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(71) Applicant: **XEROX CORPORATION**
**Xerox Square - 020**
**Rochester New York 14644 (US)**

(72) Inventor: **Bares, Jan**
**307 Brooksboro Drive**
**Webster New York 14580 (US)**

(74) Representative: **Goode, Ian Roy**
**European Patent Attorney Rank Xerox Limited Patent Department 364 Euston Road**
**London NW1 3BH (GB)**

(54) **Limited access reproducing machine bins.**

(57) A reproducing machine in which copy sheets are advanced to a selected one of a plurality of bins (28). The machine operator selects (42) either a lockable bin (32, 34, 36) or an unlockable bin for receiving the copy sheet. If the lockable bin is selected, then only an authorized individual having the combination has access to the locked bin containing the copy sheets.

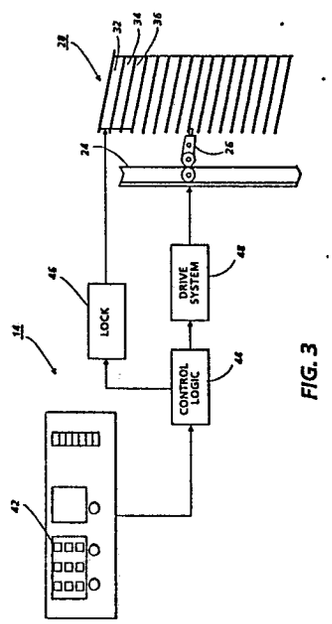


FIG. 3

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**Description**

## LIMITED ACCESS REPRODUCING MACHINE BINS

This invention relates generally to a sheet handling apparatus, and more particularly concerns an apparatus having a plurality of bins for receiving sheets therein. Such a sheet handling apparatus is especially useful in a reproducing machine such as an electrophotographic printing machine.

Generally, in an electrophotographic printing machine, successive copies of original documents are formed by recording a latent image of the original document on the photoconductive surface, developing the latent image, transferring the resultant powder image to a copy sheet, and permanently fusing the powder image to the copy sheet. In some electrophotographic printing machines, only one run of copies can be produced automatically, i.e. an original document containing a single image is placed on a document glass. Upon actuation of a start button, or suitable document sensing apparatus, the electrophotographic printing machine produces a given number of copies in accordance with the operators selected number on the control panel of the printing machine. Upon completion of the copies,the printing machine automatically stops. However, in some instances, a semi-automatic document feeder enables an operator to provide a succession of original documents, in a semi-automatic mode, to a document glass. In such instances, the printing machine senses the presence of an additional original document and then automatically restarts the making of a second run. Alternatively, some electrophotographic printing machines have a recirculating document handling system, the machine will automatically handle original documents for providing collated sets without collating the produced copies. Frequently, a collator for producing collated copies can be attached to the printing machine. The collator may be a sorter which comprises a plurality of bins or trays with each bin receiving successive copies or sets of copies therein. After the requisite number of copies have been made and stored in the respective bins of the sorter, the operator removes the collated sets of copies therefrom. When a copying machine is accessed from a remotely located workstation, there may be some time lag between the time when the copies are reproduced and the time when the operator collects the collated sets of copies. Furthermore, when several individuals are utilizing a centralized reproducing machine, frequently more than one individual is waiting to make copies at the printing machine. Under either of the foregoing circumstances, it is difficult to prevent individuals, not having a need to know, from seeing confidential documents. Thus, it is highly desirable to advance the copy sheets to bins which are lockable. Under these circumstances, only the individual having a need to know the information contained on the document would have access to the lockable bins. This precludes others from inadvertently or deliberately obtaining the information on the confidential document. Various techniques have been devised to achieve the foregoing, such as those described in the following disclosures.

US-A-4 166 030 discloses an apparatus for handling documents, such as bank notes. The documents are read by a detector to determine if they are in a fit or unfit condition. If unfit, they are advanced to a shredder. Fit documents are advanced to a stacker. The documents cannot be illegally removed from the apparatus.

US-A-4 437 660 describes a word processor printer output scanning mechanism which scans a plurality of output bins to determine the availability of a bin for receiving documents and the presence of a lock box therein. When a lock box is inserted in one of the bins, the scanner detects which bin contains the lock box and signals to which lock box the documents should be directed.

US-A-4 470 356 discloses a word processor controlled printer output bin lock box. A computer controls a sheet feed which selectively directs sheets from a printer to a predetermined output bin. A lock box can be inserted and removed from the output bins of the printer. The lock box can only be opened by an individual having a key or the appropriate access code.

US Defensive Publication T 102 102 discloses bins positioned at a copier output which are locked to the user by means of a badge reader or the like. The user enters identification data into the copier to enable the copier to operate. The document platen cover is latched and user identification data is recorded on the first copy which is delivered to the locked bin. The number of copies selected by the user are then processed and delivered to user accessible bins. The platen cover is thereafter unlatched to allow recovery of the original document by the user.

In accordance with one aspect of the present invention, there is provided a sheet handling apparatus including a plurality of bins for receiving sheets therein, characterised by means for selecting one of the bins to receive the sheets therein; and means for locking the bin selected to receive the sheets therein so as to prevent access to the sheets received in the selected bin by unauthorized individuals.

Pursuant to another aspect of the present invention, there is provided a reproducing machine for producing copies of originals on paper sheets, including a sheet handling apparatus of the kind defined by the previous paragraph.

Other aspects of the present invention will become apparent as the following description proceeds and upon reference to the drawings, in which:

Figure 1 is a schematic elevational view depicting an illustrative reproducing machine incorporating the apparatus of the present invention therein;

Figure 2 is an elevational view depicting the details of the collating apparatus of the Figure 1 reproducing machine; and

Figure 3 is a block diagram illustrating the system used to control the Figure 2 collating apparatus.

For a general understanding of the features of the present invention, reference is made to the drawings. In the drawings, like reference numerals have been used throughout to designate identical elements. Figure 1 schematically depicts the reproducing machine including the collating/sorting apparatus of the present invention. It will become evident from the following discussion that the apparatus of the present invention is equally well suited for use in a wide variety of printing systems or other types of devices wherein it is desired to sort or collate sheets. The features of the present invention are not specifically limited in their application to the particular embodiment depicted herein.

Referring now to Figure 1 of the drawings, the general operation of the reproducing machine and that of the collating/sorting apparatus associated therewith will be described with reference thereto. Inasmuch as the art of electrophotographic printing is well known, the reproducing machine operation will be described briefly hereinafter.

The electrophotographic printing machine, generally designated by the reference numeral 10, is capable of producing a stream of copy sheets having information copied either on one side only, simplex sheets, or on both sides, duplex sheets. A recirculating document feeder 12 is shown positioned above a platen at the imaging station of printing machine 10. Document feeder 12 is adapted to feed original documents, in seriatim, to the platen for copying. Usually, document feeder 12 operates in a collating mode, original documents are fed, in seriatim, from a stack in a tray at the top of the feeder to the platen for copying one at a time for each circulation and then returned to the stack. The original documents are placed in the feeder in a predetermined, page sequential order. For example, the first page is on top of the stack and the last page is at the bottom of the stack. The last original document is sent to the platen first and then returned to the top of the stack. The machine operator can control operation of the electrophotographic printing machine and its related apparatus through an operator control panel designated generally by the reference numeral 14. To this end, the machine operator can determine whether a set of copies will be stored in a lockable or unlockable bin in the collating/sorting apparatus, designated generally by the reference numeral 16.

In general, the electrophotographic printing machine includes a belt having a photoconductive surface deposited on a a conductive substrate. The belt advances successive portions of the photoconductive surface to various processing stations disposed about the path of movement thereof. Initially, a portion of the belt passes through a charging station. At the charging station, a corona generating device charges the photoconductive surface of the belt to a relatively high, substantially uniform potential Thereafter, the charged portion of the photoconductive surface is advanced through the imaging station. At the imaging station, an original document is advanced to a platen by recirculating document handling system 12. Lamps flash light rays onto the original document. The light rays reflected from the original document are transmitted through a lens forming a light image thereof. The lens focuses the light image onto the charged portion of the photoconductive surface to selectively dissipate the charge thereon. This records an electrostatic latent image on the photoconductive surface which corresponds to the informational areas contained within the original document disposed upon the platen. Thereafter, the belt advances the electrostatic latent image recorded on the photoconductive surface to a development station. At the development station, a magnetic brush development system transports a developer mixture of carrier granules and toner particles into contact with the electrostatic latent image recorded on the photoconductive surface. The toner particles are attracted from the carrier granules to the electrostatic latent image forming a toner powder image on the photoconductive surface of the belt. After development, the belt advances the toner powder image to a transfer station. At the transfer station, a copy sheet is moved into contact with the toner powder image. A corona generating device sprays ions onto the backside of the copy sheet. This attracts the toner powder image from the photoconductive surface to the copy sheet. After transfer,the copy sheet moves to the fusing station. The fusing station includes a fuser assembly which permanently affixes the transferred toner powder image to the copy sheet. By way of example, the fuser assembly includes a heated fuser roll and back-up roll. The copy sheet passes between the fuser roll and the back-up roll with the toner powder image contacting the fuser roll. In this manner, the toner powder image is permanently affixed to the copy sheet. After fusing, a conveyor belt guides the advancing sheet to collating/sorting apparatus 16. The advanced sheet is guided to the selected bin in collating/sorting apparatus.16. The bin selected may be a lockable bin or an unlockable bin. The destination of the copy sheet is determined by a code which the operator punches in on a numeric display on control panel 14. The numeric display sends a signal to suitable control logic,which, in turn, controls collating/sorting apparatus 16 such that the advancing copy sheet is guided to the appropriate bin. If a lockable bin is selected, the operator punches in the desired combination required to unlock the selected bin. Under these circumstances, the bin is locked and may only be opened with the selected combination. Furthermore, when the operator selects a lockable bin, the printing machine control logic insures that the access doors to the interior of the printing machine are locked to prevent unauthorized access thereto during machine operation or in the event of a sheet jam. The foregoing describes generally the operation of the reproducing machine having a collating/sorting apparatus associated therewith. It is believed that the foregoing description is sufficient for purposes of the present application to illustrate the general operation of the system. The detailed structure of collating/sorting

apparatus 16 and the associate control system will be described hereinafter, in greater detail, with reference to Figures 2 and 3.

Referring now to Figure 2, collating/sorting apparatus 16 is arranged adjacent the output of printing machine 10. As the copy sheet exits from the fuser, it is carried by a conveyor belt to the exit of printing 10. The sheet continues to move in the direction of arrow 18 on a conveyor belt 20. A deflection gate or chute 22 is arranged to deflect the sheet from the horizontal conveyor belt 20 onto a vertical conveyor belt 24. Conveyor belt 24 moves the sheet in a vertical direction downwardly until it engages a moving gate 26 which deflects the sheet into a bin 28. Collating/sorting apparatus 16 is composed of a plurality of sorting bins, indicated generally by the reference numeral 28, arranged in a parallel fashion, one above the other, to provide a vertical row of bins. Each bin is defined by a sheet receiving tray 30. By way of example, bins 32, 34 and 36 are lockable whereas the remaining bins are unlockable. Lockable bins 32, 34, 36 included a hinged door 38. Door 38 is adapted to pivot downwardly so as to open lockable bins 32, 34 and 36 and enable the operator to have access to the interior thereof. Doors 38 are hinged on the lowermost portion thereof so that, as they pivot downwardly, they provide an additional surface for sliding copy sheets outwardly from the interior of the lockable bins 32, 34 and 36. Doors 38 are spring biased to pivot in an upwardly direction to return to the closed, locked position when not held open. An interlock switch is associated with doors 38 to detect when the door is in the open position. At this time, the printing machine may be disabled. Thus, the printing machine will not be capable or reproducing copies until the interlock switch indicates that all of the doors of the lockable bins are in the locked position.

One skilled in the art will appreciate that there are many ways of locking the bins in response to an electrical signal corresponding to a desired combination key punched in on a numeric display. By way of example, an electromagnet may be employed which is energized to lock the bins and de-energized to unlock the bins. Alternatively, if positive engagement is required, a solenoid may be used in which the plunger thereof will engage an aperture in door 38 to positively secure the door in the locked position. When the solenoid is de-energized, the plunger is retracted from the aperture in door 38 and door 38 may be pivoted to its opened position. In either of the foregoing types of locks, the combination required to lock the bin may be punched in by the key operator on the numeric display panel of the reproducing machine. The remaining bins 28 are not lockable and, accordingly, do not require a hinged or pivotably mounted door and the associate lock.

Gate 26 is mounted on a drive system for movement in a vertical direction. A suitable drive system may be a rack and pinion arrangement. As the pinion is rotated, the rack moves gate 26 vertically. Thus, the operator selects the desired bin by keypunching in the bin number on the numeric display of the control panel 14. This actuates the an indexing motor of the drive system to rotate the pinion such that the rack advances the gate to the selected bin. Hence, gate 26 moves vertically in the directions of the arrow 40. When gate 26 is aligned with the selected bin, the copy sheet advancing downwardly on conveyor belt 24 is guided therein. Thus, the key operator may select either a lockable bin or an unlockable bin for receiving the copy sheets.

Turning now to Figure 3, there is shown the detailed structure of the control system for selecting the bin to which the copy sheets are advanced. As shown thereat, control panel 14 includes a numeric display 42. The operator initially determines the bin to which the copy sheets are to be directed. The selected bin number is punched in on the numeric display 42. An output signal is transmitted from control panel 14 to control logic 44. Control logic 44 includes a closed loop servo system for regulating indexing motor 48. Indexing motor 48 rotates the pinion which moves the rack that advances gate 26 vertically. Indexing motor 48 is energized until the error signal from the servo system of control logic 44 is nulled. When the error signal from the servo system is nulled, motor 48 is de-energized. At this time, gate 26 no longer moves in a vertical direction and is positioned at the selected bin. In the event that the operator selects a lockable bin, i.e. bins 32, 34 or 36, after gate 26 is positioned at the selected lockable bin, the operator key punches in on numeric display 42 the desired combination required to unlock the selected bin. Lock 46 which is associated with lockable bin is controlled by control logic 44. Control logic 44 transmits a signal de-energizing the electromagnetic or de-energizing the solenoid when the appropriate signal corresponding to the correct combination of numbers is received from numeric display 42. Thus, the copy sheet is guided to the selected lockable tray which, in the default condition, is locked. The operator key punches in the selected combination required to unlock the lockable bin. When the appropriate combination is keypunched in on numeric display 42, control logic 44 transmits a signal to lock 46 de-energizing the electromagnet or de-energizing the solenoid. At this time, the bin is unlocked, i.e. door 38 may be pivoted downwardly to provide access to the interior of the bin.

One skilled in the art will appreciate that the lockable bins may have permanent combination codes assigned thereto. Thus, each lockable bin would have a permanent non-operator settable combination associated therewith. The operator would then only need to key punch in the pre-assigned combination to unlock the designated bin having the set of copy sheets therein. There would be no need to set the combination required to unlock the bin door.

While the foregoing has been described for use with a reproducing machine having a numeric display integral with the control panel thereof, one skilled in the art will appreciate that a shared reproducing machine may also be employed to achieve the foregoing . For example, if a laser printing system , such as the Xerox Model No. 9700 or Xerox Model

No. 5700, is employed in conjunction with a computer, e.g. Xerox Model No. 8010 or Xerox Model No. 6085, the numeric display may be located on the computer. In this embodiment, the laser printer is substantially the same as the reproducing machine with the exception that the optical system is no longer a light lens system, but rather a laser which is modulated in accordance with electrical signals received from the computer to record the desired electrostatic latent image on the photoconductive surface. This latent image is developed and transferred to the copy sheet. Thereafter, the latent image is permanently affixed thereto. The copy sheet is advanced to the selected bin. In this latter embodiment, the selected bin is determined by the computer operator at the computer console. Thus, the computer operator may print out the desired information on the computer screen at a remote location, i.e. the laser printer. The resultant copy sheet is advanced to a selected bin. The computer operator selects whether the bin is to be a lockable bin or an unlockable bin. If the selected bin is lockable, it may only be opened by an operator having the selected combination. Thus, only an individual having a need to know has access to the lockable bin holding the copy sheets with the confidential information thereon. The lockable bin may be be employed by a plurality of operators with each operator selecting their own combination to unlock the bin. Under these circumstances, each operator will have their own combination which is not known by any other operator and provides access to the lockable bins by only that operator. In is a system of this type, a secure bin is provided for receiving confidential information.

In recapitulation, it is clear that the collating/sorting apparatus of the present invention includes lockable and unlockable bins for receiving copy sheets from a reproducing machine. The key operator may select the destination of the copy sheets and define the required combination code to unlock a lockable bin. This ensures that confidential information being reproduced is accessible only to those who have a need to know.

## Claims

1. A sheet handling apparatus including a plurality of bins (28) for receiving sheets therein, characterised by

means (42, 44, 48, 26) for selecting one of the bins to receive the sheets therein; and

means (46, 24) for locking the bin selected to receive the sheets therein so as to prevent access to the sheets received in the selected bin by unauthorized individuals.

2. An apparatus according to claim 1, including means for unlocking the locked bin to remove the sheets therein.

3. An apparatus according to claim 1 or claim 2, wherein at least one of the other bins is not lockable.

4. An apparatus according to claim 3, wherein said selecting means is operator selectable to select either the lockable bin or unlockable bin to receive sheets therein.

5. An apparatus according to claim 4, including means for setting a combination code for locking the selected bin.

6. An apparatus according to claim 5, wherein said setting means includes an operator actuatable numeric display in communication with said locking means to enable the operator to program the combination required to unlock the bin.

7. An apparatus according to claim 6, wherein said selecting means includes said numeric display to select the bin to receive the sheet.

8. A reproducing machine for producing copies of originals on paper sheets, including a sheet handling apparatus according to any one of claims 1 to 7.

9. A reproducing machine according to claim 8, wherein said selecting means is located on the machine.

10. A reproducing machine according to claim 8, wherein said selecting means is located remotely from the machine.

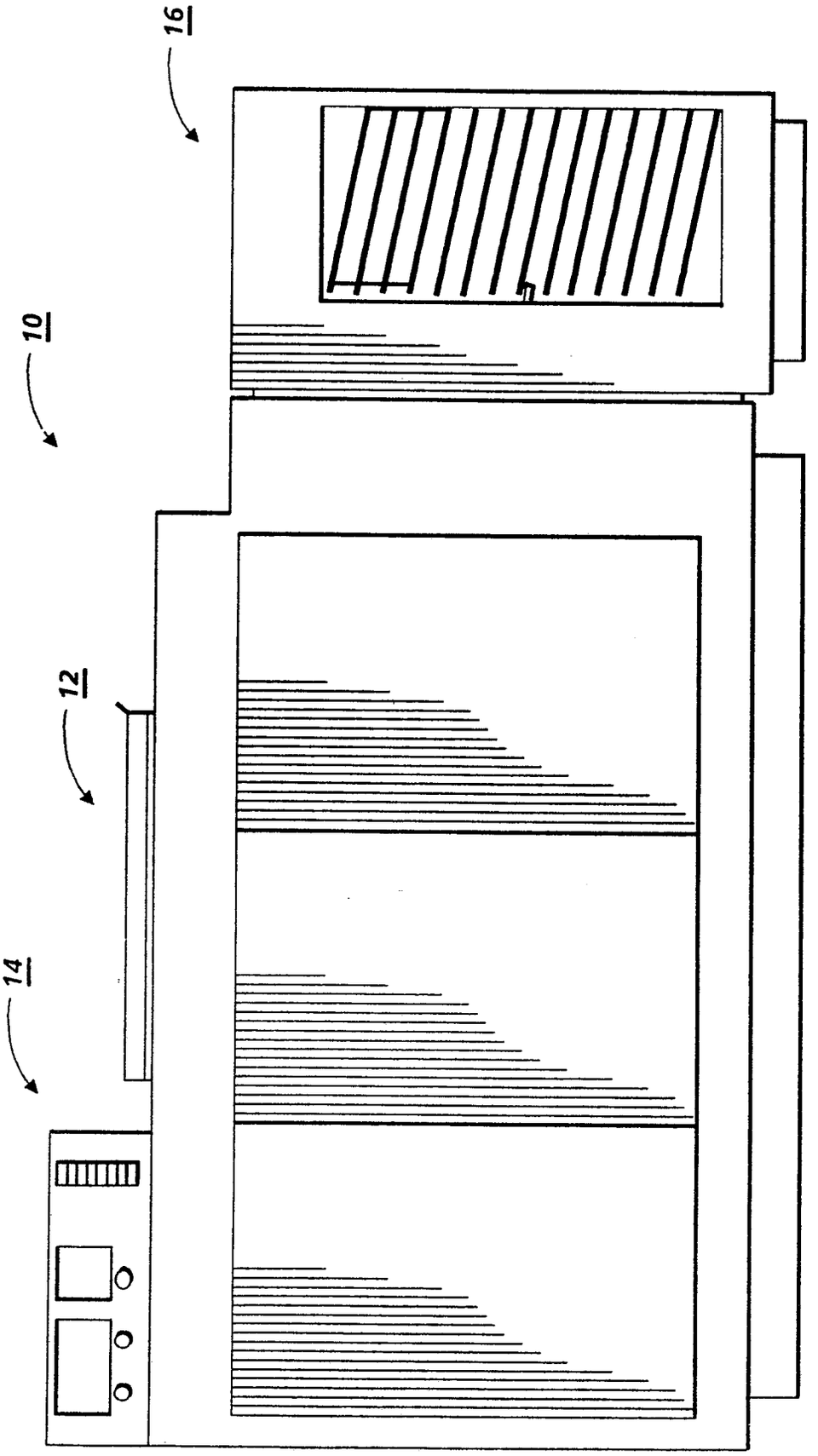


FIG. 1

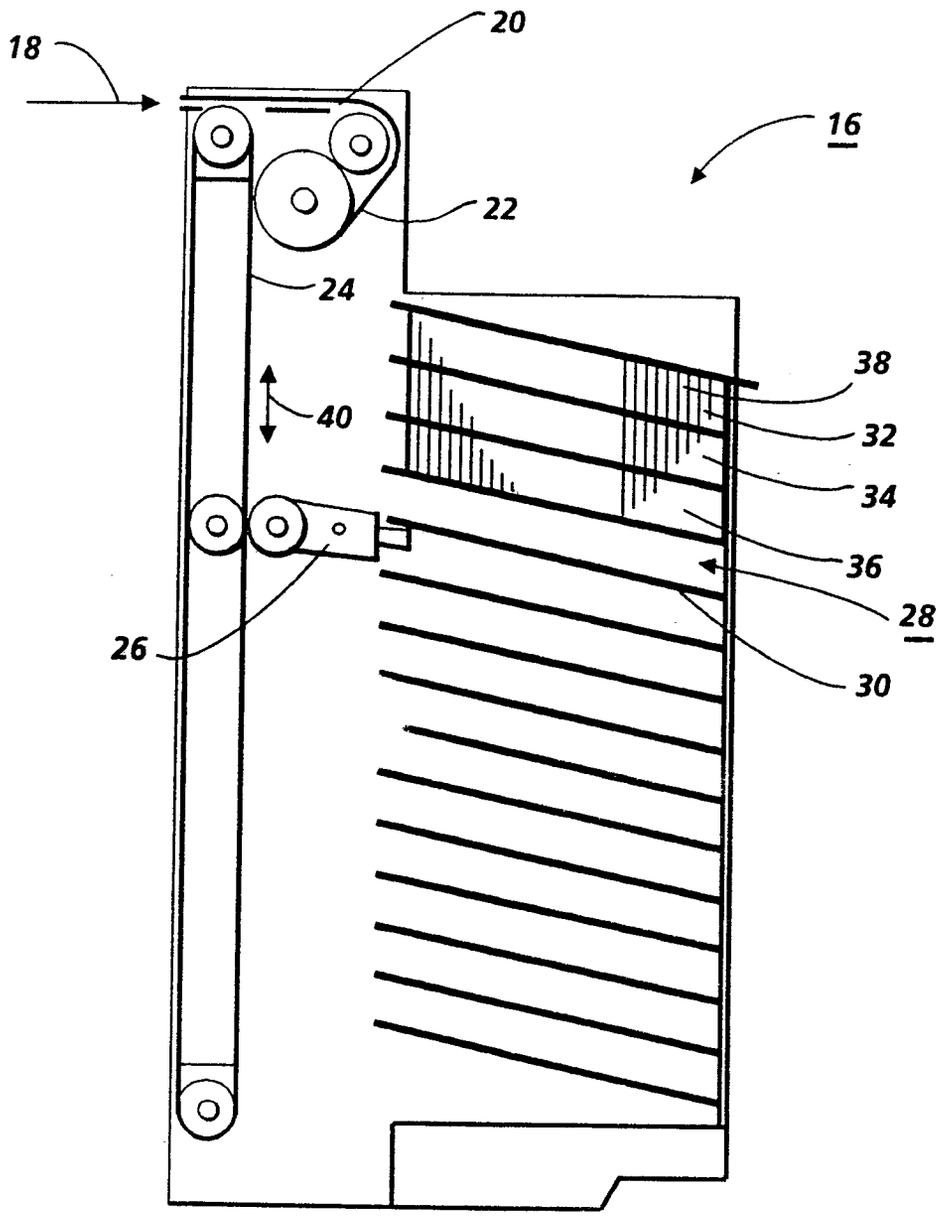


FIG. 2

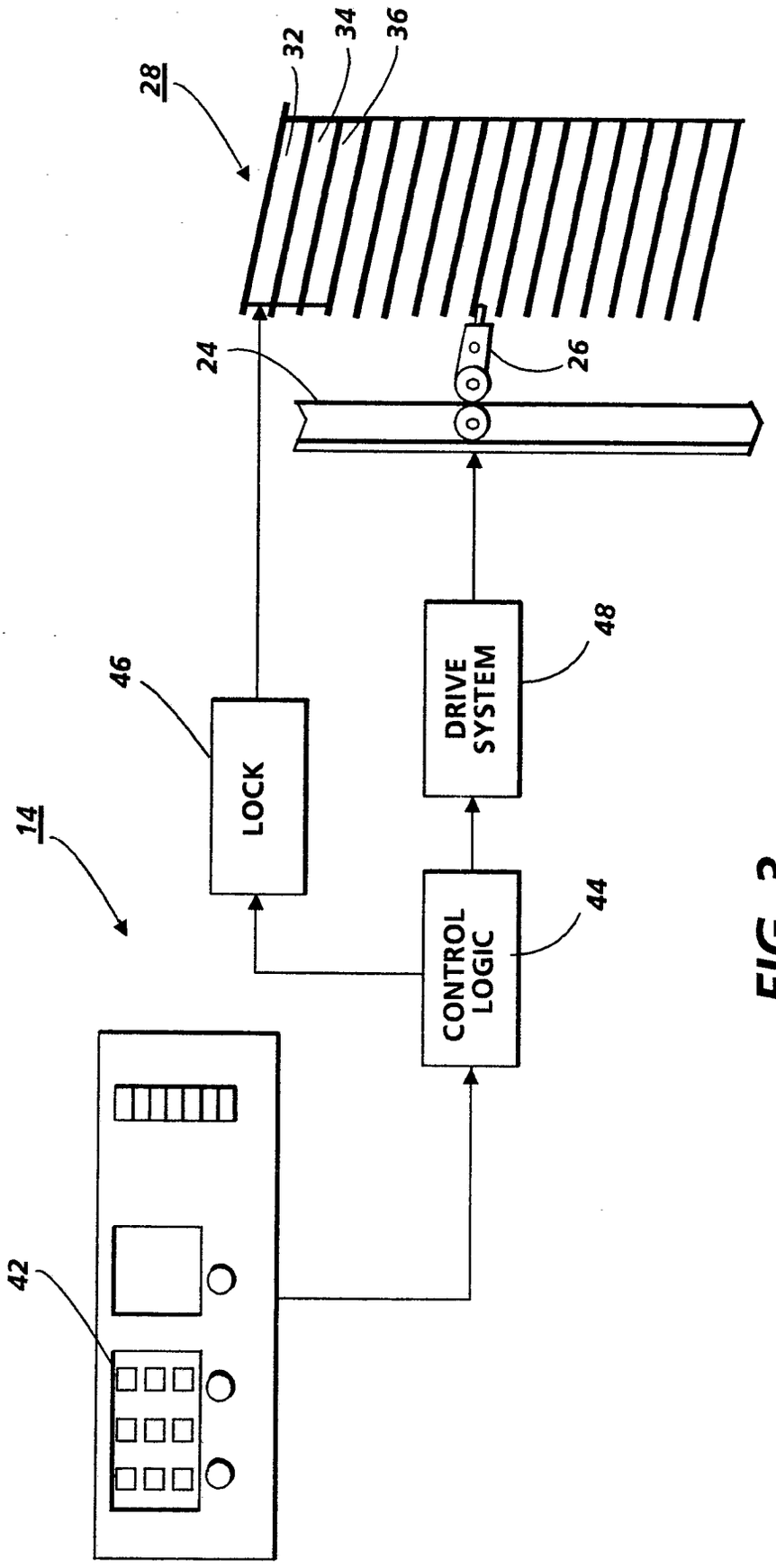


FIG. 3