March 13, 1956 F. J. FURMAN 2,737,884

TRANSFER POSTING MACHINE

Filed Dec. 29, 1950 6 Sheets-Sheet 1

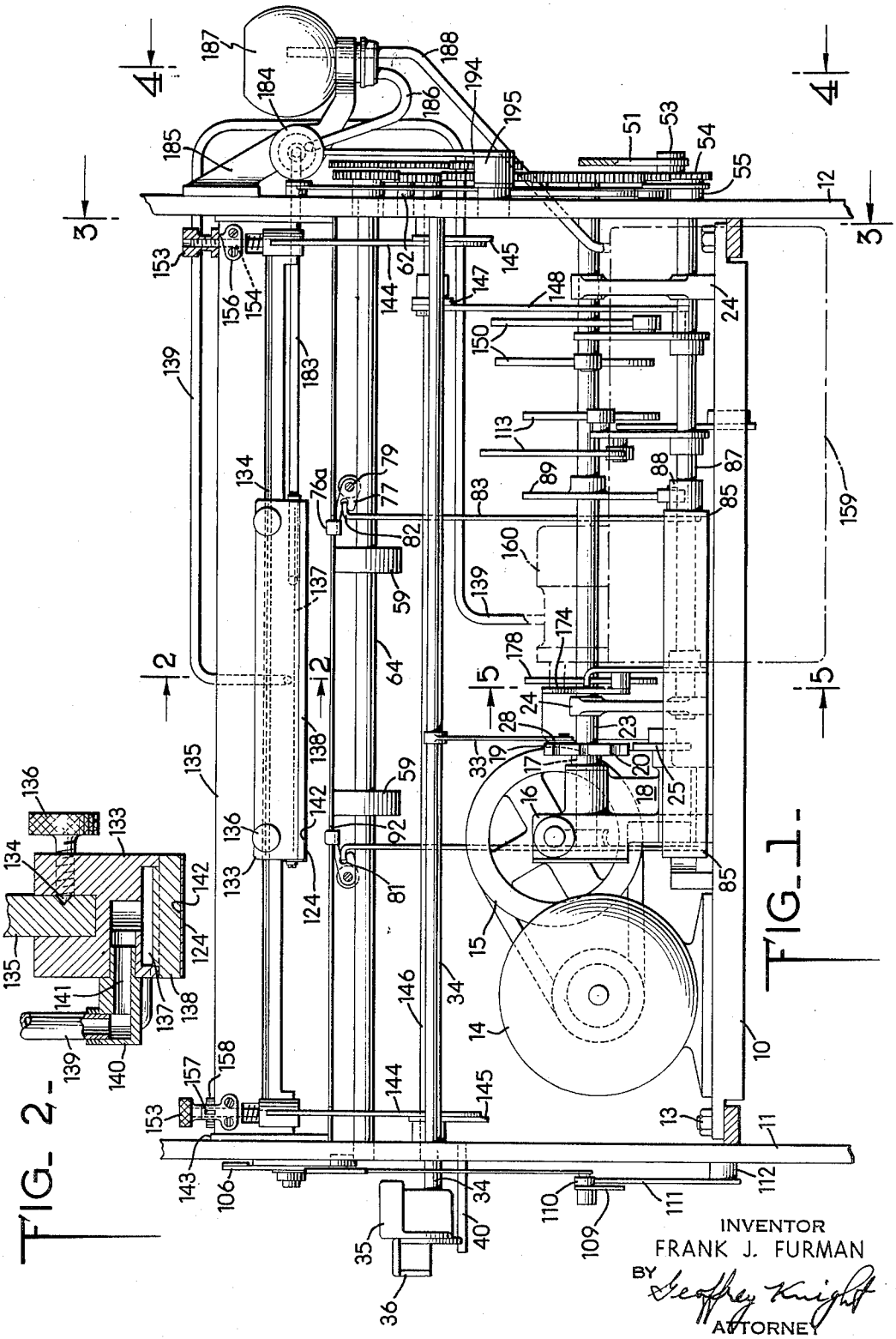


FIG. 1.

FIG. 2.

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TRANSFER POSTING MACHINE

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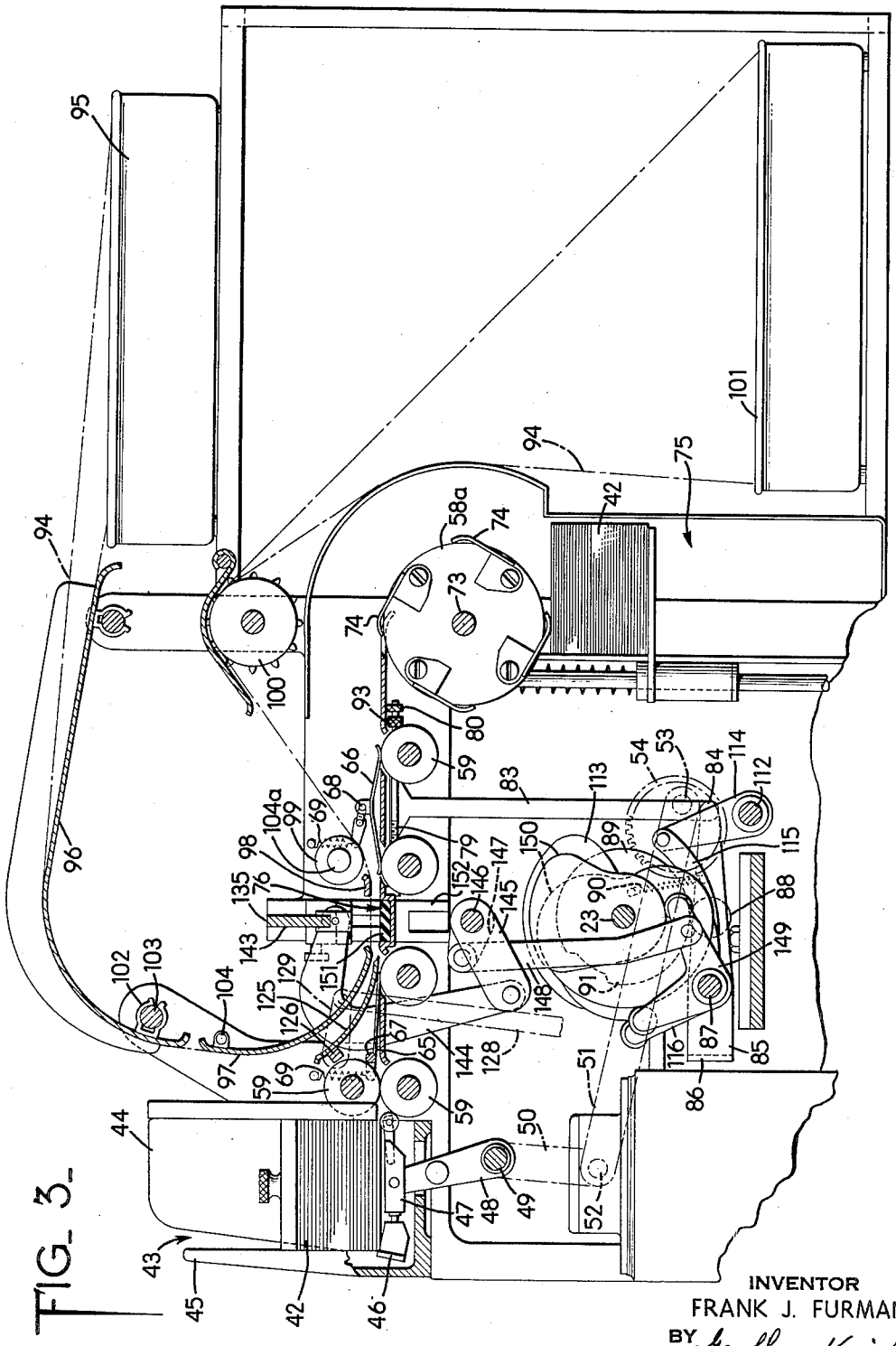


FIG. 3.

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TRANSFER POSTING MACHINE

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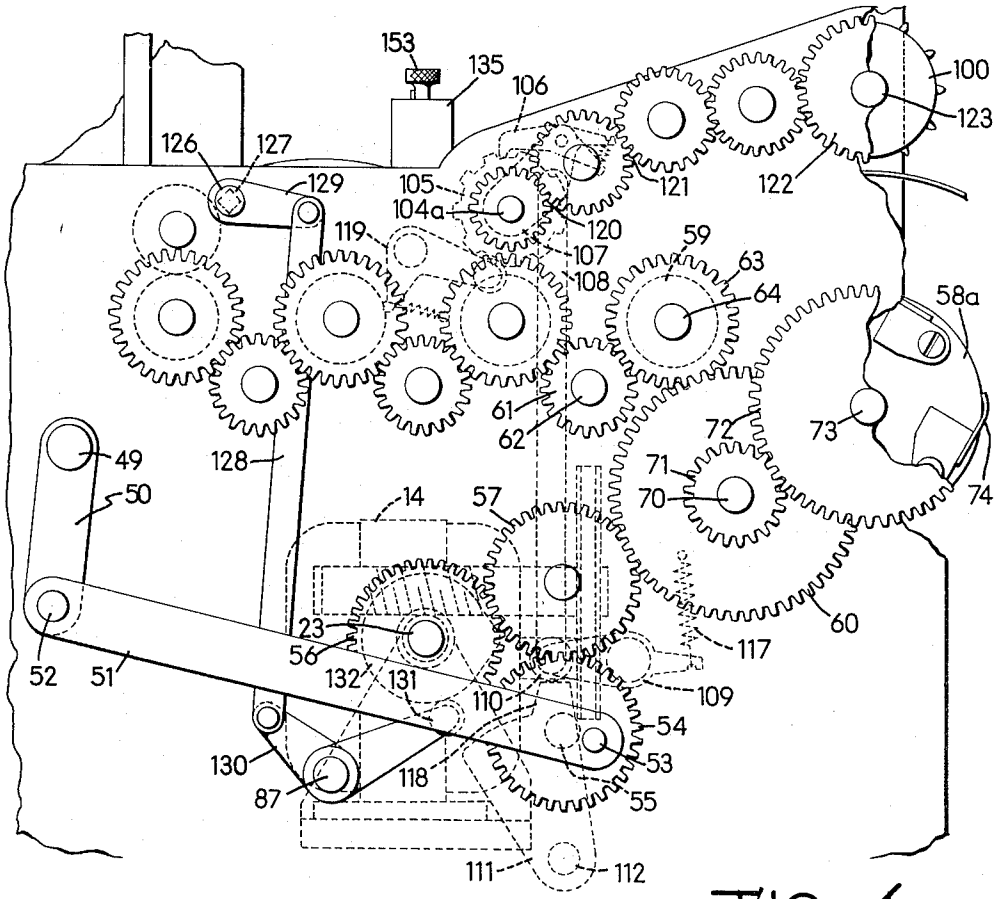


FIG. 4.

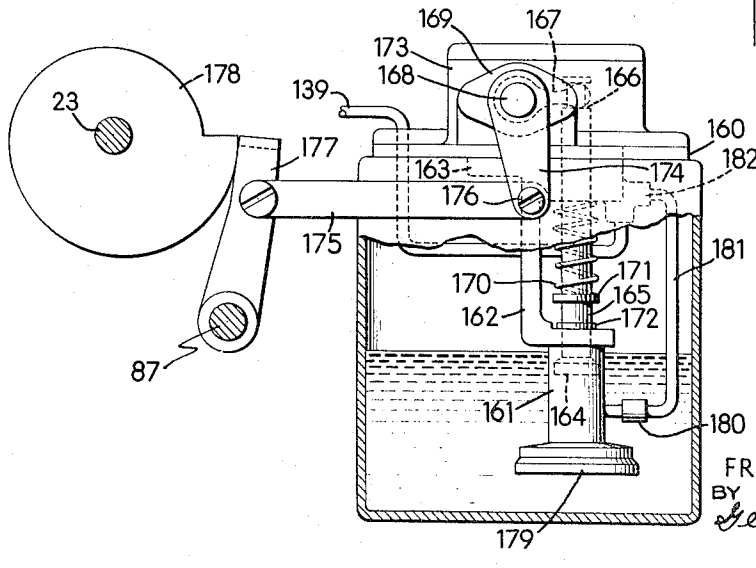


FIG. 5.

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TRANSFER POSTING MACHINE

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FIG. 8.

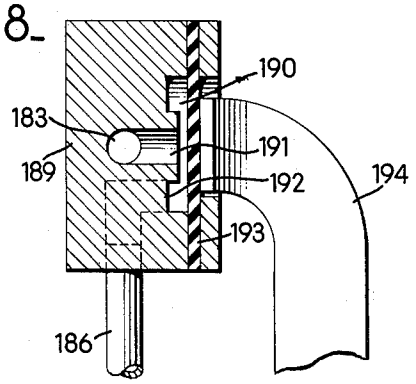


FIG. 7.

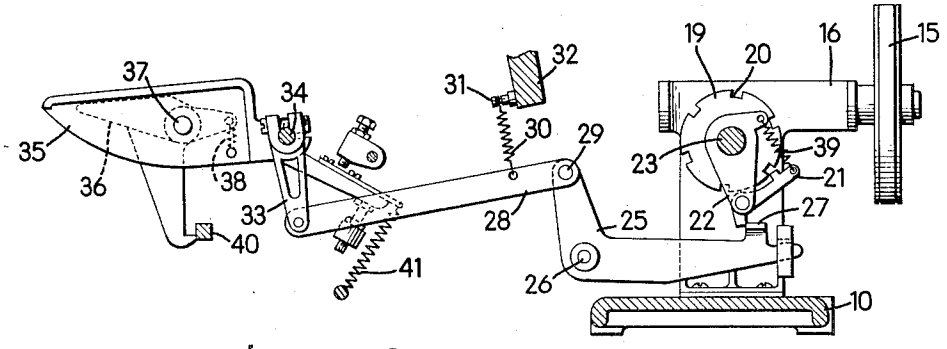


FIG. 6.

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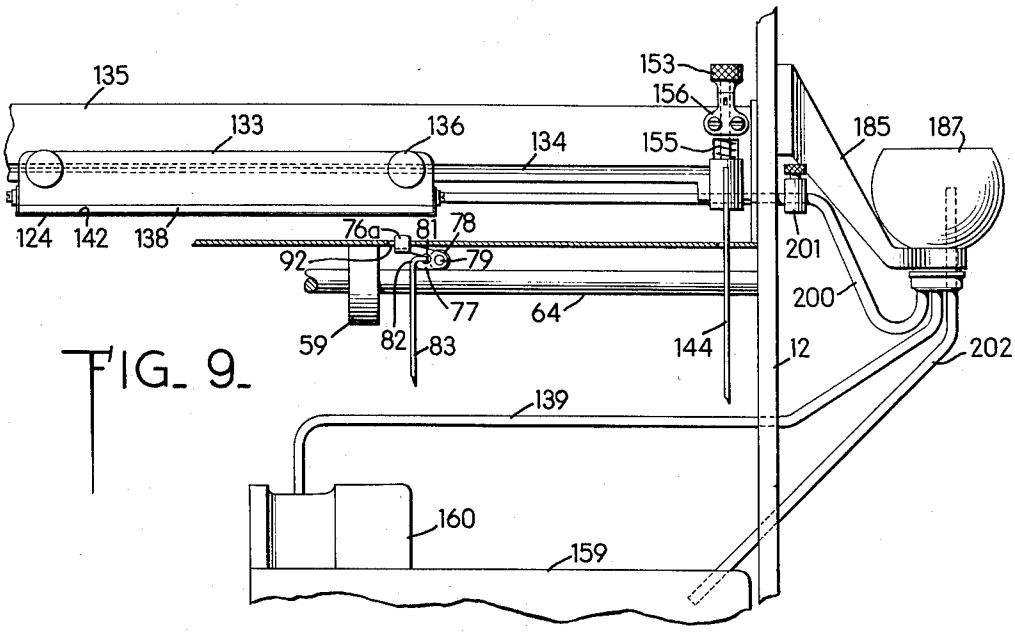


FIG. 9.

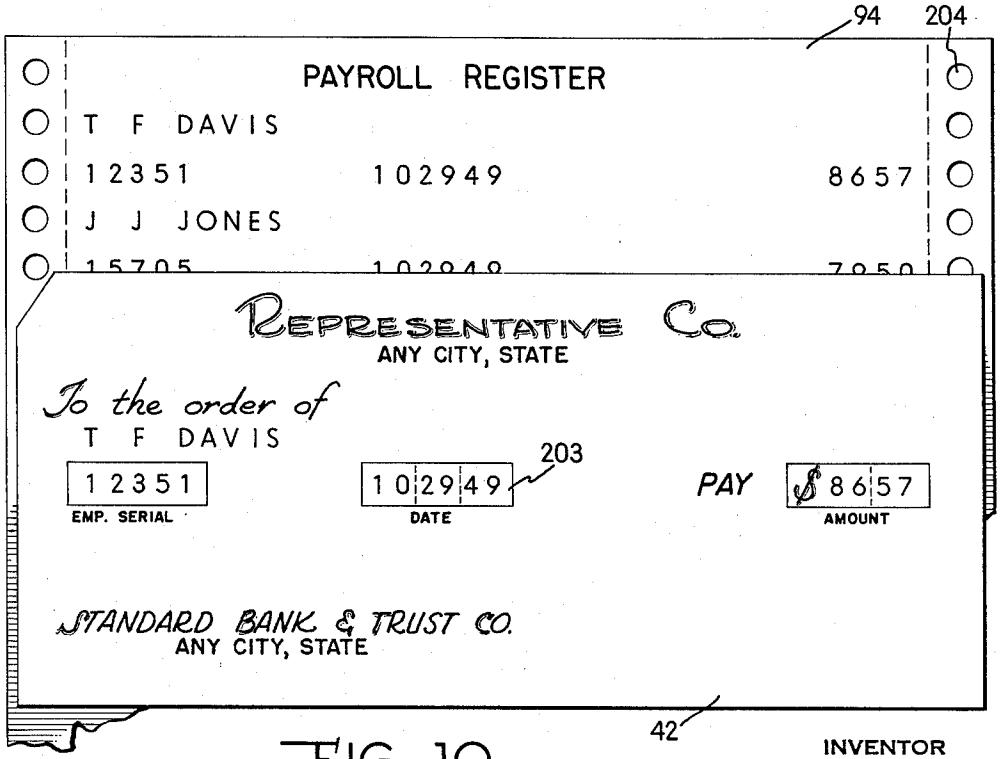


FIG. 10.

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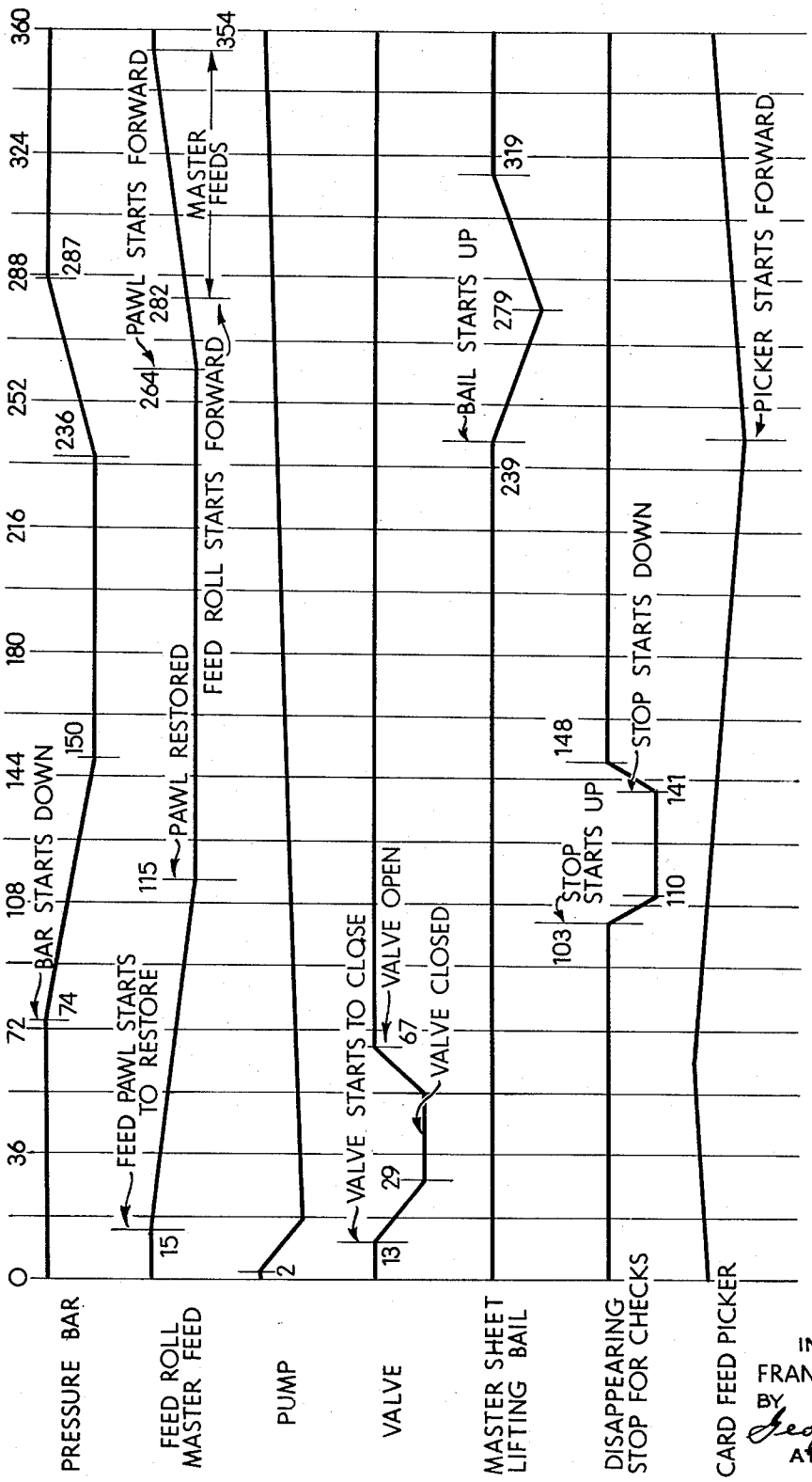


FIG. 11.

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United States Patent Office

2,737,884

Patented Mar. 13, 1956

2,737,884

TRANSFER POSTING MACHINE

Frank J. Furman, Endicott, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application December 29, 1950, Serial No. 203,318

3 Claims. (Cl. 101—134.5)

This invention relates to a transfer machine and more particularly to a machine for posting ledger sheets by the process of preparing a negative record on the back of the original record, moistening the front of the original with a suitable solvent, and pressing the back of the original against the face of the ledger sheet.

This invention pertains to several improvements which are applied to the well-known printing transferring machine described in United States Patent No. 2,282,737 which issued on May 12, 1942, to Albert W. Mills. The machine described in said Patent 2,282,737 is used by many industrial and business concerns to perform operations that necessitate the transferring of data from one record source to another record source, such as, compiling inventory records or making out payroll checks from a register sheet. Operations such as these tend to become quite voluminous and hence the speed with which the machine will perform the posting operations is of vital concern.

The amount of work which can be done by the posting machines in present use is limited due to the fact that it is necessary to manually insert and withdraw the ledger sheets, upon which the posting is done, before and after each posting operation.

Accordingly it is a particular object of this invention to provide improved feeding means whereby data may be transferred from master sheets to documents automatically and continuously, thereby eliminating the necessity of manually inserting and withdrawing the ledger sheets.

In the earlier transfer machine the posting fluid is fed to the master sheet by means of a movable ribbon and evaporation of posting fluid from the ribbon into the air may sometimes occur to an undesirable extent.

Accordingly, a further object of this invention is to provide means for transmitting posting fluid to the master sheet with little evaporation, and which limits the amount of fluid released to approximately the amount necessary for satisfactory postings.

A still further object of the invention is to provide a novel moistening device for applying posting fluid to the master sheet at a uniform rate of flow.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a front sectional view of the machine showing the preferred embodiment of the fluid feeding arrangement and control means therefore.

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional elevation taken on line 3—3 of Fig. 1.

Fig. 4 is a side elevation taken on line 4—4 of Fig. 1.

Fig. 5 is a detail view taken on line 5—5 of Fig. 1 showing the pump and pump cam.

Fig. 6 is a detail view of the clutch and motor bar mechanism.

Fig. 7 is a view of the control valve operating mechanism.

Fig. 8 is a detail view of the control valve.

Fig. 9 is a partial front view of the machine showing the second embodiment of the fluid feeding arrangement and control means therefore.

Fig. 10 is a view showing a part of the register or master sheet and one of the ledger cards.

Fig. 11 is a timing chart.

A preferred embodiment of the invention shown in the drawing is capable of posting multiple lines of information to tabulating card size documents automatically and continuously with great rapidity. The method of posting is similar to that of the transfer machine disclosed in the previously mentioned United States Patent No. 2,282,737. The master sheet is printed in a conventional manner on a tabulator, typewriter or other appropriate medium and is backed with suitable carbon paper while being printed. This master sheet in the form of a fanfold or continuous roll is inserted into the machine and automatically fed directly above the document that is to receive the posting.

The transfer is accomplished by means of moisture, pressure, and time from the master sheet to the document. One difference between the machine about to be described and the machine disclosed in the above mentioned patent is in the method of supplying and controlling the fluid used to accomplish the posting. In the old method, the fluid is carried from a receptable by means of a fabric ribbon which carries a sufficient amount of fluid to complete one posting. In the present invention the necessary fluid is fed directly into a hollow pressure bar in a controlled amount and passes through a porous block at the bottom of the pressure bar. A fabric ribbon is stretched across the face of this porous block to diffuse the fluid and distribute it uniformly over the posting area. The fluid dissolves a portion of the carbon from the original and deposits it on the ledger sheet.

The machine includes a support plate **10** (Fig. 1) fastened between the side frames **11** and **12** by means of the bolts **13**. Upon this plate is mounted a motor **14** which is provided to drive the several mechanisms of the machine.

The motor **14**, through a pulley and belt connection **15** and a gear box **16** supported on the plate **10** operates a short shaft **17**, supported in bracket **18** and secured to plate **10**. A clutch disc **19** (see also Fig. 6) fast on the shaft **17** is provided with notches **20** about its periphery, with which notches a clutch pawl **21** pivotally carried by a clutch arm **22** fast on a cam shaft **23** cooperates. The cam shaft is supported in bracket **24**, secured to plate **10**, and in side frame **12**, the shafts **17** and **23** being in axial alignment.

The arm **22** (Fig. 6) and shaft **23** are normally held against rotation by an arm **25** fast on a stud **26** supported by the bracket **18** (see Fig. 1). The arm **25** has a shoulder **27** which normally lies in the path of the arm **22** and of a tail of the pawl **21**, thus holding the pawl **21** out of engagement with the disc **19**. The arm **25** is fastened to a link **28** by a stud **29**, the right-hand end of said link **28** being supported by a spring **30** attached to a stud **31** fast on a bar **32** which is secured between the side frames **11** and **12**. The other end of the link **28** is connected to an arm **33** fast on a shaft **34** journalled in the side frames **11** and **12**. Also fast on the shaft **34** is a release bar **35**, located near the end of the shaft and being arranged to lie conveniently on one side of the machine (see Fig. 1).

A similar bar **36** is pivotally mounted on a stud **37** fastened to the side of bar **35** and is further supported

by a spring 38. As will be presently described, the bar 36 is used when it is desired to have the machine operate continuously whereas the bar 35 is used to initiate a single posting operation such as would be used for a trial and error run to ascertain if the machine was posting satisfactorily.

In order to initiate an operation of the machine, the operator depresses the bar 36, which movement rocks the shaft 34 and arm 33 counterclockwise thrusting the link 28 toward the right. At this moment, the arm 25 will be rocked clockwise, thereby removing the shoulder 27 from engagement with the arm 22 and the tail of the pawl 21. The pawl, thus freed, is engaged with one of the notches 20 by a spring 39 and thus revolves with the continuously running disc 19. The hook shaped bottom portion of the bar 36 will latch with a stud 40 fastened to the side frame 11 (see Fig. 1) to prevent the mechanism from restoring when the operator releases bar 36.

To disengage the pawl 21 the operator merely has to depress the release bar 35 and the spring 38 will rock the bar 36 clockwise causing the hook shaped bottom portion to unlatch from stud 40. As the operator lets go of the bar, a spring 41 will restore the bar to its normal position at the same time moving the link 28 toward the left and pivoting the arm 25 counterclockwise. The shoulder 27 reengages and rocks the pawl 21 out of engagement with the disc 19 and stops the arm 22 and shaft 23.

By depressing the bar 35 and then quickly releasing it, it is possible to initiate a single posting operation. The pawl will engage the disc 19 as previously described and the shaft 23 will start to rotate. As soon as the bar is released by the operator, the spring 41 will restore the mechanism as before and the pawl will disengage at the completion of one revolution. Of course, it is also possible to run the machine for any desired length of time by merely holding the bar 35 depressed. The latching arrangement on bar 36 conveniently allows the operator to leave the machine during a posting run if necessary

Ledger sheet feed

The document cards indicated at 42 (Figs. 3 and 10), onto which the transfer is to be made, are placed in a magazine 43 comprising two end plates 44 and two posts 45. This type of card magazine is well-known in the art of feeding cards and need not be described in detail. The bottom card of the stack is engaged at its rear edge by picker blades 46 attached to the ends of slideably guided arms 47 having a pin and slot connection with levers 48 fixed to a shaft 49 journalled in the machine frame.

Also fixed to shaft 49 is an arm 50 which is connected to a link 51 by means of a stud 52. The link 51 is attached to a stud 53 fast on a gear 54 (Figs. 1, 3 and 4) mounted on a short shaft 55 journalled in the side frame 12 (Fig. 1).

When either bar 35 or 36 is depressed by the operator, the cam shaft 23 will be continuously driven by virtue of the clutch arrangement previously described. A gear 56 fast on shaft 23 drives an idler gear 57 fast on a short shaft 58 journalled in the side frame 12 (Figs. 1 and 4). The idler gear 57 drives the gear 54 imparting a reciprocating motion to the picker blades 46 through the links 48, 50, and 51. During the forward stroke of the picker blades, the bottom card will be advanced out of the magazine. Any convenient feeding mechanism equivalent to that described may be employed provided it feeds a card out of the magazine as a previously fed card is being released from the posting station.

The card is conveyed from the magazine to the posting station and on out to the stacker drum 58*a* (Fig. 3) by means of the feed rollers 59. The drive for the feed rollers 59 is taken from a gear 60 (Fig. 4) and is transmitted by means of the gears 61 fast on the short shafts 62 journalled in the frame of the machine, said gears 61 meshing with gears 63 mounted on the feed roll shafts 64 as shown in Fig. 4.

Spring blade members 65 and 66, pivotally mounted on the studs 67 and 68, respectively, are biased by the springs 69 to press the cards against the feed rollers 59 with sufficient force to insure feeding.

The previously mentioned gear 60 (Fig. 4), from which the drive for the feed rollers is taken, is mounted on a shaft 70 and is driven by the idler gear 57. Also mounted on shaft 70 is a smaller gear 71 which drives a large gear 72 and the stacker drum 58*a* mounted on a shaft 73. The construction and operation of the stacker drum itself is well-known in the art and is fully disclosed in United States Patent 1,976,617 issued to Mr. C. D. Lake and Mr. G. F. Daly on October 9, 1934. As the cards approach the stacker drum, they are gripped by the fingers 74 (Fig. 3) on the drum and deposited in the card stacker 75.

In order to position the document card accurately in relation to the posting station, indicated at 76 in Fig. 3, so that an imprint may be made at a desired location, there is provided a disappearing stop arrangement which is adjustable to allow for posting at any desired height on the card.

The mechanism comprises a pair of stop fingers 76*a* each of which is a projection of a pair of operating arms 77 mounted on bushings 78 (Figs. 1 and 9). The bushings 78 are internally threaded and each receives an adjusting rod 79 the extreme ends of which are not threaded but are rotatably mounted in the stationary brackets 80 (Fig. 3) attached to the machine.

The operating arms 77 each have a slot 81 adapted to receive the top edge 82 of the T-shaped links 83. The links 83 are connected, by means of studs 84 (Fig. 3), to a bail comprising the two arms 85 joined by a cross member 86. One of the arms 85 is pivotally mounted on an auxiliary shaft 87, journalled in the bracket 24 and the side frame 12, and has fixed to it a cam follower 88 which is urged to ride on the periphery of a cam 89 by the spring 90 (Fig. 3). The cam 89 is fast on the cam shaft 23 and has a notched portion 91.

When the cam follower 88 is on the high portion of the cam 89, the T-shaped links 83 will be in their downward position and the stop fingers 76*a* will be beneath the surface of the card bed to allow cards to feed by, as shown in Fig. 3. When the cam follower 88 enters the notched portion 91 of the cam, the bail will pivot in a clockwise direction and the links 83 will be forced upward causing the arms 77 to pivot in a clockwise direction and the stop fingers 76*a* to project up through the opening 92 in the card bed into the path of the card as shown in Fig. 1. Referring to Fig. 11, the cam 89 is timed with respect to the card feed so that the stop fingers 76*a* will be up in a position to stop the card when the card reaches the posting station and will drop out of position as the pressure bar commences to bear on the card. As the pressure bar starts its upward travel after the posting operation, the feed rollers 59 will feed the card to the stacker drum 58*a*.

The position of the stop fingers 76*a* may be adjusted to position the card accurately in relation to the posting station or to change the printing to any desired height on the card merely by turning the knurled knob 93 (Fig. 3) thereby rotating the rod 79. The top edge 82 of the link 83 will prevent the stop finger from rotating with the rod and as a result the stop finger will move horizontally along the rod to a desired location.

Original sheet feed

The original from which a transfer is to be made indicated at 94 (Figs. 3 and 10) is of the continuous perforated edge type and is placed in a magazine 95 (Fig. 3) whence it passes over a shield 96, around another shield 97, underneath a bar 98 and feed roll 99, around two pin wheels 100 and into a stacker box 101. The shield 96

has attached therewith two brackets **102** which are adapted to clamp on the studs **103** secured to the frame of the machine. The shield **97** is secured to the frame of the machine by means of a bolt as at **104**. The guide bar **98** extends across the machine and is secured in the side frames.

The drive mechanism for feeding the original sheet is substantially the same as disclosed in the previously mentioned Patent 2,282,737 and will be but briefly described.

The feed roll **99** is mounted on a shaft **104***a* journalled in the side frames of the machine. Secured to one end of the shaft **104***a* is a ratchet wheel **105** (Fig. 4) with which cooperates a spring pressed feed pawl **106** carried on an arm **107** free on the shaft **104***a*. A link **108** connects the arm **107** to an arm **109** pivotally supported on the frame **11**. An antifriction roller **110** normally rests on the flattened end of an arm **111** secured to a shaft **112** journalled in the side frames of the machine.

Referring to Figs. 1 and 3, the shaft **112** rocks first clockwise and then back to a normal position under the influence of the cams **113** (also indicated at **94** in Fig. 13 of said Patent 2,282,737) mounted on the cam shaft **23**. An arm **114** fast on the shaft **112** is connected by a link **115** to a bell crank **116** which cooperates with the cams **113**. When the arm **111**, also secured to the shaft **112**, rocks clockwise from beneath the roller **110**, a spring **117** draws the arm **109** and link **108** downwardly rocking the arm **107** clockwise to retract the pawl **106**. After a transfer has been made, the cams **113** cause the arm **111** to rock counterclockwise to normal position, at which movement an inclined or cam surface **118** of the arm **111** moves the link **108** upwardly rocking the arm **107** counterclockwise causing the pawl **106** to engage the ratchet wheel **105** to feed the original sheet one line space. A spring pressed retainer **119** (Fig. 4) serves to hold the roll **99** and the original sheet in alignment.

A gear **120** integral with the feed roll **99** on the shaft **104***a* meshes with a train of gears **121** which drive the gear **122** fast on the shaft **123** causing the pin wheels **100** to advance the original sheet. It is to be understood that the above described mechanism is not limited to spacing the original sheet one line space for each document card, but may space the original sheet several spaces for posting several lines of information on each document card.

It is important that the ribbon **124** (Figs. 1, 2, and 3), the original sheet **94** and the ledger sheets **42** be separated immediately after each posting and before the feed rollers **59** carry the ledger sheets away from the posting station. The reason for this is that it is desired to produce a clean copy without smudges or smears which would occur if the original sheet **94** touched the ledger sheet **42** during movement of either.

To accomplish this, there is provided a bail **125** (Fig. 3) positioned beneath the original sheet **94** and secured to a bracket **126** fast on a shaft **127** journalled in the side frames of the machine (Fig. 4). A link **128** connects an arm **129**, secured to one end of said shaft **127**, with a bell crank **130** loosely mounted on the shaft **87** (Figs. 1 and 4). The bell crank **130** has attached a roller **131** which cooperates with a cam **132** mounted on the cam shaft **23**. When the high portion of the cam **132** strikes the roller **131**, the bell crank **130** will pivot clockwise and the link **128** will move upwardly to cause the shaft to rotate counterclockwise. Thus, the bail **125** will separate the original sheet **94** from the document sheet **42** just before the document sheet is fed away from the posting station. When roller **131** leaves the high portion of the cam, the bail **125** will be restored to its normal position.

Moistening device

It is extremely desirable, when posting from an original sheet to a ledger sheet, that the amount of fluid applied to the original sheet be neither smaller nor in excess of that amount necessary to provide a satisfactory transfer. In addition, it is a distinct advantage to have a continuous uniform flow of fluid to the moisture applicator so that the applicator will always contain the necessary amount of moisture required for automatic posting operations.

It can be readily understood that if too little or too much fluid is delivered to the original sheet or if the fluid is delivered spasmodically the resulting postings will be of varying line quality and will make a messy and oftentimes illegible ledger sheet.

In order to apply a satisfactory amount of fluid to the original sheet at a uniform and continuous rate of flow, there is provided a moistening device which comprises a fluid applicator consisting of a U-shaped block **133** (Figs. 1 and 2) adjustably mounted to a pressure bar **135** by means of a groove **134** in the pressure bar and a pair of set screws extending through said block and into said groove. The bottom face of block **133** has a hollow chamber **137** which is sealed over by a porous metal block **138** attached to said block **133**. The posting fluid is introduced into the chamber **137** through tubing **139** and adapter **140** (Fig. 2), said adapter **140** having a passageway **141** connecting the tubing **139** with the chamber **137**.

The porous block **138** is formed of powdered metal and this powdered metal allows the fluid in the chamber **137** to spread and diffuse evenly through the porous block and over its bottom surface **142**. To prevent the posting fluid from collecting in small drops on the bottom surface **142**, there is provided the fabric ribbon **124** which fastens over and adjacent to said surface **142** and allows the fluid to spread more evenly over the posting area on the original sheet.

The manner in which the fluid inside the chamber **137** is controlled to maintain a uniform flow through the porous block will be later described in connection with the fluid feeding arrangement.

It is to be noted that by virtue of the construction of the above described moistening device, the amount of fluid that is exposed to the air is limited to only that fluid applied to the posting area on the original sheet and hence the evaporation of this fluid is greatly reduced. As a result very little, if any, posting fluid is wasted and the escape of any undesirable fumes into the air is reduced to an unnoticeable state.

By loosening the set screws **136**, the applicator may be moved horizontally along the pressure bar **135** to a different location if desired.

Pressure bar

The pressure bar **135** is slideable vertically in grooves **143** in the side frames **11** and **12** (Figs. 1 and 3) and is operated by a pair of links **144**, one being pivotally connected to the bar **135** near each end. The links **144** are connected at their lower ends to arms **145** fast on a shaft **146** (Fig. 1), one of said arms being disposed near each end of said shaft. An arm **147** (Fig. 3) is connected by a link **148** to one arm of a bell crank **149** pivoted on the shaft **87**. A pair of cams **150** on the shaft **23** cooperates with antifriction rollers on the bell crank **149** to rock it first clockwise and then counterclockwise to normal. The clockwise movement of the follower through the link **148**, arms **145** and links **144** lowers the pressure bar **135** against a platen **151** and support member **152** to cause the transfer and the counterclockwise movement of said bell crank **149**, through the same linkage, raises the pressure bar to normal position.

Referring to Fig. 1, there are provided two pressure adjusting knobs **153** above the pressure bar **135** which serve to adjust and equalize the pressure applied. These knobs are threaded to shouldered pins **154** whose lower ends are pivoted to the actuating arms **144**. Thus the pins **154** make an excursion with arms **144** of invariable extent. By turning the knobs **153**, pins **154** and the pressure

bar 135 are relatively shifted, springs 155 serving to urge them apart. Thus, when thick ledger sheets are to be used, the bar is adjusted upwardly and when thinner ledger sheets are used the bar is adjusted downwardly. The knobs are tensioned by spring blade members 156 which have a projection 157 that meshes with the knurled teeth 158 on the knobs.

Fluid feeding system

There are two proposed systems for controlling the flow of fluid to the porous block 138 both of which employ the same pump and pump actuating means as shown in Fig. 5.

A reservoir 159 for the posting fluid is located on the base and toward the front of the machine. Inside the reservoir is a cam loaded, spring actuated plunger type pump 160 comprising a cylinder 161 attached to a bracket 162 which is an integral part of a pump flange 163. The cylinder contains a piston 164 and a piston rod or plunger 165 having a notched portion 166 adapted to receive one end of an arm 167 fast on a shaft 168 journalled in two bosses 169 of the reservoir. The plunger 165 is spring loaded by means of a spring 170 compressed between the top portion of the bracket 162 and a ring 171 set-screwed to the plunger rod 165, said plunger rod being mounted in a bushing 172 in the bottom portion of bracket 162.

One end of the shaft 168 extends through the side wall of the pump housing 173 and has rigidly mounted thereon an arm 174 which is connected to a reciprocating link 175 by a stud 176. The reciprocating link 175 is connected to a cam follower arm 177 pivotally mounted on the shaft 87. The spring 170 exerts a continuous force on the ring 171 tending to push the plunger rod 165 downward thereby exerting a force on arm 167 and consequently the shaft 168 in a clockwise direction. As a result the arm 174 is urged clockwise and the link 175 is urged to the left to forcibly maintain the cam follower arm 177 to ride on the periphery of a cam 178 mounted on the main cam shaft 23 of the machine.

By virtue of this arrangement when the cam follower 177 is on the high point of the cam 178 the piston 164 will be at the top of its upstroke as shown in Fig. 5 and the posting fluid will enter the cylinder 161 through a filter 179. When the came follower clears the high point of the cam, the resulting downstroke of the piston 164 will force fluid out of the cylinder 161 through a check valve 180, tubing 181, a by-pass valve 182 and out through the tubing 139 to be distributed to the machine.

The first arrangement provided to properly distribute the posting fluid from the pump to the porous block 138 is shown in Fig. 1 and comprises the previously mentioned tubing 139 which serves as a fluid carrying connection between the pump and the chamber 137. A second tube 183 provides a connection between the chamber 137 and a cut-off valve 184 (Figs. 1, 7, and 8) attached to a bracket 185 fixed to the machine. A third tube 186 connects said valve 184 with a constant level priming reservoir 187 which has an overflow tube 188 leading back to the pump reservoir.

Referring to Fig. 8, the cut-off valve 184 is composed of a metallic cylinder 189 having a hollow chamber 190. A port opening at 191 is adapted to receive one end of the tube 183 to direct fluid from the porous block into said hollow chamber 190 and another port opening 192 at the bottom of the chamber is adapted to receive one end of the tube 186 to direct fluid from the valve to the priming reservoir 187. A rubber diaphragm 193 is fixed in the valve 184 and extends through the middle of the chamber 190.

The rubber diaphragm 193 is operated by the blunt end of an arm 194 (Fig. 7) fixed to a sleeve 195 rotatably mounted on a stud 196 fixed to the side frame 12. Also fixed to the sleeve 195 is an arm 196*a* having a roller 197 attached which is urged to ride on the periphery of a cam 198 by spring 199. The cam 198 is fixed on the short shaft 58 journalled in the side frame 12 and is driven by the gear 57 fast on the shaft 58 which meshes with the gear 56 fast on the main cam shaft 23.

In the position shown in Fig. 7, the roller 197 is on the low portion of the cam and the diaphragm 193 is in its normal position (Fig. 8) leaving the valve open to allow fluid to pass from the chamber 137 through the tube 183, through the valve and tube 186 into the priming reservoir 187. When the roller rides onto the high portion of the cam, the rubber diaphragm 193 will close the port opening at 191 to prevent fluid from flowing out of the chamber 137 back through said valve. As a result there will be a build up of pressure within the chamber 137 which will force the posting fluid to feed down through the porous block 138 and through its lower surface 142.

Referring to the timing chart shown in Fig. 11, the pump 160 will force fluid through the tubing 139 to the chamber 137 from 2° to 18° of every machine cycle. During the first 11° of the pumping cycle the cut-off valve 184 will be open in order to allow fluid to flow from the chamber 137 into the priming reservoir 187. The valve 184 starts to close at 13° and will be fully closed at 29° to allow the preessure in chamber 137 to increase sufficiently to force the fluid through the porous block 138 for posting. At 54° in the cycle the valve will start to open to allow the priming reservoir to be filled to the proper level for the purpose of supplying fluid to the porous block during those portions of each cycle when the pump 160 is idle and no fluid is being pumped to the chamber 137. Thus, the priming reservoir aids in keeping the porous block moist at all times and this is important when posting continuously and automatically. The valve 184 will be fully opened at 67° in the cycle and will remain open until 13° of the next cycle.

The fluid pump stroke is adjusted so that sufficient fluid arrives at the priming reservoir to keep the fluid level built up to the level of the return outlet 188 to the main reservoir 159 during actual posting operations. The excess fluid in the priming reservoir, if any, will be returned to the main reservoir through said outlet tube 188.

The height at which the fluid level in the priming reservoir is set, which is a slight distance higher than the lower surface of the porous block, is dependent upon the porosity of the powdered metal. If too much difference in height exists, the posting fluid will flow excessively through the block. Consequently, the height of the outlet tube 188 in the priming reservoir is adjusted so that the porous block 138 is kept moist enough to give good posting results without an excess or splashing of fluid in the chamber.

The second arrangement for distributing the fluid to the porous block is shown in Fig. 9. The main reservoir and pump are the same as in the system just described, but the tubing is arranged differently. In this arrangement, the outlet tube 139 from the main reservoir is connected to the priming reservoir 187 attached to the bracket 185. A second tube 200 connected to the bottom of said priming reservoir extends through a needle valve 201 and into the chamber 137. A return tube 202 connects the priming reservoir 187 with the main reservoir 159.

In this arrangement it is necessary to manually prime the porous block before the start of a posting run. This is done by closing the return tube 202 to the main reservoir by a valve or other suitable means and then operating the pump manually a sufficient number of times to bring the required amount of fluid into the porous block.

After this is done, the machine can be operated automatically as in the other arrangement. On a pumping cycle the fluid will be forced through the tube 139 into the priming reservoir to maintain a head of fluid there-

in equal to the height that the return tube extends up into said priming reservoir. It was then found that due to a combination of capillary action at the posting surface **142** and siphoning in the tubing **200**, a suction condition exists so that the fluid is fed from the priming reservoir through the tube **200** and the needle valve **201** into the porous block **138** even when the level of the fluid in the priming reservoir falls a considerable distance below the level of the moistening block posting surface. The needle valve **201** is adjusted in the usual manner to control the fluid flow as desired.

There is shown in Fig. 10 a sample original or master sheet form **94** and document card **42** as they would appear in a simple payroll application where the master sheet contains the employee's name, serial number, date, and net earnings for a plurality of employees. The ledger or copy sheet in this case is a tabulating card in the form of a check provided with blank spaces **203** adapted to receive said serial number, date, and net earnings. A space is also provided directly above the serial number for the employee's name, there being one document card for each employee listed on said original sheet.

To briefly sum up the operation of the machine with respect to the above described forms, the register or original sheet **94** usually of the continuous perforated type is placed in the magazine **95** and is inserted into the machine as previously described with the perforated holes **204** (Fig. 10) placed on the pins of the two pin wheels **100** (Fig. 3), and the document cards **42** are placed in the magazine **43** (Fig. 3).

Assuming that this is to be a continuous posting operation, since there would be a plurality of checks to be made out, the operator presses the bar **36** (Fig. 6) clutching in the main cam shaft **23** allowing said shaft to be continuously driven from the motor **14**.

Referring to the timing chart (Fig. 11), at 2° of the first machine cycle the pump **160** will start a downstroke to force posting fluid into the chamber **137** and also to put a supply of fluid into the priming reservoir **187** through the control valve **184** which is open at this time in the cycle. The valve **184** starts to close at 13° just prior to the completion of the pump downstroke which is at 18° and will be fully closed at 29° to cause a build-up of pressure to take place within the chamber **137** which will force the posting fluid down through the pores of the porous block **138** and out through the bottom surface **142**. The valve **184** will be fully open at 67° and will remain open for the remainder of the cycle.

Thus, the first portion of the cycle is devoted to conditioning the porous block and the priming reservoir for posting operations that follow later in the cycle. It will be noted that the pressure bar **135** and the disappearing stops **76***a* also operate during the first portion of the cycle and their operation in the first machine cycle is only incidental since the original sheet and document sheet have not as yet been advanced.

At 239° the master sheet lifting bail **125** (Figs. 1 and 3) starts moving upward to lift the master or original sheet **94** up and away from the posting surface and reaches its upward limit of travel at 279°. Meanwhile at 243° the picker knives **46** start forward to start feeding a document card **42** and at 264° the feed pawl **106** starts forward to engage the ratchet wheel **105** (Fig. 4) and the original sheet **94** will start to feed at 282° at which time the lifting bail **125** is moving downward. The original sheet **94** is in posting positing at 354° and the original sheet feed stops. The document card **42** will feed until it engages the disappearing stop fingers **76***a* (Figs. 1 and 3) at approximately 110° of the second machine cycle at which time said card **42** will be positioned underneath the line or lines on the original sheet **94** that are to be transferred.

The disappearing stop fingers **76***a* start moving down at 141° and at 148° are out of the path of the document card and the pressure bar which started moving downward

at 74° reaches the bottom of its travel at 150° at which time it presses the original sheet and ribbon **124** against the document card to effect a transfer. The employee's name, serial number, date, and net earnings on the original sheet will be posted on the document card as shown in Fig. 10.

At 236° the pressure bar will start moving upwardly to its normal position and the document card will be free to be fed to the stacker drum **58***a* (Fig. 3) by the feed rollers **59**. Simultaneously at 239° the lifting bail **125** will start to move upwardly lifting the original sheet away from the document card to avoid smearing.

At 243° the picker knives will feed in a new document card and at 282° the original sheet will be advanced for the next posting operation.

The above described procedure will be repeated every cycle until all of the postings are made and the cam shaft **23** is de-clutched from the motor shaft by the operator. It is to be understood that in the second embodiment a procedure similar to the one just described will apply after the operator has manually operated the pump to prime the moistening block.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine of the class described for transferring from a continuous web to individual copy sheets, means to support a copy sheet, means to support said continuous web in a position directly above said copy sheet and in alignment with same, a pressure bar slideably supported above said continuous web, means to feed said web stepwise past said pressure bar, means to feed said copy sheets past said pressure bar in sequence in time with the stepwise feeding of said web, a moistening device having a member attached to and extending beneath said pressure bar to form the presser surface, a hollow chamber formed in the bottom surface of said member, a porous block attached to the bottom surface of said member to seal said hollow chamber, a fabric ribbon fixed across the bottom surface of said porous block, a source of posting fluid, cyclically operable means for transferring a supply of posting fluid from said source to said hollow chamber, control means connected to said hollow chamber and operable during operation of said transferring means for allowing pressure to form within said hollow chamber to force fluid therein through said porous block to said ribbon, and cyclically operable means to operate said pressure bar to press said ribbon and web against each copy sheet.

2. A machine as in claim 1 having an auxiliary chamber for storing fluid, said cyclically operable transferring means being effective to transfer a supply of posting fluid from said source to said auxiliary chamber, connections between said hollow chamber, said control means and said auxiliary chamber, said control means operating during a portion of the operation of said cyclically operable transferring means to close the connection between said hollow chamber and said auxiliary chamber to cause said pressure to form within said hollow chamber, and said control means operating during non-operation of said cyclically operable transferring means to open the connection between said hollow chamber and said auxiliary chamber to allow fluid to pass from said auxiliary chamber into said hollow chamber for the purpose of keeping said porous block continuously moist.

3. A machine as in claim 1 having an auxiliary chamber for storing fluid, said cyclically operable transferring means being effective to transfer a supply of posting fluid from said source to said auxiliary chamber, connections

between said hollow chamber, said control means and said auxiliary chamber, said control means operating during a portion of the operation of said cyclically operable transferring means to close the connection between said hollow chamber and said auxiliary chamber to cause said pressure to form within said hollow chamber, and said control means operating during non-operation of said cyclically operable transferring means to open the connection between said hollow chamber and said auxiliary chamber to allow fluid to pass from said auxiliary chamber into said hollow chamber for the purpose of keeping said porous block continuously moist, and adjustable overflow means associated with said auxiliary chamber for controlling the height of posting fluid that may be retained in said auxiliary chamber for the purpose of controlling the amount of fluid that is presented to the porous block.

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