Oct. 10, 1933. E. A. FORD 1,930,266

SORTING MACHINE

Filed Dec. 31, 1928 9 Sheets-Sheet 1

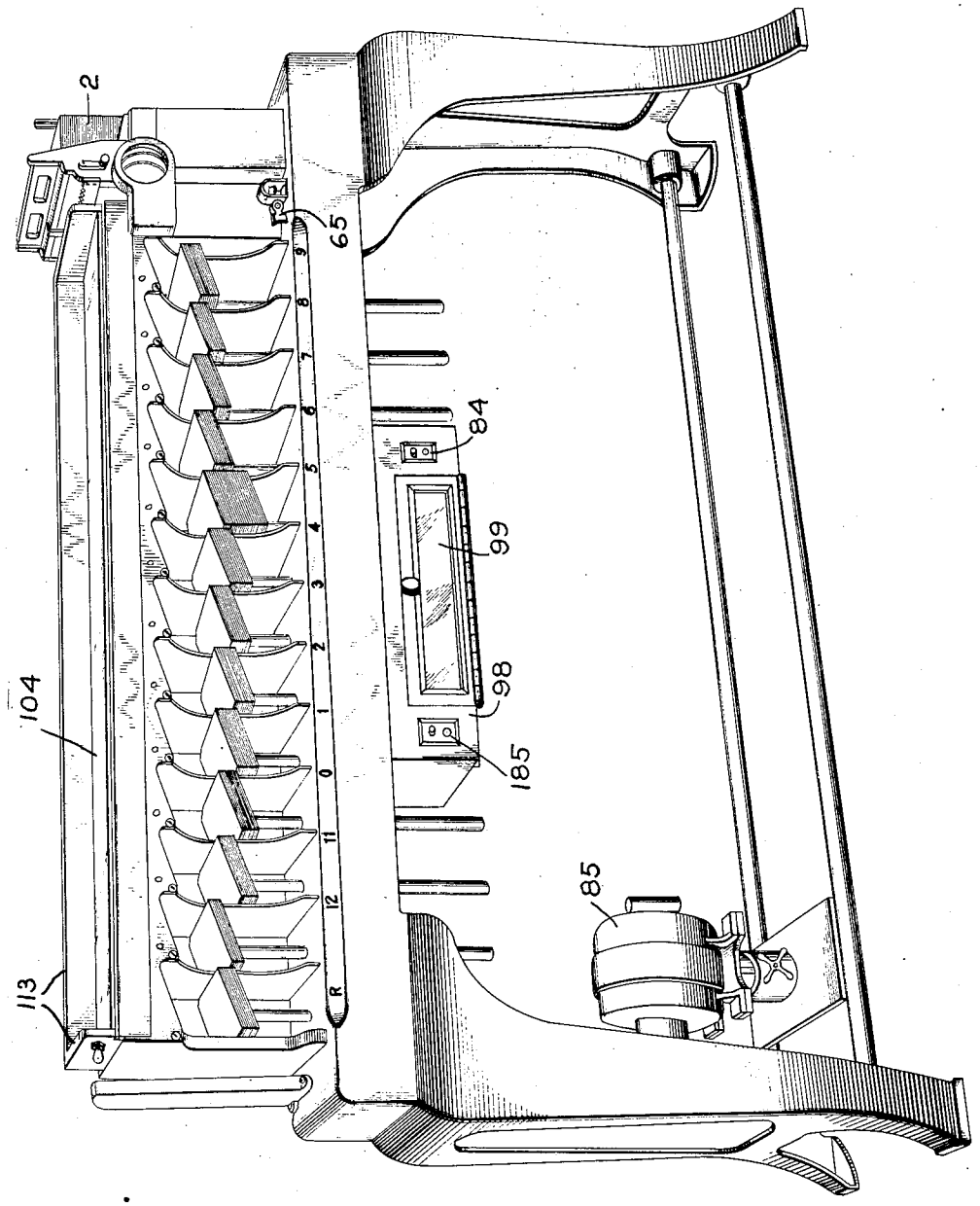


FIG. 1.

Inventor
E. A. Ford
By his Attorney
W. W. Wilson

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SORTING MACHINE

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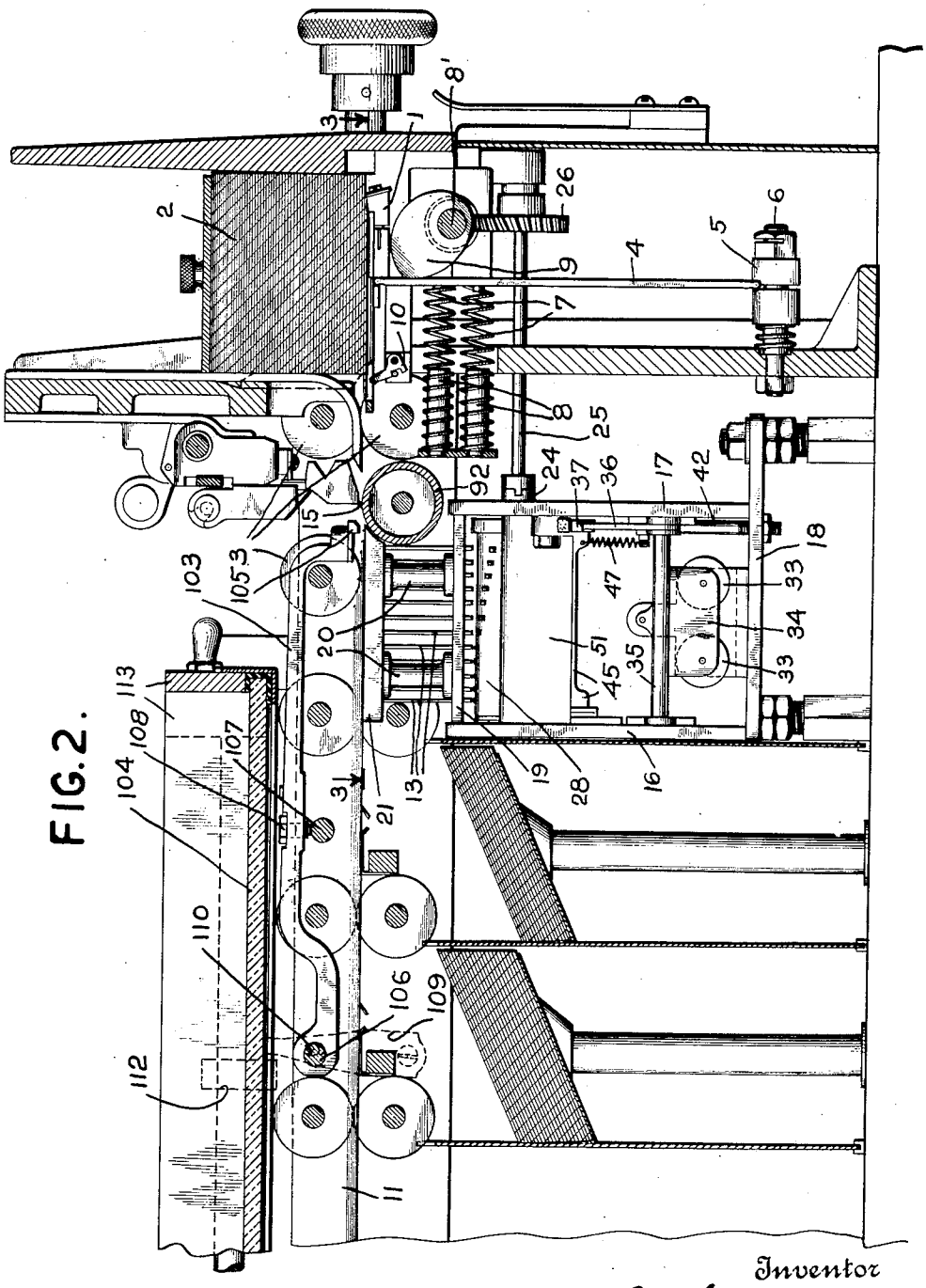


FIG. 2.

Inventor

E. A. Ford

By his Attorney

W. W. Wilson

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SORTING MACHINE

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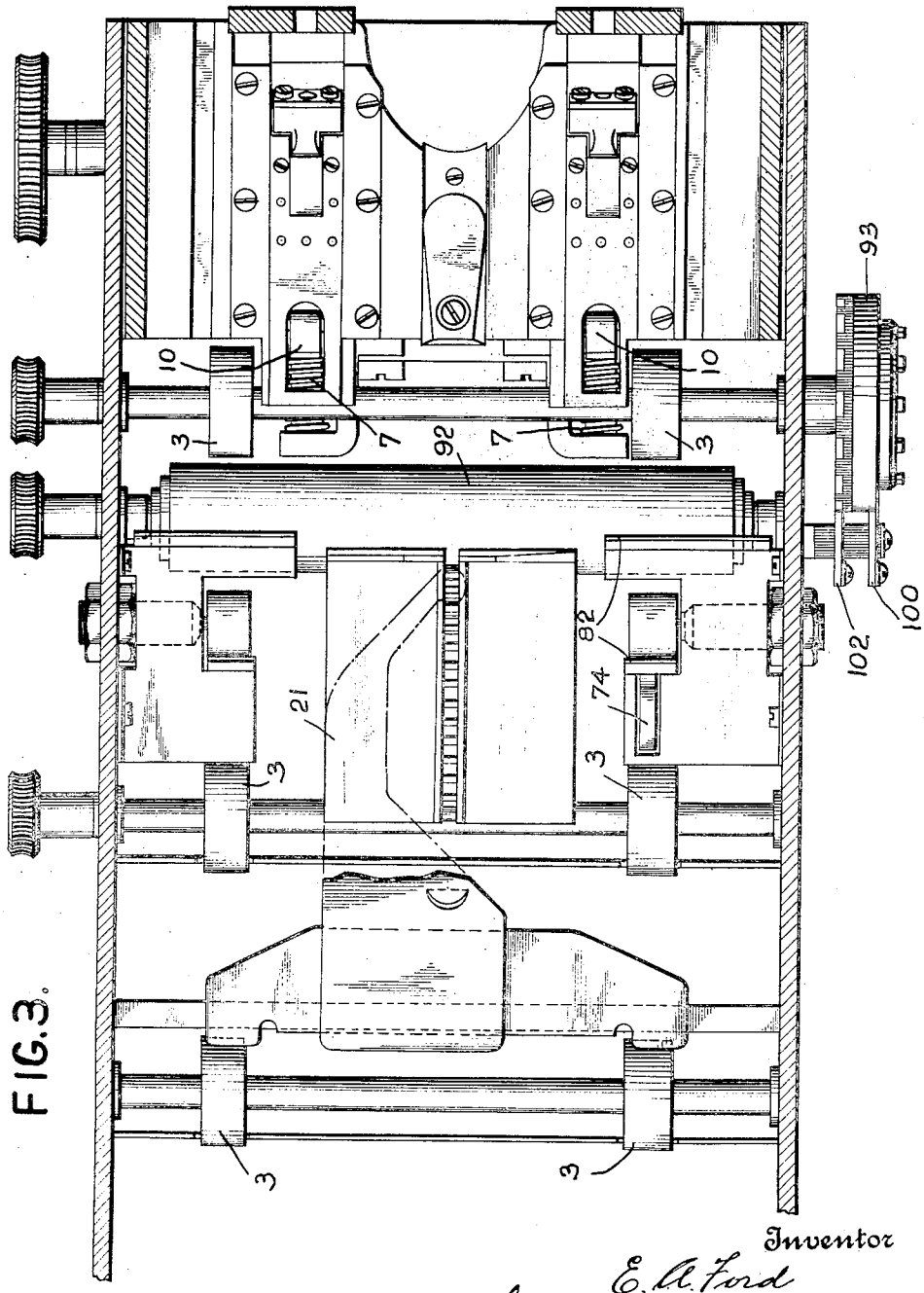


FIG. 3.

Inventor
E. A. Ford
By his Attorney
W. Madison

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SORTING MACHINE

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FIG. 4.

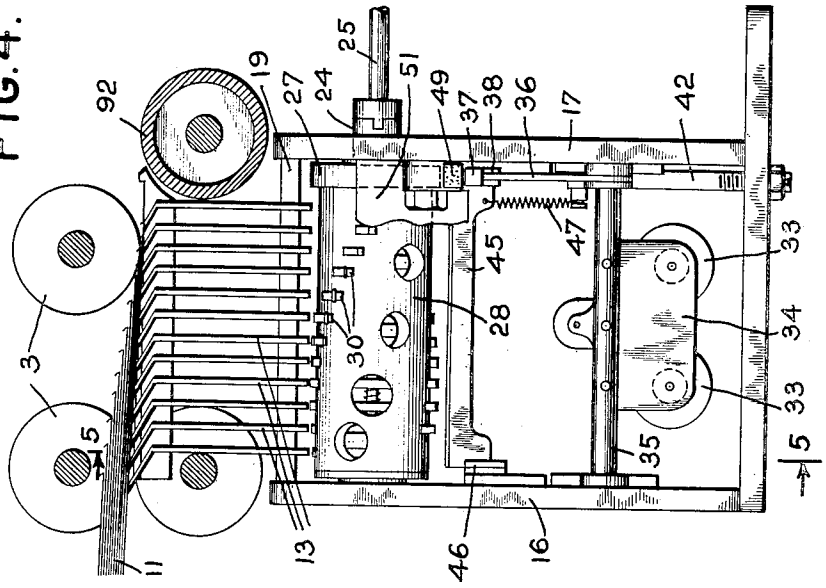
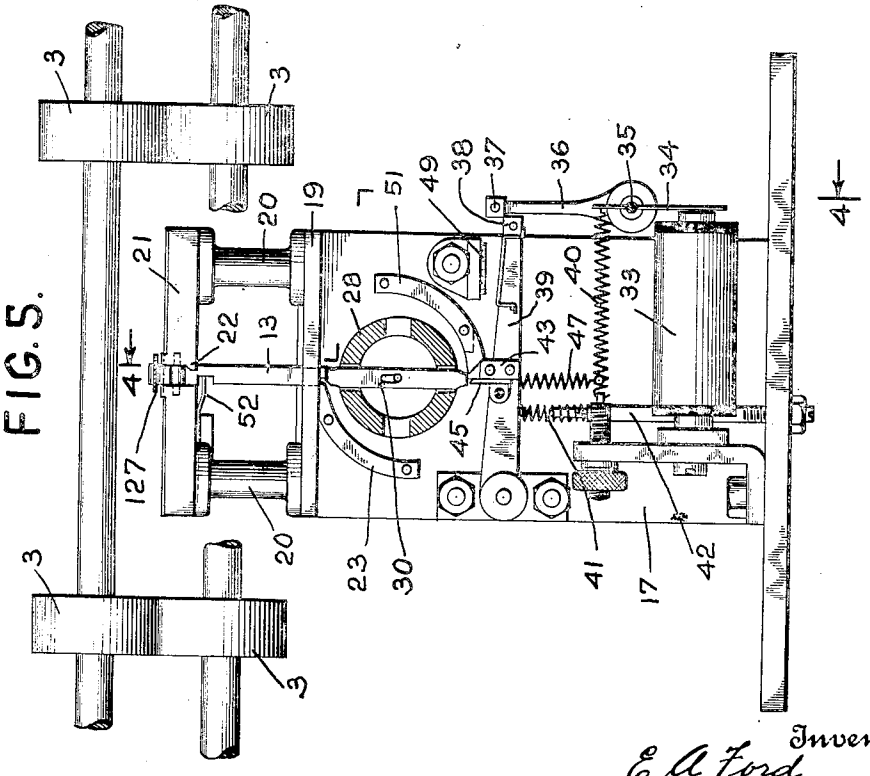


FIG. 5.



Inventor

E. A. Ford

By his Attorney

W. M. Wilson

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SORTING MACHINE

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FIG.8.

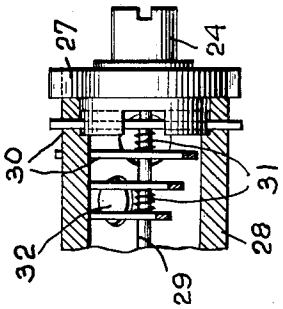


FIG.6.

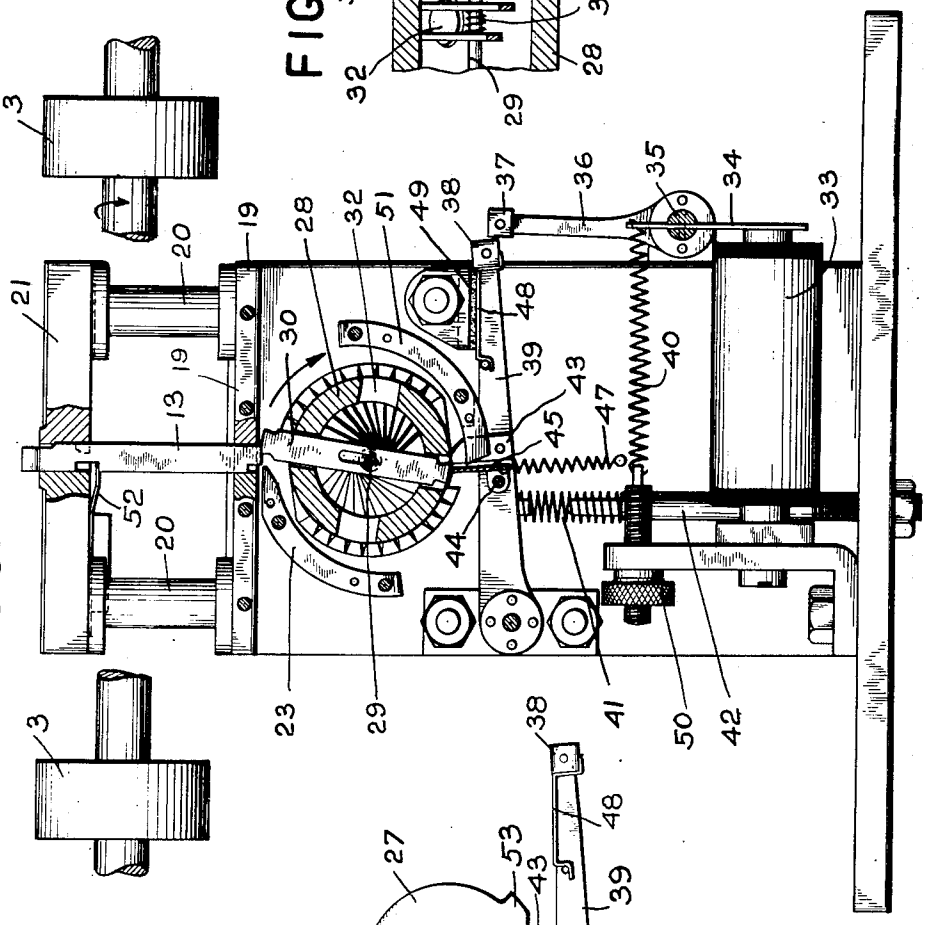
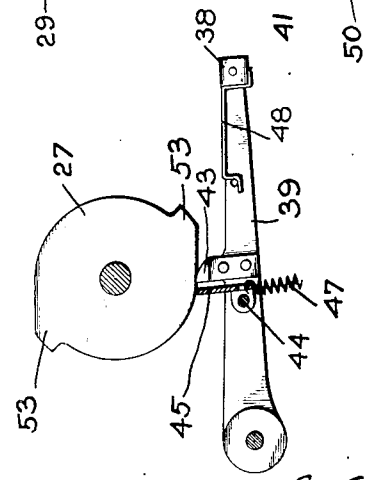


FIG.7.



Inventor

E. A. Ford

By his Attorney

W. W. Wilson

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SORTING MACHINE

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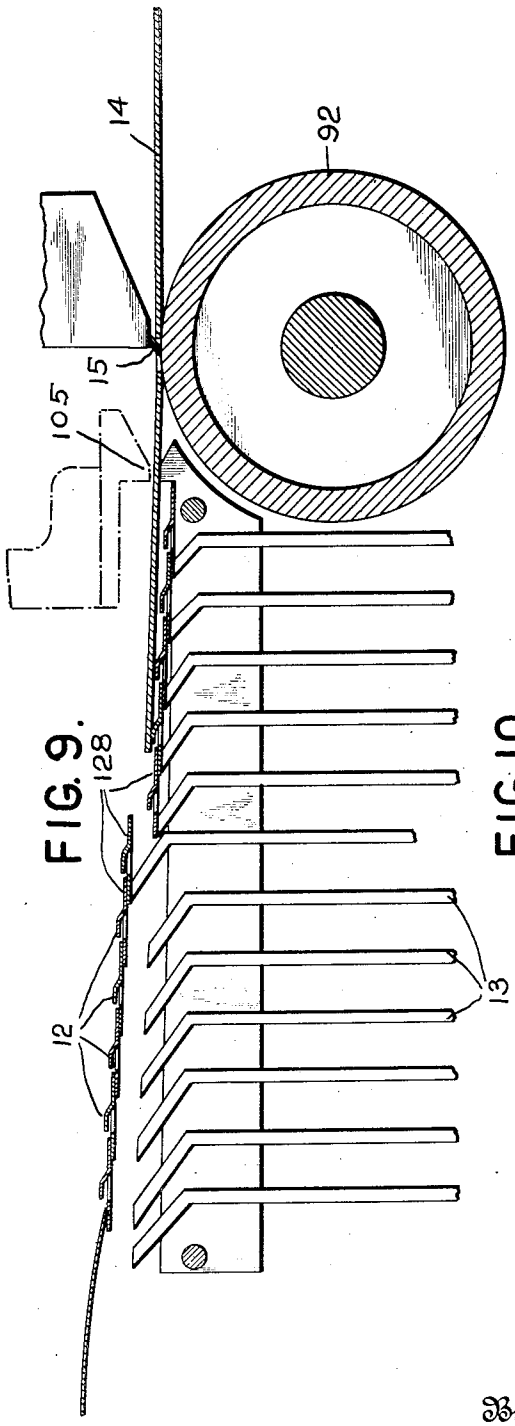


FIG. 9.

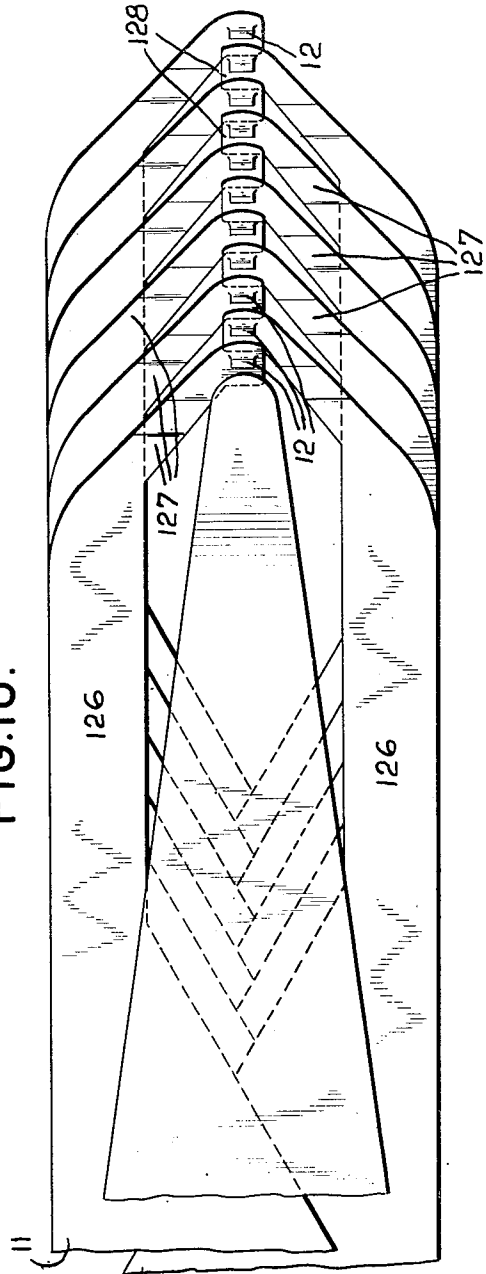


FIG. 10.

Inventor
E. A. Ford
By his Attorney
W. W. Wilson

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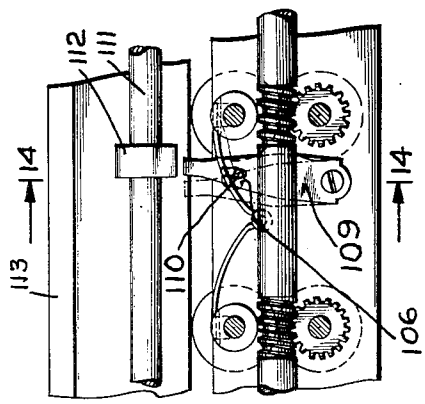


FIG. 13.

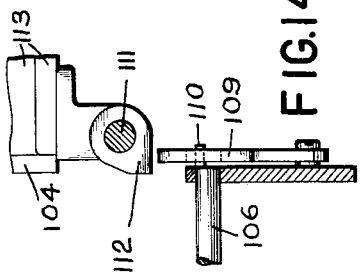


FIG. 14.

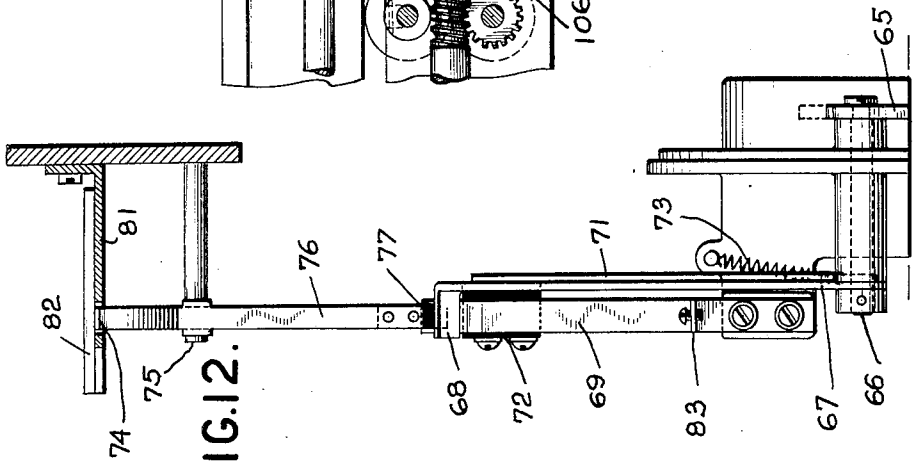


FIG. 12.

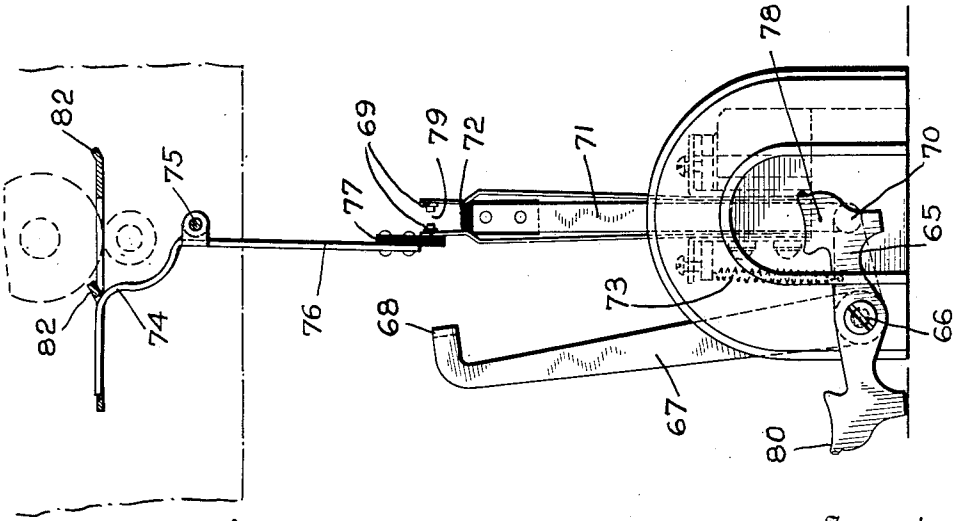


FIG. 11.

Inventor
E. A. Ford
By his Attorney
W. W. Wilson

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SORTING MACHINE

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FIG.16.

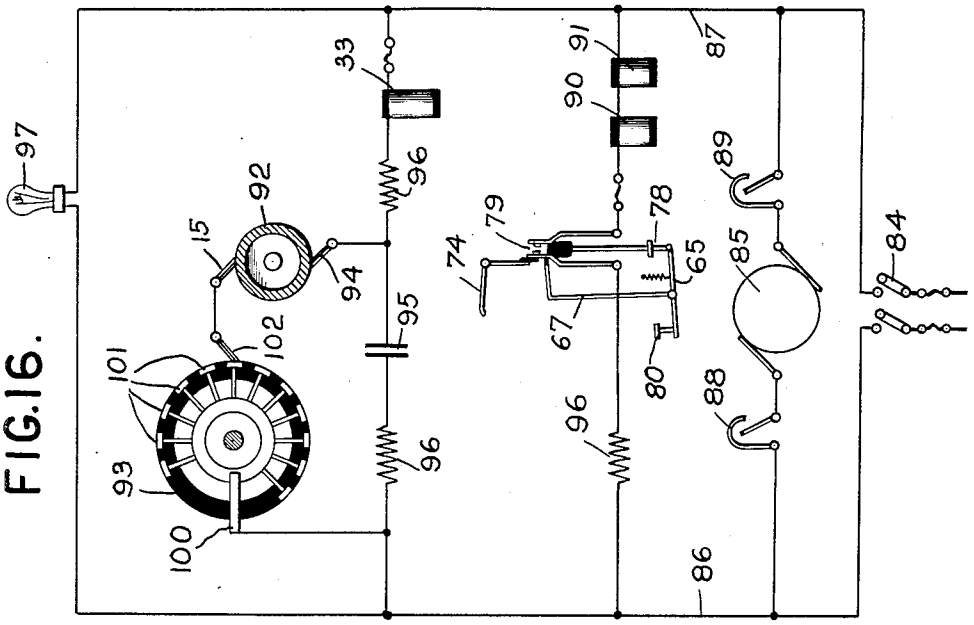
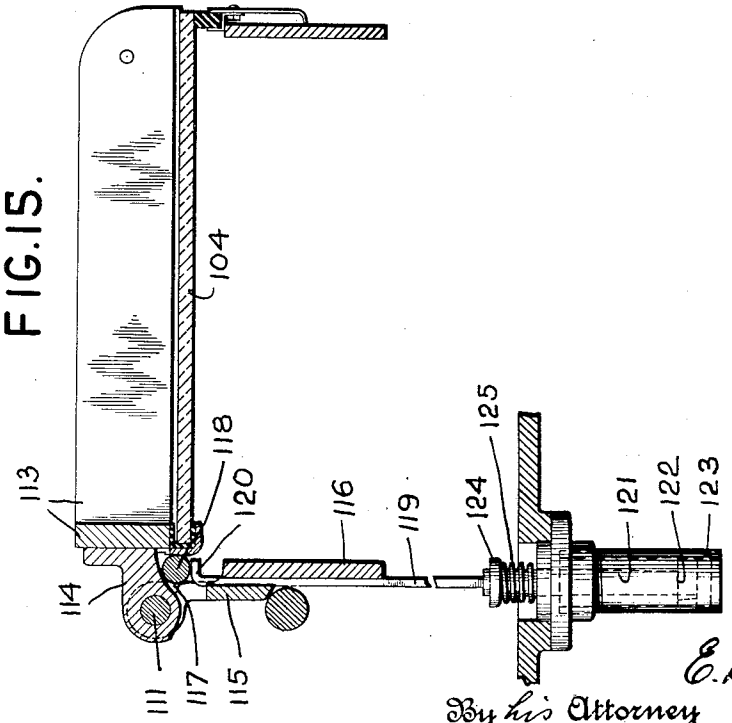


FIG.15.



Inventor
E. A. Ford
By his Attorney
W. W. Wilson

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SORTING MACHINE

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FIG. 17.

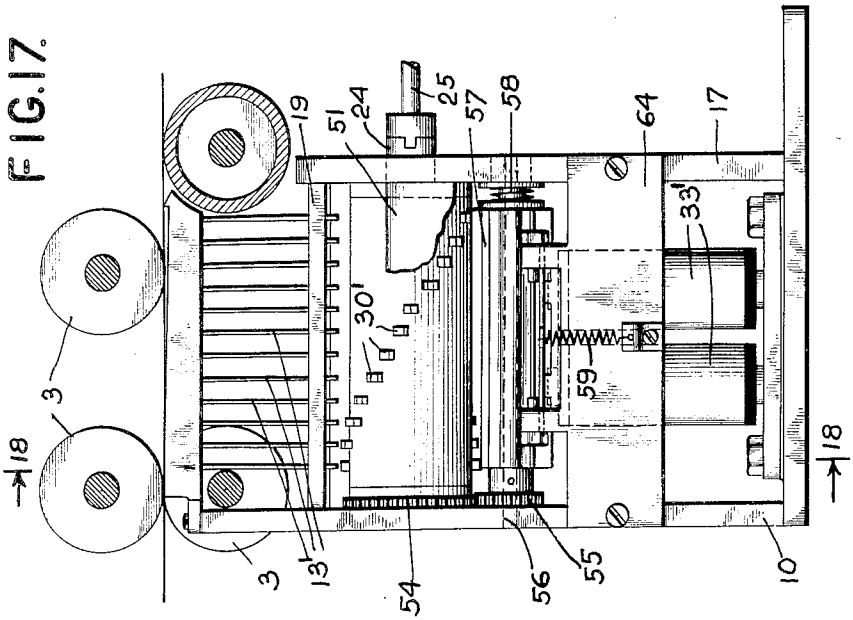
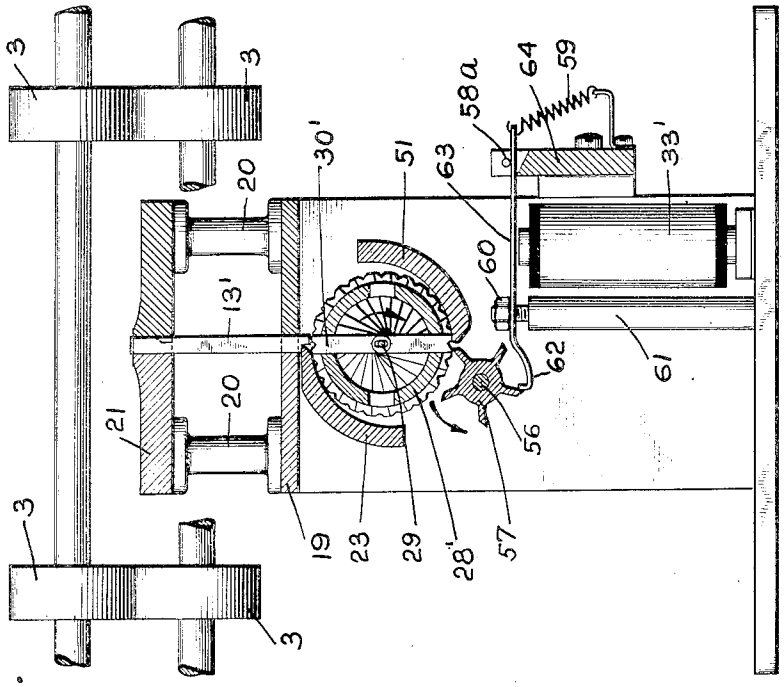


FIG. 18.



Inventor

E. A. Ford

By his Attorney

Wm. Wilson

Patented Oct. 10, 1933 1,930,266

UNITED STATES PATENT OFFICE

1,930,266

SORTING MACHINE

Eugene A. Ford, Scarsdale, N. Y., assignor, by mesne assignments, to International Business Machines Corporation, New York, N. Y., a corporation of New York

Application December 31, 1928
Serial No. 329,388

16 Claims. (Cl. 209—110)

The present invention relates broadly to record controlled machines and more particularly to sorting machines for record cards bearing data usually represented by perforations. As is well known in the art to which this machine refers, the card perforations are analyzed by an analyzing mechanism which controls the distribution of the cards into sorting receptacles. The machine is provided with a plurality of sorting blades cooperating with record controlled elements which separate said blades corresponding to the perforated data to provide a passage for the card to conduct it to the upper proper receptacle.

It is the main object of the present invention to provide new and efficient improvements on sorting machines of this nature.

Another important object of the invention consists in the provision of controlling elements for the distributing mechanism which are successively brought into their corresponding controlling position in accordance with the successive analysis of the index point positions.

A further object is to provide controlling elements for each sorting blade said elements being brought successively into their controlling position and further provision is made for a common record controlled element to cause controlling operation of the controlling elements which are in controlling position at the time the perforations in the record card pass the analyzing means.

Another object of the invention is to provide a controlling drum bearing diametrically arranged controlling elements, said elements being axially and angularly displaced with respect to each other.

A further object of the invention is to provide a rotary controlling mechanism adapted for successive cooperation with the individual sorting blades in accord with the successive analyses of the index point positions.

Another essential object of the invention consists in the provision of a common record controlled controlling device for the sorting blades and a coupling device for successively coupling each sorting blade with said controlling device in accordance with the successive analyses of the index point positions.

A further important object of the present invention consists in a new arrangement and a new shape of the sorting terminals of the sorting blades, which enable reliable sorting operation with high speed and without considerably straining the sorting blades.

Another object of the invention is to provide a new contact mechanism for record controlled machines, said contact being under the control of a hand operated element and of a record controlled element, arranged in the path of the record cards passing through the machine.

Another object of the invention relating generally to record controlled machines is to provide one common contact governing both starting and stopping of the machine.

Another object of the invention is to provide new and improved structures in connection with the cover plate for the sorting receptacles.

Other objects and advantages will be hereinafter set forth in the accompanying specification and claims and shown in the drawings which show by way of illustration what is now considered to be a preferred embodiment of the invention.

In the drawings:

Fig. 1 is a general view of the machine.

Fig. 2 is a longitudinal sectional view showing the essential units, such as the feeding, distributing and receiving mechanisms.

Fig. 3 is a sectional view showing certain elements of Fig. 2 in plan.

Fig. 4 shows the controlling means for the distributing mechanism on an enlarged scale and is taken on line 4—4 of Fig. 5.

Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Fig. 6 shows a side view, partly in section, of the controlling means.

Figs. 7 and 8 illustrate details of Fig. 6.

Figs. 9 and 10 show the sorting blades and their coordinated actuating elements.

Fig. 11 shows a contact mechanism for starting and stopping the machine.

Fig. 12 is a side view of the device shown in Fig. 11.

Figs. 13 and 14 illustrate a mechanism to prevent closing of the cover plate for the receptacles and conveyor when certain parts are not in proper position.

Fig. 15 illustrates a shock absorbing and damping device coacting with the cover plate.

Fig. 16 is a circuit diagram of the machine.

Fig. 17 shows a modified embodiment of the mechanism in Figs. 4 and 5, and,

Fig. 18 is a sectional view on line 18—18 of Fig. 17.

The present invention provides the usual card feed which extracts perforated cards one at a time from a card magazine or stacker and feeds them to an analyzer. The analyzer searches the cards for data perforations and governs their

distribution to sorting pockets or receptacles according to their analyses. A plurality of sorting blades, one for each pocket, are provided and the ends of the blades are separated to form the proper passage for each card to lead it to the sorting pocket called for by the perforation which it bears. Contrary to the usual operation in which the blades are moved and some or all of them stopped to provide or present an opening for each card, the present case contemplates a plurality of normally stationary blades with their ends echeloned and a member cooperating with the end of each blade and tending when operated to move the blade and thus form the distributing passage. The members which thus operate the blades may take numerous forms but for the present disclosure it may be assumed that they consist of rods. A rotary member carrying a slidable pin for each rod presents the pins successively for cooperation with the several rods. When the analyzer detects a certain perforation or group of perforations on a card, the slidable pin corresponding to the data represented is caused to operate at the time when it is in cooperative relationship with its rod to in turn operate the latter and open the proper passage way for the card. This mechanism will be fully described hereinafter.

For the purpose of clearly explaining the invention it has been shown as applied to an electric sorter of the type in which single perforations or Hollerith cards are analyzed while in motion. To further avoid complication and this applies equally well to practice, the machine has been constructed in such a manner that the distributing passage for each card is prepared substantially simultaneously with its analysis. That is the ends of the sorting blades are so located that immediately a perforation is encountered a corresponding blade a shifted and the leading edge of the card is in position to immediately enter the passage thus formed. While this eliminates the necessity for holding parts set for any appreciable time and is found convenient in practice, it will be understood that this is not an essential feature of the invention.

Card feed mechanism

The cards are fed from a card stack 2 (Fig. 2) by means of the reciprocal picker 1 to the first pair of feeding rolls 3. The mechanism for moving the picker 1 comprises two symmetrically arranged plates 4 which are pivoted at their lower ends upon a block 5 mounted upon the screw element 6. Each plate coacts with a pair of pressure springs 7 connected to the plate at one end and guided by pins 8 fixed to the frame of the machine. The upper part of each plate 4 passes into a notch of picker element 1. Upon the shaft 8 which makes one revolution for each machine cycle are fixed two cam disks 9 coacting with the plates 4 so as to move these plates to and fro during each machine cycle whereby the picker 1 picks a card from stack 2 and delivers it to the transport rolls which are all driven in unison. A pawl 10 is provided on the machine frame and passes into a slot of the picker unit. This pawl is turned in clockwise direction when it is engaged by the extreme left part of the picker element on return movement of the same and therefore will engage the lower cards of the stack and align them prior to each picking operation. This picker mechanism is fully described and claimed in my copending application Serial No. 321,291, filed November 23, 1928, and is not per se part of the present invention.

As the general operation of the card feed mechanism will be understood from the above explanation it is not necessary to go more into detail.

Distributing mechanism

In the present machine sorting blades of a new shape are used as may be seen in Figs. 9 and 10. The individual sorting blades 11 lie upon each other at their forward ends in the usual manner. With the exception of the upper blade, each is cut away at its end to form a narrow finger 126 having an angular extension 127 which extends slightly beyond the longitudinal middle line of the blade. The fingers 126 are formed on opposite sides of alternate blades and the extensions 127 rest upon each other, as may be seen in Fig. 10, but leave a clear portion underneath to cooperate with operating rods 13 (see Fig. 9). The uppermost blade is tapered at its end and rests upon extension 127 of the blade directly below it. Obviously, however, this uppermost blade may also be formed similarly to the others if desired. The tip 128 of each extension 127 is provided with a struck up tongue 12 inclined in the direction of card feed to lift the card slightly and raise it to the level of the next blade as it feeds over the blade ends (see Fig. 9). The operating rods 13, of which one is provided for each blade, are also inclined at their upper ends in the direction of card feed and each rod normally contacts with the clear space on the under side of the tip 128 of its corresponding blade. When any rod 13 is raised, as illustrated for the seventh rod from the left in Fig. 9, it raises its corresponding blade and all above it to provide a passageway for the card which happens to be feeding.

The operation of the actuating members 13 under the control of analyzing brush 15 will now be explained in detail. The auxiliary mechanism provided for controlling the actuating members 13 (see Fig. 2) is mounted upon a frame comprising side plates 16 and 17 and a base plate 18 which in turn is mounted upon the frame of the sorting machine. The top plate 19 supports posts 20 which in turn carry a pair of plates 21. The actuating members 13 (see also Figs. 4, 5 and 6) are guided between the plates 21 one of which is provided with projections 22 (see Fig. 5) between members 13. The members 13 are also guided in slots formed in top plate 19. At their lower ends the members 13 have a notch providing a shoulder which normally rests upon the edge of curved plate 23.

A shaft 24 is coupled with the shaft 25 which is driven from shaft 8' by means of worm wheel 26 (see Fig. 2). The ratio is such that shaft 25 makes half a revolution for each machine cycle, that is, for each revolution of shaft 8'. Fastened to shaft 24 which has its bearings in the side plate 17 is a cam disk 27 (Figs. 4, 7 and 8) to which is fastened a drum 28 journalled at its opposite end in the side plate 16. Within the drum is provided a rod 29 carrying controlling members 30 (see also Figs. 5 and 6) which have a slot in their central part through which rod 29 passes to slidably support the members. The members 30 pass at their opposite ends through slots in the wall of drum 28 and are angularly displaced with respect to each other so as to provide twelve actuating ends on each half of the periphery of the drum. A small pressure spring 31 (Fig. 8) is interposed between pairs of the elements 30 to provide a slight friction between the members

and the slots in the drum 28 so that the members 30 do not move to and fro unnecessarily when the drum is rotating. Holes 32 in the drum 28 serve to permit insertion of springs 31 and observation of the parts during assembly. The magnet 33 is under the control of the analyzing brush and attracts its armature 34 which is fastened to a pivotally mounted shaft 35 when the magnet is energized.

At one end of shaft 35 (Figs. 2, 4, 5 and 6) is fixed a lever 36 having a square head portion 37 which cooperates with another head portion 38 provided on a pivotally mounted lever 39. In the normal position as shown in Fig. 5 the pivoted lever 36 is held by spring 40 in the position shown, with head portion 38 held in its lower position by head portion 37 thus latching lever 39 in the position shown against the pressure of spring 41 which tends to rock it counterclockwise. The lever 39 is further provided between its ends with a lug 43 which cooperates with the cam disk 27 to restore the lever 39 when it has been released in consequence of energization of magnet 33 (Fig. 7). A lever similar to lever 39 is pivoted opposite it on side wall 16 and these levers are connected by a bail 45 (Fig. 4) which is pivoted to each as indicated at 44 (Fig. 6). The bail 45 extends below the drum 28 and a spring 47 normally tends to turn it in clockwise direction as viewed in Fig. 6. It is held in vertical position, however, by lug 43. The lever 39 is provided with a spring 48 which cooperates with a shock absorbing member 49 of felt or similar material when the lever 39 is released by lever 36.

It has been explained that the drum 28 makes half a revolution for each machine cycle so that when the analyzing brush is searching the different index point positions of the record card the controlling member 30 corresponding to the index point position in analyzing position will be in vertical position between the controlling bail 45 and the corresponding actuating member 13. If therefore there is a perforation at a certain index point position the magnet 33 will be energized and the lever 36 will be turned in clockwise direction against the tension of the spring 40 which tension may be adjusted if necessary by adjusting screw 50. The head 37 will release head 38 of lever 39 and this lever and accordingly also bail 45 will swing upward under the pressure of spring 41. This will cause the particular controlling member 30 to be raised by the bail and in turn raise the corresponding member 13 which thereupon raises its own blade 11 and those above it to provide the proper distributing passageway for the card being analyzed as illustrated in Fig. 9.

To ease and limit the movement of member 13 spring plate 52 (Fig. 6) is provided coacting with a notch in the member. The lifted controlling element 30 will remain in its shifted position in consequence of the friction derived from spring 31 until it is restored to its central position. This is done by curved plate 51. The configuration of the plate is such that its surface gradually approaches the revolving drum. Consequently any member 30 which is displaced will be gradually returned to its normal position by the plate 51 as the drum rotates and will be in normal position before it again reaches bail 45. A similar curved plate 23 serves to steady the members 30 as they are thus restored.

At the end of each machine cycle one of the cam projections 53 of cam member 27 encounters the lug 43 and thus restores the lever 39 and bail 45 to normal latched position. It will be recognized that the lever 39 remains in raised position until the end of the machine cycle and that therefore the bail 45 will be encountered by all following controlling elements 30; but this bail being pivoted at 44 and tending to be drawn in clockwise direction by spring 47 will slide over the ends of the following members 30 and hence only the one originally in operative relationship will be affected.

Another embodiment of the present invention using the same principle of the controlling drum is illustrated in Figs. 17 and 18. In these figures the same reference numerals with the primes added are used for parts similar to those in the previously described figures so that no special explanation of the function of these parts is necessary. According to this embodiment the drum 28' is provided on its rear end with a toothed wheel 54 meshing with a toothed wheel 55 carried by a shaft 56. Loosely mounted upon this shaft is a star drum 57 which is frictionally driven by the shaft 56 by means of a pressure spring 58. The armature 63 of magnet 33' is pivoted upon a plate 64 which has sharp portions on its upper ends and a rod 58a between which the armature 63 is pivotally located. It is held on its rear end by a spring 59 and limited in its clockwise movement by screw nut 60 provided on a guiding post 61.

In the normal position as shown in Fig. 18 the hook 62 of the armature 63 cooperates with a tooth of star drum 57 and consequently stops this star drum while in the same position another tooth is just below the controlling element 30' of the controlling drum 28'. If, however, the magnet 33' is energized under the control of a perforation in the record card, the hook 62 will release the star drum 57 which will turn under the influence of its frictional coupling with shaft 56. During the conjoint movement of star drum 57 and controlling drum 28 the controlling element 30' will be moved towards the actuating member 13' and will lift this member to provide for the separation of the sorting blades. As the spring 59 will at once restore the armature 63 after the deenergization of magnet 33' the hook 62 will again catch a tooth of the star drum 57 and stop the same, and another tooth of the drum will be in position to actuate a member 30 during the next machine cycle. It will be seen that the star drum 57 cooperates only instantaneously with the corresponding controlling member 30' and that there is no interference between this drum and the controlling members 30' following the original controlling of one of these members.

Start and stop mechanism

It is well known in record controlled machines to provide a special start key and corresponding start contacts and a stop key with contacts governing the motor circuit of the machine. The present sorter includes a mechanism which provides only one pair of contacts for closing and opening the motor circuit, which contacts may be controlled by the start and stop key as well as by a lever which is under the control of the record cards passing through the machine and which lever closes the contact as long as cards are being fed through the machine. The device, as illustrated in Figs. 11 and 12, comprises a key lever 65 provided with a start key portion 78 and a stop key portion 80. The key lever 65 is fixed to a shaft 66 which also carries a bell crank lever 67. A spring 73 normally holds the

stop portion 80 of the key lever depressed and the bell crank 67 to the left as viewed in Fig. 11.

The controlling contacts 79, whose arrangement in the motor circuit will be explained later, are mounted on spring blades 69 which are suitably anchored to an insulating block at their lower ends. At a small distance from their upper ends the spring blades are offset to cause their upper ends to converge. This provides flat parallel portions closely spaced and carrying the contacts 79 at the upper ends and flat parallel portions widely spaced at the lower ends, the two portions being joined by the converging slanting surfaces forming the offsets. A link 71 is pivoted to the horizontal arm of bell crank 67 and carries an insulating block 72 which slides between the blades 69. A card lever pivoted at 75 has one arm 74 extending into the path of feeding cards in the well known manner and another arm 76 carrying an insulating block 77 coacting with the contact plates 69. The vertical arm of the bell crank 67 has a sidewise extension 68 coacting with the insulating block 77.

In the normal position of parts, with no card affecting the card lever 74—76, the insulating block 72 is held between the closely spaced upper portions of spring plates 69 opening the contacts 79. Depression of the start key portion 78 of key lever 65 rocks bell crank 67 clockwise against action of spring 73. Lowering link 71 and sliding block 72 to the lower widely spaced portions of the blades 69 in which position it will allow contacts 79 to close. Incidentally extension 68 encounters insulating block 77 and rocks card lever 74—76 to close contacts 79. The start key portion 78 must be held down until the first card encounters the card lever and thereafter the card lever holds the contacts closed as long as cards are feeding. As soon as card lever 74—76 encounters no card, however, meaning that cards have stopped feeding the resiliency of the left hand blade 69 opens contacts 79 rocking card lever 74—76 clockwise. It will be noted that as soon as hand pressure is released from start key portion 78, spring 73 tends to rock the parts back to normal position.

When the contacts 79 are held closed by the card lever, however, the sloping portions of the spring blades 69 hold the insulating block 72 down and the spring 73 stretched with stop key portion 80 of the key lever elevated. If it is desired to stop the machine while cards are still feeding and holding the card lever down, stop key portion 80 may be depressed. This forces block 72 upwardly camming spring plates 69 apart, to open contacts 79, the right hand plate 69 yielding in this case as the left hand plate is held by the card lever.

Circuit diagram

The circuits of the sorting machine may be connected with the current source by the main switch 84 which is provided on the front of the sorter (see Figs. 1 and 16). Another switch 185 (Fig. 1) which is not shown in the diagram may be provided to connect a transformer with the current source if alternating current is used. The driving motor 85 may be connected with the main lines 86 and 87 by relays 88 and 89 which are under the control of magnets 90 and 91. In the circuit of these magnets is arranged the contacts 79 which are under the control of the card lever 74 and of the key member 65 as has been previously explained. The sorting circuit comprises the sorting magnet 33, the contact roll 92, and the usual commutator 93 which serves to select only certain index point positions for sorting operation. Brush 15 analyzes the record cards while brush 94 supplies current to the contact roll. The condenser 95 serves to reduce sparking on the brushes. As usual in circuits of electric accounting machines resistances 96 are provided. A signal lamp 97 is directly connected to the main lines 86 and 87 and is located in the housing 98 (see Fig. 1) the front door of which has a glass plate insert 99. When the main switch 84 is closed this lamp will be lighted and thus indicate to the operator of the machine that the sorter is under voltage.

When the machine is to be started the operator depresses the start key 78 of member 65 and contact 79 will be closed by the lever 67. The card feed will be initiated and the first card will turn the lever 74 counterclockwise to hold contacts 79 closed and they remain closed as long as cards run through the machine. The magnets 90 and 91 therefore will be energized and remain energized thus closing the contacts of relays 88 and 89 and connecting the motor 85 to the main lines 86 and 87. When there is a perforation in the position of the record card a current impulse will be effected from main line 86 over commutator brush 100, the corresponding selecting member 101 of commutator 93, second commutator brush 102, analyzing brush 15, contact roller 92, brush 94, resistance 96 and sorting magnet 33 to the main line 87.

Miscellaneous

The new sorter is provided with a guiding member for the cards to guide the same before they reach the sorting blades. This guiding member 103 (Fig. 2) is arranged adjacent the path of the record cards passing through the machine. The member 103 is provided on its front end with a lip 105 having an inclined surface which prevents buckling of the cards and feeds them flatly to the sorting blades. Member 103 is pivoted on shaft 106 and rests upon rod 107. The height of guiding member 103 and guiding lip 105 respectively, may be adjusted by means of an adjusting screw 108. When it is necessary to inspect the front end of the sorting plate the glass cover 104 may be opened and lever 103 may be turned in counterclockwise direction.

A special safety device is provided to prevent damage to the glass plate which would be possible if the glass cover could be closed while lever 103 is not in proper position. On one side of the sorter (see Figs. 13 and 14) is pivoted a lever 109 into a slot in which passes a pin 110 provided on the end of the shaft 106 which carries the guiding lever 103. Upon the shaft 111 which is fixed to the glass cover is provided a cam member 112 which encounters the lever 109 if the glass cover is in open position as may be seen from Figs. 13 and 14. Normally lever 109 is in the position shown in dotted lines but when the glass cover 104 is in open position and the lever 103 turned counterclockwise (according to Fig. 2) the lever 109 will be shifted by pin 110 into the position shown in Figs. 13 and 14 where the cam member 112 encounters the lever 109 if an attempt is made to close the glass cover before the lever 103 has been restored again to its normal position. In the new machine provision is also made to prevent damage of the glass cover by quick dropping of the same. The device used for this purpose is schematically shown in Fig. 15. The glass cover

104 is carried by a metal frame 113 which bears a member 114 rockable about shaft 111 which shaft has its bearings in frame member 115 connected to the frame 116 of the sorter. Several members 114 may be provided along the shaft 111 and one of these members, preferably in the middle of the machine, cooperates with the damping device. The member 114 carries on both ends side plates 117 which in turn carry a shaft 118 which cooperates with a bar 119 having a bent end 120. On its lower end the bar 119 carries a shaft 121 which has a plunger 122 guided in the cylinder 123 filled with oil or any other suitable damping material. On the upper end the shaft 121 is provided with a collar 124 and between this collar and the cover plate of the cylinder is provided a pressure spring 125 which holds the bar 119 and its bent end 120 respectively in engagement with the shaft 118.

When the glass cover 104 is in open position bar 119 will also be raised slightly and if the glass cover 104 is suddenly dropped the shaft 118 will encounter the bent end 120 of bar 119 and the spring 125 will absorb the shock. Then in consequence of the gravity of plate 104 the piston 122 will slowly drop and spring 125 will be depressed accordingly until the glass cover has reached its closed position.

Conclusion

The record cards are picked from the stack 2 and fed through the machine by the transport rolls which are driven in unison from the driving motor 85. The cards are analyzed by the analyzing brush 15 which controls the sorting magnet 33 which in turn cooperates with a controlling drum as has been explained. This controlling drum controls the sorting blades and separates the same to provide a passage corresponding to the perforated data of the record card. The card is then fed between the selected sorting blades in the usual way to the corresponding receptacle. Towards the end of the machine cycle the controlling parts of the drum are restored to their normal positon in readiness for the next analyzing cycle.

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

I claim:

1. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades, a plurality of controlling elements one being coordinated to each sorting blade, means to successively move said elements into controlling position to correspond with the analysis of the index point positions and record controlled means common to all controlling elements to cause controlling operation of the controlling element in controlling position under the influence of an index point in the record card.

2. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades, a plurality of controlling elements one being coordinated to each sorting blade, means to successively move said elements into controlling position in synchronism with the analysis of the several index point positions and during the same machine cycle and record card controlled means common to all controlling elements to cause controlling operation of the controlling element in controlling position under the influence of an index point in the record card.

3. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades a plurality of actuating members one being coordinated to each sorting blade to effect distribution and a plurality of controlling elements one being coordinated to each actuating member, means to successively move said controlling elements into controlling position relatively to their corresponding actuating members in accordance with the analysis of the index point positions and record controlled mean common to all controlling elements to cause controlling operation of the corresponding controlling element.

4. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades, a plurality of actuating members one being coordinated to each sorting blade to effect distribution, a plurality of controlling elements one being coordinated to each actuating member, means to successively move said controlling elements into controlling position relatively to their corresponding actuating members in synchronism with the analysis of the index point positions and record controlled means common to all controlling elements to cause controlling operation of the corresponding controlling element.

5. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades, a rotary mechanism including a controlling element for each sorting blade, said rotary mechanism being turned in accordance with the analysis of said index point positions to successively move said controlling elements into controlling position with respect to the coordinated sorting blades and record card controlled means to cause controlling operation of the controlling element being in controlling position under the influence of an index point in the record card.

6. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism including a plurality of sorting blades, a common record controlled controlling device for said distributing mechanism and a coupling device for successively coupling each sorting blade with said common record controlled controlling device in accordance with the successive analysis of the index point positions.

7. In a sorting machine for record cards having index point positions, means for successively analyzing the index point positions, a distributing mechanism, including a plurality of sorting blades, an actuating member for each sorting blade to effect sorting operation, a common record controlled controlling device for all said actuating members and a coupling device, successively coupling each actuating member with said common record controlled controlling device in accordance with the successive analysis of the index point positions.

8. In a sorting machine for record cards, a record controlled distributing mechanism for the same including a plurality of sorting blades said blades having spaced parallel portions terminating in overlapping ends which converge to a central line.

9. In a sorting machine for record cards, a record controlled distributing mechanism including a plurality of superimposed blades having ends terminating at different points, said blades having raised portions in proximity to adjacent blades to guide record cards over adjacent blades.

10. In a sorting machine for records, a feeding track for said records, a guard plate for said track rockable into and out of guarding position, a pivoted guiding member for the records arranged between said guard plate and said feeding track and means controlled by said guiding member to lock the guard plate against movement to its guarding position when said guiding member is not in guiding position.

11. In a sorting machine for records, a feeding track for said records, a guard plate for said track, a rockable shaft connected to said guard plate to rock the same into and out of guarding position, a guiding member for the records pivoted upon a shaft, said shaft and guiding member being both arranged between said guard plate and said feeding track, a pivotally mounted lever shiftable into different positions by said shaft of the guiding member and a cam member upon said shaft for the guard plate to lock said guard plate against movement to its guarding position by said pivotally mounted lever when said guiding member is not in guiding position.

12. In a sorting machine for record cards, a feeding track for said cards, a guard plate for said track movable into and out of guarding position and shock absorbing means cooperating with said guard plate when it is moved from unguarding to guarding position including a dash pot, a plunger therein connected to the guard plate and a damping member between the guard plate and plunger for urging the plunger toward the guard plate.

13. In a sorting machine having a plurality of card pockets and a set of chute blades extending thereto to selectively guide cards to said pockets, a rotatably mounted device for engaging and positively separating the several chute blades to provide passages to the several pockets, and electric magnetically controlled timing means for operating the device in accordance with index points in the card records.

14. A record card sorter comprising a plurality of guides defining distributing passages for the cards, a device for opening the passages, a carrier for the device movable to successively coordinate the device with the guides, means for holding said device normally ineffective to open a passage during said movement of the carrier, and card-controlled means for rendering the device effective by mechanical engagement of said device with said guides during such movement to operate the guides for opening a passage in accordance with the control characteristics of the card.

15. A machine comprising means for analyzing a record bearing data in the form of index points, record sorting elements, mechanism for operating said elements, a continuously movable shaft, a member releasably driven by said shaft for actuating said mechanism to selectively operate the elements, and means controlled by the analyzing means for normally restraining said member from being driven by said shaft and for releasing said member in accordance with the analysis of cards.

16. A machine comprising a record analyzing device, a plurality of record arranging elements, a drum carrying a plurality of members in spiral formation, each member corresponding to an element, means for rotating the drum to successively coordinate each member with its corresponding element, and means controlled by the analyzing device for selectively moving one of members while coordinated with its respective element to effect operation of the element.

EUGENE A. FORD.