Jan. 7, 1969 G. E. SHEPHERD 3,420,162

DRIVE MEANS FOR FEEDING AND MOISTENING MEANS IN ADDRESS PRINTING MACHINES

Filed March 23, 1967 Sheet 1 of 3

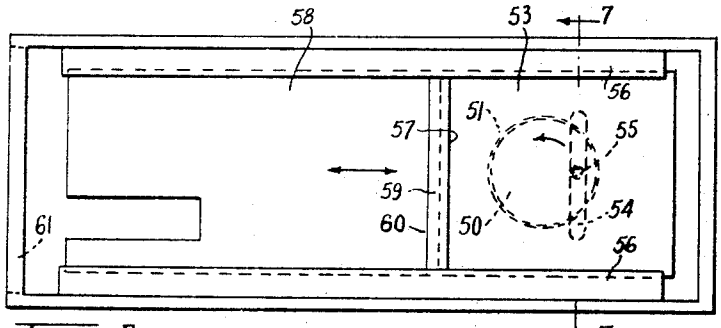


Fig. 6

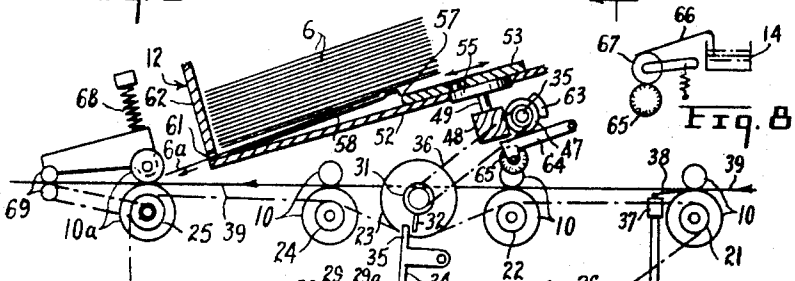


Fig. 4

Fig. 8

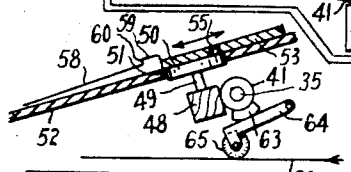


Fig. 5

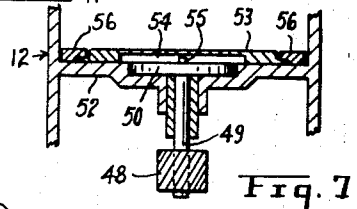


Fig. 7

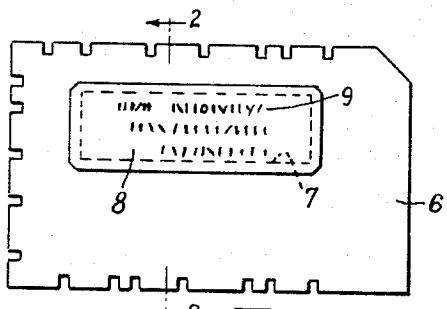


Fig. 1



Fig. 2

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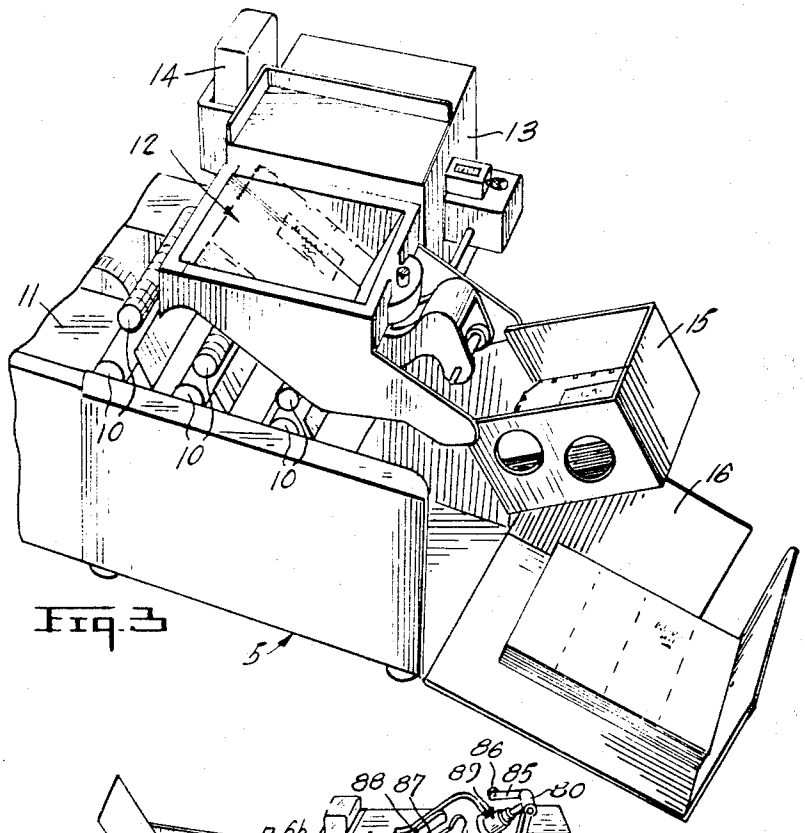


Fig. 3

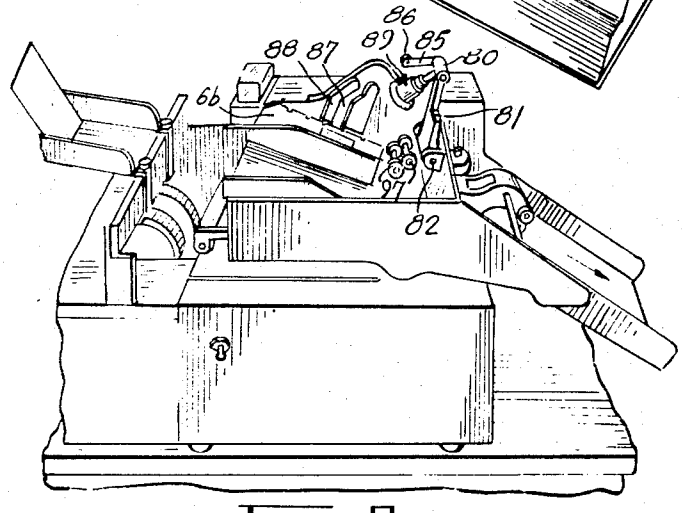


Fig. 9

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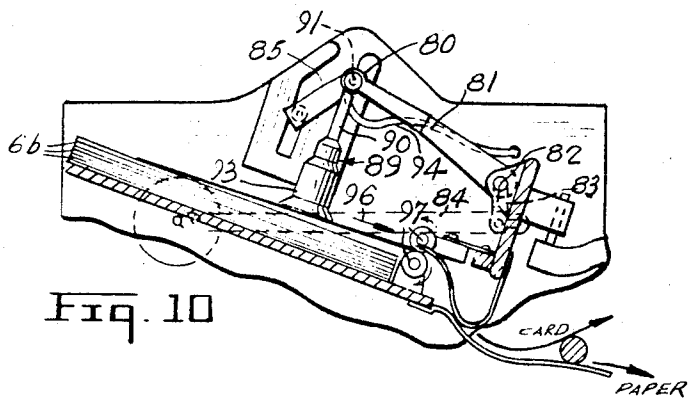


Fig. 10

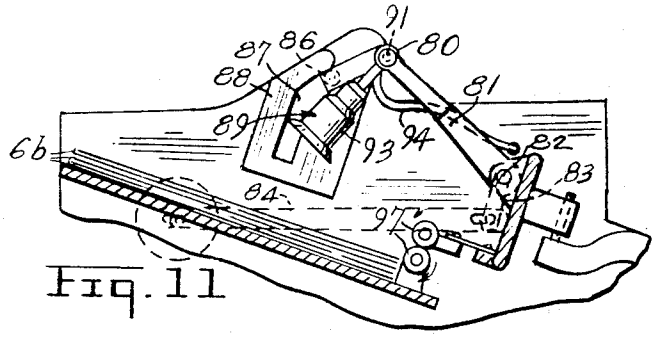


Fig. 11

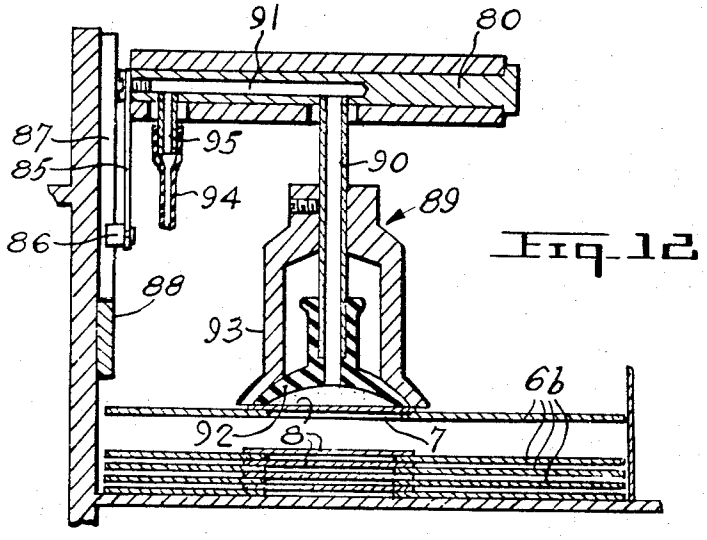


Fig. 12

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DRIVE MEANS FOR FEEDING AND MOISTENING MEANS IN ADDRESS PRINTING MACHINES

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U.S. Cl. 101—53 14 Claims
Int. Cl. B411 *45/00*

ABSTRACT OF THE DISCLOSURE

A feed mechanism for feeding single master address punched cards through an addressing machine, synchronized with the feed into the machine of the sheet to be printed from the address card.

This invention relates to addressing machines and particularly to addressing machines in which are used master address punched cards from which the address or other information on the cards is transferred on to a sheet or sheets fed through the machine.

It has been found difficult, in the past, to feed, automatically, punched address cards singly through a machine for the following reasons:

(a) The notched edges of the stacked punched cards interfere with each other so that one card will not slide forward without carrying with it one or more additional cards from the stack.

(b) When more than one card passes through the machine at one time, only one card will imprint and the others will pass through without imprinting.

(c) Suction means have been tried to lift solid type cards, one at a time. This has failed, due to the stiffness of the card and, in addition, as no air is trapped between cards in the stack, there is a tendency, if strong suction is used, to lift more than one card.

The present invention has been designed to overcome the defects above outlined, and consists essentially of a drive means, including feed and pressure rolls whereby sheets to be printed are fed into the machine one after the other and the leading edge of each sheet as it is fed into the machine sets in motion a secondary drive operable to feed one only master address card on to the sheet passing through the machine, the sheet and card then passing under press rolls for imprinting of the underlying sheet. It is a characteristic of the machine that the sheet to be printed is moistened by a moistening roll brought into contact with the sheet, by the secondary drive, at a predetermined position on the sheet relative to its leading edge and that the secondary drive is activated to feed one only of the master address cards and is, thereafter, inactive until the leading edge of a following sheet to be printed enters the machine. A solenoid forms a part of the drive mechanism and is activated when a micro-switch is closed by pressure of the sheet to be printed as the sheet passes thorugh the machine. Associated with the solenoid is a trip mechanism and a pair of spring clutches which permit one cycle of operation only of the secondary drive effecting feeding of one only of the master cards and one moistening operation. One of the spring clutches is of a type which can be set by means of a timing cam to control the length of time during which the secondary drive is operable.

In order that only one master card will be fed into address printing position at one time a special feed apparatus operable by the secondary drive is utilized. In a preferred embodiment of the invention a special knife engages with and pushes forward a single card from the bottom of a pile, while in another embodiment the top card in a pile is lifted off and transferred forward by motion means. In order that only a single card will be transferred at one time, the cards are so designed that there is a layer of air between each card. To accomplish this, the cards have a rectangular cut-out at a predetermined location and a thin paper label on which is imprinted the desired name and address or other information, is adhesively attached to the card so as to cover the rectangular opening in the card. The name and address on the thin paper label is printed on the back with a transferable ink for impression on a statement sheet or other sheet to be addressed.

It is an object of the invention to provide an addressing machine in which one only master address card is fed into impression transfer contact with a single sheet to be printed.

A further object of the invention is to provide a sheet drive mechanism and a secondary drive whose time of starting is controlled by the leading edge of the sheet to be printed as it is fed into the machine.

A further object of the invention is to provide timing means whereby the length of time during which the secondary drive is operable can be controlled.

A further object of the invention is to provide means whereby moistening means is applied to the sheet to be printed and is synchronized with the delivery of the master card into printing position on the sheet.

A further object of the invention is to provide means whereby the drive mechanism can be used to deliver a master card into printing position by either mechanical or suction means.

A further object of the invention is to provide a master card which, when piled into a stack, will have a layer of air between them.

These and other objects of the invention will be apparent from the following detailed specification and the accompanying drawings, in which:

FIG. 1 is a plan view of a master card.

FIG. 2 is a transverse section of the card shown in FIG. 1 taken on the line 2—2.

FIG. 3 is a perspective view of a preferred embodiment of the invention using a mechanical feed of individual master cards into printing position.

FIG. 4 is a diagrammatic vertical elevation of the drive mechanism to the various parts of the machine shown in FIG. 3, including timing apparatus whereby a secondary drive controlled by the leading edge of the sheet to be printed sets in motion the sheet moistening and the feed of a single master card.

FIG. 5 is a partial diagrammatic view taken from FIG. 2, showing the moistening roll moved into contact with the sheet to be printed.

FIG. 6 is a plan view of the master card rack shown in FIG. 4 showing the card feeding knife and the means to reciprocate the knife.

FIG. 7 is a vertical transverse section taken on the line 7—7 of FIG. 6.

FIG. 8 is a diagram showing a capillary method of feeding moisture to the moistening roller.

FIG. 9 is a perspective view of an embodiment of the machine adapted for suction transfer of the master card from a stack.

FIG. 10 is an enlarged vertical section of the master card rack shown in FIG. 9 with the suction device in contact with the top card of the stack.

FIG. 11 is a view similar to FIG. 10 but showing the suction device before descending into contact with a card.

FIG. 12 is an enlarged transverse section of the suction device showing the top card in a stack partly lifted.

Referring to the drawings, and particularly to FIGS. 1

to 8 inclusive. The addressing machine **5** is preferably for the use of punched type master cards **6** generally of the type shown in FIGURES 1 and 2. The cards **6** can be of any of the regular sizes used for the purpose of addressing material such as statements, etc. and are provided with a cut-out **7** over which a printed label **8** is adhesively fixed to the card. The label **8** is printed on its underside with a transferable ink as indicated at **9**.

The machine **5** has a series of pairs of feed rollers **10** by which sheets of paper to be printed are fed through the machine from the table **11**.

A master card rack **12** is located above the feed rollers **10** and a gear casing **13** provides the drive for the various elements of the machine. A moisture container **14** is mounted on the side of the gear casing **13** to provide moisture to sheet moistening rolls as will be described later.

A master card receiving bin **15** and a printed sheet receiving bin **16** are provided at the discharge end of the machine.

The drive mechanism contained within the gear casing **13** is shown diagrammatically in FIGS. 4 and 5 and includes a primary drive shaft **17**, driven by a motor **18**. A chain **19** is led over the sprockets **20**, **21**, **22**, **23**, **24** and **25** back to the shaft **17**. A tension sprocket **26** is adjustable to maintain a desired tension in the chain **19**. The sprockets **21**, **22**, **24** and **25** rotate the pairs of feed rolls **10**.

The sprocket **20** is secured to one side of a spring clutch **27**, the spring end **28** of which is normally held against rotation by the hooked end **29** of the pivoted lever **30**. The sprocket **23** is secured to one side of a second spring clutch **31**, the spring end **32** of which is normally held against rotation by the upper end **33** of the pivoted lever **34**. When the spring clutches **27** and **31** are released, a secondary drive from the sprocket **23** to the shaft **35** through the chain **36** is initiated. In order to activate this secondary drive the micro-switch **37** is closed by the leaf spring **38** which is depressed when the leading edge of a sheet of paper, generally indicated at **39** enters between the first of the pair of feed rollers **10**. Closing of the micro-switch **37** activates the solenoid **40**, pulling down its shaft **41** which is normally held in the up position by the spring **42**.

The lower end **43** of the trip plate **44** engages with the head of the shaft **41** while the upper end **45** of the trip plate **43** engages with the pin **46** on the lever **30**.

The shaft **35** has mounted on it a worm **47** engaging with the worm gear **48** for rotation of the shaft **49**. A disc **50**, secured to the end of the shaft **49**, is located within a circular opening **51** in the bottom wall **52** of the master card rack **12**. Slidably mounted on the top surface of the bottom wall **52** is a plate **53** provided with a transverse slot **54** on its under surface. A pin **55** projecting upwards from the disc **50** engages in the slot **54** to effect reciprocation of the plate **53** in the guides **56** when the disc **50** is rotated.

Attached to the transverse edge **57** of the plate **53** is a thin steel knife **58**. The knife **58**, adjacent its attachment to the plate **53**, is provided with an upstanding transverse ridge **59** providing a shallow shoulder **60**. From this shoulder **60** the body of the knife slopes downwards to its opposite edge which is in contact with the upper surface of the bottom wall **52** of the rack **12**. The depth of the shoulder **60** does not exceed the thickness of the master cards **6**. A slot **61** at the bottom of the rear wall **62** of the rack **12** permits one card only to be pushed out of the rack as the card is engaged by the shoulder **60** of the knife **58**.

The shaft **35** has a cam **63** secured to it. This cam **63**, on rotation of the shaft **35**, depresses the lever **64** which, in turn, supports the paper moistening roller **65** to move the roller down into contact with the paper **39** being fed through the machine.

FIG. 8 shows diagrammatically a means for feeding moisture from the reservoir **14** by means of a felt strap **66** to the spring loaded roller **67** against which the paper moistening roller **65** is normally in contact with.

As the sheet **39** is fed through the final set of feed rolls **10***a* a single master card **6***a* (FIGURE 4) is fed into contact with the sheet **39** synchronized to locate its printed label **8** with the moistened portion of the sheet **39** in order that, when both the sheet and master card are passed through the feed rolls **10***a* the transferable ink impression **9** on the label will be impressed on the sheet **39** at the exact predetermined location. In order that a good transfer will be made from the label **8** to the sheet **39** the topmost roll **10***b* is spring loaded by the spring **68**. The sheet **39** and card **6***a* are then discharged from the machine by the feed rolls **69** and the cards are separated from the sheet in well known manner, the cards being discharged into the receiving bin **15** while the printed sheets are discharged into the receiving bin **16**.

The secondary drive controls the location of the moisture deposit on the sheet **39** and the feeding of individual master cards **6***a*, the operation of the secondary drive will now be described in detail.

When the motor **18** is switched on by the switch **70**, the feed rolls are rotated by the chain **19** which, in turn causes the sprockets **20** and **23** to rotate. However these sprockets **20** and **23** rotate freely as the spring clutches are held locked by reason of their spring ends **28** and **32** being held against rotation by the levers **30** and **34** respectively.

The cam **29** on the spring clutch **27** is set so that its shoulder **29***a* has a predetermined time gap A with respect to the end **34***a* of the lever **34**. This gap A determines the lapse of time required between when the leading edge of the sheet **39** causes the micro-switch **37** to close and release of the second spring clutch **31** to initiate the secondary drive.

As the leading edge of the sheet causes the micro-switch **37** to close the solenoid **40** is activated to pull down the trip plate **44** against the spring **42**. The trip plate **44**, in turn, pulls down the end **29** of the lever **30** thereby releasing the spring end **28** and the clutch **27**. The cam **29** rotates with a time delay before contacting the end **34***a* of the lever **34**, causing the lever to rotate which, in turn, releases the spring end **32** and the clutch **31**. The secondary drive to the shaft **35** is now activated through the chain **36**.

Rotation of the shaft **35** causes rotation of the worm and worm-gear **47–48** which, in turn, rotates the disc **50** to impart reciprocation motion to the plate **53** and knife **58**. As the shoulder **60** of the knife **58** can only contact the thickness of one master card and as there is a pocket of air in the rectangular opening **7** of the card, the master card **6***a* will readily slide forward beneath the stack above. At the same time as a single master card **6***a* fed forward the cam **63** on the shaft **35** is rotated to depress the lever **64**, moving the moistening roller **65** down into contact with the sheet **39** as it is fed through the machine. The setting of the cam **63** on its shaft **35** and the time delay caused by the cam **29** combine to ensure that the sheet **39** will be moistened at a predetermined location relative to the leading edge of the sheet and the master card **6***a* will be moved forward into contact with the sheet so that its printed label **8** will be located directly over the moistened portion of the sheet **39** as both sheet and master card enter between the rolls **10***a* and **10***b*.

The lever **30** is spring loaded by the spring **71** and the solenoid shaft **41** is also spring loaded by the spring **42**. As the solenoid is activated and its shaft **41** is pulled down, it carries with it the trip plate **44** thereby releasing the trip plate **44** from engagement with the pin **46** on the lever **30**. The spring **71** immediately rotates the lever **30** back to its original position (solid lines in FIGURE 4) to immediately re-engage the spring end **28** of the clutch **27** and so limit the operation of the clutch to one cycle only. The lever **34** is spring loaded by the spring **72** to maintain its lower end in contact with the cam **29**, therefore, as the spring clutch **27** is limited to one cycle only,

the upper end 33 of the lever 34 will also limit the spring clutch 31 to a single cycle.

The solenoid 40 is maintained activated all the time that a sheet 39 is passing over the micro-switch 37 so that ony one master card 6*a* is fed forward during this time. As soon as the trailing edge of the sheet 39 clears the micro-switch 37 the solenoid 40 will be de-energized and the spring 42 will cause the solenoid shaft 41 and trip plate 44 to move upwards into engagement with the pin 46 on the lever 30. The apparatus is then in position to recycle the secondary drive to moisten a following sheet 39 and feed forward another master card 6*a* as soon as the leading edge of the following sheet 39 closes the micro-switch 37.

In the embodiment of the invention illustrated in FIGURES 9 to 12 the drive is similar to that shown between the motor 18 and the shaft 35 illustrated in FIGURE 4, including the micro-switch 37, solenoid 40 and the two spring clutches 27 and 31 and the following description is to be read in conjunction with FIGURE 4.

A rocker shaft 80 is mounted for rotation on the lever 81 which, in turn, is secured to the shaft 82. The shaft 82 is rotated by a crank arm 83 operatively connected with the shaft 35 (FIGURE 4) by the link 84. Secured to the rocker shaft 80 is an arm 85 having a pin 86. This pin 86 engages in the cam slot 87 in the side plate 88 of the machine frame. Also secured to the rocker shaft 80 is a suction device 89 adapted for rocking movement with the shaft 80.

The suction device 89 includes a hollow tube 90 one end of which connects with an axial bore 91 in the shaft 80 while the opposite end of the tube 90 has a suction cup 92 mounted thereon. A protective cap 93 is secured on the tube 90 and has its lower peripheral edge engaging with the upper surface of the suction cup 92. A flexible tube 94 is connected through a nipple 95 with the bore 91 in the shaft 80 and with a source of suction not shown.

The master cards 6*b* are similar to the master cards 6 above described and include the cut out 7, label 8 with printed matter 9.

As the shaft 35 is rotated in the manner above described, the suction device 89 is moved from the position shown in FIGURE 11 down into contact with the label 8 of the topmost master card 6*b* in the stack. At the same time suction is applied to the suction device 89 continuous partial rotation of the shaft 35 causes the suction device 89 to rise in the manner shown in FIGURES 10 and 12, and swing forward due to the action of the pin 86 in the cam slot 87.

As will be seen in FIGURE 12 suction is applied only to the thin paper label 8 of the topmost master card 6*b* and, due to the fact that there is a pocket of trapped air in the cut-out 7 below the label 8, the topmost master card 6*b* will be lifted clear of the next below card.

On continuous partial rotation of the rocker shaft 80 the suction device 89 and lifted card 6*b* will move forward in the direction of the arrow 96 to deliver the card into the nip of the feed rollers 97 prior to the printing of the sheet 39 being fed through the machine in the manner shown in FIGURE 4.

Following delivery of the master sheet 6*b* to the feed rollers 97 the suction device 89 is swung back to its normal position as shown in FIGURE 11. As the operation of the shaft 35 is governed by the two spring clutches 27 and 31 which, in turn are controlled by the feed of a sheet of paper to be printed passing over the micro-switch 37 in the manner previously described, the suction device 89 will remain in its normal position shown in FIGURE 11 until such time as a cycle of operation is initiated by the leading edge of a sheet 39 closing the micro-switch.

It will be obvious from the above description, in which a particular form of master card is used for printing sheets with an address or other information and with the use of a synchronized secondary drive for delivering a single master card into printing position relative to the sheet to be printed that the printing operation can be carried out swiftly and accurately without the possibility of more than one master card being fed through the machine at one time and with the surety that a master card will not be fed through the machine unless there is a sheet to be printed actually in the process of passing through the machine.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An addressing machine in which a master address card is fed into print contacting position at a printing station with a sheet, as the sheet is fed through the machine past the printing station, the machine including a first drive means for continuously feeding a sheet through the machine, an actuatable moistening means, a master card feeding means, a secondary drive means for the moistening means and master card feeding means operable from said first drive means and wherein said secondary drive means includes actuatable means adapted to be actuated by passage of a sheet through the machine, means energized by said actuatable means, first clutch means actuated by said means energized by said actuatable means, and second clutch means actuated by said first clutch means to operably engage said secondary drive means with the first drive means for a single cycle of operation in which said moistening means is actuated to moisten said sheet at a predetermined location on said sheet as said sheet is fed through the machine and to actuate said master card feeding means to feed a master card into print contacting position with the predetermined moistened location of said sheet at the printing station.

2. The addressing machine of claim 1 wherein:
said first clutch means includes a first movable member and a second movable member, whereby when said means energized by said actuatable means actuates said clutch means said first member will be operatively related to said second member so that movement of said first member will cause movement of said second member.

3. The addressing machine of claim 2 wherein:
said first clutch means includes a timer means to cause said second clutch means to be actuated by said first clutch means after the passage of a predetermined time period.

4. The addressing machine of claim 3 wherein:
said means energized by said actuatable means includes a solenoid which is adapted to actuate said first clutch means.

5. The addressing machine of claim 4 wherein:
said second clutch means includes a first movable member and a second movable member, whereby when said first clutch means actuates said second clutch means, said first member will be operatively related to said second member so that movement of said first member will cause movement of said second member.

6. The addressing machine of claim 5 wherein:
said single cycle of operation causes the termination of the operation of the secondary drive means while the sheet is still passing through the machine.

7. The addressing machine of claim 6 wherein:
said means energized by said actuatable means includes a trip lever which lever is moved by said solenoid to actuate said first clutch means, and
wherein said lever also is adapted to move into position to disengage said first clutch means.

8. The addressing machine of claim 7 wherein:
a second trip lever is positioned between said first and second clutch means which lever is actuated by said first clutch means to cause the actuation of said second clutch means.

9. The addressing machine of claim 8 wherein:

said timer means includes a cam which is adjustable to vary the time of actuation of said second trip lever which varies the actuation of said second clutch means and thereby varies the feeding of said card and the actuation of said moistening means.

10. The addressing machine of claim **9** wherein:
said first and second clutch means are spring clutches.

11. The addressing machine of claim **10** wherein:
said secondary drive includes a reciprocating knife member having a transverse shoulder which is adapted to engage an edge of a master card and feed said card forward into print contacting position with the sheet being fed.

12. The addressing machine of claim **10** wherein:
said secondary drive includes a suction device and means to lower said suction device into contact with said master card and feed it into print contacting position with said sheet being fed through the machine.

13. The addressing machine of claim **10** wherein:
said secondary drive includes a cam and said moistening means including a roller wherein the cam depresses the roller into contact with the sheet being fed to moisten said sheet at said predetermined position thereon.

14. The machine as set forth in claim **10** wherein a plurality of master cards are provided and wherein said master cards each have a rectangular cutout area on which a paper label is attached.

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U.S. Cl. X.R.

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