Nov. 23, 1948. K. J. BRAUN 2,454,628

PUNCHED CARD SORTING MACHINE

Filed Nov. 25, 1944 8 Sheets-Sheet 1

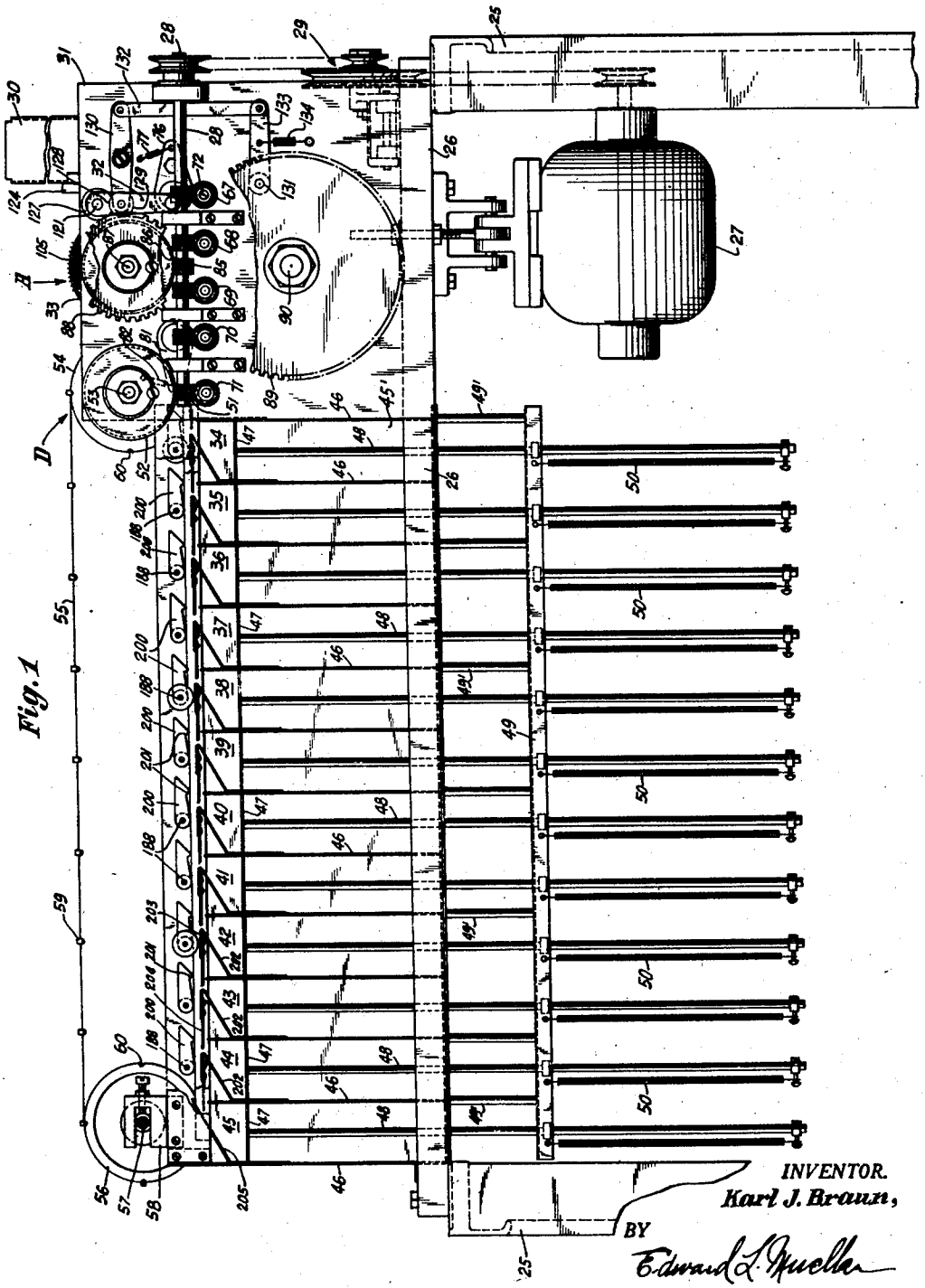


Fig. 1

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PUNCHED CARD SORTING MACHINE

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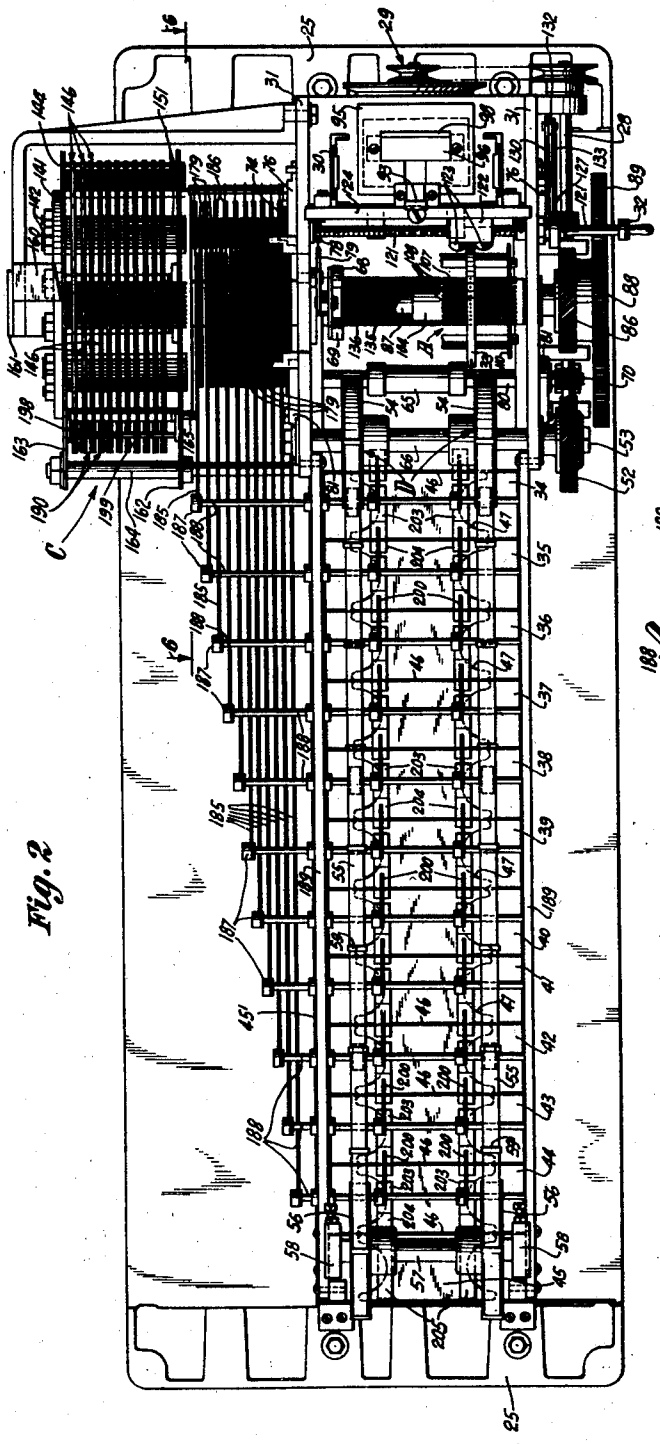


Fig. 2

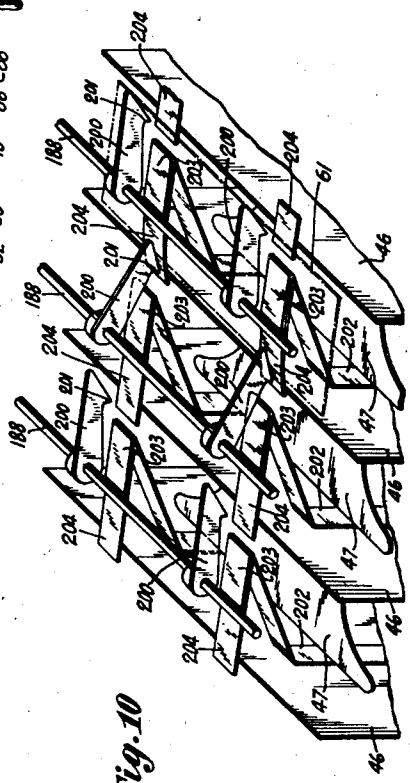


Fig. 10

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PUNCHED CARD SORTING MACHINE

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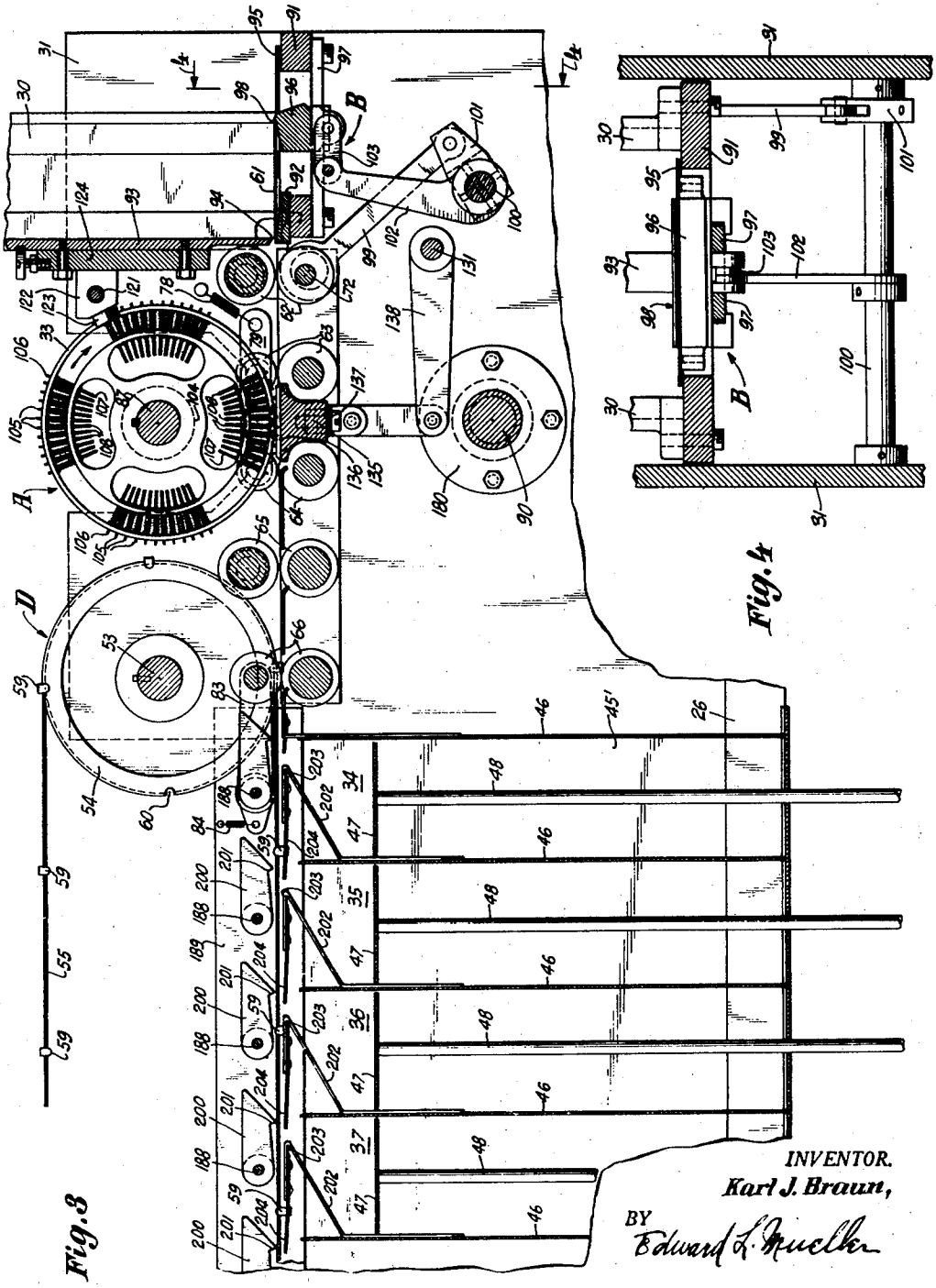


Fig. 3

Fig. 4

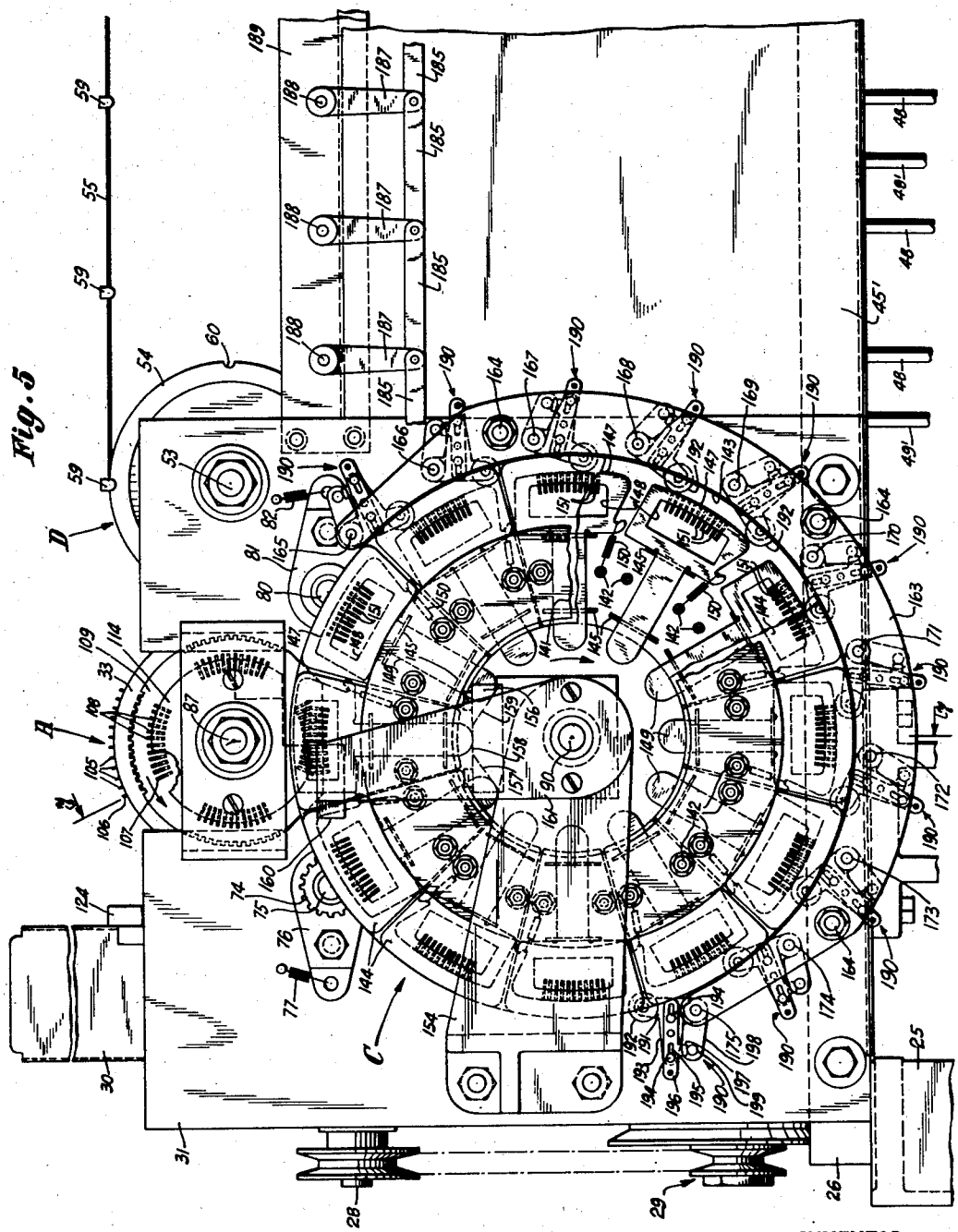
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Nov. 23, 1948. K. J. BRAUN 2,454,628

PUNCHED CARD SORTING MACHINE

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Fig. 5



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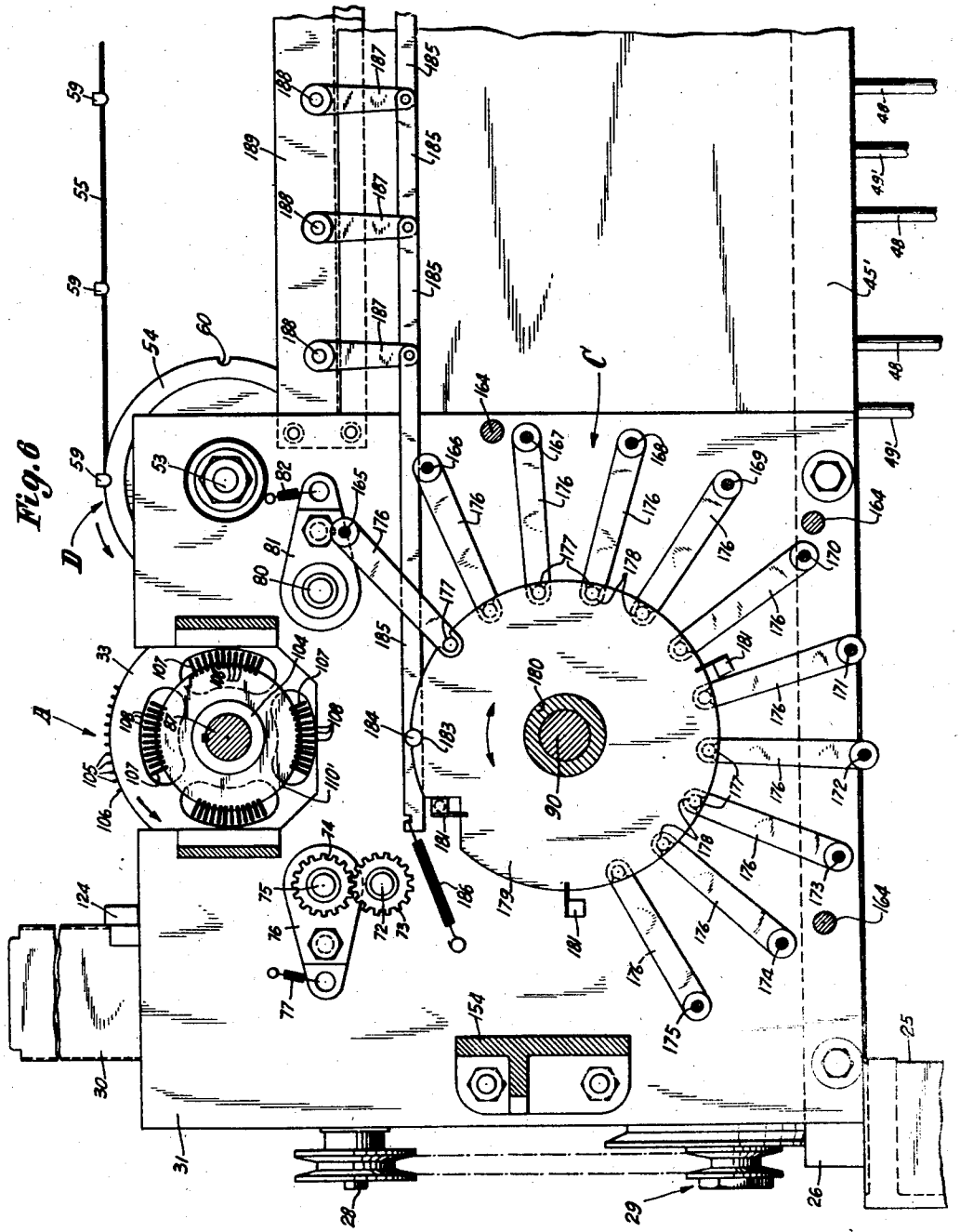
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PUNCHED CARD SORTING MACHINE

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Fig. 6



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PUNCHED CARD SORTING MACHINE

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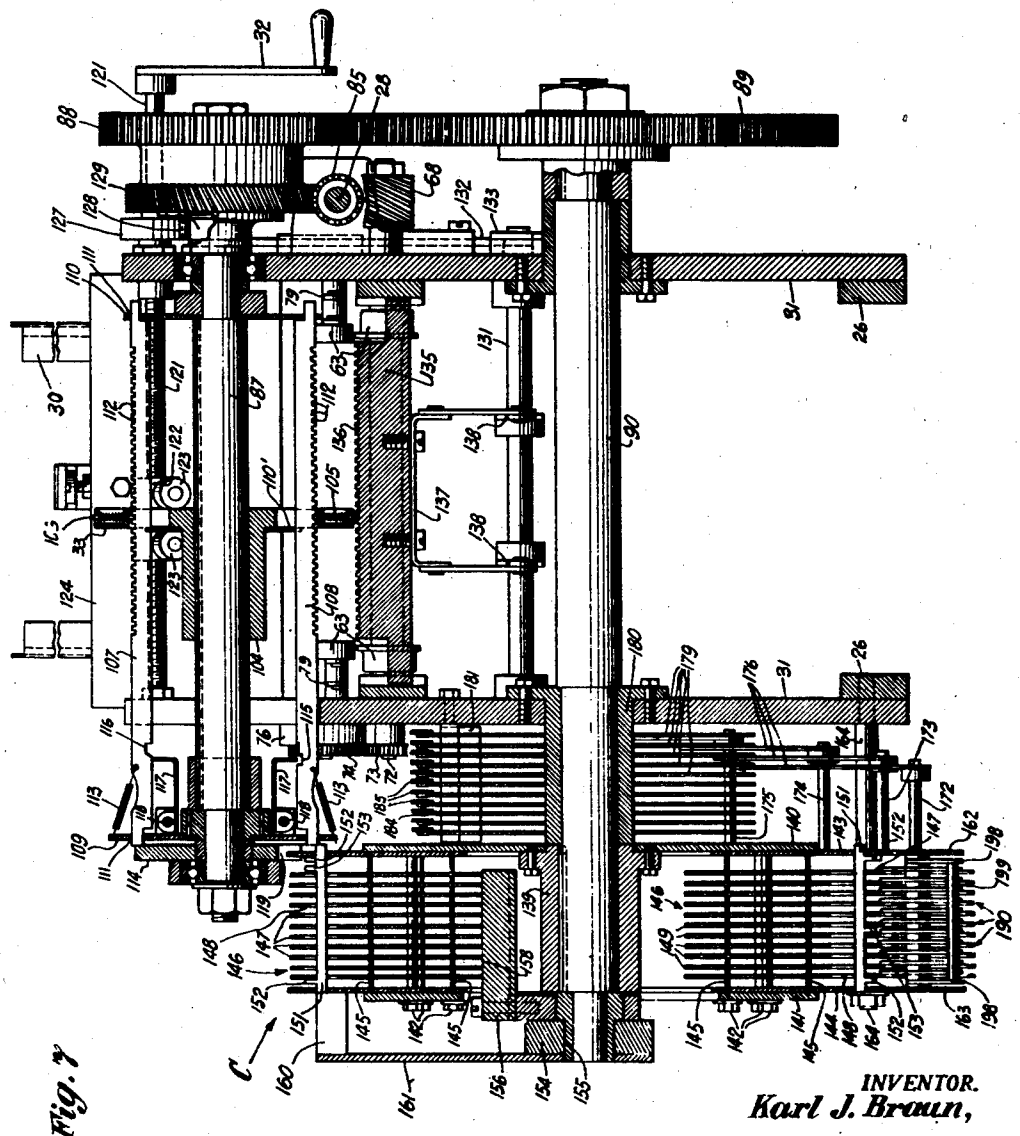


Fig. 7

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PUNCHED CARD SORTING MACHINE

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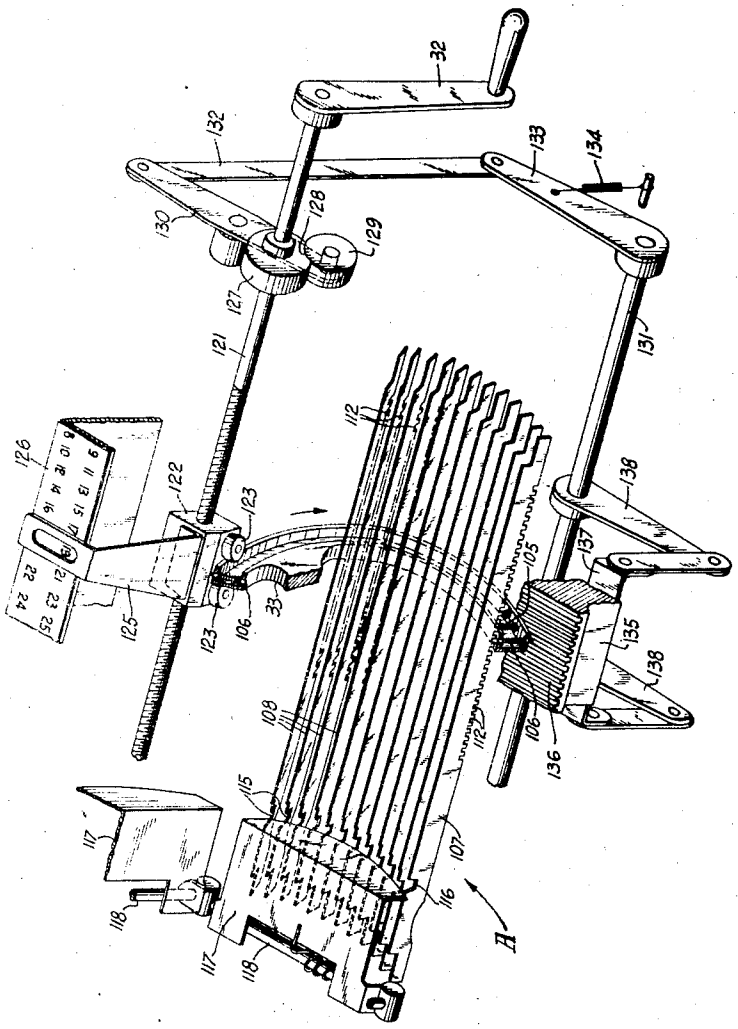


Fig. 8

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PUNCHED CARD SORTING MACHINE

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Fig. 9

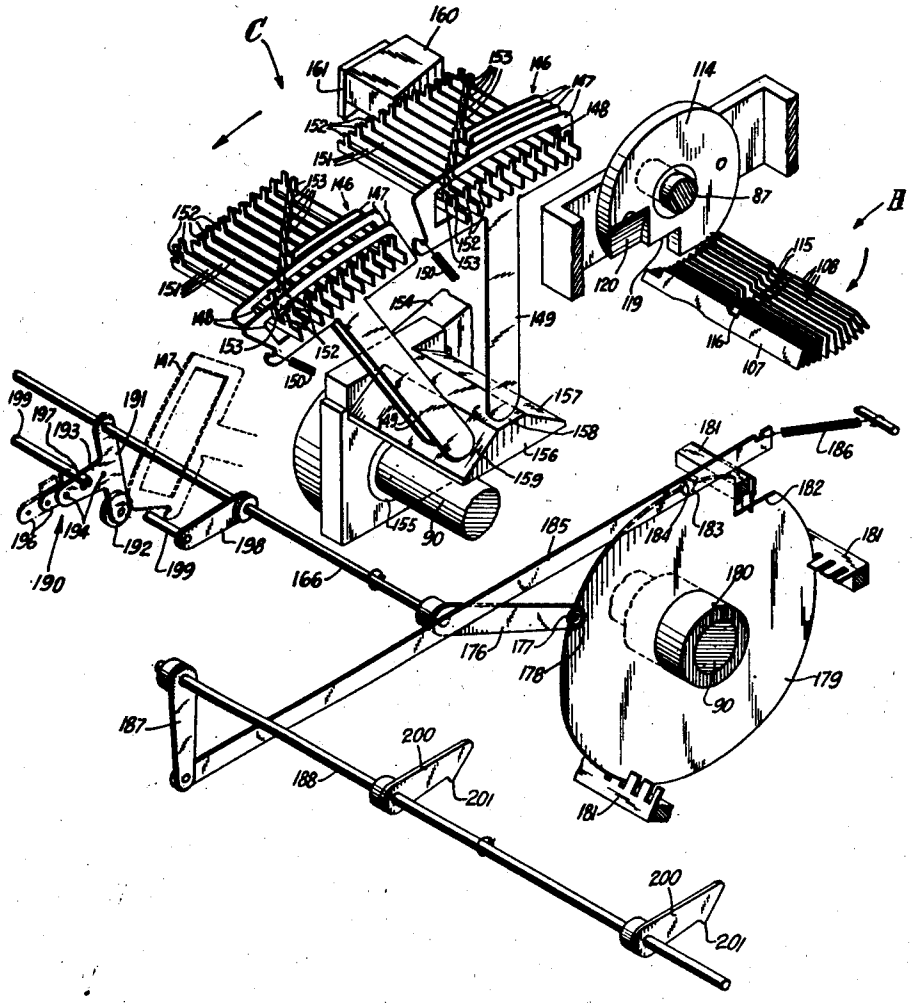
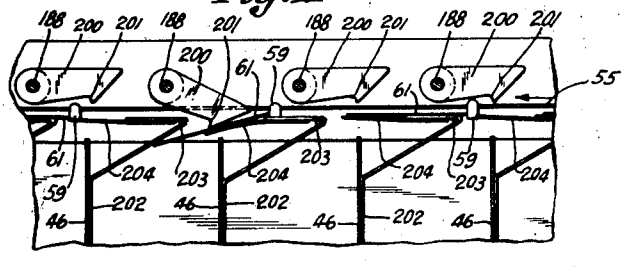


Fig. 11



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Patented Nov. 23, 1948 2,454,628

UNITED STATES PATENT OFFICE

2,454,628

PUNCHED CARD SORTING MACHINE

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Application November 25, 1944, Serial No. 565,108

22 Claims. (Cl. 209—110)

1

This invention relates to improvements in sorting machines and has particular reference to a machine for sorting cards bearing statistical records in the form of punched index points.

It is well known that, in machines of this character, pockets are arranged at varying distances from the sensing means where the cards are analyzed as they are fed thereto and that, by this analysis, said means selectively controls the distribution of said cards into the various pockets in timed relation to the movement of the cards from the sensing means. This has been accomplished both electrically and mechanically and, in the latter method, it has been the customary practice to sense the cards column-wise for index point perforations therein, and then distribute them into pockets corresponding to said perforations by the provision, at each pocket, of a timing mechanism operable under the control of the sensing means to open the pocket for which a card is destined as it approaches said pocket.

According to the present invention it is proposed to provide a machine embodying features of simplicity of construction and rapidity in the sensing and sorting of cards wherein a single timing and distribution control unit is provided with a plurality of actuating members each individual to a card index point and operable by the sensing of the perforation at one of said points to control the opening of the pocket intended to receive the card having said perforation therein; and further, in which said actuating members are periodically positioned in operative association with a sensing mechanism having means responsive to a sensed perforation in a card to select the actuating member individual to said perforation to thereby control the opening of the pocket for which said card is destined.

The inventive idea involved is capable of receiving a variety of mechanical expressions one of which, for purposes of illustration, is shown in the accompanying drawings; but it is to be expressly understood that said drawings are employed only to facilitate the description of the invention as a whole and not to define the limits thereof, reference being had to the appended claims for this purpose.

In the drawings:

Fig. 1 is a side elevation of the sorter constructed in accordance with the invention.

Fig. 2 is a top plan view thereof with the sensing unit partly broken away.

Fig. 3 is an enlarged fragmentary longitudinal sectional view.

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Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3 showing the card feeding mechanism.

Fig. 5 is an enlarged fragmentary side elevation, partly broken away and showing the timing and distributing mechanism disposed on the opposite side of the machine from Fig. 1.

Fig. 6 is an enlarged fragmentary longitudinal section taken on the line 6—6 of Fig. 2.

Fig. 7 is a transverse section taken on the line 7—7 of Fig. 5.

Fig. 8 is a fragmentary isometric view of the sensing unit, including the columnar adjusting mechanism for the sensing wheel of said unit.

Fig. 9 is an expanded fragmentary isometric view of the timing and distributing mechanism.

Fig. 10 is an enlarged fragmentary isometric view illustrating the mechanism for controlling the card-receiving pockets, and

Fig. 11 is an enlarged fragmentary longitudinal section showing a portion of the card-conveying means, and illustrating the manner in which cards are transmitted over and into the various pockets of the machine.

Referring more particularly to the drawings, the numeral 25 indicates the supporting framework of the machine from the horizontal portions 26 of which is suspended the prime mover 27 utilized to drive the main shaft 28 through the transmission indicated at 29.

Generally, a sorting operation consists in placing a stack of punched cards in the feed magazine 30 supported between side plates 31 at the right hand end of the machine, as view in Fig. 1. Before starting the motor 27, the operator turns the crank 32 in the proper direction to effect a columnar adjustment of the rotating disc or wheel 33 of the sensing unit A so that the desired index column of the cards in the magazine will be analyzed during their transitory movement beneath said unit. A reciprocating mechanism B operates to feed the bottom cards of the stack from said magazine to the sensing unit and, in accordance with the analysis of said cards at the sensing position, a timing and distributing mechanism C is controlled to distribute the cards at various stations which are in the form of pockets 34 to 45 arranged horizontally along the portions 26 of the main frame and provided with the back closure plate 45'. The first eleven of these pockets extending from the sensing unit receive, respectively, cards whose index points 11, 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9 in any column thereof are punched, while the twelfth pocket 45 is adapted to receive the reject cards. After analysis by the unit A, the cards are received by the endless conveyor system D and

carried along until each card approaches the pocket for which it is destined, at which time the mechanism C, in which a selective operation has taken place under control of the sensing unit, operates to open said pocket to permit entry of the card. Any card not sensed by the unit A or which does not contain a punched index point in the column thereof being analyzed, is carried by the conveyor system D to the reject pocket 45. The various pockets are formed by the vertical walls or partitions 46 in each of which is disposed a horizontal card supporting platform 47. A rod 48 depends from each platform and extends downwardly through a channeled guide 49 supported by rods 49' with the lower end of said rod 48 connected to said guide by a coil spring 50 that normally urges the platform 47 upwardly and is of such tension that said platform will gradually lower as the weight of the cards in its pocket increases.

The conveyor system D is driven from the main shaft 28 by a worm gear 51 thereon meshing with the large gear 52 carried by one end of the transverse shaft 53 supporting the two grooved pulleys 54 about which extend the two flexible conveyor belts 55. Other pulleys 56, around which the belts 55 also travel, are supported at the far end of the machine on an idler shaft 57 adjustably journaled in the blocks 58 so as to provide for proper adjustment of the tension of said belts. At regularly spaced intervals, the belts are provided with card-pushing elements in the form of lugs 59 engageable in notches 60 formed in the pulleys 54 and 56 so as to be driven thereby, and the spacing of said lugs is such that each opposed pair on the two belts will engage the following or rear edge of a card 61 as it is delivered from the sensing position, and will thus carry said card along and over the pockets until its proper destination is reached.

By reference to Figs. 1 and 3, it will be seen that as the cards 61 are fed from the magazine 30 and continuously through the sensing position to the conveyor D, they are successively engaged between pairs of feed rollers 62, 63, 64, 65 and 66 driven from the main shaft 28 by the worm gears 67 to 71, respectively. The upper roller 62 of the pair adjacent the magazine is positively driven by providing the opposite end of the shaft 72 from that on which the worm gear 67 is carried (Fig. 5) with a spur gear 73 which meshes with a similar gear 74 on the shaft 75 of said upper roller. The latter shaft has a slight vertical play and is supported by arms 76 pivoted on the opposed side plate 31 and to which is connected the springs 77 for exerting downward pressure on the upper roller. The lower rollers 63 and 64 at the sensing position are positively driven by their gears 68 and 69, while the upper rollers are bracketed (Fig. 2) and urged downwardly by a spring 78 connected to one end of a pivoted link 79 the other end of which is joined to the bracket for said upper rollers. The upper roller of the pair 65, the lower one of which is driven from the gear 70, has its shaft 80 (Figs. 5 and 6) carried by pivoted arms 81 on the side plates 31 and has a slight vertical movement the same as the upper roller 62. On the opposite sides of their pivots, the arms 81 are connected to springs 82 which exert downward pressure upon said upper roller 65 so as to maintain it in engagement with the associated lower roller. The gear 71 of the lower roller of the pair 66 is driven by the same gear 51 on the main shaft which drives the conveyor system D through the gear 52, while the upper roller of said pair 66 is carried at one end of a pivoted arm 83 (Fig. 3) and urged downwardly into contact with its lower roller by the spring 84 connected to the other end of said arm.

The sensing unit A is continuously driven from the worm gear 85 on the main shaft, which gear meshes with the worm wheel 86 carried by the shaft 87 of said unit. Also mounted on said shaft 87 is a spur gear 88 that drives the larger gear 89 secured on the shaft 90 that extends transversely through the side plates 31 and forms a common mounting for units of the timing and distributing mechanism generally indicated at C. The gear ratios are such that the sensing unit A will make three revolutions for each one of the timing unit of the mechanism C and, as will later appear, will sense four cards during each revolution; therefore, twelve cards will be analyzed and the distribution thereof controlled during each complete rotation of the timing unit.

The apertured bottom 91 of the magazine 30 is provided at the feeding end of the magazine with an upwardly and forwardly inclined guide plate 92 engaged by the center portion of the card as it is advanced and with which cooperates a vertically adjustable throat plate 93 to form a micrometer slot 94 through which only the lowermost card will pass upon each operation of the feed mechanism B.

This feed mechanism is of the reciprocating type and, as shown in Fig. 3, comprises a sliding face plate 95 upon a portion of which rests the lowermost card in a stack preparatory to the card being fed to the positively driven feed rollers 62. Said face plate 95 is supported by the block 96 movable between parallel guides 97 and carrying the picker knife 98 which, upon each forward movement of the block, engages the rear edge of only the lower-most card in the magazine and feeds the same through the slot 94 and between the rollers 62 for advancement to the sensing position beneath the unit A. To reciprocate the knife 98, a pitman 99 is connected to the shaft 72 which drives the lower roller 62, and said pitman is joined to and oscillates the rocker shaft 100 through the link 101. Rocker arm 102 secured on said shaft 100 has its upper end connected to the sliding block 96 by a link 103 so that said block is reciprocated to successively feed the cards from the magazine.

Sensing unit

Each analyzing operation of this unit during a revolution thereof performs the dual function of, first, detecting the presence or absence of a card at the sensing position and, second, of accomplishing the selecting operation in accordance with the valuation and position of a punched index point on a card, to which operation the timing and distributing mechanism C is responsive and is so controlled, as will hereinafter appear, that the sensed card will be directed to its proper pocket. At the beginning of each sensing operation if a card is not in proper position to be analyzed, this fact is detected by the unit A and any subsequent selective operation and consequent response of the mechanism C is prevented until another card is in proper position to be sensed. Also, it will be understood that any improperly positioned card or a card whose column being sensed contains no punched index point will, should it be passed through the sensing position, be conveyed to the reject pocket 45.

As previously stated, the unit A comprises shaft 87 driven from the main shaft 28 by the worm gear 85 thereon meshing with the worm wheel 86

fixed on one end of said shaft 87. The sensing wheel 33 of said unit is adjustable along the latter shaft and is provided with a hub 104 keyed on the shaft 87 for sliding movement thereon when a columnar adjustment of the wheel is effected, as will later appear. The peripheral portion of said wheel 33 has mounted therein a plurality of equally spaced groups of radially extending, spring pressed sensing pins 105. The springs of said pins normally urge the outer ends thereof beyond the periphery of the wheel and yieldingly permit said pins to move inwardly when they contact a card at the sensing position, which contact occurs when the pins find unpunched index points in the column of the card being sensed. Each of the four groups consists of twelve pins, the first of which to reach the sensing position, as the wheel 33 rotates, being the detector pin indicated at 106, while the succeeding ones of the group are each individual to one of the index point positions on a card as the latter progresses beneath said wheel. As will presently be described, the engagement of a pin 105 with an unperforated index point, and its consequent inward movement on the wheel 33, prevents a selective operation in the mechanism C by the unit A, while the passage of the pin through a perforated index point results in a selective operation by means of which said mechanism C will control the deposit of the card being sensed into the pocket assigned to the perforated index point position, when a straight sorting operation is being performed.

Associated with each group of sensing pins and rotatable with the shaft 87 is a group of twelve selectively operated elements in the form of slides including one detector slide 107 and eleven selector slides 108, the slide 107 being individual to the detector pin 106 while the slides 108 are each individual to one of the pins 105 and to one of the eleven index points in a card column. The various slides are supported for limited linear movement in the rotating end discs 109 and 110 carried adjacent opposite ends of the shaft 87 and said slides are guided in such movement by an intermediate comb 110'. Said discs are formed with slots 111 that receive the reduced ends of the slides, and the outer longitudinal edge of each slide is provided with a plurality of pin-receiving notches 112 corresponding to the number of columns in the cards. Each slide is constantly urged outwardly, or to the left as viewed in Fig. 7, by a coil spring 113 joining the slide with the end disc 109, but is prevented from doing so by engagement with a stationary disc cam 114 until the slide reaches the sensing position. Should the detector pin 106, which is the first of each group to arrive at said position as the unit A is constantly rotated, fail to engage a card between its leading edge and the first index point in the column being sensed, means are provided under the control of the detector pin and its slide 107 for locking all the other slides 108 in the group against outward movement and a consequent selective operation in the timing unit of the mechanism C. To this end, the various selector slides 108 of each group are provided in their inner edges with normally circumferentially aligned recesses 115 while the detector slide 107 is provided with a recess 116 which is normally offset linearly relative to the recesses 115. In this normal position, as shown in Figs. 7 and 8, a spring pressed bail 117, pivoted at 118 to a rotating part of the sensing unit, has its free arcuate edge resting against the inner edge of the slide 107 adjacent the recess 116 therein, and is thus prevented from entering the recesses 115 of

the selector slides with which said edge of the bail is aligned. However, should the detector pin 106 not engage a card at the sensing position in the manner above referred to, said pin will remain in its normally projected position on the wheel 33 and therefore its inner end will not enter a notch 112 in the detector slide 107. Consequently, the spring 113 of said slide will move it outwardly so that the reduced end thereof will enter a cut away portion 119 formed in the fixed cam 114 in alignment with the sensing position. In so moving, the recess 116 of the detector slide becomes circumferentially aligned with the recesses 115 in the eleven other slides 108 and the spring of said bail 117 thereupon causes the edge of the latter to enter all of said recesses 115, 116 to lock the selector slides 108 of the group against outward or selective movement as said slides successively pass through the sensing position. The result of this locking action is that the mechanism C will be unaffected by the sensing of a perforated index point in the card which has initially entered the sensing position improperly. On the other hand, should the detector pin 106 engage a card at the point previously indicated, said pin will be forced inwardly into engagement with the aligned notch 112 in the detector slide 107 and will thus lock the latter against outward movement and thereby prevent its notch 116 from aligning with the notches 115 in the other slides, thus maintaining the bail 117 in its inoperative or non-locking position. When the inner end of a detector pin 106 is engaged in a notch 112 in its slide 107 to prevent outward movement of the latter sufficiently to align its notch 116 with the notches 115 in the slides 108 and said slide 107 thereafter aligns itself with the cutout portion 119 of the cam 114, the spring 113 of said slide will urge the same outwardly a very slight distance, due to a small amount of lateral play of the detector pin 106 in its notch 112, and thus bind the inner end of said pin in said notch with enough friction to prevent the free outward movement of said pin under the influence of its spring, and this same condition prevails with respect to the sensing pins 105 and their slides 108. This condition is maintained after the detector pin has passed its detecting position and until the last sensing pin 105 has had an opportunity to sense for a perforation in the last index point position of a card column to control its associated slide 108, whereupon the slightly projected outer ends of the slides 107 and 108 contact the upper portion of the cam surface 120 which then pushes the slides inwardly to thereby relieve the binding action of the slides on their pins 105 and 106 which then restore to their normal projected positions preparatory to sensing a succeeding card. Therefore, during the rotating movement of the selector slides through the sensing position, each will be free to execute a linearly selective movement or not, depending upon whether the associated pin 105 finds a punched hole or engages an unpunched index point position. In the former event, the outer end of the pin will pass through the hole and the associated slide 108 will be free to move outwardly under the influence of its spring 113 to effect a selecting operation in the timing unit of the mechanism C, while in the latter event said pin will be forced inwardly into locking engagement with its slide and no selective operation will be performed by the slide. In either event, after the slides 107 and 108 of a group have passed the sensing position, the projecting end of any slide which may have been linearly actuated will engage the in-

clined surface 120 of the cam 114 and be forced inwardly thereby against the tension of its spring 113 so that the slide will be restored to normal until it again reaches the sensing position. Should the detector slide 107 be projected, as above described, to effect the locking of all other slides in the group, it will, upon its return to normal by the cam 114, force the bail 117 out of the recess 116 so that the locking edge of said bail will again be restored to its resting position on the inner edge of the slide 107 preparatory to the next detecting operation.

The columnar adjustment of the sensing wheel 33 and associated operations, best shown in Fig. 8, will now be described. It is understood that said adjustment is effected before starting a sorting operation and is for the purpose of positioning said wheel along the shaft 87 so that the sensing pins will rotate in a plane directly above a predetermined column of a card to be analyzed. Said adjustment is accomplished by means of a screw shaft 121 rotatably mounted in the side plates 31 and carrying a follower block 122 and rollers 123 which engage on opposite sides of said wheel 33. Said block contacts the front wall 124 of the magazine 30 so that as the shaft 121 is rotated in either direction the block will move therealong and thus shift the wheel across the sensing position. The pitch of the shaft 121 is such that one complete revolution thereof by the crank 32 will shift the block 122, and consequently the wheel 33, a distance equal to the space between two adjacent columns on a card. An apertured indicator 125 carried by the block 122 moves over an index scale 126 to indicate the position of the sensing wheel with respect to the card columns. In order that the turning of the shaft 121 may be terminated at the conclusion of a complete revolution and the sensing wheel positioned directly over the desired card column, said shaft carries a cam roller 127 having a transverse groove 128 in its periphery in which a roller 129 engages. The latter roller is carried by one end of a rocker arm 130 the other end of which is joined to a rocker shaft 131 by means of the link 132 and arm 133. A coil spring 134 exerts a constant downward pull upon the arms 133 and 130 so that the roller 129 will be maintained in contact with the roller 127 and the groove 128 therein.

At the sensing position, there is mounted for vertical movement a card supporting plate 135 which, during sorting, is in its up position so as to maintain the cards passing thereover in operative association with the sensing pins. For the purpose of permitting any pin which encounters a hole in a card to pass completely therethrough and thus not be forced inwardly toward its locking engagement with one of the slides 107, 108 by contact with the plate 135, the upper surface of said plate is provided with a plurality of channels 136 extending in the direction of movement of the cards for receiving the outer ends of said pins in any columnar position of the sensing wheel. Therefore, in order to prevent possible mutilation of the pins when adjusting the wheel 33, means are provided for lowering said plate 135 sufficiently to permit said pins to pass laterally thereover without contacting the side walls of any channel 136. To this end, the plate 135 is supported by a bracket 137 linked to the rocker arms 138 fixed upon the rocker shaft 131. With this arrangement, as the crank 32 is initially turned to effect an adjustment of the wheel 33, the cam roller 127 will depress the roller 129 as the latter is disengaged from the groove 128, and the arm 130 is thus moved about its pivot to rock the shaft 131 in the proper direction to depress the plate 135. With the roller 129 engaging the high surface of the cam roller 127, the plate 135 will be held in its lowered position free of the sensing pins until a complete revolution of the shaft 121 and consequent shifting of the wheel 33 the distance between two adjacent columns is effected, whereupon said roller 129 again enters the groove 128 under the influence of the spring 134, and the rocker arm 130 then reverses its movement to raise the plate 135 to its operative position.

Timing unit

This unit is selectively controlled from the sensing unit A by successive outward movements of the selector slides 108 of the various groups in the sensing unit when the sensing pins 105 individual to said slides encounter punched index points, as previously described. Such outward movements of the slides 108 are utilized to set up conditions in the timing unit which effect the opening of the proper pockets for receiving the sensed cards in timed relation to their movements from the sensing position.

Said timing unit, which is bodily removable from its operative position, comprises a hub 139 (Fig. 7) keyed on the shaft 90 for positive drive of the unit. Secured to the inner end of said hub is a circular plate 140 forming the back of the unit and joined to the front ring 141 thereof by a series of bolts 142 which also secure the inner ring plate 143 and the outer series of twelve segmental plates 144 in abutting relation with said members 140 and 141, respectively. Twelve pairs of radially aligned and transversely disposed spacer combs 145 are arranged equi-distantly about and between the plates 143, 144, with their outer and inner edges recessed therein for support thereby. Associated with each pair of combs 145 is a group of eleven radially movable and spaced apart actuating members in the form of cams 146, each individual to one of the eleven index point positions of a card and each consisting of a cam head 147 (Figs. 5 and 9) provided with an opening 148 and having the reduced shank 149 extending inwardly therefrom and through aligned slots in the associated pair of combs 145. The cams 146 of the twelve groups are normally and yieldably held against outward movement by springs 150 and their inward movement is limited by engagement of the inner edges of the heads 147 with the adjacent outer comb 145. As the timing unit rotates in synchronism with the sensing unit A, each group of cams 146 is successively moved outwardly in a radial direction, as will more clearly appear in the course of the description. This outward movement of the cams brings them into operative association, at the sensing position, with the group of the selector slides then at said position for a selective operation by one of said slides in the event that the detector slide 107 of said group is not actuated because of the fact that the detector pin 106 engaged a card properly fed to the sensing position, as previously described. The selection of one of the cams 146 of the goup moving past the sensing position is dependent upon the actuation of a slide 108 resulting from the sensing of a hole in the card by the sensing pin 105 individual to said slide, and said selection is effected through the medium of one of a group of latches 151 associated with said group of cams 146 and extending through the aligned openings 148 therein. Each latch of said group is individual to one of the associated cams 146 and conse-

quently to an index point of the card being sensed, and said latch is mounted for horizontal movements in the plates 143, 144, with the inner end of the latch normally projecting beyond the plate 143 for actuation by one of the slides 108 and consequent selection of one of the cams 146, as will more fully appear hereinafter. Each latch 151 is provided with lugs 152 adjacent its extremities which limit the inward and outward sliding movements of the latch by contact with the plates 143 and 144, respectively, and is further provided with a cam-engaging lug 153. The latter lugs of each group of latches are linearly spaced relative to each other, as clearly shown in Fig. 9, so that when a latch is operated by its corresponding slide 108 its lug 153 will be moved into the plane of the opening 148 of the cam to which it is individual, said cam having been previously moved to its selectable position in a manner now to be described.

The timing unit is retained in position on the shaft 90 by the offset bracket 154 secured to the adjacent side plate 31 and having a bearing 155 receiving the adjacent end of said shaft. Said bracket carries a stationary cam 156 which projects inwardly beneath the three uppermost groups of movable cams 146 shown in Fig. 5. Said cam 156 is formed with angular surfaces 157, 158 and 159, best shown in Fig. 9, over which the inner ends of the cam shanks 149 of said three uppermost groups of cams successively ride as each group approaches, passes through and recedes from the sensing position. The surface 157 forces the cams 146 of a group outwardly toward their selectable positions against the tension of the springs 150 so that any one of the latches 151 will be free for outward movement to position its lug 153 in a plane with the opening 148 of its corresponding cam 146. The surface 158 maintains the cams 146 in such condition while passing through the sensing position, as in Figs. 7 and 9. The surface 159 permits said cams to recede inwardly toward their normal positions under the influence of their springs 150, with the exception of any cam of the group whose latch 151 has been selectively operated by the slide 108 individual thereto. In the latter instance, the lug 153 of said latch is disposed in vertical alignment with its cam so that as the shank 149 of said cam leaves the surface 158 and the cam attempts to recede, said lug 153 will be contacted by the outer edge of the cam opening 148, and the cam will thus be held in its projected or outward position to perform a distributing operation later to be described. Any cam that has thus been held in its operative position will remain so until it has performed its distributing function and is again approaching the sensing position toward the end of the complete revolution of the timing unit, at which time the outer ends of the latches of the group in which said cam 146 appears will sweep pass the stationary cam 160 carried by the vertical arm 161 attached to and forming a part of the bracket 154. This action occurs concurrently with the engagement of the shanks 149 of the cam group with the surface 157 of the stationary cam 156 and before the sensing position is again reached, and any projected or operated latch 151 in said group will then contact cam 160 and be forced inwardly thereby to its normal position. The lug 153 of said latch will thus be disengaged from its cam 146 and the latter will be pulled inwardly by its spring 150 until the inner end of the shank 149 contacts the cam 156 whereby said cam 146, together with the other cams of the group, will again be successively forced outwardly and maintained thus by the surfaces 157 and 158 so that said cams will be in their selectable positions preparatory to another selecting operation under the control of the unit A.

Combined operation of sensing and timing units

Before proceeding to the description of the distribution of the sensed cards under control of the timing unit, the operational sequence of the sensing and timing units will be more fully described. Assuming that the sensing wheel 33 has been adjusted columnwise and further assuming that a card 61 has been fed from the magazine and is being moved toward the sensing position by the positive feed rollers 62, as the leading edge of the card reaches said position the detector pin 106 of one of the groups of sensing pins will also reach the stage in the revolution of the wheel 33 where it will either engage the card 61 between its leading edge and the first or #11 index point position or, in the case where said card may not have been properly fed to said sensing position, will not contact the card. In the latter instance, the detector pin 106 will not be forced inwardly and thus will fail to enter the aligned notch 112 of the detector slide 107. Therefore, the latter slide will be urged to the left, as viewed in Figs. 7 to 9, by its spring 113 so that its projected end will enter the cut away portion 119 of the cam 114 which is directly opposite the sensing position. This movement of the detector slide 107 aligns its recess 116 with the recesses 115 of the other slides 108 so that the bail 117 will enter all said recesses and thereby prevent any subsequent selective operation of the slides 108 while they are passing through said sensing position and until again brought into operative association with a properly fed card during a subsequent revolution of the sensing unit. The movement of the detector slide 107 performs no other function than that just described since, unlike the selector slides 108, it is not in opposed relation to any of the latches 151 while the sensing and timing units are passing through the sensing position. When the detector pin 106 encounters a properly fed card, said pin will be forced inwardly and engage in its aligned notch 112 in the slide 107, thus locking said slide against movement and leaving the slides 108 free for a selecting operation. When the sensing pin 105 individual to one of said slides 108 passes through a punched index point, said slide is permitted to move outwardly at the sensing position since it will not be locked against such movement by its pin 105. On the other hand, engagement of a pin 105 with an imperforate index point causes said pin to lock its slide 108 against movement.

At the instant of the outward movement of a released slide 108, the same has reached the position where it is directly opposed to the latch 151 of the group passing through the sensing position which is individual to the actuated slide 108 and to the punched index point of the card. The outward movement of the slide 108, which is now free of the cam 114, projects its latch 151 outwardly to its operative position where the lug 153 on said latch will be disposed in the plane of the opening 148 in its associated cam 146. In Fig. 9, the group of latches 108 of the sensing unit A are shown just prior to the instant when one of said slides is actuated and, for purposes of clarity in illustration, said slides are shown spaced a considerable distance from the associated latches 151 of the right hand group although, actually,

the adjacent ends of the slides and latches in their normal positions (Fig. 7) are very close together when at the sensing position.

With the sensing and timing units rotating in opposite directions, as indicated by the arrows, the various slides 108 of the group shown in Fig. 9 as passing through the sensing position will be directly opposed to their corresponding latches 151 during an interval of movement of the two units which is sufficient to permit any one of said slides to operate its latch. It will be assumed that the second slide 108 shown in Fig. 9 is about to be released due to the corresponding sensing pin 105 entering a hole at the second or #0 index point on the card. As soon as this occurs, said slide will be projected outwardly by its spring 113, causing the second latch 151 to also move outwardly to its operative position. At this time, the shanks 149 of the group of cams 146 at the right of said figure have been raised by the cam surface 157 and are now engaged with the surface 158, thereby raising the cam heads 147 so that their openings 148 are positioned to permit free linear movement of the selected latch 151 when it is actuated by its slide 108. The result of this operation is shown in the group of cams at the left wherein it will be observed that the second latch 151 is now in its projected position where its lug 153 is in the plane of the opening 148 in the second cam head 147 and the outer edge of said opening is resting on said lug. Therefore, the second cam 146 will be held in its operated position while the remaining cams of the group having no lugs 153 thereunder will recede toward their inner or inoperative positions under the influence of their springs 150 as the shanks 149 of said cams move over and disengage from the cam surface 159. After performing its selecting operation, the projected slide 108, upon continued rotation of the unit A, will engage the cam surface 120 of the stationary cam 114 and thus be restored to normal thereby, and held in such position by said cam until the group of slides has again reached the sensing position opposite the opening 119 in said cam 114. Likewise, the operated cam 146 in the group illustrated will be held by its latch in the operative position thereof until the card distributing function is accomplished and said group is again approaching the sensing position. At this time, the outer end of the projected latch 151 encounters the cam 160 and is restored to normal thereby, with the result that the lug 153 of said latch will release its operated cam 146, and the latter will be returned to normal by its spring 150 to again be controlled by the cam 156.

As the described group of cams 146 continues its movement from the sensing position following the operation of a latch 151, and the analyzed card is fed from said position to the conveyor system D by the series of rollers 63 to 66 (Fig. 3), the timed relation between this movement and that of the timing unit is such that the operated cam 146 of said group reaches the dotted line position in Fig. 9 at the moment that the card is passing over the first pocket 34 and is approaching the entrance to the second or #0 pocket 35 for which the card is destined. The action which then takes place under the control of said cam 146 and that results in the deposit of said card into the pocket 35, will be later described.

Distributing mechanism

This mechanism comprises a stationary framework consisting of inner and outer arcuate plates 162 and 163 of substantially semi-circular formation which extend partially about the timing unit (see Fig. 5). Said plates are supported in position by a series of three bolts 164 having their inner ends secured in the adjacent side plate 31 (Fig. 7), and are vertically aligned, respectively, with the inner plate 143 and the outer segmental plates 144 of said timing unit. Beginning with the upper right hand extremities of the two plates 162, 163, as viewed in Fig. 5, there are mounted therein eleven equidistantly spaced rocker shafts 165 to 175 each individual to one of the pockets 34 to 44, respectively. The rocker shafts are, with respect to their numerical order, of progressively increasing length, as will be noted from Fig. 7, and the inner end of each shaft has secured thereto one end of an arm 176 the other end of which (Fig. 9) carries a stud 177 engageable in a recess 178 in the periphery of a pocket control member in the form of an oscillatory disc 179 individual to one of the card pockets and to one of the cams 146 in each of the twelve groups comprising the timing unit, the disc shown in Fig. 9 being assigned to the second pocket 35 and to the second cams 146 of said various groups. The eleven discs 179 are mounted for oscillatory movement on a fixed bearing 180 through which the shaft 90 extends, said shaft thus providing a common mounting for the various pocket control members 179 and the timing unit. The discs 179 are guided by combs 181, one of which extends through an angular opening 182 in each disc so that the oscillatory movements of all the discs will be limited by engagement of the edges of said opening with said comb. Said discs are further provided in their peripheries with normally aligned recesses 183 for receiving the studs 184 projecting from the sides of a series of eleven operating links 185 each connecting its disc to the pocket individual thereto. Thus, as best shown in Fig. 2, the outermost disc 179 is operatively connected to the first pocket 34, the next outermost disc (the one illustrated in Fig. 9) to the second pocket 35, and so on. A coil spring 186 is connected to the end of each link 185 adjacent its disc for yieldingly retaining said element in its normal position and for restoring the same and its associated rocket shaft 165, etc., to said position at the conclusion of each card distributing operation under control of one of the cams 146. The links 185 increase in length from the pocket 34 to the pocket 44 but otherwise are of the same construction and operate similarly. At the end of each link opposite the spring 186, the same is connected by an arm 187 to a rocket shaft 188 journaled in the side rails 189 (Fig. 2) and extending transversely over its associated pocket. The shaft 188 is actuated by the linear movement of its link 185 to open the pocket for the entrance of a card, as will later appear.

The means for rocking each of the various shafts 165 to 175 comprises a series of eleven adjustable tripping units, each generally indicated at 190, mounted on each of said shafts, and each unit is individual to one of the cams 146 of each of the twelve groups included in the timing unit. Thus, the tripping unit shown in Fig. 9 is individual to the second innermost cam, which has been actuated and is about to operate said unit as shown in dotted lines, and also to all the second cams of the remaining groups. As will presently be set forth in detail, when accomplishing what is generally known as a straight sorting operation, only one tripping unit 190 is

made operative on each of the eleven shafts 165 to 175, while all other units are adjusted to inoperative positions. However, in split or selective sorting, two or more different units 190, according to the number of index points in any preselected combination, are made operative on any one of the shafts 165 to 175 depending upon which one of the pockets is to be utilized in collecting, during a single sorting operation, those cards containing the punched index points of said combination. Further, it is possible with the present construction, and also during a single sorting operation, to preselect two or more combinations of index points by adjusting to operative position on two or more different shafts, the proper units 190 corresponding to the index points of each combination. In so doing, the cards having punched index points of each of the combinations are sorted into the different pockets individual to the rocker shafts on which said combinations have been set up.

Each of the tripping units 190 comprises a T-shaped member 191 loosely supported, at one of its extremities, on its rocker shaft such as the shaft 166 in Fig. 9, while the opposite extremity carries a roller 192 adapted for contact with and movement by the operated cam 146 when said unit is made operative. The right angular extension 193 of said member carries two guide pins 194 (see also Fig. 5) which project through slots 195 formed in an adjusting slide 196 to guide the latter along said extension and to maintain the slide in such frictional contact with the extension that said slide will remain in either of its adjusted positions. Projecting from one edge of the slide 196 intermediate its ends is a lug 197 which, in the operative position of the slide, is adapted to cause a turning movement of the shaft 166 in the direction of the arrow in the following manner. A rocking frame is carried by the rocker shaft and is common to all the units 190 thereon. Said frame includes two arms 198 (see Fig. 2 for the other arm) secured to the shaft exteriorly of the group of units 190, and said arms are joined by the rod 199 which extends across said units. When the lug 197 is in its operative position, the rod 199 is in the path of movement of said lug as the member 191 is rocked relative to the shaft 166 by contact of the cam 146 with the roller 192 as said cam proceeds in its movement from the dotted line position of Fig. 9. The lug 197 will therefore swing the rocking frame which, being fixed to said shaft 166, will turn the latter in the proper direction. Restoration of said shaft and its frame, after disengagement of the cam 146 from the roller 192, is effected by the return movement of the link 185 under the influence of its spring 186. When it is desired to adjust any unit 190 out of operative association with its cams 146, it is only necessary to pull the slide 196 outwardly to its dotted line position, thereby removing the lug 197 to an offset position relative to the rod 199 so that any movement of the member 191 about the shaft 166 will not result in a contact of the lug 197 with the rod 199 and consequent operation of the rocking frame.

From the foregoing description, it will be apparent that each shaft 188 is rocked, by the actuation of the disc 179 connected to said shaft, in timed relation with the engagement of an operated cam 146 with an operative unit 190 on the rocker shaft to which said disc is individual. The rocking of said shaft 188 forces downwardly, from normally raised positions, two pressure members 200 in the form of arms fixed on said shaft and each having its free end provided with a projection 201. The operated position of the arms 200 is shown in Fig. 10 with respect to the second pocket 35 which is the one to receive the card whose analysis was set forth in connection with the description of Fig. 9. Each of the pockets 34 to 44, inclusive, is provided with two deflectors 202 secured to the left wall of the pocket in vertical alignment with the arms 200. The horizontal disposed upper end 203 of each deflector acts as a support for the cards as they travel along above the pockets under control of the lugs 59 on the conveyor belts 55, and also has attached to the under surface thereof a resilient, normally horizontal, closure member 204 for the next pocket succeeding that one in which the deflector is disposed. Thus, the closure members 204 overlying a portion of the pocket 35 are carried by the deflectors 202 located in the pocket 34, and so on. Said members 204 also provide additional support for the cards as they are conveyed over the pockets.

When the arms 200 of the pocket 35 are depressed, which occurs as the card 61 shown in dotted lines in Fig. 10 is passing over the pocket 34 and approaching said pocket 35, the projections 201 of said arms contact the resilient closures 204 for the latter pocket and flex the same downwardly to the position shown. Then the leading edge of the card contacts and passes under the free ends of the arms 200 and the card is thereby stripped, by positive action, from the conveyor belts 55 and diverted downwardly into the upper end of the pocket 35 where said leading edge contacts the inclined portions of the deflectors 202 and finally comes to rest on top of the platform 47. In addition to the described functions of the arms 200, it will be apparent that should a card, as it approaches the pocket for which it is destined, be so positioned, when carried along by the conveyor, that its leading edge is not exactly at right angles to the direction of its travel, the then leading portion of said edge will first engage the projection 201 of one of the arms 200 and be momentarily retarded thereby until the trailing portion of said edge contacts the projection 201 of the other arm 200, whereupon the leading edge will be shifted so that the card will enter its pocket in the correct position.

Straight sorting operation

When preparing the machine for a straight sorting operation in which each card having a punched index point in the column thereof being analyzed is directed to the pocket individual to said point, only one of the units 190 on each of the eleven rocker shafts 165 to 175 is made operative, and the ten remaining units on each of said shafts are disabled by pulling out the slides 196 thereof. On the shaft 165, individual to the first pocket 34, the innermost unit 190 thereon is made operative so that it will be actuated by any one of the innermost cams 146 of the various groups in the timing mechanism that has been selected and held projected by its latch 151, while the remaining units 190 on said shaft are all made inoperative so that they will be incapable of rocking said shaft when contacted by operated cams 146 in the various groups as they successively pass the shaft during rotation of the timing unit. Therefore, said shaft 165 will be rocked to open the first pocket 34 so as to receive any card whose #11 index point position is punched, only when one of the innermost cams 146 has been projected out-

wardly and held thusly by its operated latch 151 controlled by the sensing unit. In the same manner, for the deposit into pocket 35 of a card whose #0 index point is punched, only the next innermost unit 190 on the shaft 166 shown in Fig. 9 is made operative, and all other units on said shaft are disabled. Similar adjustments on the remaining rocker shafts 167 to 175 are effected in a manner now understood, with the result that each card will be deposited into its respective pocket in accordance with the valuation of the punched index point in the column thereof being analyzed, and with the further result that any card containing no perforation in said column will be conveyed to the reject pocket 45 whose deflectors 205 (Fig. 1) have their upper ends extended above the plane of travel of the cards so as to guide them into said pocket.

Selective sorting operation

This method of sorting, as distinguished from straight sorting, involves an operation in which a plurality of cards containing amongst them a preselected group of differently punched index points, is sorted out during a single run of the machine. As hereinbefore stated, certain known machines are only capable of grouping such cards by either gathering all the desired ones in the reject pocket, or by sorting them into a number of different pockets equal to the number of index points in the preselected group; and further, such machines can accomplish the sorting of only one such group of cards during a single run.

As distinguished from the above methods, the present machine is capable of depositing all cards containing the desired group of index points into any one of the pockets which is individual to one of the index points included in said group, or into any other pocket of the machine, while either depositing all other cards into the reject pocket or sorting them into their respective pockets. Additionally, it is possible to preselect two or more different groups of index points and, during a single sorting operation, gather all cards of each group into a different pocket.

The above functions are accomplished in the following manner. It will be first assumed that it is desired to sort into pocket 35 all cards whose punched index points comprise the group of the three identifying characters or numbers 0, 2, and 4, and that it is further desired to deposit all other cards into the reject pocket including those having no perforations in the column being analyzed. On the shaft 166 individual to the pocket 35, the second, fourth and sixth innermost units 190 corresponding to the 0, 2 and 4 index point positions are made operative, and all other units on the said shaft and on the remaining ten shafts 165 and 167 to 175 are disabled. With this set up, it becomes apparent from the foregoing description that each time any one of the three operative units 190 is tripped by an operated cam 146 in any one of the twelve groups with which said unit is circumferentially aligned, the shaft 166 will be rocked to open the pocket 35 and all cards punched with the desired and preselected combination will enter said pocket to the exclusion of all the other pockets. By performing the same set-up on either of the two shafts 168 or 170 individual to the other two index points 2 or 4 of the desired group, or on any one of the remaining shafts, it becomes obvious that the same result of gathering into only one pocket all the cards containing the preselected group of index points, is attained. With only one of the pockets capable of being opened to receive the desired cards, the remaining cards, even though they may be punched at index point positions other than those included in said group, will pass over all the pockets 34 to 44 and enter the reject pocket 45 in their original sequence. This takes place notwithstanding the fact that one or more of the cams 146 individual to said other index point positions may be projected to operative position by the sensing unit, for when said operated cams engage the disabled units 190 on the various shafts the latter are not rocked and consequently their pockets are not opened. Now, should it be desired to sort the remaining cards instead of directing them to the reject pocket, it is only necessary to render operative one unit 190 on each of the shafts 165, and 167 to 175 just as described in connection with the straight sorting operation.

Assume now that two groups of preselected index points are to be sorted during a single run of the machine, and for simplicity of description, let one of the groups be the one above described and another be the combination including the index points 1, 3, 5 and 6. After setting up the first of said groups in the manner described, the second one is prepared by making operative the third, fifth, seventh and eighth innermost units 190 on either one of the shafts 167, 169, 171 or 172, and the remaining units 190 on the selected shaft and those on all the remaining shafts are disabled. The sensed cards containing the groups of index points will now be sorted into the two pockets individual to the selected shafts and all other cards will enter the reject pocket, or be straight sorted if the proper set-up is made on the remaining shafts, as previously described. It will be further seen that one or two additional groups may be made up from the remaining index points 11, 7, 8 and 9, or these points may be separately sorted by following the same procedure as above outlined in connection with straight sorting.

From the foregoing description, it is observed that the multiplicity of adjustments of which the machine is capable renders it universal with respect to both straight and selective sorting.

What is claimed is:

1. In a sorter, a sensing means, a plurality of pockets into which cards are selectively deposited in conformity with the analysis of the cards by said sensing means, a rotary timing unit common to said pockets, said unit including a plurality of actuating members having operative association with said sensing means for selection thereby and each individual to one of said pockets and to an index point of the cards being sensed, a shaft about which said unit rotates, oscillatory members each individual to one of said pockets and supported upon and movable about said shaft as an axis, each of said oscillatory members having operative connection with one of said actuating members, and means connecting each oscillatory member with its pocket so as to open the same when said member is operated by a selected one of said actuating members.

2. In a sorter, sensing elements, a plurality of pockets into which sensed cards are deposited, selectively operated means controlled by said sensing elements, a movable timing unit including a framework and a plurality of actuating members supported therein for movement relative thereto for selection by said selectively operative means and each individual to one of said pockets, operating means for moving said actu-

ating members in unison to selective position and immediately restoring those members not selected, a plurality of trip members each individual to one of said pockets and each operable by a selected one of said actuating members, and means controlled by an operated trip member for opening its corresponding pocket.

3. In a sorter, sensing elements, a plurality of pockets into which sensed cards are deposited, selectively operated means controlled by said sensing elements, a rotary timing unit including a framework and a plurality of actuating members supported therein for movement relative thereto for selection by said selectively operated means and each individual to one of said pockets, operating means for moving said actuating members in unison to a selective position and immediately restoring those members not selected, a plurality of trip members each individual to one of said pockets arranged in angularly spaced relation about said timing unit and each operable by a selected one of said actuating members, a plurality of pocket control members each connected to one of said trip members for operation thereby to open the pocket corresponding thereto, and a shaft upon which said operating means, said timing unit and said pocket control members are mounted.

4. In a sorter, a sensing means, a plurality of pockets for receiving sensed cards, a movable timing unit including a plurality of actuating members having operative association with said sensing means for selection thereby and each individual to one of said pockets, a plurality of groups of trip members arranged about said timing unit and adjustable relative to said actuating members, the members of each group being each individual to a different one of said pockets, means to adjust any one of the trip members of the several groups which is individual to one of said pockets into operative relation to a selected actuating member for actuation thereby, and means controlled by the actuation of said trip member for opening said pocket.

5. In a sorter, a sensing means, a plurality of pockets for receiving sensed cards, a movable timing unit including a plurality of actuating members having operative association with said sensing means for selection thereby and each individual to one of said pockets, a plurality of groups of trip members arranged about said timing unit and adjustable relative to said actuating members, the members of each group being each individual to a different one of said pockets, means to adjust any one of the trip members of the several groups which is individual to one of said pockets into operative relation to a selected actuating member for actuation thereby, a plurality of pocket control members each operatively connected to a group of said trip members and each individual to one of said pockets, and operative connections between each control member and its pocket.

6. In a sorter, a sensing means, a plurality of pockets for receiving sensed cards, a movable timing unit including a plurality of actuating members having operative association with said sensing means for selection thereby and each individual to one of said sprockets, a plurality of groups of trip members arranged about said timing unit and adjustable relative to said actuating members, the members of each group being each individual to a different one of said pockets, means to adjust any one of the trip members of the several groups which is individual to one of said pockets into operative relation to a selected actuating member for actuation thereby, a plurality of pocket control members each operatively connected to a group of said trip members and each individual to one of said pockets, operative connections between each control member and its pocket, and a common mounting for said timing unit and said pocket control members.

7. In a sorter, a sensing means, a plurality of pockets into which sensed cards are deposited, a rotating timing unit including a plurality of actuating cams supported for radial movement thereon and each individual to one of said pockets, cam selecting means controlled by said sensing means, means to periodically associate said cams with said selecting means by moving the same radially in unison in one direction for selection of one of said cams, means to thereupon move the other cams in opposite radial direction, a plurality of trip members each individual to one of said pockets and to one of said cams and operated by the latter following selection thereof by said sensing means, and means controlled by the operation of said trip members to open the respective pockets.

8. In a sorter, a sensing means, a plurality of pockets into which sensed cards are deposited, a rotating timing unit including a plurality of actuating cams slidably supported for radial movement thereon and each individual to one of said pockets, cam selecting means controlled by said sensing means, means to periodically move said cams in one direction to associate the same with said selecting means for selection of one of said cams, means to thereupon move the other cams in an opposite direction, a plurality of trip members each individual to one of said pockets and to one of said cams and operated by the latter following selection thereof by said sensing means, and a plurality of oscillatory pocket control members each individual to one of said pockets and operatively connected to one of said trip members for actuation thereby to open the corresponding pocket.

9. In a sorter, a sensing means, a plurality of pockets into which sensed cards are deposited, a rotating timing unit including a plurality of actuating cams slidably supported for radial movement thereon and each individual to one of said pockets, cam selecting means controlled by said sensing means, means to periodically slide said cams in one direction to associate the same with selecting means for selection of one of said cams, means to thereupon move the other cams in an opposite direction, a plurality of trip members each individual to one of said pockets and to one of said came and operated by the latter following selection thereof by said sensing means, and a plurality of oscillatory pocket control members having a common center of oscillation about the axis of rotation of said timing unit and each individual to one of said pockets and operatively connected to one of said trip members for actuation thereby to open the corresponding pocket.

10. In a distributing mechanism for card sorting machines wherein the cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating thereon, a stationary supporting frame extending about said timing unit and including a plurality of circumferentially arranged rocker shafts, a plurality of selectively controlled actuating members forming part of said timing unit and each individual to one of said pockets, a plurality of oscillatory pocket

control members on said shaft, an operating connection between each of said rocket shafts and one of said oscillatory members, and a trip member on each rocket shaft individual to and operated by a selected one of said actuating members.

11. In a distributing mechanism for card sorting machines wherein the cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating thereon, a stationary supporting frame extending about said timing unit and including a plurality of circumferentially arranged rocker shafts, groups of selectively controlled actuating members forming part of said timing unit, each group having members thereof each individual to one of said pockets, a plurality of oscillatory members mounted on said shaft and each individual to one of said pockets, an operating connection between each of said rocker shafts and one of said oscillatory members, and a plurality of trip members on each rocker shaft, each movable thereon into operative association with one of said actuating members in each of said groups.

12. In a distributing mechanism for card sorting machines wherein the cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating thereon, a stationary supporting frame extending about said timing unit and including a plurality of circumferentially arranged rocker shafts, a plurality of selectively controlled actuating members forming part of said timing unit and each individual to one of said pockets, a plurality of oscillatory pocket control members on said shaft, an operating connection between each of said rocker shafts and one of said oscillatory members, a trip member on each rocker shaft individual to and operated by a selected one of said actuating members, said trip members being linearly spaced on said rocker shafts relative to each other.

13. In a sorter, rotatable sensing means movable through a sensing position and including a detector pin and a plurality of sensing pins for analyzing cards during transitory movement through said position, mechanism responsive to said sensing pins for distributing cards after being sensed, a movable control element operatively associated with said detector pin for engagement thereby to lock said element against movement when said pin contacts a card at said sensing position, means responsive to the failure of said pin to engage a card to move said control element, and means activated by the movement of said control element to prevent said mechanism from responding to said sensing pins.

14. In a sorter, sensing means movable through a sensing position and including a rotating wheel, a detector pin and a plurality of sensing pins arranged circumferentially about said wheel, a selecting mechanism including a plurality of slides each individual to one of said pins and provided with means engageable by its pin when the latter contacts a card to prevent movement of the slide, and means controlled by a movement of the slide individual to said detector pin for locking all said slides should the latter pin fail to engage a card at said sensing position.

15. In a sorter, sensing means including a rotating wheel, a detector pin and a plurality of sensing pins arranged circumferentially about said wheel, a selecting mechanism including a plurality of slides each individual to one of said pins, all said slides having circumferentially aligned notches therein for receiving said pins when they engage a card, the slides individual to said sensing pins having circumferentially aligned recesses therein and the slide individual to said detector pin having a recess normally offset from said aligned recesses, means to shift the latter slide to align its recess with the other recesses when said detector pin fails to engage a card, a common bail for said slides held out of said recesses by said latter slide when its recess is offset, and means to urge said bail into the recesses of said sensing and detector slides when said recesses are all aligned.

16. In a sorter, a sensing means, a selecting mechanism controlled by said sensing means and including a plurality of slides each individual to an index point in a card column and each movable when a hole is sensed at its corresponding index point, a plurality of latching bars each actuated to latching position by one of said slides when it is moved, an actuating cam associated with each of said bars and having operative and inoperative positions, means to move said cams to operative position in timed relation to the actuation of said bars so that the cam individual to an actuated bar will be latched in its operative position, means to then restore the remaining cams to inoperative position, a plurality of card-receiving pockets each individual to one of said cams, and means operated by the latched cam to open the corresponding pocket.

17. In a sorter, a continuously rotating sensing means, a plurality of pockets into which cards are selectively deposited in conformity with the analysis of the cards by said sensing means, a shaft, a single timing unit rotatable about said shaft and common to all said pockets, said unit including a plurality of actuating members arranged side by side along said shaft and radially slidable with respect thereto to positions of selection and each individual to one of said pockets, means to so move said actuating members, means controlled by said sensing means to select one of said actuating members after it has been radially moved, and means controlled by the selected member for opening one of said pockets.

18. In a sorter, a rotatable sensing means, a plurality of pockets into which cards are selectively deposited in conformity with the analysis of the cards by said sensing means, a single rotary timing unit common to said pockets and including a plurality of actuating members rotating with said unit into periodic proximity to said sensing means and also movable radially with respect to the axis of rotation of said unit, means to radially move said actuating members, means to rotate said sensing means and timing unit in opposite directions, means controlled by said sensing means to select one of said actuating members after it has been radially moved, and means controlled by the selected member for opening one of said pockets.

19. In a sorter wherein cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating about said shaft and including a group of selectable actuating members movable with respect to the rotation of said unit from normal positions and each individual to one of said pockets for controlling the opening thereof, means to periodically move said group of members to selective position, means to select one of the members at said position, means thereupon cooperating with said moving means to restore to normal all said elements not selected, and means thereafter controlled by the selected member for opening its associated pocket.

20. In a sorter wherein cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating about said shaft and including a group of selectable actuating members movable with respect to the rotation of said unit from normal positions and each individual to one of said pockets for controlling the opening thereof, a cam operable to periodically and simultaneously move all the members of said group from normal to a selective position, means to select one of the members at said position, means cooperating with said cam to thereupon restore to normal all said members not selected, and means thereafter controlled by the selected member for opening its associated pocket.

21. In a sorter wherein cards are sensed and distributed into a plurality of pockets, a shaft, a timing unit rotating about said shaft and including a group of selectable actuating members reciprocatingly mounted in said unit and each individual to one of said pockets for controlling the opening thereof, means to periodically move said group of members as a unit in one direction to selective position, a group of sliding latches associated with said group of actuating members and having interposing movements transverse thereto, means responsive to the sensing of a card to operate one of said latches to engage and retain one of said actuating members in its selective position until the pocket individual thereto has been opened, and means controlled by the selected member for opening its associated pocket.

22. In a distributing mechanism for card sorting machines wherein the cards are sensed and distributed into a plurality of pockets, a sensing means, a timing unit comprising a group of selectively controlled actuating members having aligned openings and movable as a group from

an inoperative to an operative position, means to so move said group, an associated group of sliding latches operated by said sensing means and extending through said openings, each latch having a lug thereon individual to one of said actuating members and movable with its latch into engagement with its actuating member to support the latter in its operative position when said latch is operated by said sensing means, and means responsive to said actuating member for opening one of said pockets.

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