

Feb. 7, 1939.

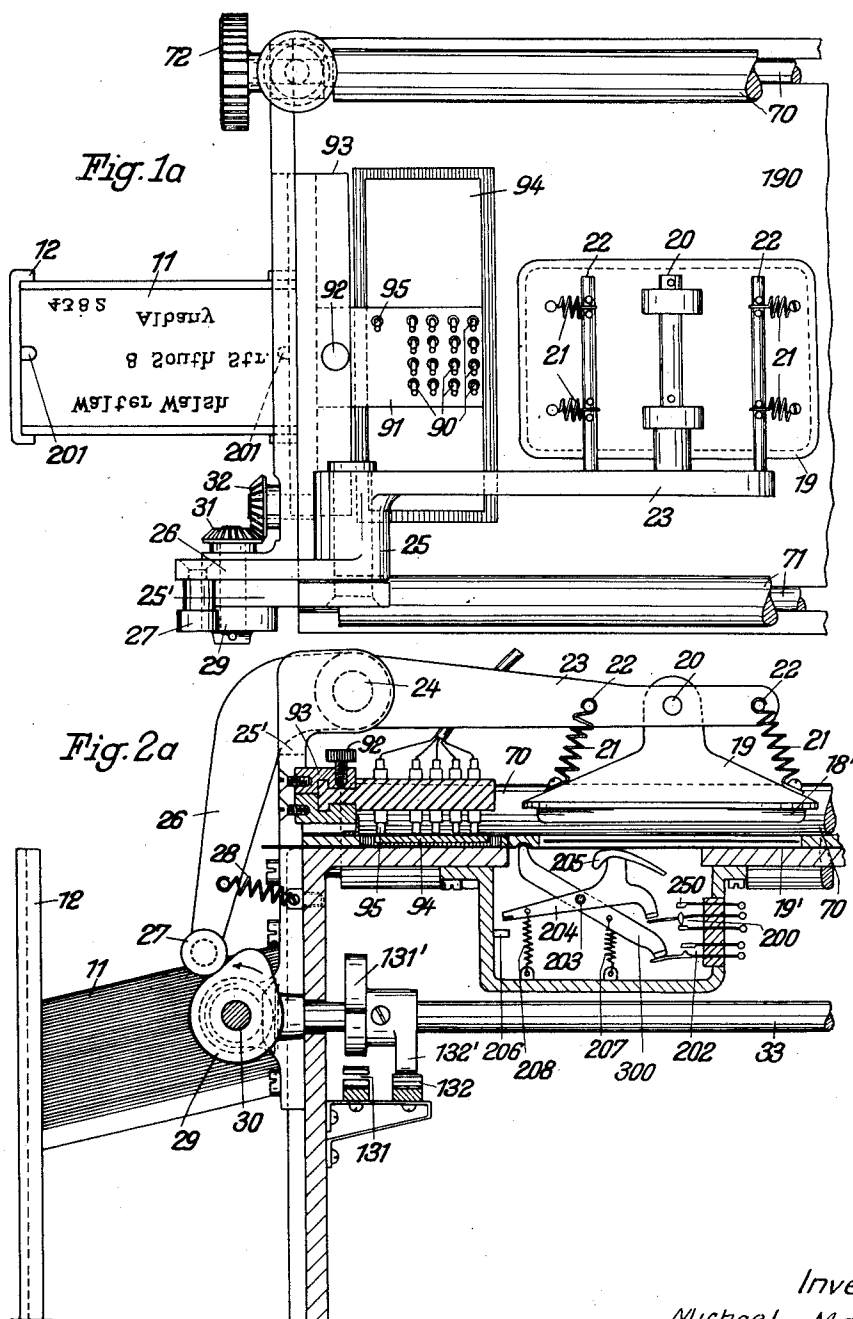
M. MAUL

2,146,307

ADDRESSING MACHINE WITH COUNTER

Filed Aug. 20, 1937

5 Sheets-Sheet 1



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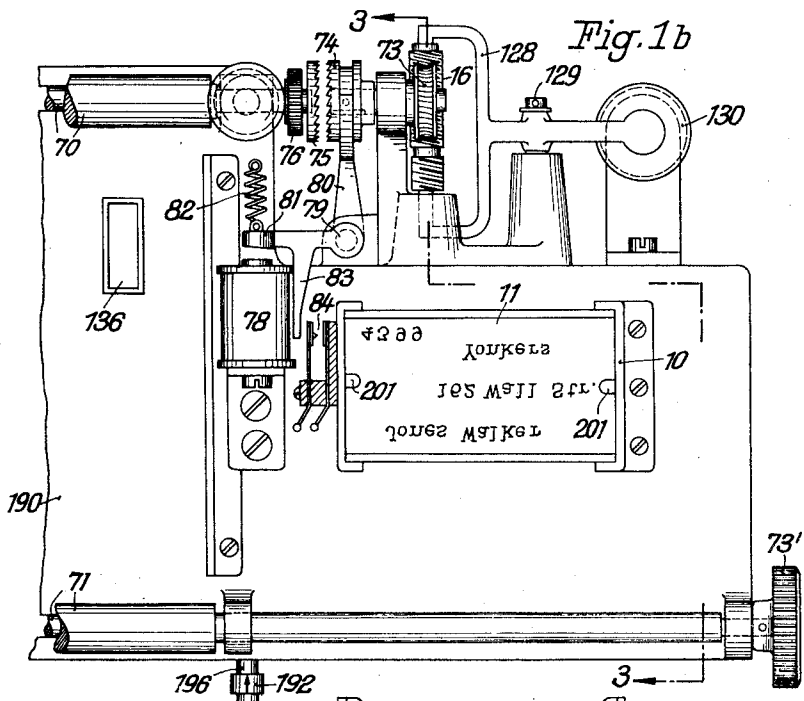
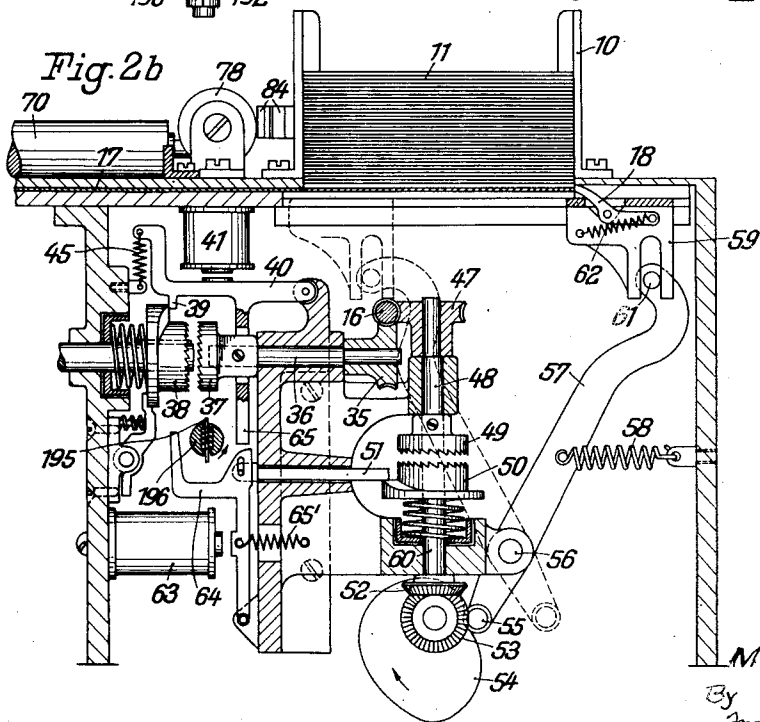
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ADDRESSING MACHINE WITH COUNTER

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5 Sheets-Sheet 2



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ADDRESSING MACHINE WITH COUNTER

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5 Sheets-Sheet 3

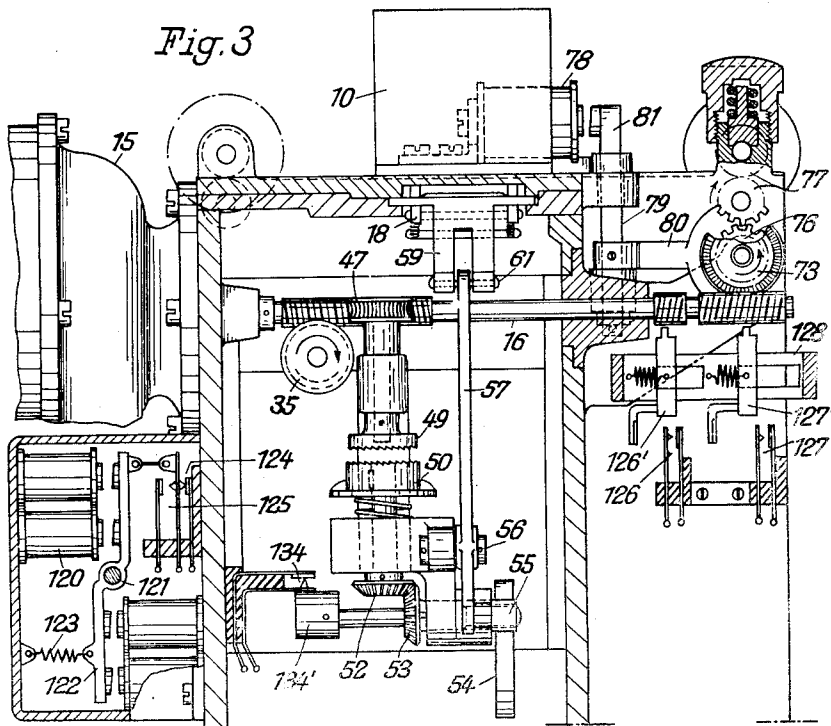
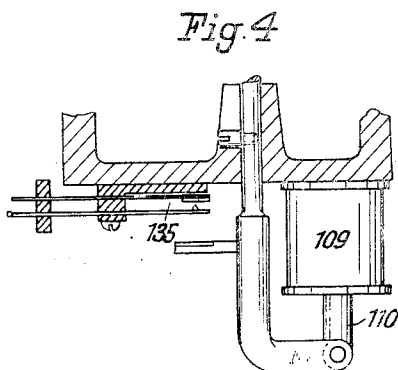


Fig. 5

0	1	2	3	4	5	6	7	8	9	
○	○	○	○	○	○	○	○	○	○	I
○	○	○	○	○	○	○	○	○	○	II
○	○	○	○	○	○	○	○	○	○	III
○	○	○	○	○	○	○	○	○	○	IV

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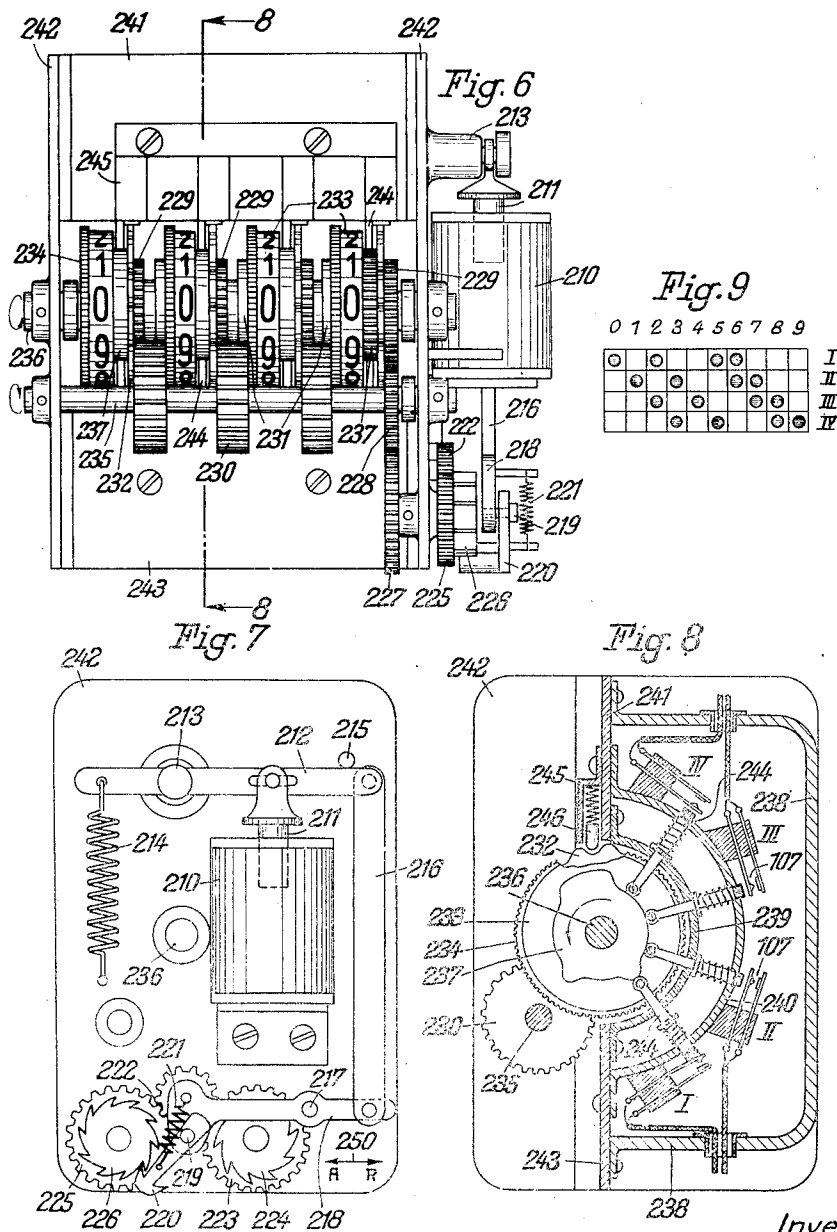
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ADDRESSING MACHINE WITH COUNTER

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5 Sheets-Sheet 4



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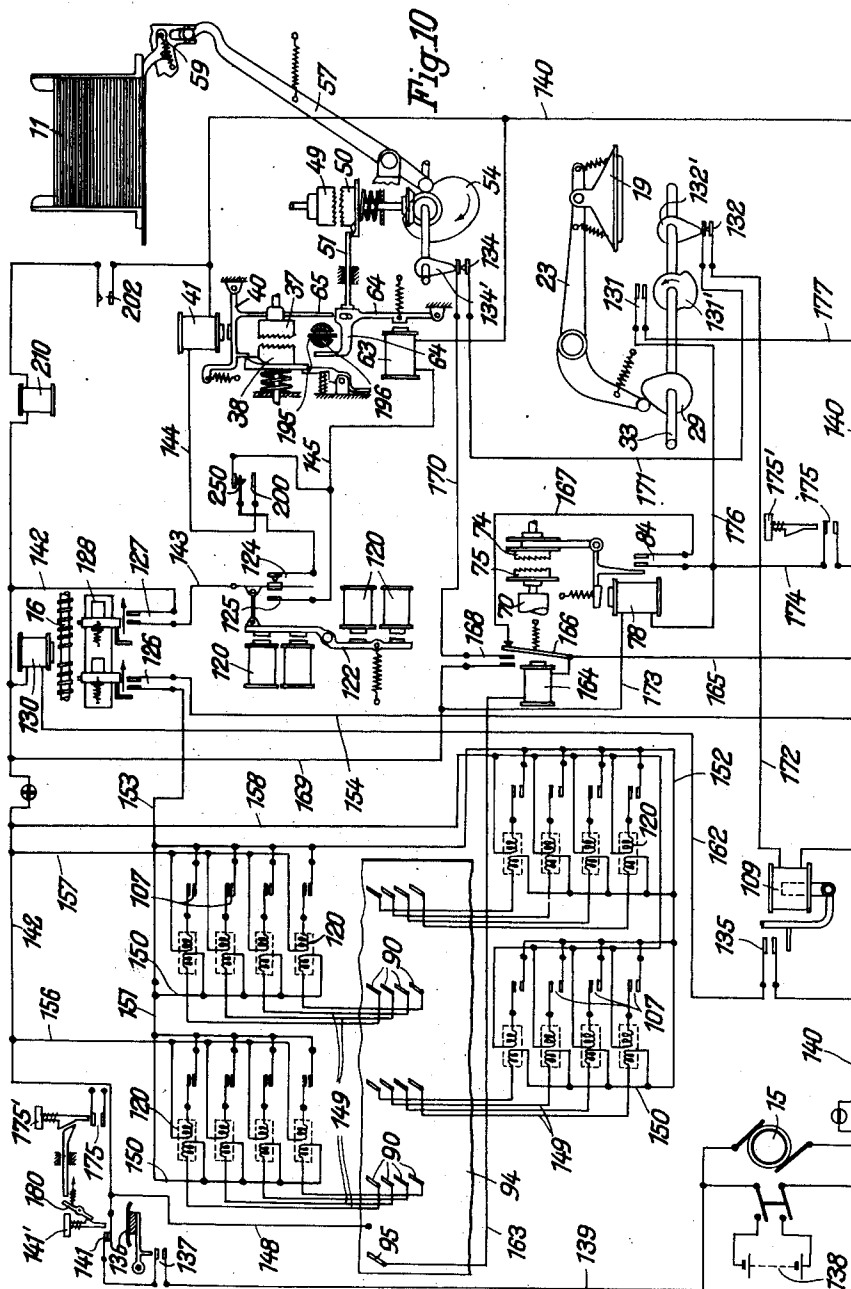
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ADDRESSING MACHINE WITH COUNTER

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,146,307

ADDRESSING MACHINE WITH COUNTER

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13 Claims. (Cl. 101—58)

The present invention relates to a hole controlled transferring mechanism, such as a printing mechanism preferably embodied in an addressing machine by means of which names and addresses may be entered upon records or the like; such machines have already been suggested in connection with the perforated record card system. In these machines printing is effected preferably by means of printing patterns or address plates, however, printing may also be effected by a special type printing mechanism being under the control of perforated record cards. The transfer may, however, also be effected in a known manner by duplication of the perforations in records.

The present invention is particularly adapted for a method wherein all data carriers, such as for instance address plates or perforated record cards are fed through the machine in consecutive sequence one by one and wherein identification perforations of the record lists are compared with identifications associated to the carriers of the data to be transferred such as for instance with identification perforations. Upon agreement of the identification numbers transferring of the data is effected, for instance transferring of the address upon the list while upon disagreement the subsequent data carriers are fed one by one to printing position and the list remains in printing position until transferring is again effected whereupon again the next list and the next data carrier are fed to printing position. These operations will be performed consecutively and automatically so that the lists bearing the identification perforations are provided with the addresses in the proper way. The lists are in numerical order but need not be present with numerically consecutive numbers. This method and machines adapted for carrying out the same are for instance described in my prior U. S. Patents No. 2,002,437, 2,009,021, 2,009,022 and in my British Patent 461,695.

In order to compare the identification perforations of the lists with the data carrier which is for instance provided as an address plate, the data carriers may be provided immediately with the identification indexes such as for instance with identification perforations or tabs or the like as is also illustrated in the machines shown and described in the above named patent letters. Now, according to the present invention identification indexes are also associated to the data carriers, however, the provision of the identification indexes on the data carriers themselves is eliminated so that for instance the ordinary ad-

dress plates without any identification indexes on the plate may be used in the above indicated addressing method.

In order to obtain the aim of the invention the perforations of the list are compared with the identification number of the address plate being in printing position in a mediate way by providing a counter which is shifted for one unit upon each passage of an address plate through printing position so that the positioning of the counter corresponds always to the identification number of the address plate in printing position. The counter on its part controls a suitable set-up mechanism such as for instance a set of contacts which may be compared with the identification perforations of the lists in the same manner as immediate perforations on the address plates. The further operation of the machine is then depending upon the result of the comparison so that in the same manner as is already known a running addressing operation for the consecutive lists is effected

The address carriers are preferably provided with recesses or the like in which passes for instance a finger analyzing the feeding path and which controls the step by step movement of the counter. If an address carrier is advanced the analyzing finger will be moved and will shift thereby the counter so that the identification number of the subsequent address carrier will be set up in the counter.

The counter is preferably adjustable by hand upon a certain number and may further be selectively adjustable for forward or backward shifting. The before mentioned manual set-up is necessary in order to permit addressing beginning with any desired number (of course, the address carriers in the magazine must also begin with this number) and by means of the adjustment to forward or backward shifting the addressing of the lists may be effected in raising or falling sequence.

If upon start of the machine the first address carrier is not at once in printing position as it is usually the case in addressing machines with a feeding path wherein the address plates are moved one by one, due to the existing set-up of the counter representing the number of the first address plate the result of the comparison between counter set-up and list perforations would be positive (i. e. in the meaning of agreement) and the printing mechanism would be actuated though the address plate is not yet in printing position. This would cause the advance of the next list and since then the required relation be-

tween the number of the list and the number of the address plate would be disturbed proper addressing would be impossible, unless one would feed the first list and plate manually into the proper initial position in which case, of course, the machine would continue to operate in the proper way.

With provisions made according to the invention the proper automatic operation is also secured at the beginning of the machine operations in that in each machine cycle exclusively the address plate feed mechanism can be actuated and will advance address plates one by one until the first plate is in printing position. As soon as plates arrive in printing position the feed mechanism for the lists and the plates will again be set under regular conditions by means of a special analyzing arm provided in the address plate feeding path, i. e. the feeding operations will be dependent upon the result of the comparison whereas before only the feed for the address plates could be rendered active.

Since the identification numbers of the lists are preferably provided as hole combinations in order to save paper and to increase the capacity, according to the invention the set-up of the counter in each place is represented through different combinations of set-up elements, such as for instance contacts, set up in accordance with the numerical value to be represented so that the set-up elements of the counter may be immediately compared with the hole combinations. Each counter disk is preferably provided with a cam closing contacts by means of resiliently mounted pins, four contacts being associated to each place of the counter and closed depending upon the position of the counter disk. Shifting of the counter is preferably effected electromechanically under the control of the address plates passing through printing position.

The application of the machine according to the invention is, of course, by no means restricted to addressing machines wherein the data to be transferred are represented on printing patterns. The data carriers may also be provided as perforated record cards the numbers or other data of which shall be transferred upon lists or cards. Finally, the invention may also be modified in such manner that the counter is not shifted in agreement with the lists or cards. This is particularly possible if the relation in the numerical order between lists and data carriers is reverse to the instance mentioned in the introduction, i. e. if the lists follow each other in complete numerical sequence while in the sequence of the data carriers, such as for instance in perforated record cards, interruptions may be present. With the last mentioned application of the invention the counter would render superfluous the identification perforations of the lists or record cards respectively whereas, of course, the identification indexes of the data carriers must be retained.

One embodiment of the invention shall now be explained in connection with the attached drawings; the machine described may be adjusted to two different manners of operation: so that either a plurality of lists with the same numbers may be printed one by one with the same address or that addressing work may be effected with an increased operating speed if each list is only present with one number.

In the drawings:

Figs. 1a and 1b represent a top view of the addressing machine according to the invention.

Figs. 2a and 2b represent a section through the machine shown in Figs. 1a and 1b. Figs. 1a and 1b and Figs. 2a and 2b respectively belong together.

Fig. 3 is a section on line 3—3 of Fig. 1b and shows the driving mechanism of the machine.

Fig. 4 shows a detail.

Fig. 5 shows the key according to which the numerals in the lists to be addressed are represented.

Fig. 6 is a front view of the counter which is shifted in agreement with the feeding operations for the address plates.

Fig. 7 is a side view of the counter illustrated in Fig. 6.

Fig. 8 is a section according to line 8—8 through the counter shown in Fig. 6.

Fig. 9 shows the diagram of the contact set-up of the counter at different positions of the counter disk.

Fig. 10 shows the circuit diagram of the machine.

Address plates and lists

The address plates 11 (Figs. 1a, 1b, 2a, 2b) are fed from the magazine 10 through the machine to the receptacle 12. The plates carry the name and the address of the various addressees and in addition thereto each plate has a special identification number which, of course, is exclusively coordinated to the respective addressee. Each plate is provided on each one of its narrow sides with a recess 201 in such manner that upon passage of the plates through the addressing machine a slot is formed between two adjacent plates in which an analyzing finger still to be described may enter. The respective arrangement is shown more in detail in Fig. 2a. In a casing provided on the lower side of the machine a pin 203 is provided upon which a lever 204 and a double arm lever 300 are pivotally mounted. The lever 300 is drawn by a spring 207 with its upper end into a slot of the feeding path for the address plates while its lower end controls a contact 202. If address plates are in the feeding path and if the same are in their proper position, the upper end of the lever 300 may pass just in the hole formed by the two recesses 201 of two adjacent address plates so that in this position (as it is also shown in Fig. 2a) the blade spring contact 202 is held open by the lower end of the lever 300. However, during a plate feeding cycle the lever is pressed downwardly by the advancing address plate so that during this time the contact 202 will remain closed and only if the row of address plates is advanced for the length of one plate, the upper end of the lever 300 may again engage in the two recesses between two adjacent address plates and the contact 202 will again be opened. Due to this closure of the contact the counter will be shifted for one unit which is thus effected in agreement with the advance movement of an address plate. The lever 204 mounted upon the pin 203 is drawn with its upper rounded portion 205 by means of a spring 208 also against the address plate path and in case there should be no address plate in this path the lever will be drawn far enough upwardly until its lower end will engage the stop 206. If, however, there are address plates in the feeding path the lever 204 will be pressed downwardly independently of the recesses 201 which due to the broad curved back 205 will have no influence on the lever 204; in this position the lever is shown in Fig. 2a. The lever 204 controls a double contact 200, 250 in such man-

ner that the contact 200 will be closed if the lever is in its lower position i. e. if an address plate is in printing position while the contact 200 is closed if there is no plate in printing position and if therefore the lever may be drawn under the control of the spring 208 against the stop 200. The above mentioned contact arrangement serves to render the comparing mechanism only then effective if an address plate is actually in printing position.

The lists to be addressed may be provided in any desired form (as cards, sheets and the like) and are perforated according to the key in Fig. 5 in such manner that in each record column four hole positions are provided within which a numeral may be represented by perforations. In addition thereto the lists are also provided with a standard point hole which is at the level of the lowermost hole position of a hole combination and which serves as a standard point for the meaning of the hole combinations. With the present embodiment of the invention in connection with the counter the lists must be perforated in all decimal places depending upon the number of places of the counter. If therefore for instance a counter having four effective decimal places is provided corresponding to an identification number perforation up to four decimal places upon the lists, also all places upon the lists must be perforated and in case the identification number does not amount to four decimal places the places to the left of the highest place must be punched by zeros; for instance not only 85 but 0085.

Driving mechanism

The machine is driven by the motor 15 (Fig. 3) through the worm 16. The plates 11 are fed by a slide 18 (Figs. 2b, 3) from the right to the left through the machine. The slide 18 is actuated by means of parts 55, 62, 61 by a lever 57 being under the influence of a spring 58; said lever is pivotally mounted at 56 and is rocked about its pivot under the control of a cam disk 54 upon which the roller 55 rides. The cam disk 54 is driven by means of gears 52, 53 and the one-revolution clutch 49, 50 provided upon the shafts 48, 50, said one-revolution clutch being controllable by magnet 63 by means of a pin 51 and lever 64 coacting with a spring 65. The shaft of the disk 54 carries a cam 134' closing in the home position of said disk a contact 134. The shaft 48 is driven by worm 16 through worm gear 47. The one-revolution clutch 37, 38 (Fig. 2b) for the printing mechanism is controlled by means of parts 45, 39, 40 by the magnet 41. The shaft 36 of the clutch member 37 is driven by worm 16 over the worm gear 35. The lever 40 has a downwardly extending member 65 which, as will still be described, is adapted to control the clutch member 64 of the one-revolution clutch 49, 50 for the plate feeding mechanism. In the front and rear wall of the casing is a shaft 196 mounted adapted to be adjusted into any one of two shift positions which are set off to each other by 90°; the shaft is provided with a spring actuated pin 195, engaging in the one shift position of the shaft between the arms 65 and 64. Upon the shaft 196 is fastened on the outside of the machine (Fig. 1b) a handle 192. If the parts are in the position shown in Figs. 1b and 2b the arm 65 will freely move upon energization of the magnet 41 and no influence upon the arm 64 will be effected. The handle 192 must be adjusted in this position if the mechanism shall be adapted

to print the same address upon a number of subsequent lists having the same identification perforations. However, if the machine shall be shifted to another manner of operation wherein each identification perforation occurs only once in the series of record sheets, the lever 192 must be turned for one fourth turn in clockwise direction so that the pin 195 will move between the arms 64 and 65. Accordingly, upon energization of magnet 41, also the one-revolution clutch 49, 50 for the plate feeding mechanism will be released by means of pin 195 which will be moved to the left by arm 65.

The printing cushion 18' is fast on the plate 19 (Figs. 1a, 2a) which is connected by means of parts 20, 21, 22 to the arm 23 which is integral with sleeve 25 and arm 26, the roller 27 of which is riding under the influence of spring 28 upon the cam disk 29; the cam disk can be driven over shaft 30 and bevel gear 31, 32 and shaft 33 by means of the one-revolution clutch 37, 38 to perform one printing cycle. Upon the shaft 33 are fast two cams 131' and 132'; after completion of the printing operation the first cam closes temporarily the contact 131 and the last mentioned cam keeps the contact 132 closed. The sleeve 25 is pivotally mounted upon the shaft 24 which is fastened to the bracket 25'. The address plates are advanced in the channel 17 (see Fig. 2b) and by means of a ribbon 19' (Fig. 2a) they are printed upon the lower side of the record sheet which is fed between the printing cushion 18' and the ribbon 19'.

The record lists are inserted by means of hand wheels 72 and 73' through rollers 70 and 71 (the first ones operating as drive rollers) over the table 190 of the addressing machine thereby closing the contact 137 (Fig. 10) which is under the control of a lever 136. The feed of the lists is effected by means of a clutch 74, 75 (Figs. 1b, 3); said clutch is driven by a wheel 73 through worm 16 and is operatively connected through gears 76 and 77 with the feed rollers 70. The clutch is under the control of the magnet 78 controlling the clutch mechanism 79—83 which on its part closes upon energization of magnet 78a contact 84. Upon energization of magnet 130 a frame 128, pivotally mounted at 129, will be rocked; the fingers 126', 127' of said frame are adapted to close the contacts 126 and 127 under the control of the spindle 16 (Fig. 3).

Counter

In connection with the addressing machine a counter is provided which is shifted step by step in accordance with the passage of the various address plates past the printing position so that the adjustment of the counter corresponds always to the identification number of the address plate in printing position. Any type of counter may be used, however, preferably the counter is provided in such manner that a counter disk controls a combination of set-up elements which may be immediately compared with the hole combinations of the lists to be addressed. A preferred electro-mechanical counter is shown in Figs. 6-8. The counter casing consists of two side plates 242, an upper and lower cover plate 241 and 243 respectively and of a casing 238 in which are mounted the set-up elements controlled by the counter disks. Each counter place includes a counter disk 233 to which are fastened a cam 237 as well as a fastening disk 232 and a toothed wheel 229. The various counter disk units are loosely mounted upon the shaft 236 fastened in

the walls of the casing and between the various units tens transfer wheels 230 are provided in a known manner which are loosely mounted upon the shaft 235. A transfer wheel 231 connected to each of the three first counter places is provided with teeth only on one portion of its circumference which upon the passage of the co-ordinated counter disk from 9 to 0 will move the tens transfer mechanism 230 for such an amount that thereby also the toothed wheel 229 and accordingly the counter disk 233 of the next higher place will be shifted for one unit. The various counter disks are arrested in their position through fingers 246 resiliently mounted in the casing 245.

For each counter place one set of contacts is provided consisting of four contact elements controlled by the counter disk in different combinations according to the numerical adjustment of said disk. As may be seen from Fig. 8, between the semi-round casings 239 and 240 pivotally mounted pins 244 pass into the recess between the counter disk 233 and the fastening disk 232 and are pressed by their springs with their lower ends against the cam 237 fastened to the respective counter disk. The shape of the cam is such that upon different adjustments of the counter disk different combinations of the pins 244 are pressed outwardly or are kept in their lower position respectively. In Fig. 8 for instance just the lowermost pin 244 has been pressed outwardly by a raised portion of the cam 237 while the other three pins are in their lowermost position.

To each contact finger 244 a contact 107 is co-ordinated, also designated with I—IV. The diagram Fig. 9 indicates by black points which of the contacts 107, I—IV is closed upon the different adjustments of a counter disk. It may, for instance, be seen that with the adjustment of the counter disk at 0 the contact I is closed while the remaining three contacts are open. Upon the adjustment of the counter disk at the value 5 the contacts I and IV are closed while with the value 8 the contacts III and IV are closed and so on. From the comparison of Fig. 9 (representing the diagram for the adjustment of the contacts) with Fig. 5 (representing the key for the list perforations) it may be seen that list perforations being in agreement with contact adjustments represent the same numeral which corresponds to the respective counter adjustment. Shifting of the counter in agreement with the address plate feed may be effected in a mere mechanical or electrical manner such as for instance in the present embodiment. A solenoid 210 is provided for shifting the counter and the armature 211 of said solenoid is connected by a pin and slot connection with lever 212 pivotally mounted at 213 which lever is drawn by a spring 214 against the stop 215. The lever 212 is pivotally connected by a bar 216 with a shift lever 218 pivotally mounted at 217 which lever will cause by means of a shift pawl 220 shifting of the counter in forward or backward direction. The unit counter disk 233 (Fig. 6) is geared to the wheel 227 by means of a toothed wheel 228 loosely mounted upon the shaft 235 and the wheel 227 is geared to the wheel 225 by means of a shaft mounted in the wall 242 of the casing. Through the toothed wheel 222 rotatably mounted on the wall 242 of the casing the toothed wheel 225 is geared to the toothed wheel 223 mounted on the wall of the casing. To each of the counter wheels 225 and 223 is fastened a shift wheel 226 and 224 respectively with which

the shift pawl 220 may be engaged which is pivotally mounted at 219 on the lever 218. The shift pawl 220 is held by a spring 221 either in the position illustrated or it may be moved to the right where it will then be in engagement with the shift wheel 224. If the counter shall be shifted in forward direction, i. e., if the address plates are passed through the machine in numerically raising sequence, the shift pawl 220 must be adjusted to the position illustrated in Fig. 7. If, however, the address plates are passed through the machine in numerically falling sequence, the counter must be shifted in backward direction and the shift lever 220 must therefore be moved to the right so that it will engage the shift wheel 224 which will then shift the counter in backward direction over the gear connection 223, 222, 225.

With addressing work of the type indicated it will usually be necessary to begin the work with a certain address plate number, for instance that all lists up from the number 500 must be addressed. In this instance the counter is moved manually by means of the disks 234 to the value 5 in the third decimal place so that it will be adjusted to 500. If any other adjustment should be desirable, of course, also the other counter disks may be turned accordingly and there may also be provided (as is well known in counters and accumulators) a resetting device to permit resetting of all counter disks simultaneously to zero.

Comparison of list perforations and counter set-up

Each individual hole position of the list and of the coordinated contacts (of the same indexes I—IV) of the corresponding counter place are simultaneously and electrically analyzed and both coordinated current circuits control two oppositely acting windings of an electromagnet so that upon agreement the magnetically acting windings compensate each other and no controlling effect will be caused while in the latter instance a controlling effect will take place. These magnets are designated 120 in Fig. 3 and control a plate 122 pivoted at 121 and keeping normally the contact 124 closed under the influence of the spring 123; upon energization of one or a plurality of magnets 120, however, the contact 125 will be closed and 124 will be opened.

The analysis of the perforations of the lists is caused by the analyzing brushes 90 (Figs. 1a and 1b); for each hole position four brushes are provided arranged in a vertical row adjacent each other. The standard point hole of the list is analyzed by the brush 95 (Fig. 1a). The brushes 90, 95 cooperate with a contact plate 94 and are fastened on an insulating block 91 movable along the adjusting bar 93 on which the block may be fastened by the set screw 92.

The contact mechanism of the counter representing always the identification number of the address plate being in printing position has already been described. The contacts 107 controlled by the counter are connected by lines with the comparing mechanism for the list perforations with the adjustment of the counter, and the cooperation of the contacts 107 and of the perforations of the lists will still be explained.

Circuit diagram

The current source 138 (Fig. 10) may be connected by the main switch to the main lines 139 and 140 to which the motor 15 is directly connected. From the contact 137 leads over

stop contact 141 a line 142 terminating in contact 127. From line 142 branches a line leading over the countershift magnet 210 and the contact 202 to the negative line 140. The contact 127 is connected through line 143 with the middle blade spring of the shiftable contact 124, 125. From the right hand side of the contact 124 leads a line to the middle blade spring of the shift contact 200, 250. The lower blade of the same leads over a line 144 to the clutch magnet 41 (for printing mechanism) which then on its part is connected to the main line 140 and the upper blade of the contact 250 is connected to the line 145. The left hand blade of the normally open contact 125 is connected by a line 145 to the clutch magnet 63 (for address plate feed) which then on its part is also connected to the line 140.

The analyzing and comparing mechanism is inserted into the current circuit as will now be described: As will be seen from the circuit diagram, each magnet 120 comprises two windings. In the circuit of the one winding of each magnet lies the contact of the coordinated brush 90 with the contact plate 94 while the circuit of the other winding is controlled by the contact 107 (see Fig. 8) of the corresponding decimal place of the counter and of the same Roman index designation (I, IV). The plate 94 is connected by a line 148 with line 142 and the brushes 90 are connected by lines 149 with the one ends of their coordinated windings. The terminals of said windings are connected by common lines 150, both upper lines 150 leading to a common line 151 and both lower ones leading to a common line 152. The lines 151 and 152 are connected to a common line 153 leading to the contact 126 which in turn is connected over line 154 with the main line 140. The counter controlled magnet windings of both upper sets of magnets are connected by lines 156 and 157 directly to the line 142 while the corresponding entries of both lower sets are over line 158 in connection with line 142. The terminals of said windings in which the contacts 107 are arranged are connected as shown in Fig. 10 by common lines to the lines 151 and 152 which are connected to the line 153. It will be seen that from the positive pole (line 142), over line 143, contact plate 94 and brushes 90 the list perforation controlled magnet windings are connected over line 153, contact 126 and line 154 with the negative pole (line 140) of the current source; on the other hand, the counter contacts controlled windings of the magnets 120 are connected with their entries by lines 156, 157 and 158 to the positive pole (142) while their terminal lines in which the contacts 107 are arranged are connected with line 153 leading in the above described way to the negative side (140) of the current source. Accordingly, the comparing magnets 120 are controlled by the list perforations as well as by the counter contacts. If the contacts 90, 94 and 107 are closed, no current circuit is yet established since the completion of the current circuit is controlled by contact 126 arranged in the common back line of all magnets; it is only if the circuits of the magnets have been prepared by the perforations of the list and the closure of the selected counter contacts 107 that by closure of contact 126 the comparing circuit may be finally completed so that the windings of the magnets 120 may be energized.

To the line 142 is the magnet 130 connected

which in turn is connected by a line 162 over contact 135 with the line 140 so that the magnet 130 will be energized if due to the energization of the solenoid 109 the contact 135 is closed. The solenoid 109 is fastened on the casing of the machine in a manner as will be seen from Fig. 4. Upon energization it will draw its armature upwardly and the bar slidable in the casing of the machine and pivotally connected to said armature will then close by means of a projection the contact 135.

For the control of the paper feed, the brush 95 (Fig. 10) is connected by a line 163 with the relay 164 which in turn is connected over line 165 to line 140. The armature 166 of relay 164 establishes in the deenergized state of the relay a connection between the line 165 and the line 167 leading to the contact 84; however, if the relay 164 is energized its armature closes the contact 168 thereby connecting the line 169 with the line 170 leading to the contact 134. From the contact 134 leads a line 171 to the contact 132 and from said contact leads a line 172 to the solenoid 109 which is connected to the negative side 140 of the current source. From the line 169 branches a line 173 to the clutch magnet 78 for the record sheet feed, said magnet being connected to a line 174 leading over the start key (175') controlled contact 175 to the negative line 140. To the line 174 is connected on the one hand the contact 84 and on the other hand over a line 176 the contact 131, the other side of said contact being over a line 177 in connection with line 140.

Operation of the machine

Now at first the instance shall be described if the machine is shifted to the manner of operation where each identification perforation of the lists occurs only once; for this manner of operation, the lever shown in Fig. 1b is turned to the right for one fourth revolution so that the pin 195 (Fig. 2b) establishes an operative connection between the links 65 and 64.

If the machine is in rest position all parts are in the position shown in the drawings and the electrical connections as shown in the circuit diagram are established. The address plates are inserted in the magazine 10 (Fig. 1b) in such manner that their relief side is upwardly directed; the plate with the lowest account number lies lowermost while the plates with numbers increasing in current numerical order are following. The operator feeds the unprinted leading end of the continuous record sheet between the rollers 70 and 71 by means of the previously described handwheels in such way that the lists lie with the side to be printed upon directed towards the table of the machine. The record sheet is inserted with the end having the lowest account number so that the lists with raising account numbers will follow and the counter must be adjusted at the lowest number. If addressing is to be effected in the reverse order, of course, also all address plates must be inserted in the machine in reverse order and the counter must be adjusted at the highest number. If the record sheet is tightly tensioned upon the table 190 of the addressing machine, the contact 137 is closed by contact lever 136 (see Fig. 10) thereby connecting the electrical mechanisms of the machine with the current source. It must still be mentioned that in this initial position of the record sheet all brushes 90 and also the brush 95 are insulated from the contact plate 94 since the leading end

of the record sheet is supposed to be blank for an extent sufficient so that in the start position of the sheet there are no holes under the brushes.

In order to start the machine for operation, the operator depresses the start key 175' (Fig. 10) thereby closing the contact 175. Consequently, the clutch magnet 78 for the sheet feed receives current from the lines 169, 173, flowing over line 174 and contact 175 to the negative line 140. The magnet 78 will therefore be energized and will engage in the previously described manner the clutches 74, 75, thereby operating the feed rollers 70 to feed the record sheet upwardly (Figs. 1a, 1b). Due to the energization of magnet 78 the contact 84 will be closed, said magnet establishing thereby its own stick circuit over the contact 84, line 167, armature 166 of relay 164 and line 165 so that after instantaneous actuation the start key 175' may again be released and the contact 175 may open again. The record sheet feed will now be maintained in operation and the sheet will be advanced by the feed rollers 70 until a standard point hole comes under the brush 95 (Figs. 1a, 2a, 10). In this moment a current impulse will flow from line 142 (Fig. 10) over line 148, contact plate 94, brush 95, line 163, relay 164 and line 165 to the negative line 140, and said impulse will energize relay 164. Consequently the armature 166 will be drawn to the left so that the stick circuit of clutch magnet 18 leading over line 167 and armature 166 will be immediately interrupted, thereby disengaging the clutches 74, 75, and interrupting the record sheet feed operation. The record sheet will therefore be stopped so that the standard point hole will be arrested under the brush 95 and all hole positions of the list now being in printing position will be under the analyzing brushes 90 for the list perforations. Due to the energization of relay 164 the contact 168 has been closed and since also the contacts 134 and 132 of the coordinated mechanism (now being in home position) are closed, a current will flow over line 169, contact 168, line 170, contact 134, line 171, contact 132, line 172 through the solenoid 109 to the line 140. The solenoid 109 will be energized and will lift its armature so that the contact 135 will be closed. The magnet 130 will then be energized over line 162. Consequently the frame 128 (Fig. 3) will be drawn upwardly and the previously described fingers will engage the worm 16 and will be moved to the right. Soon afterwards the contact 126 will be closed and a little later also contact 127. Through the contact 126 the current circuit of the comparing magnets will be completed. It is now possible that the perforations of the first list do not agree with the adjustment of the counter if for instance the lists do not begin with the number 1 but with the number 5. Upon disagreement one or a plurality of the magnets 120 will become effective in the moment in which the contact 126 closes. The armature plate 122 will be rocked by said magnets 120 in counterclockwise direction so that the contact 124 opens and the contact 125 will be closed. Timing is provided in such a way that shifting of the contacts 124 and 125 is already completed if the contact 127 is closed by its coordinated slide. In the above assumed case i. e. if at the beginning of the work there is not right away agreement between the perforations of the first list and the counter set-up, upon closure of contact 127 a current will be sent over line 142, contact 127, line 143, contact 125, line 145 and clutch magnet 63 to the negative line 140 so that by the ener-

gization of clutch magnet 63 the one-revolution clutch 49, 50 is engaged and a plate feed cycle will be initiated. The connection of the line 145 to the contact 250 is in this instance of no influence because the continuation of contact 250 is open at contact 124. In the moment in which the one-revolution clutch 49, 50 is engaged the contact 134 will open due to the cam 134' now moving from its home position so that the current circuit of the magnet 109 will open which in turn causes opening of contact 135. Consequently, also magnet 130 will become deenergized and the frame 128 will return to its home position so that also the contacts 126 and 127 will open immediately; the magnets 120 will become deenergized and instead of contact 125 the contact 124 will again be closed. It will, however, be noticed that in the current circuit of the solenoid 109 no contact is open besides the contact 134; the contact 168 is still held closed by the relay 164 since the standard point hole is still under the brush 95. On the other hand, also the contact 132 is still closed since the one-revolution clutch 37, 38 for the printing mechanism has not been engaged. If now a plate has been advanced the contact 134 will again be closed by the cam 134' after one revolution of the cam disk 54 and thereupon the solenoid 109 will again be energized. This causes in the above described way closure of the current circuit of the magnet 130 and consequently thereof closure of the contact 126 for actuation of the electric comparing mechanism. Then the magnet 63 will again be energized and another plate feeding cycle will be initiated and the solenoid 109 will be deenergized by opening of contact 134. These operations will continue until the first printing plate whose identification number agrees with the set-up of the counter contacts reaches the printing position. As soon as printing plates pass the printing position, the lever 204 (Fig. 2a) will open the contact 250 and the contact 200 will be closed. It will be seen that even in case that the counter adjustment for these printing plates does not agree with the perforations of the first list still being in printing position again a new plate will be advanced. With this plate feeding, however, also the contact 202 will be temporarily closed and through the shift magnet 210 the counter will be shifted for one step. If it is now assumed that for instance after a number of plate feeding cycles a plate comes into printing position and if then the counter is set to a number corresponding to the identification perforations of the list still being in printing position, the following operations will take place:

At the end of the preceding plate feeding cycle the contact 134 has been closed thereby energizing the solenoid 109. Consequently thereof the contact 135 will have been closed and the magnet 130 will have been energized which in turn causes closure of contacts 126 and 127 in time sequence. If now the perforations of the list and the set-up of the counter contacts 107 are in agreement, both windings of the magnets coordinated to the respective positions will neutralize each other while on all remaining imperforate positions no energization of magnets will be effected at all; accordingly the armature plate 122 will remain in the position shown in Figs. 3 and 10 and the contact 124 will also remain closed. If then contact 127 is closed a current will flow from line 142 over contact 127, contact 124, the now closed contact 200, line 143 and clutch magnet 41 to the negative line 140; due to the energization of 75

magnet 41 the one-revolution clutch 37, 38 of the printing mechanism will be engaged. In the previously described mechanical way, however, simultaneously therewith also the one-revolution clutch 49, 50 for the plate feed mechanism will be engaged by the now horizontally adjusted clutch pin 195 (Fig. 10). During the first quarter of the operating cycle printing of the address plate being in printing position will be effected upon the list being in printing position, and during the second and third quarter of the operating cycle the next plate will be advanced into printing position. Since upon release of both one-revolution clutches the contacts 134 and 132 will open, of course, also the magnets 109 and 130 will be immediately deenergized. After printing has been effected by the printing cam 29, the cam 131' will encounter the contact 131 thereby establishing a shunt circuit to the start contact 175 and energizing immediately (still during the same operating cycle) the clutch magnet 78 for the sheet feeding mechanism. This magnet establishes then (if contact 131 opens again after having been left by the cam 131') over contact 84, line 167, relay-armature 166 and line 165 its own stick circuit; it must be mentioned in this connection that the contact 131 remains closed until the record sheet feeding mechanism having been engaged in the meantime has already moved the standard point hole away from the brush 95 and that due to relay 164 which has been deenergized thereby, a connection will again be established by armature 166 between line 167 and line 165 before contact 131 opens. It will be clearly seen that immediately after the first quarter of the machine cycle after printing has been effected the sheet feeding operation is initiated while the plate feeding mechanism is still in operation. By the feeding mechanism the next list will now be advanced and as soon as the standard point hole 14 of the next list comes under the brush 95, the relay 164 will again be energized so that the stick circuit of the clutch magnet 78 for the record sheet feed is interrupted and the list will again be stopped in printing position. However, simultaneously therewith also the contact 168 will be closed; independently thereof whether the operating cycle of the printing plate feeding mechanism or the operation of the paper feed mechanism is completed first, it is only if both operations are actually completed and if all parts are again in home and rest position that the solenoid 109 will again be energized since its circuit includes the contact 168 as well as the contacts 134 and 132. Due to the energization of the solenoid 109 and after the counter has been advanced in the plate feeding operation step by step another comparing cycle will be initiated and depending upon the result of said comparison either the contact 124 remains closed or the contact 125 will be closed. If the contact 125 is closed, upon closure of contact 127 only the plate feeding mechanism will be released electromagnetically and the next address plate will be advanced into printing position and the counter will be shifted for one step while the list will stay in its position since the shaft 33 of the printing mechanism is not rotating and consequently thereof also contact 131 will not be closed. However, if the identification perforations and the counter set-up are in agreement, the line 143 remains connected with the contact 124 and clutch magnet 41 will be energized over the contact 200 (which is always closed if plates are in printing position), said magnet releasing the plate feed-

ing mechanism as well as the printing mechanism; depending upon the latter the paper feed mechanism will then again be automatically engaged after completion of the printing operation, and a new list will be fed into printing position. It will be clearly seen that all these operations will be repeated in automatic and uninterrupted sequence so that the proper address will be printed upon the lists which are fed through the machine one by one.

In the foregoing specification it has been assumed that in the beginning of the work the perforations of the first list have a higher number than corresponds to the initial counter set-up. Now, it may also occur that right away the first list agrees with the set-up of the counter. In this instance, however, no immediate printing cycle should take place but provision must be made that printing is only effected if the respective plate has actually reached printing position and, of course, the first list must also remain in printing position until the plates have arrived there. For this purpose the lever 204 (Fig. 2a) is provided controlling the shift contacts 200, 250. As long as no plates pass through printing position the contact 250 will remain closed. No matter if upon a comparison at the beginning of the work there is agreement or not, i. e. independent thereof if the contact 124 remains closed or if contact 125 is closed: In any case only the plate feed magnet 63 may be energized, in the one instance over 143, 124, 250, 145, and in the other instance over 143, 125, 145. Since the feed of the lists is depending upon the actuation of the printing mechanism and since the latter—as long as there is no plate in printing position—cannot be rendered active at all, also the perforated list will remain in printing position so far. As soon as the first plate reaches printing position the contact 250 will be opened and 200 closed. The further operations will then take place in the regular order depending upon the agreement between the perforations in the list and the adjustment of the counter contacts as has been described herein: If there is agreement the magnet 41 will be energized over 143, 124, 200, 144 and therewith a printing and a plate feeding cycle will be initiated; upon advance of the address plates the counter will be shifted for one unit through the energization of the shift magnet 210; further, after the preceding printing the subsequent list will be advanced. If there is no agreement only the magnet 63 will be energized over 143, 125, 145 and only a new address plate will be advanced.

If the machine shall be adjusted to the manner of operation where a plurality of lists having identical perforations may occur, the lever 192 and pin 195 must be adjusted to the position shown in Fig. 2b so that the pin 195 is in vertical position and the one-revolution clutch 49, 50 is not mechanically depending upon the one-revolution clutch 37, 38, each clutch being then only releasable by its coordinated magnets 41 or 63 respectively. Starting of the operation is then effected in the same way as has been described in connection with the other manner of operation until finally the regular addressing will take place. Also upon adjustment to the second manner of operation always only the plate feed magnet will be energized until the first printing plate has reached printing position. Then upon agreement of the perforations and of the counter contacts the one-revolution clutch 37, 38 will be released due to the energization of magnet 41 and consequently thereof a printing cycle will be initi-

ated; in the course of said cycle the contact 131' (Fig. 10) will be closed by a rotating cam 131' thereby initiating the record sheet feeding operation. It will, however, be seen that in the present instance (contrary to the other manner of operation) the clutch 49, 50 for the plate feeding mechanism will not be released. Accordingly, a new list will be advanced and the interruption of the feeding operation will be effected under the control of the standard point hole of the next list, said hole being analyzed by the brush 95. If now the next list bears the same identification perforations as the preceding list, i. e., if its perforations agree with the still existing contact set-up of the counter, the contact 124 will remain closed and only magnet 41 will again be energized thereby initiating another printing cycle in the course of which the contact 131' will again be closed and another record sheet feeding operation will start. The address plate will then still remain in printing position since the clutch for the plate feeding mechanism has not been released. These operations will continue as long as the subsequently advanced lists agree with the contact set-up still remaining in the counter and accordingly the same plate will be printed upon a number of consecutive lists. If now finally a list of a higher identification number has been advanced its identification perforation will not anymore agree with the set-up of the counter. Accordingly, as a result of the comparing operation the contact 125 will be closed and due to the energization of magnet 63 only the clutch 49, 50 will be released thereby initiating a plate feeding cycle. The next plate will now be advanced, the counter will be shifted for one unit and the new counter set-up will be compared with the perforations of the list being in printing position. If there is no agreement which is the case if from the preceding list to the list just being in printing position there is a gap in the running identification numbers, the magnet 63 will be energized and the next plate will be advanced; these operations will continue until the counter shifted in accordance with the plates advanced one by one has reached the number of the list in printing position. Then there is again agreement and printing will be effected. Subsequently to this operation, however, the address plate will remain in printing position and, as has been described, the next list will be advanced. If now there is no agreement the next address plate will be advanced while upon agreement printing will be effected and the next record sheet will only be advanced, and in this manner the operating cycles will automatically continue.

I claim:

1. In an address printing machine, means for analyzing numerical representing perforations of record material receiving the printed data, means for printing from successively fed address printing carriers on said record material, a counter comprising setup means manifesting numerical representing positions, means for successively feeding said address printing carriers to printing position and correspondingly causing the operation of means to change the setting of said setup means, a comparing mechanism controlled by said setup means and said analyzing means for comparing the perforations of said record material with said setup means, and means rendered operative by said comparing mechanism for causing the automatic and successive operation of said feeding means and the means for changing the setting of said setup means until the counter

represents a numerical representation coinciding with the numerical representing perforations analyzed.

2. In an addressing machine for printing the data of address carriers upon a perforated record receiving material, means for feeding the perforated receiving material to and through the printing position and means for feeding the address carriers one by one to and through the printing position, a counter comprising setup means manifesting the numerical representation of the counter, means for shifting the setup means of said counter step-by-step in accordance with the passage of the address carriers past printing position, a comparing mechanism for comparing the perforations of the record receiving material and the setup means of the counter, and means under the control of said comparing mechanism for governing the printing of the data of the address carriers upon said record receiving material and for governing the feeding means for perforated record receiving material and the address carriers.

3. In an address printing machine, a series of address printing carriers, means for successively feeding said carriers, means for analyzing successive numeral representing perforations of control material, a counter and means for effecting a change in its numerical representation for each address printing carrier fed, means for feeding said control material for successively analyzing the numeral representing perforations, a comparing mechanism controlled by said analyzing means and said counter means for comparing the numeral representations of the control material with said counter, and means controlled by said comparing means for causing upon an identity in the numeral representations an operation of both of the aforesaid feeding means.

4. In an address printing machine, a series of address printing carriers, means for printing from said type carriers, means for successively feeding said carriers, means for analyzing successive numeral representing perforations of control material, a counter and means for effecting a change in its numeral representation for each address printing carrier fed, means for feeding said control material for successively analyzing the numeral representing perforations, a comparing mechanism controlled by said analyzing means and said counter means for comparing the numeral representations of the control material with said counter, and means controlled by said comparing means for causing upon an identity in the numeral representations an operation of said printing means and both of the aforesaid feeding means.

5. In an address printing machine, a series of address printing carriers, means for successively feeding said carriers, means for analyzing successive numerical representing perforations of a control sheet, a counter and means for effecting a change in its numerical representation for each address printing carrier fed, means for comparing the numerical representing perforations of said control sheet with said counter, and means controlled by the last-named means for controlling the operation of said feeding means.

6. In an address printing machine, a series of address printing carriers, means for feeding said carriers and for effecting printing impressions thereof, means for analyzing control material for coded representations, a counter provided with means for representing numerical values by coded settable means, means controlled by said settable

means and said analyzing means for determining an identity in numerical representation on said counter and said control sheet and means controlled thereby for governing the operation of said feeding and printing means.

7. In an address printing machine, a series of address printing carriers, a counter, means for successively feeding said carriers, means for effecting a change in the numerical representation in said counter for each address printing carrier fed, and a machine control means comprising means for sensing and determining when said counter represents an identical predetermined numerical representation.

8. In an address printing machine, a series of address printing carriers, a counter, means for printing from said carriers, means for successively feeding said carriers, means for effecting a change in the numerical representation in said counter for each address printing carrier fed, means for sensing and determining when said counter represents an identical predetermined numerical representation, and means for controlling the operation of said printing means by said last named means.

9. In an address printing machine, a series of successively fed address printing carriers, a counter, a control sheet having represented thereon a numerical representation, means for analyzing said representation, means for effecting a change in said counter for each address printing carrier fed, and a machine control means controlled by said analyzing means and counter comprising means for sensing and determining when said counter represents a numerical representation identical with the numerical representation on said control sheet.

10. The combination of a control sheet having a numerical representation, a counter having a supposedly identical numerical representation, address printing carriers, normally operative means for successively feeding said address printing carriers and changing the numerical representation of said counter for each address printing carrier fed, and means rendered active consequent upon the identity of the numerical repre-

sentation of the control sheet and said counter to suspend the operation of said feeding means.

11. In an address printing machine, a series of address printing carriers, means for analyzing successive numerical representing designations of a control sheet, a counter, a comparing mechanism controlled by said analyzing means and said counter for comparing the numerical representations of said control sheet with said counter, means rendered operative by said comparing mechanism and responsive to the latter upon sensing an identity in the numerical representation of the control sheet and said counter, and means controlled by said last named means for effecting further operations of the machine.

12. In an address printing machine, a series of address printing carriers, means for effecting printing operations from said carriers, means for analyzing successive numerical representing designations of a control sheet, a counter, a comparing mechanism controlled by said analyzing mechanism and said counter for comparing the numerical representations of the control sheet with said counter, means rendered operative by said comparing mechanism and responsive to the latter sensing an identity in the numerical representation of the control sheet and said counter, and means rendered operative by said last named means for thereupon causing the operation of said printing means.

13. The method of preserving and maintaining the proper correlation of address printing carriers and perforated control medium adapted to receive such data for identity purposes, without the necessity of having the address printing carriers themselves carry designations for selection purposes, comprising, providing a control sheet with numerical indicia, changing the numerical representation in a counter for each printing carrier fed, analyzing said numerical indicia and comparing the latter with the numerical representation of the counter, and upon a disagreement successively feeding the address printing carriers until the numerical indicia on the control sheet coincides with the numerical representation of the counter.

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