory resolutions original information while simultaneously reproducing from a variable information input which is placed in a selected position therewith in a singular optical path.

These and other objects of the invention are attained by selectively exposing fixed information in the form of a transparency by a copying system using reflection projection and additional variable information on opaque stock in a singular optical path whereby a selective composite image can be exposed from an object plane onto a photosensitive surface of the apparatus and then processing the image formed on the photosensitive surface to produce copies thereof.

For a better understanding of the invention as well as other objects and further features thereof, reference is had to the following detailed description of the invention to be read in conjunction with the accompanying drawings wherein:

FIG. 1 illustrates schematically an embodiment of copying apparatus embodying the invention arranged in conjunction with an electrostatographic apparatus adapted for continuous automatic operation;

FIG. 2 is an exploded view of the platen of the copying apparatus and card handling apparatus according to the present invention;

FIG. 3 is a side sectional view of the card handling apparatus according to one embodiment of the invention and

FIG. 4 is the side sectional view of the card handling apparatus according to a second embodiment of the invention.

Referring now to the drawings wherein like numerals designate like elements, there is shown schematically in FIG. 1 an electrostatic copying apparatus **10** adapted to reproduce document information in the environment of a platen **11**. The copying apparatus comprises a xerographic plate formed as a drum **12** containing a photoconductive layer on a conductive backing. The drum is mounted on a shaft journaled on a suitable frame of the machine to rotate in the direction indicated by the arrow to cause the drum surface sequentially to pass a plurality of processing stations.

As is usual with electrostatic copying machine, the several xerographic processing stations in the path of movement of the drum surface comprise a charging station preferably located as indicated by reference character A at which a uniform electrostatic charge is deposited on the photoconductive layer of the drum. An exposure station located as shown by reference character B, at which a light radiation pattern of copy to be reproduced is projected onto the drum surface to dissipate the drum charge in the exposed portions thereof, thereby forming a latent electrostatic image of copy to be reproduced.

Adjacent to the exposure station is a developing station C, whereat the latent electrostatic image is developed by cascading an electrostatic powder over the drum forming a powder image corresponding to the latent electrostatic image on the drum. Next adjacent to the developing station is the image transfer station D, where the powder image is electrostatically transferred from the drum surface to a transfer material or support surface. The powder image on the transfer material may be fused thereto by a fuser **14** and transported to the copy output tray **16**.

The final station E is a drum cleaning and discharge station to prepare the drum surface for the next cycle. For a more complete and detailed description of the automatic copying stations referred to above, see U.S. Pat. No. 3,062,109 to Mayo issued Nov. 6, 1962.

In accordance with the present invention, composite imaging of multiple inputs is accomplished in conjunction with electrostatic reproduction at an object plane on plate **11** of the copying apparatus. A transparent member **20** with reproducible opaque information thereon is supported on the platen such that image light rays from the projection system may be reflected by the opaque information on the transparent member to the surface of drum **12**. Opaque card members **22** bearing variable information are advanced from a stack **24** by card handling apparatus generally designated **30** for copying with the fixed information on transparent member **20** on the platen **11** in a manner as will become more apparent.

The card handling apparatus **30** comprises a base **31**, a transparent card tray **32**, top and rear end walls **33** and **35**, respectively, and sidewalls **37**, **39**. Top wall **33** is formed with an opening which allows easy insertion or withdrawal from above the stack of opaque card members each bearing individual graphic information as for example addressees to be sent copies of a letter as represented by the information on transparency member **20**.

To feed the cards **22** individually from the stack onto transparent support tray **22** in overlying position with the platen, there is a card feeder mechanism **54** comprising a base on which is mounted a card feeding knife element **48** which serves to advance the bottommost card member of the stack in the direction of the support tray **32**. Card feeder mechanism **44** comprises a single drive cord **51** which is passed around a pulley **53** mounted on the card feeding knife element and then

is passed around a cord drive train including pulleys **55**, **57** mounted on the base, pulleys **61**, **63** mounted on sidewall **39** and pulleys **65**, **67** mounted on sidewall **37**. To cause a card member to be advanced, a drive unit **70** comprising a crank wheel **71** and crank pin **73** imparts a reciprocating movement to a pulley **75** encircled by the cord **51** to urge the card feeding knife element in a forward direction thereby advancing the bottom most card toward drive rolls **77**, **78** mounted on shafts **80**, **81**, respectively. Drive rolls **77**, **78** mounted on shafts **80**, **81** are continuously driven by a drive (not shown) connected to drive shaft **80** to advance the card from the feed position onto the support tray **32**. A spring member **79** serves to return card feeding knife element **48** to its original position thereby restoring cord **51** to its starting position for another feed cycle. It will be noted that support tray **32** is formed with an upwardly inclined portion **34** so as to enable card members to stack on the tray from the bottom.

In order to enable the opaque card members to be fed to be aligned along the platen **11** in a direction transverse to the feed direction toward the platen, lateral movement may be imparted to the card feeder mechanism **54** a drive control means employing the cord drive train as will become more apparent. Card feeder mechanism **54** is mounted for lateral movement on a pair of slide rails **83**, **85** and cord **51** is fixed to the base by tie element **87**. A lateral position drive unit **90** comprising crank **91** is connected to a pulley **93** which is two or more times encircled by cord **51** whereby rotary movement imparted to the crank **91** causes the cord **51** to impart a movement transverse to the direction of feed of the card feeder mechanism. It will now be appreciated that card feed mechanism utilizes a single or unitary drive means in both a longitudinal and transverse direction to the platen of the copying apparatus position the variable information on a card in a preselected position in registration with the transparent member bearing fixed document information. Thus merely by changing the opaque card information or the location of the card information relative to the transparent member and platen, it is possible to change the composition of forms to be reproduced on a single transfer sheet or copy to obtain a desired composite image.

In FIG. **4**, there is illustrated a second embodiment for the card feeder drive mechanism which is similar to that of FIG. **3** only in the last embodiment, a second cord **95** is utilized in place of the spring member of the earliest embodiment.

While the invention has been described with reference to the structure disclosed herein, it is not confined to the details set forth but is intended to cover such modifications or changes as may come within the purpose of the improvement of the scope of the following claims.

What is claimed is:

1. Copying apparatus for making a composite image from fixed and variable information comprising,

a platen on which a transparent member bearing opaque fixed information is supported,

card handling means including a transparent support tray for advancing opaque cards bearing different information in registration with a selected portion of the transparent member along a first dimension thereof, and

control means associated with said card handling means for moving said support tray from a first position to additional positions along the platen in registration with a selected portion of the transparent member along a second dimension.

2. Apparatus according to claim **1** wherein unitary drive means is connected to said card handling means and said control means to obtain the aforementioned registration.

3. Apparatus according to claim **2** wherein said unitary drive means comprises a single cord element in an associated drive train.

4. Apparatus according to claim **2** wherein said unitary drive means comprises dual opposed cord elements in an associated drive train.

5. In a reproduction system for producing final copies from information imaged onto a photosensitive surface adapted for movement past image processing stations, the improvement comprising

a platen on which a transparent member bearing opaque fixed information is supported,

card handling means including a transparent support tray for advancing opaque cards bearing different information in registration with a selected portion of the transparent member along a first dimension thereof, and

control means associated with said card handling means the moving said support tray from a first position to additional positions along the platen in registration with a selected portion of the transparent member along a second dimension whereby copies of fixed and variable information may be produced.

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