June 11, 1929. J. S. WYLLIE 1,716,677

SORTING MACHINE

Filed Jan. 11, 1927 8 Sheets-Sheet 1

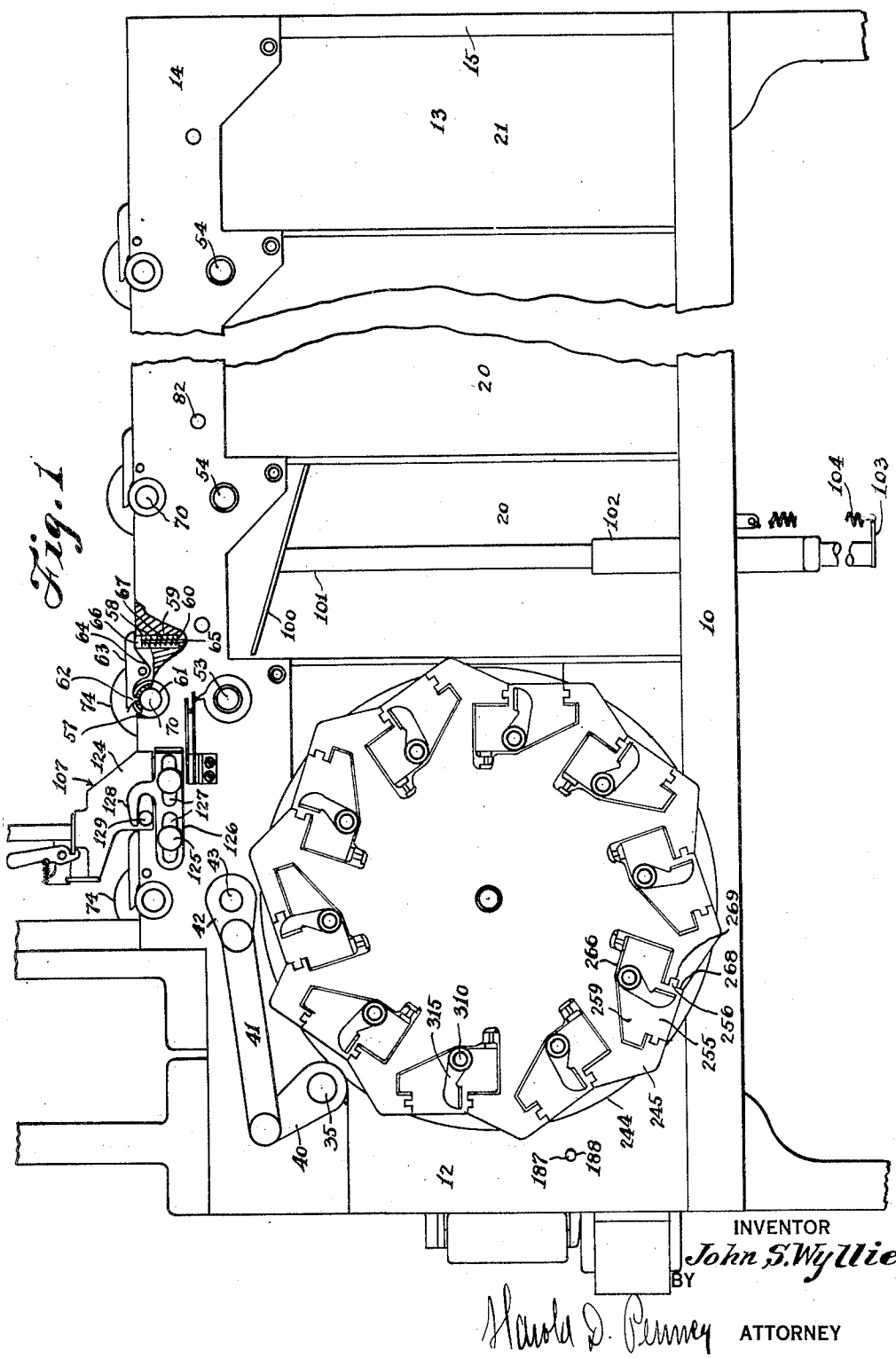


Fig. 1

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SORTING MACHINE

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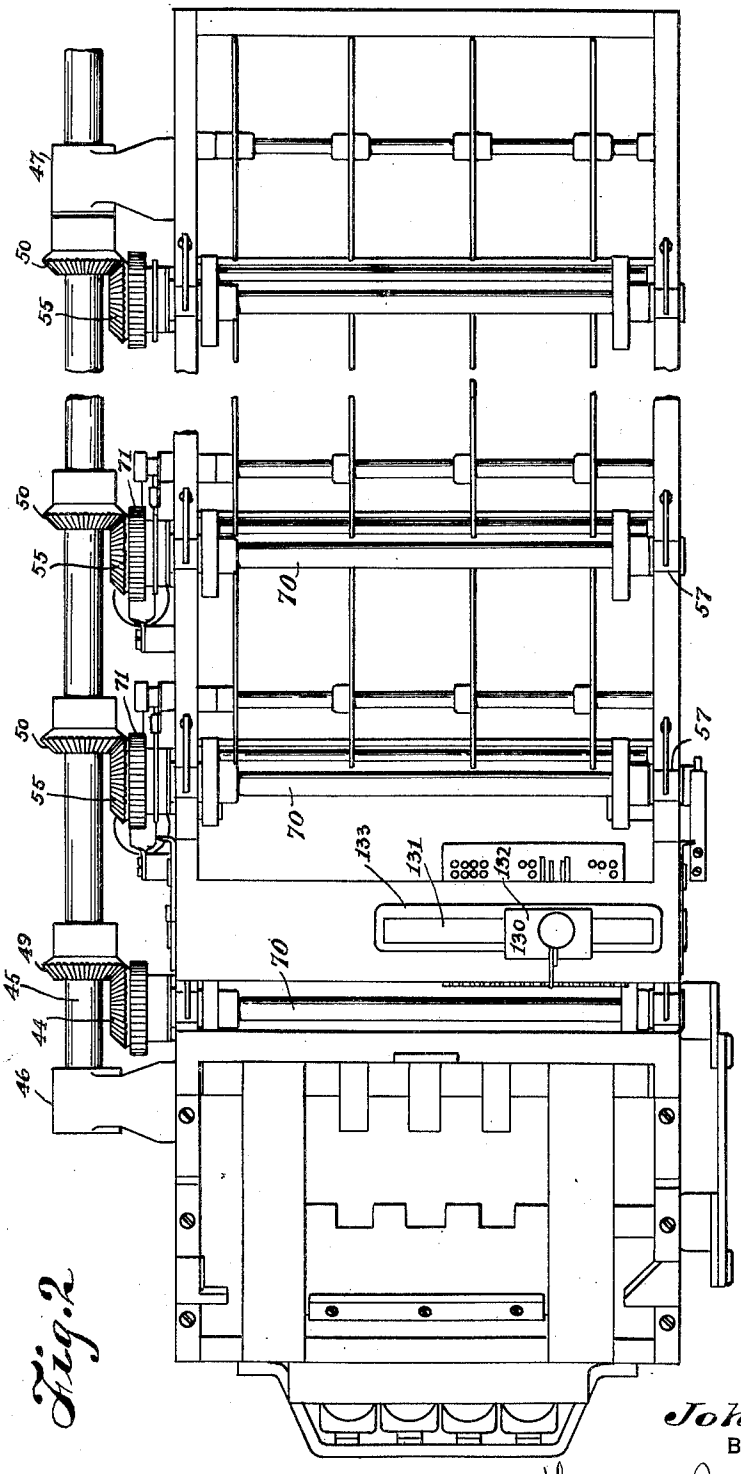


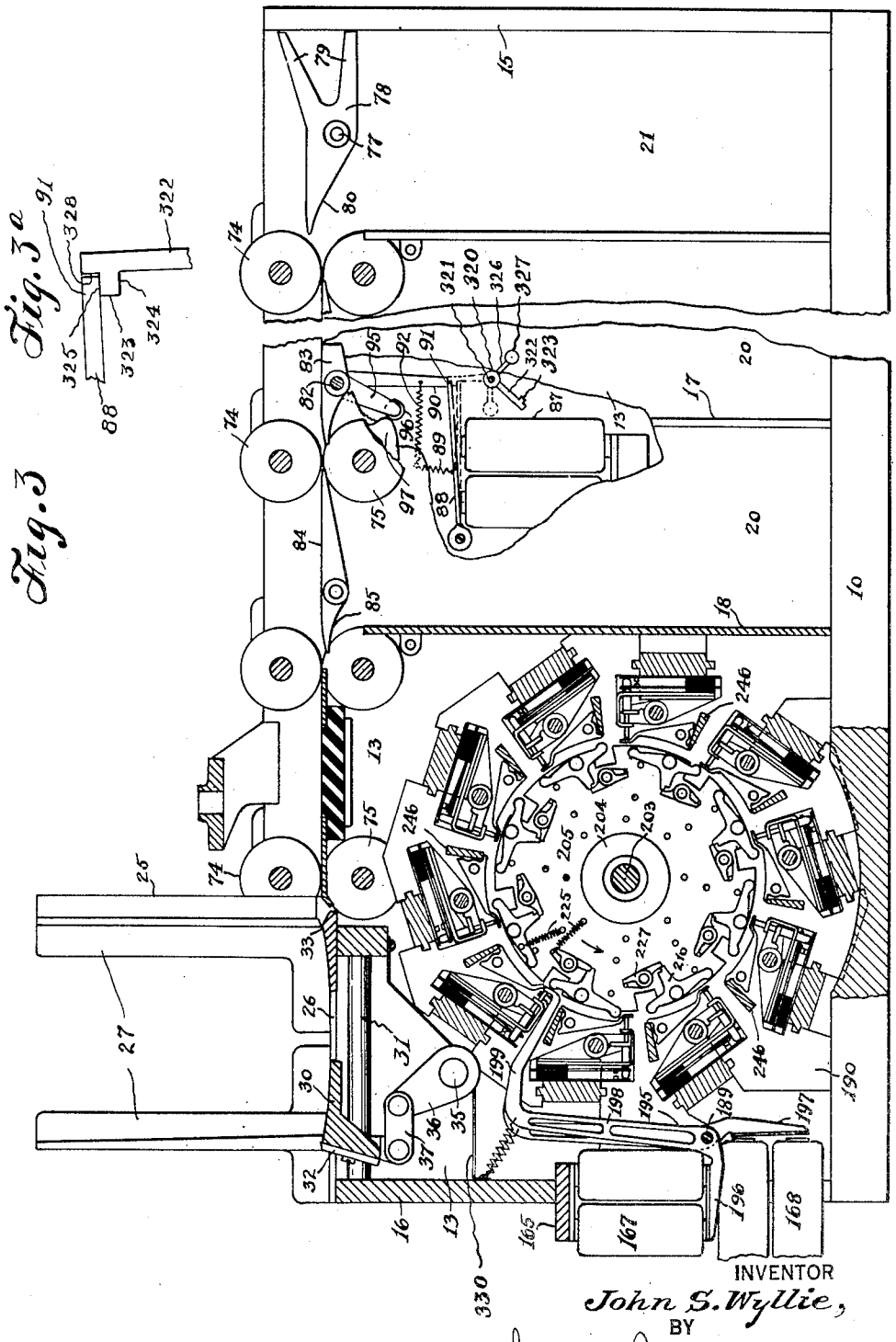
Fig. 2.

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SORTING MACHINE

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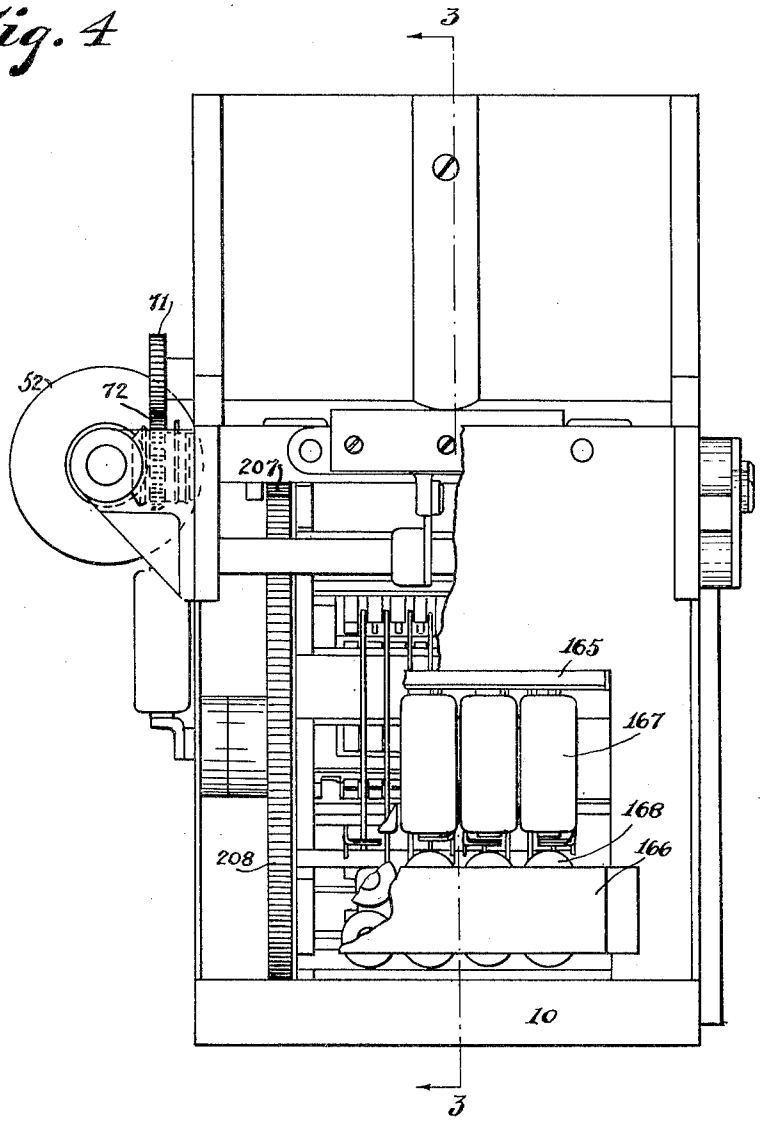
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SORTING MACHINE

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Fig. 4



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SORTING MACHINE

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Fig. 5

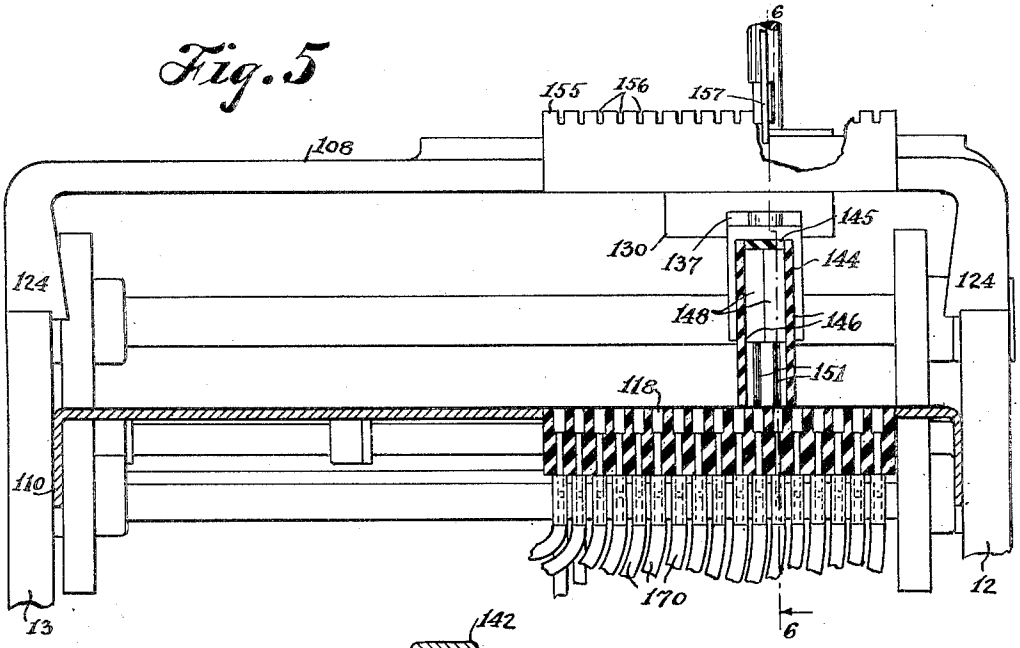
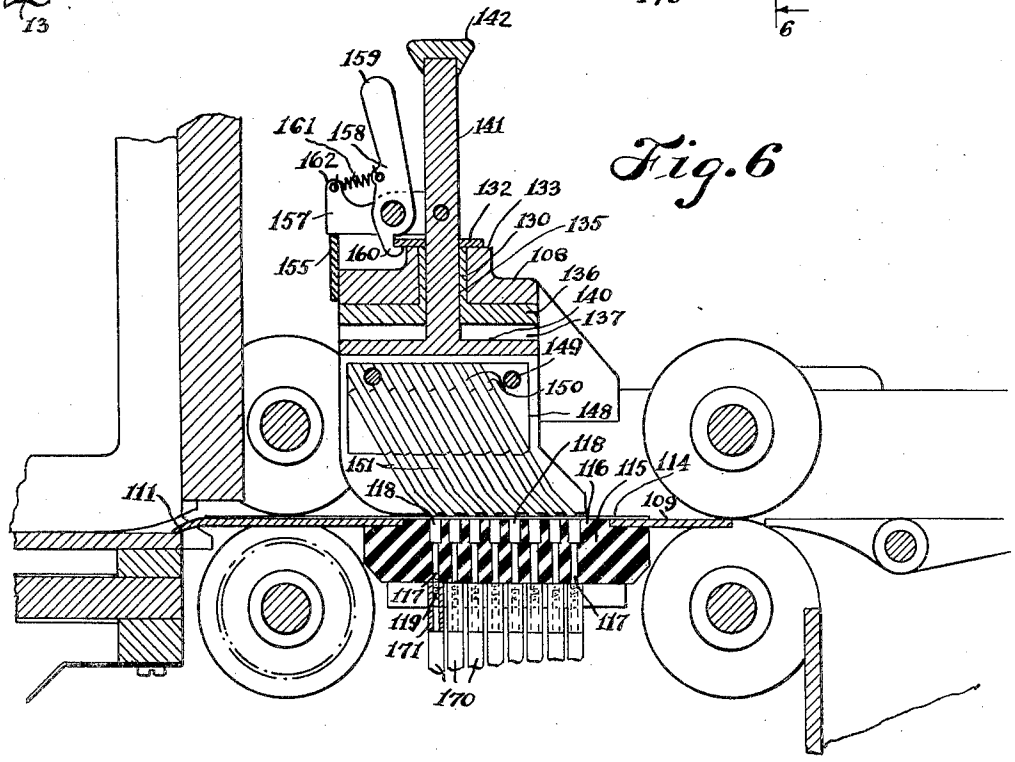


Fig. 6



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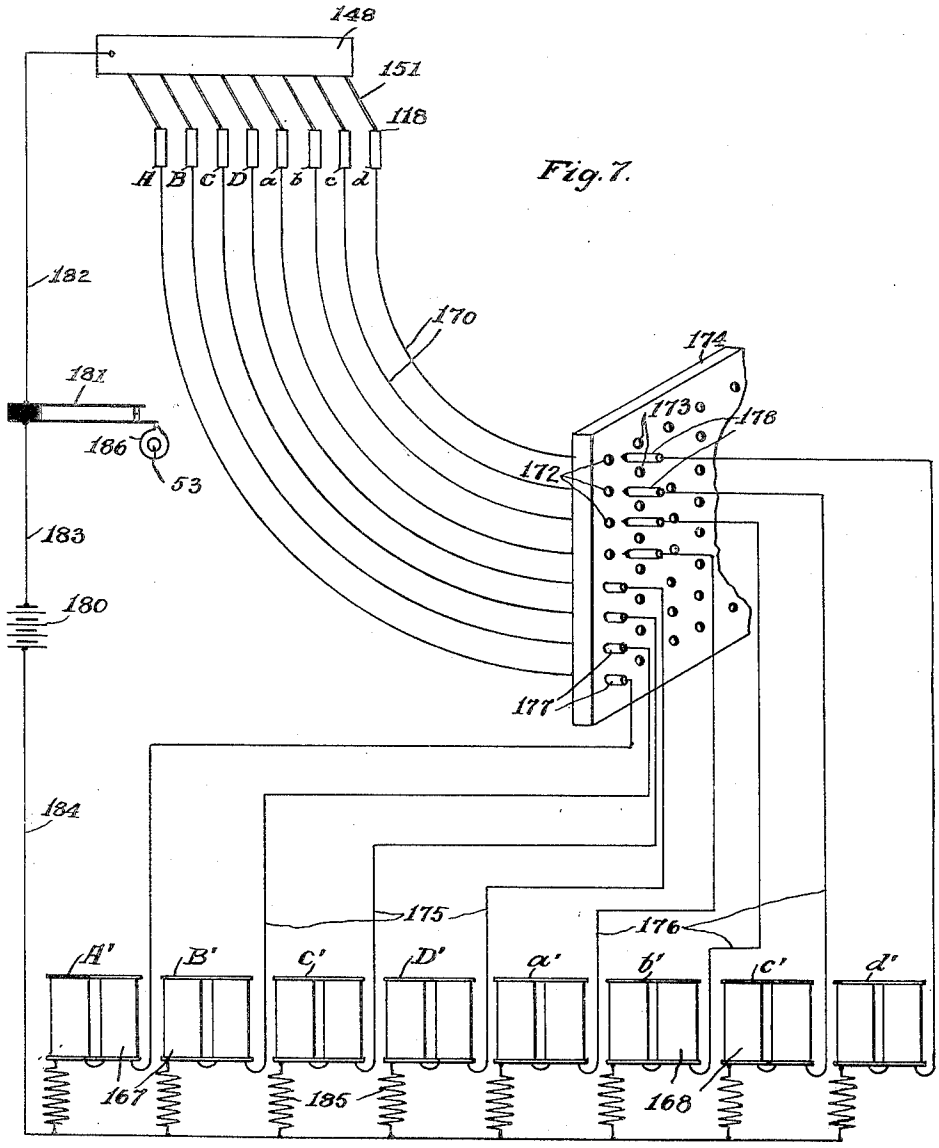


Fig. 7.

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SORTING MACHINE

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Fig. 10.

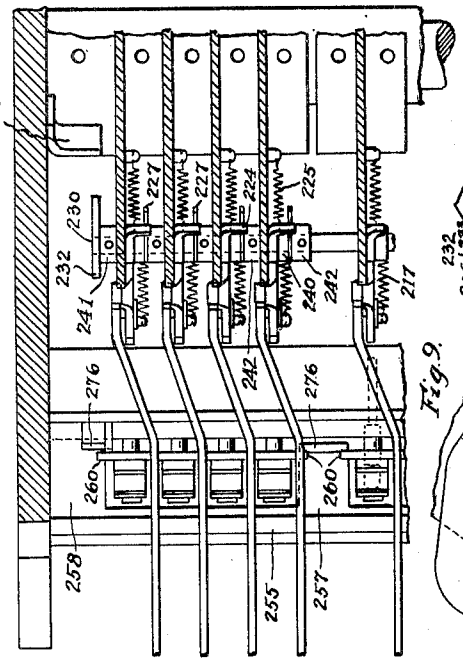


Fig. 9.

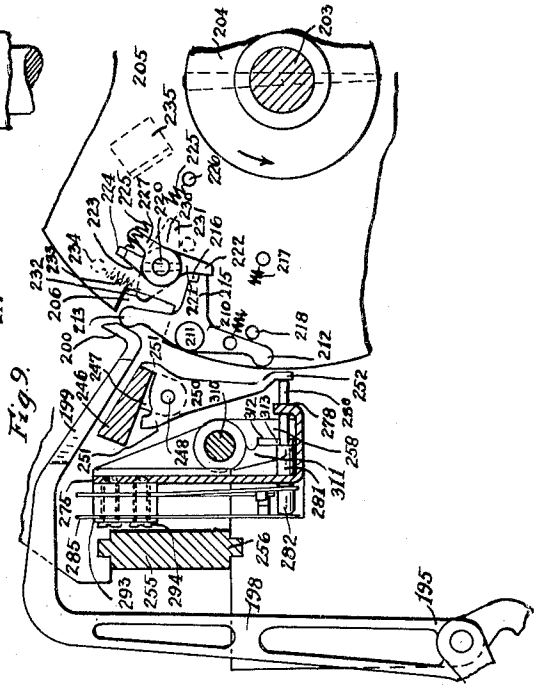
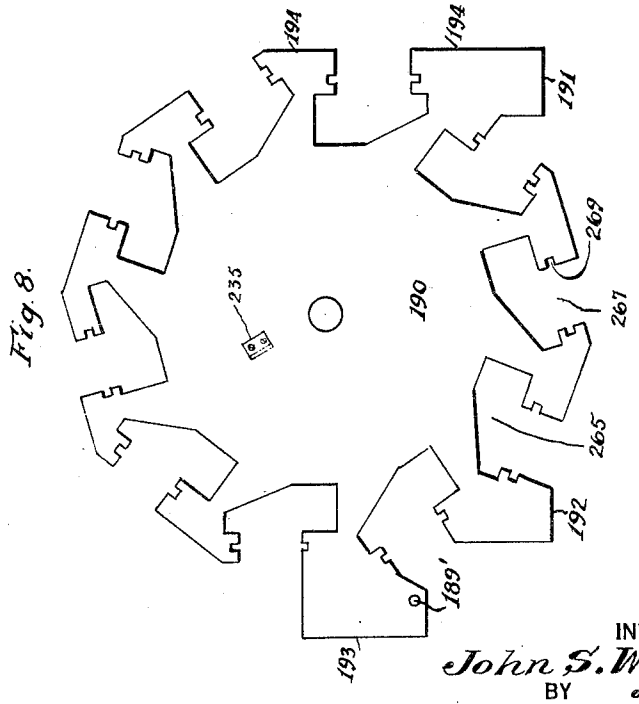


Fig. 8.



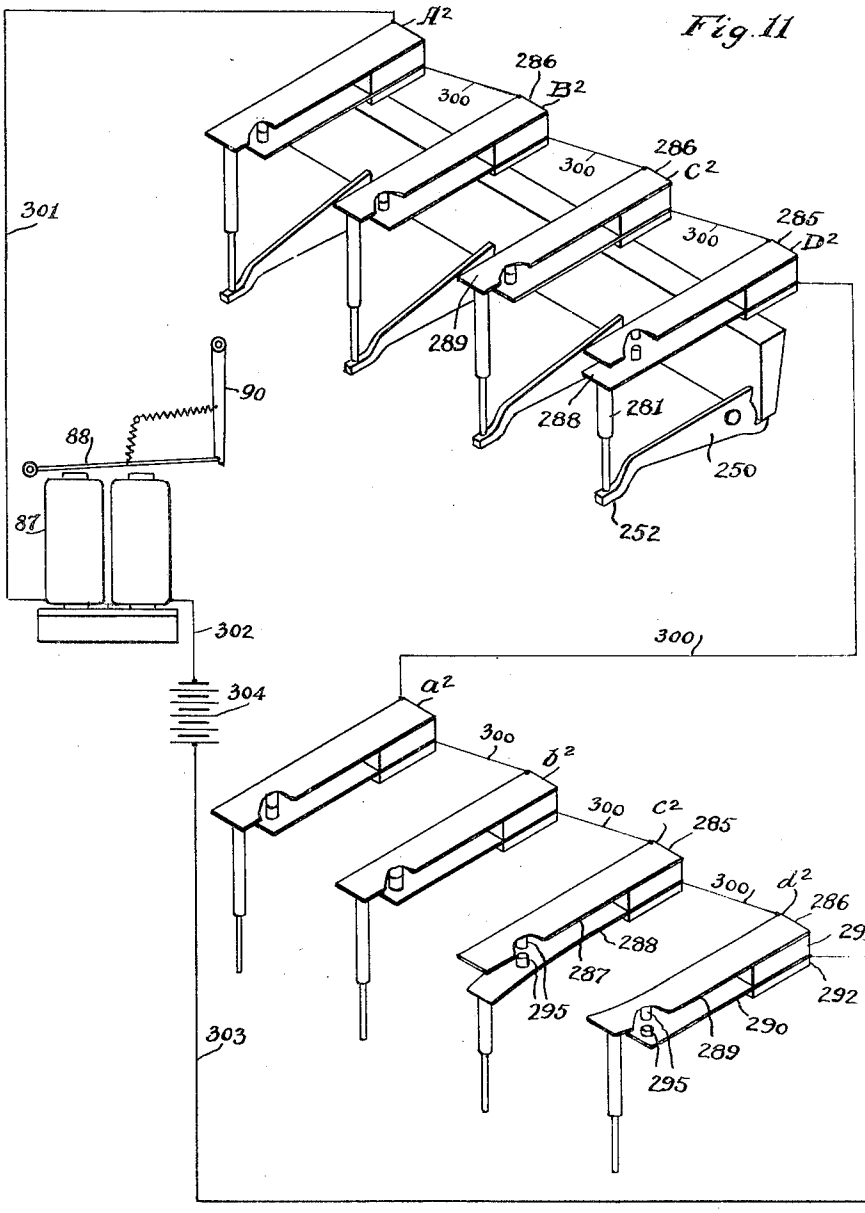
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SORTING MACHINE

Filed Jan. 11, 1927 8 Sheets-Sheet 8

Fig. 11



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Patented June 11, 1929. 1,716,677

UNITED STATES PATENT OFFICE.

JOHN S. WYLLIE, OF NEWARK, NEW JERSEY.

SORTING MACHINE.

Application filed January 11, 1927. Serial No. 160,423.

This invention relates to machines or apparatus for sorting perforated cards and more particularly to machines for sorting cards of the type in which different combinations of more than one hole represent single digits, single letters or the like, though it is noted that the invention is not limited to sorting machines using combinations of index points to represent a single character, nor is the invention limited, in some respects, even to sorting machines.

One object of the invention is to provide an improved apparatus of this kind for analyzing and sorting, in a reliable and efficient manner and at high speed, cards having more than one hole for each digit or character and also cards having only one hole for each digit.

Another object of the invention is to provide an apparatus of this kind which is particularly useful for sorting out a large collection of cards, all of the cards bearing particular numbers or other designations, particularly when these numbers or designations consist of more than one digit or letter, or both, or other characters, the number of different groups sorted at the same time being limited only by the number of compartments provided on the machine.

Another object is to provide a machine which may be adjusted to arrange the cards in numerical or alphabetical order or in any mixed or arbitrary arrangement.

Another object of the invention is to provide a suitable analyzer adjustable for different columns or groups of the card, or different numbers thereof.

Other objects of the invention are to improve generally the simplicity and efficiency of such machines and to provide an apparatus of this kind which is economical, durable and reliable in operation, and economical to manufacture.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention as described and claimed, the invention is not limited to these, since many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with an improved sorting machine which, briefly stated, includes a card analyzer, a plurality of compartments, a card magazine and feeding means and conveying or transmitting means for transmitting cards from the feeding means through the analyzer in a path above the compartments from which path they are deflected by an electrically controlled selector means for each compartment.

The analyzer is placed near the feeding means and comprises groups or rows of contact pins registerable with card perforations, and one or more groups or rows of brushes adjustable to be engageable with any of the groups of the contact pins through the perforations.

Electromagnets, adapted to be connected respectively to any of said pins and in series circuit with the brushes, respectively actuate setting levers thereby to set tripping levers carried on disks carried on a timing shaft rotatable in step with the feeding means.

Normally open and normally closed switches, arranged in groups disposed equal distances around the disks and respectively corresponding to said compartments are engageable and actuable by set tripping levers, each normally open switch being closable by a set tripping lever, and each normally closed switch being openable by a set tripping lever. Conductors connect the switches of each group in series with each other and the corresponding electrically controlled deflector means, each group of switches being such a distance beyond said setting levers that tripping levers set by setting levers controlled by a card will reach such group at the instant such card reaches the corresponding compartment, thereby to deflect that card in the compartment.

The switches are adjustable at will from normally open to normally closed switches and each group has normally open switches corresponding only to all of the perforations of the rows being analyzed of the cards which are destined to the compartment to which said group is connected.

It is often desirable to pick out from other

cards only one or more groups less than the ten without changing the adjustment of the switches. To this end I provide a suitable disabling device for at will holding deflectors in non-deflecting or deflecting position, leaving only the deflectors of the required groups to function normally.

In the accompanying drawing, showing by way of example, one of many possible embodiments of the invention,

Fig. 1 is a fragmental side elevation showing the assembled machine;

Fig. 2 is a plan of the machine;

Fig. 3 is a longitudinal vertical sectional view, partly in elevation, showing the setting and tripping means and switches;

Fig. 3[a] is a fragmental side elevation of a detail of the disabling machine;

Fig. 4 is a fragmental end elevation of the machine;

Fig. 5 is a longitudinal vertical sectional view, partly in elevation, showing the analyzer;

Fig. 6 is a transverse vertical sectional view, partly in elevation, showing the parts of the analyzer, the section being taken on the line 6—6 of Fig. 5, looking in the direction of the arrows of said line;

Fig. 7 is a diagrammatic perspective showing the electrical connections between the contact pins, brushes and setting magnets;

Fig. 8 is a side elevation showing the rear mounting plate;

Fig. 9 is a vertical sectional view transverse to the timing shaft showing in elevation the setting levers and tripping levers;

Fig. 10 is a fragmental plan of the setting and tripping levers, the disks and rear mounting plate being in section; and

Fig. 11 is a diagrammatic perspective view of a group of the normally closed and open switches, showing a diagram of the electric circuit.

My improved sorting machine is carried in and by a casing comprising an elongated base 10 supported by suitable legs, upstanding plates or side walls 12 and 13 disposed over the side edges of the base, and supported thereon at the magazine end and provided at the upper part of the front wall with an extension 14 over the distributing end of the base. End walls 15 and 16 (Fig. 2) are secured to said side walls and extension.

Transverse partitions 17 and 18 on the base secured to said extensions form card stations or compartments 20 and 21, usually eleven in number, slightly less than the width of the cards, the stations 20 being the usual distribution compartments, the end compartment 21 being the reject compartment.

A card magazine 25 disposed across the opposite end of the casing comprises bottom members 26 on which a pack of cards are adapted to lie, and upright corner members 27 adapted to receive the corners of the cards lying horizontally in the magazine. A reciprocatory picker block 30 having transverse bearing bores slidable on transverse rods 31 is thereby slidable under the cards and carries a picker blade 32 projecting above its rear edge adapted as the picker reciprocrates to engage the rear edge of the lowest card to project said card forwardly through a micrometer throat slot 33 provided at the forward side of the lower part of the magazine.

An oscillatory picker actuating shaft 35 passing through the casing beneath the picker carries an active arm 36 to which is pivoted a link 37 linking said arm to the lower part of the block. A motive arm 40 (Fig. 1) carried on the front end of the shaft is connected by a link 41 to a crank 42 carried on a lower combined crank and roller shaft 43 passing through the casing forward of the magazine below the path of the card and provided at the rear end with a beveled gear 44 (Fig. 2).

A power shaft 45 mounted in bearing brackets 46, 47 on and parallel to the upper part of the rear side wall 13 provided with a plurality of miter pinions 49, 50 the pinion 49 of which engages with said gear, whereby when the power shaft is driven by a belt connecting a pulley 52 (Fig. 4) with a suitable motor, said picker block is reciprocated to project the cards forwardly.

A plurality of lower roller shafts 53, 54 (Fig. 1) passing transversely through the casing near the upper edge of said partitions are each provided with a beveled gear 55 (Fig. 2) engaging and rotated by one of said pinions 50 on the power shaft.

Over each respective lower shaft said rear wall and said extension are provided with upwardly opening transverse recesses 57, with each of which is associated a longitudinal vertical slot 58 (Fig. 1) intersecting the recess, and a vertical bore 59 intersecting the outer end part of the slot and having a lower reduced portion forming a shoulder 60. A bearing bushing 61 slightly upwardly movable in the recess is provided with a depression in the top in which is engaged an inner end projection 62 of a pressure lever 63 in said slot having an intermediate downward extension 64 pivoted in the slot. A rod 65 slidable in said reduced portion has a head 66 engaging under the lever and held yieldably raised by a spring 67 compressed between said head and shoulder 60 for yieldably depressing the bushings.

Upper roller shafts 70 disposed in said bearing bushings over said lower shafts 43, 53 and 54 respectively are driven from the latter by means of intermeshing gears 71, 72 (Fig. 4) on the respective upper and lower shafts. Transmitting rollers 74, 75 (Fig. 3) on said shafts form transmitting means whereby cards projected from the throat slot may be seized and transmitted over all of the card stations or distribution compart-

ments 20 to the discard compartment 21, the springs 67 maintaining good yielding contact of the rollers with the cards.

A fixed rod 77 disposed across the last or discard compartment 21 carries stationary deflectors 78 received on the rod and each provided with a bifurcated end 79 engaging the end wall 15 of the casing to prevent rotation of the deflectors. A curved lower deflecting face 80 extending above the path of the cards directs the rejected cards into the discard compartment.

Oscillatory deflector shafts 82 disposed across the upper part of each of the distribution compartments near the side toward the magazine respectively carry oscillating deflectors 83 intermediately received fast on said shafts and each provided with a normally horizontal upper edge 84, adapted to guide the cards from one roller to the next, the deflector arm toward the magazine having at its lower part a forwardly and upwardly curved deflecting edge 85 adapted when the deflector is oscillated, to be moved upwardly across the path of the card to deflect the card into the associated distribution compartment 20.

Deflector magnets 87 mounted on the rear wall 13 of the machine, one at each distribution compartment, are adapted when energized to attract approximately horizontally disposed armatures 88 pivoted over the poles of each magnet and are adapted when normally raised by springs 89, thereby to engage a retaining lever 90 pending fast on each deflector shaft 82 and each provided at its lower end with a notch 91 adapted to catch on the end of the armature 88 to hold the deflector in normal horizontal position and to be released under the action of the spring 92, when the magnet is energized, as will be explained hereinafter, to cause the edge 85 to be raised and a card about to pass to be deflected downwardly into the compartment.

A restoring lever 95 fast on the deflector shaft carries an end roller 96 engageable by a restoring cam 97 on each lower roll shaft and comprising a bump adapted to engage said roller to restore the deflector after a card has been deflected, said bump being timed to be away from the roller to permit the deflector to oscillate at the instant the card is about to pass.

A follower or platform 100 (Fig. 1) in each compartment upwardly inclined toward the magazine side is carried by a follower rod 101 slidable in a bearing bushing 102 passed through the base 10 at the middle of each compartment, said follower rod being provided with a lateral bracket 103 on the lower projecting end to which is secured a long spring 104 tensioned between said bracket and a bracket on the base for yieldably holding the upper cards near the top of the compartment and lowering the cards as the pile increases in weight and height.

An analyzer 107 is disposed across the casing between the first and second set of rolls from the magazine.

Said analyzer comprises a bridge member 108 (Figs. 5 and 6) and a horizontal bed plate 109 over which latter the cards pass, said plate having downturned ends 110 (Fig. 5) secured to the side walls 12 and 13 of the casing, one side edge of the plate being provided with a downwardly beveled edge 111 (Fig. 6) extending to the throat slot. The intramarginal part of the plate 109 is provided with a large opening 114 receiving a large insulating block 115 disposed in and under said opening flush with the top of the plate and provided with a plurality of countersunk contact receiving apertures 116, one for each perforation of the card to be analyzed, adapted to register with the perforations when the card is in analyzing position. Said perforations carry contact pins 117, each comprising a contact head 118 flush with the top of the block, and a projecting lower threaded end 119 later to be mentioned.

Said bridge member 108 has downturned flanged ends 124 fitted on the top edge of the side plates and has its bridge portion spaced over and above said bed plate. Pairs of horizontally alined studs 125 (Fig. 1) in the outer face of the side walls just below said downturned ends 124 carry latch plates 126 having alined slots 127 slidably receivable on said studs 125. Horizontally disposed hooks 128 engageable over lugs 129 on the outer face of said downturned ends 124 releasably hold the bridge member in place.

A slide block 130 slidably adjustable in a guide opening 131 (Fig. 2) of the bridge member and held in place by a retaining plate 132 (Fig. 6) secured to the top of the slide block and resting on and projecting from a slide face 133 around said opening 131 is provided with a central vertical bore 135 (Fig. 6) and an extended lower block portion 136 having therein a lower transverse recess 137 (Fig. 5) intersecting the bore in which recess is received a brush holder 140 (Fig. 6) vertically adjustable in said recess and comprising an upright rod 141 passing through said bore 135 and provided with a manipulating head 142. The lower face of the holder is provided with a deep recess 144 (Fig. 5) longitudinal to the rows of the perforations transverse to the cards in which recess is received a brush housing of inverted U-shaped cross-section formed of three insulating plates 145, 146.

A pair of conducting brush blocks 148 secured side by side by rivets 149 (Fig. 6) in said housing are each provided in one side face with a row of downwardly and forwardly inclined grooves 150 receiving contact

brushes 151 engageable, when the holder is lowered, with the respective contact heads 118 of any two adjacent columns of contact pins to which the slide block may be adjusted. It is noted that the invention is not limited as to the number of rows of brushes or to having them engage adjacent rows.

A locating plate 155 secured upright on the rear edge face of the bridge member is provided in its top edge with a plurality of locating notches 156 (Fig. 5) in which is engageable a bracket plate 157 fast on said upright rod and adapted when lowered, to engage in any one of the notches to hold the brushes in registration with any of said rows of contact pins. A releasing lever 158 (Fig. 6) intermediately pivoted on said bracket plate is provided with an upper handle 159 and a lower hook 160, the latter being adapted to engage under the retaining plate 132 to hold the brush holder down, the brushes in engagement with the pins, and the bracket plate in the notches 156. A spring 161 tensioned between said handle and the outer end 162 of the bracket plate yieldably holds the hook in place and permits the hook to be moved to release the retaining plate for raising the holder and selectively shifting the brushes from one set of rows to another.

Upper and lower supporting bars 165, 166 (Fig. 4) disposed across the lower part of the magazine end of the casing respectively transversely horizontal and vertical to their axes carry two sets of four bipolar setting electromagnets 167, 168 secured at their yoke to said bars respectively, the upper set having its poles pointed downwardly and the lower set having its poles pointed inwardly toward the distributing end of the machine.

Insulated cables 170 (Fig. 6) having interiorly threaded terminals 171 respectively connected to said threaded lower ends 119 of the contact pins are all respectively connected to corresponding sockets 172, 173 (Fig. 7) of a plug board 174 provided with sockets corresponding to all of said contact pins. Flexible cables 175, 176 connected to said magnets 167, 168 respectively are provided with plug contacts 177, 178 each engageable in one of said sockets, whereby said magnets may be respectively connected to four pins of adjacent columns for two column work, or to four pins of a single column for one column work or to six contact pins of a single column for alphabet work.

A source of current 180 and a timing switch 181 are connected by conductors 182, 183, 184, and resistances 185 in series with each other between said magnets and the brush block 148. A timing cam 186 on the lower roller shaft 53 (Figs. 1 and 7) closes said switch to pass current through the contacting contact pins 118, brushes 151 and magnets 167, 168 connected thereto, only when the card is in analyzing position, whereby magnets corresponding to the holes in the card are energized.

A fulcrum rod 189 (Fig. 3) disposed across the casing near the magnet poles has its front end carried in an opening 188 (Fig. 1) in the front side wall 12 of the machine and its rear end carried in an opening 189 (Fig. 8) of a rear mounting plate 190 mounted in the casing parallel to said side walls and having edges 191, 192, 193, 194 secured to the base 10 (Fig. 3), the adjacent end wall 16 and partition 18. Setting levers 195 are intermediately fulcrumed on said rod 189, some comprising horizontal armatures 196 adapted to be drawn by the upper magnets 167, the others having downwardly disposed armatures 197 adapted to be drawn by the lower magnets 168, all being provided with upwardly disposed active arms 198, each active arm being forwardly and downwardly inclined as at 199 (Fig. 9) toward the distributing end portion of the machine and provided with an upwardly and forwardly turned active end 200 adapted to move inwardly when the magnets are energized and the armatures attracted.

A timing shaft 203 disposed transversely across the casing below the magazine remote therefrom and from the first compartment 20 carries fast thereon a plurality of spacing collars 204 and spaced disks 205 therebetween, one disk for each setting lever, the disks being approximately tangential to said active ends respectively, each provided with a plurality of peripheral recesses 206 equal angles apart and in transverse alinement with the recesses of the other disks. A set of timing gears 207, 208 (Fig. 4) interposed between the timing shaft and the crank shaft move the timing shaft the distance of one recess for each cycle of the crank shaft and picker. Herein I show eight recesses on said disks, as being a convenient number, but obviously the invention is not thus limited.

Settable tripping levers 210 (Fig. 9) are intermediately pivoted as at 211 on said disks near said recesses. Each tripping lever comprises a forward tripping cam end 212 and a following motive end 213 bent into the adjacent recess and engageable and settable by the active end 200 of the associated tripping lever, if in active position, to depress said motive end 213 and project the tripping end 212. Said tripping lever is also provided with an inwardly directed detent arm 215 having a latching notch 216 in the rear part of its end face. Springs 217 yieldably retract said tripping cam ends against stop pins 218 in the disk limiting inward movement of said ends.

Pivot shafts 220 each passing through all the disks near said notches and pivotally oscillatory therein about their own axes carry latches 221 loosely pivoted on the pivot shafts against the disk and each provided with de-

tents 222 normally engageable against said end faces of the arm 215 when the tripping lever is in normal position and adapted to engage in said notch 216 when the tripping lever is set thereby to hold the tripping lever set. Each latch is also provided with an oppositely directed arm 223 having a releasing end 224 laterally turned away from the disk. Springs 225 tensioned between said ends 224 and pins 226 in the disks hold the detents in the notches 216 or against said end faces.

Releasing dogs 227 mounted fast on said pivot shaft each has an arm engageable with said turned ends 224 to release the detents from said notches when the pivot shaft is rotated by the action of a releasing lever 230 fast on the end of the shaft and provided with an engagement arm 231 and a spring receiving arm 232 connected to a spring 233 tensioned between said receiving arm 232 and a pin 234 in the disk for yieldably holding all of said dogs out of engagement with the latches. Said shaft is rotated when said engagement arm 231 engages a bracket 235 mounted on the mounting plate 190 (Fig. 8) is engaged by said engagement arm 231 just before the tripping levers reach said active ends 200, whereby tripping levers set by said active ends may make substantially a complete revolution before the associated engagement arm 231 reaches said bracket 235 thereby to rotate the pivot shaft as the disk moves to cause the dogs 227 carried by such shaft to engage all of the associated latches and release all of the tripping levers that have been set.

Collars 240, 241, 242 on said shaft between said dogs and the disks and latches and on the outer face of the end disk and dog hold the dogs and latches in place, certain of the collars 242 being secured fast to the dogs and shaft, whereby the dogs are secured fast to the shaft the end collar 241 being secured fast to the shaft and releasing lever 230.

The front side wall 12 is provided with a large opening 244 (Fig. 1) concentric with the timing shaft partially closed by a front mounting plate 245 mounted on the face of said wall and having marginal portions secured to the marginal face of the opening. The front and rear mounting plates together support a plurality of fulcrum supporting bars 246 (Fig. 3) one for each distribution compartment disposed transversely across the casing equal distances around and near the disks. Bracket ears 247 (Fig. 9) on a face of said bars carry fulcrum rods 248 on which are pivotally carried interposed pieces 250, one for each disk, formed at the inner end with movement limiting lugs 251 engaging the bar, and at the outer end with a portion offset toward the disk to form a cam portion 252 engageable by the cam end 212 of a set tripping lever. A plurality of switch-supporting bars 255 disposed transversely of the casing respectively near and longitudinal to the fulcrum bars 246 but slightly more distant from said disks are provided at the side edges with tongues 256 and on the side toward the disks with intermediate and end elongated lugs 257, 258, 259 (Figs. 1 and 10) transverse to the bar, each lug having a marginal groove 260 (Fig. 10), the intermediate lug being smaller than the end lugs and having the grooves on both sides.

Said mounting plates 190 and 245 are provided with a plurality of peripheral cut-away portions 265, 266 (Figs. 1 and 8) forming large inner portions adapted to receive said lugs, and smaller outer portions 267, 268 having spaced side edges having notches 269 adapted slidably to receive said tongues 256 to support said supporting bars, said portions 256 of the rear mounting plate snugly slidably receiving the inner ends of the bar and the inner end lugs, the outer portions 268 of the front mounting plate snugly slidably receiving the bar, the larger portions 266 of the outer plate being larger than corresponding portions of the rear mounting plates, to permit easy removal of the bars with said end lugs 258, 259 and devices carried on the lugs later to be described.

Switch plates 275 (Fig. 9) received in said grooves 260 (Fig. 10) and thereby supported in spaced relation with the bars are held therein by overhanging retaining plates 276 mounted on said lugs. Each plate has one marginal portion turned toward the disks and then backwardly to form a portion 278 (Fig. 9) parallel to the main portion of the plate, said portions being provided with alined perforations in which are slidably received actuating push pins 280 having the inner ends engaging said offset cam portions 252 and at their outer ends formed with heads or insulated portions 281, 282, some longer than others.

A plurality of normally open and normally closed switches 285, 286 (Fig. 9 and lower part of Fig. 11), the switches being arranged in groups, are disposed on the respective switch plates 275 on the face toward the switch supporting bars. Each switch comprises a pair of flat springs 287, 288 or 289, 290 substantially parallel to the plate, insulating blocks 291, 292 between the inner ends of the springs and between the plate and the adjacent spring and an insulating plate 293 (Fig. 9) on the outer spring at the inner end, all of which are held together by headed studs 294 passing through block, plates and inner ends, out of contact with the springs holding the inner ends of the springs spaced and insulated from each other and the supporting plate. Contact points 295 engageable with each other secured on the inner face of the outer ends of the springs of each switch.

Each normally open switch has said contacts 295 normally held spaced apart by the

resilience of the springs and has its spring 288 (upper part of Fig. 11) nearest the disks engaged by the associated pin head 281 whereby a set tripping lever closes the switch. Each normally closed switch has its contact 295 normally held contacting, its spring 289 most remote from the disk being longer than the other and engaged by the head 282 of the associated pin, whereby the associated tripping lever if set opens said switch. The switches of each group are connected in series with each other by conductors 300 (Fig. 11) and conductors 301, 302, 303 connect each group of switches in series with a source of current 304 and the deflecting magnet 87 of a corresponding distribution compartment 20, one source of current serving for all of the magnets and groups.

Each group of switches is disposed such an angular distance beyond said actuating ends 200 that the tripping levers 210 set by a card in the analyzer will reach such group at the same instant that such card reaches the corresponding compartment to which it is destined, such group being connected by said conductors 301, 302, 303 to the deflecting magnet 87 of such corresponding compartment only; and each group of switches is changeable, by interchanging switches, to provide one or more normally open switches corresponding only to the perforation or all of the perforations of the one or more columns to be analyzed of the cards which it is desired to pick out and direct to such corresponding compartment.

Thus at said same instant that the card reaches the deflector and the tripping levers set thereby reaches the switch group, all of the normally open switches of such group will be closed by the tripping levers 210 set in accordance with the perforations of said card and all of the normally closed switches will be left closed by the unset tripping levers, corresponding to unperforated parts of the selected column or columns, to permit the circuit to be closed through the deflector magnets of the corresponding compartment only thereby to deflect the card into such compartment. Cards not destined for such compartment have differently arranged perforations which will result either in the opening of one or more normally closed switches of such group or the failure to close certain of the normally open switches, whereby said circuit will not be completed and the deflector magnet of such compartment will not be actuated and the card will not be deflected to such compartment.

In other words, the group of switches first reached by the tripping levers after they have passed and been set by the ends 200 are connected in series with the magnet of the first compartment 20 nearest the analyzer, and the switches of such group are so arranged that there is a normally open switch controlled by every perforation of the columns being analyzed of the cards that are to be deflected into said first compartment, but there must be no normally open switch in this first group controlled by any perforation that is not on the cards destined for said first compartment.

In like manner the second group engaged by the tripping levers after they have left the ends 200 of the setting levers are arranged to have only normally open switches corresponding only to all of the perforations of the cards destined for the second compartment 20 from the analyzer.

It will be seen that the normally closed switches serve as disabling means to prevent the operation of the selector means when necessary, while the normally open switches serve to bring about the actuation of the selector means unless thus prevented.

In order to change the switches of a group to provide normally open switches to correspond only to all of the perforations which such group is to find and pick out, it is necessary to slide out the supporting bar 255 (Fig. 9) on which the group is mounted. In doing this some of the interposing pieces 250 might get caught on some of the push pins 280 were it not for the arrangement which I will now describe.

A depressor shaft 310 (Figs. 1 and 9) passing through said end lugs 257, 258, 259 of each switch supporting bar and projecting at the front end of the bar carries a plurality of depressor arms 311 (Fig. 9) fast on the shaft, one for each push pin, each depressor arm having on its free end part a laterally turned flange 312 engaging the inner end of the insulating head of the associated pin 280 and provided with a notch 313 loosely receiving the pin. A handle arm 315 (Fig. 1) is provided on the projecting end of the shaft, whereby the shaft may be slightly rotated to cause all of the depressor arms 311 thereon to depress all of the push pins of the supporting bar out of reach of the interposed pieces 250, to permit the supporting bar and switches thereon to be withdrawn, for switch adjustment, without interference between the push pins and interposed pieces.

The switch may be changed by removing and interchanging individual switches or by removing and interchanging the switch supporting plates with all switches thereon, or even by interchanging the bars themselves.

The mechanical and electrical operation of the machine will be clear from the foregoing, and now may be only briefly described.

The brush holder 136 (Fig. 6) is adjusted to the proper columns and the cards, being placed in the magazine, are thrust one by one by the picker to the first set of rollers 74, 75 (Fig. 3) and thereby carried to the analyzer. At the instant the brushes register with all of the perforation or index point locations, the

timing switch 181 closes the circuit through the brushes which at that instant meet perforations and through the corresponding magnets 167, 168, thus energizing the magnets.

The energized magnets then attract armatures 196 or 197 (Fig. 3) and the card is passed by the rollers 74, 75 in a path over the compartments.

The attraction of the armatures projects the active ends 200 (Fig. 9) against the ends 213 of the unset tripping levers, which are timed to meet said ends 200 at the instant they are projected.

The set tripping levers are held set by the engagement of the detents 222 in the notch 216 and continue to move in the direction of the arrow of Fig. 9 until they reach and actuate all of the interposed pieces 250 and associate switches of the successive groups of switches.

The travel of the tripping levers is such that they reach the successive groups as the card that set the tripping levers reaches the deflectors respectively connected to such groups. If the set tripping levers reach a group of switches not having normally open switches corresponding only to all of the set tripping levers, a circuit is not formed through that group and the associated deflector magnet, the deflector magnet is not deflected, and the card and the set tripping levers pass on.

When, however, the set tripping levers reach the group of switches having normally open switches corresponding only to all of the set tripping levers, the circuit is completed through the corresponding deflector magnet, the deflector is released, and the card is deflected into the associated compartment. As soon as the card is deflected into the compartment, the bump 97 reaches the roller 96 and restores the deflector before the succeeding card reaches it.

If the set tripping levers after passing all of the groups have found no group having normally open switches corresponding only to all of the set tripping levers, no circuit through a deflector magnet is formed and the card passes on and is deflected into the discard compartment.

After the set tripping levers have passed all of the group, the engagement arm 231 (Fig. 9) reaches the bracket 235, and the releasing dogs 227 engage the turned ends 224 of all of the latches and disengage the detents 222 from the notches and permit the set tripping levers to be restored by the springs 217.

Referring to Figs. 7 and 11 and the letters associated with the contact pins 118, the magnets 167, 168 and the switches 285, 286, it is noted that the magnet A′ may be controlled by the perforation registering with the pin A, and that this magnet may, though the corresponding setting lever and tripping lever control the switch A^2. The other switches may be in like manner controlled from the other pins.

For number work the combinations given below are usually used, though not necessarily, the letters given corresponding to perforations, the contact pins and the normally open switches connected thereto, as shown in Figs. 7 and 11. These combinations are as follows:

1 = D	6 = A D
2 = C	7 = C D
3 = B D	8 = B C
4 = A C	9 = A B
5 = B	10 = A

A particular advantage of my machine is in the fact that it may analyze more than one column at a time and pick out and sort cards in accordance with arbitrarily selected numbers or characters of more than one digit or order. As an example of the operation, I will explain how I may pick out from a collection of cards all those cards which, in a pair of selected adjacent columns, carry perforations designating the numbers 12, 15, 18, 22, 35, 42, 44, 52, 60 and 92, and place groups carrying these numbers in the order named in the compartments 20, the group of cards carrying perforations designating 12 being placed in the first compartment next to the analyzer and so on.

The brush holder is moved to cause the two rows of brushes to register with the two columns (four-hole columns in this case) to be analyzed and the bracket plate 157 (Fig. 6) is locked in the proper notch 156. The plugs 177 are connected as in Fig. 7 to connect the magnets A′ to D′ with the contact pins A to D of the tens column of contacts; and the plugs 178 are inserted in the four lowest of the sockets 173 of the sectioned column of sockets thereby to connect the contacts A to D of the units column of contact pins with the magnets a' to d'. It is noted, however, that I might just as well connect the tens contacts with magnets a' to d' and the units pins with A′ to D′, and that the machine would operate equally as well.

With the connections made as above described, I next slide out the switch supporting bars and arrange the switch groups so that the first switch group has normally open switches D^2 corresponding to 1 in the tens column, in accordance with the above table, and c^2 corresponding to 2 in the units column, both as illustrated in Fig. 11, all the other switches being normally closed. This first group is nearest the setting lever ends 200 and is connected with the deflecting magnet of the compartment 20 nearest the analyzer.

The second group of switches connected to the second compartment is set to show normally open switches D^2, b^2 corresponding to the number 15.

In accordance with the above arrangement and table, the relations of the ten groups and compartments with the switches would be as follows:

Group and compartment	Number to be sorted out	Normally open switches
1	12	D^2, c^2
2	15	D^2, b^2
3	18	D^2, b^2c^2
4	22	C^2, c^2
5	35	B^2D^2, b^2
6	42	A^2C^2, c^2
7	44	A^2C^2, a^2c^2
8	52	B^2, c^2
9	60	A^2D^2, a^2
10	92	A^2B^2, c^2

As the switches of each bar are properly arranged, the bars are replaced in their proper places in the machine.

With the switches and connections thus arranged, the cards are placed in the magazine and the machine started. Cards representing the number 12 will close switches D^2 and c^2 of the first group, but will not open any of the normally closed switches, and will therefore be deflected to the first compartment.

Cards representing the number 15 destined for the second compartment will not close normally open switch c^2 of the first compartment and therefore will not be deflected into the first compartment, but it will close switches D^2 b^2 of the second group and not open any of the normally closed switches of that group and will therefore be deflected to the second compartment.

Cards representing the number 18 are destined for the third compartment, and the third group has the normally open switches D^2 b^2 as has the second group; but cards destined for the third compartment will not be deflected to the second compartment because they must open switch c^2, which is normally open in the case of the third group but normally closed in the case of the second group. Thus cards destined for the third compartment will open the normally closed switch c^2 of the second group, thus preventing the passage of current to the deflector magnet of the second compartment so that these cards cannot be deflected to the second compartment.

The deflection of cards to the other compartments will be understood without further explanation, all cards not destined to compartments 20 going to the discard compartment 21.

If only one column of perforations is to be analyzed either upper or lower group of Fig. 11 could be disconnected and the contact pins connected only to the other group could be used, the switches being arranged in accordance with the first table.

If more than one column is to be analyzed at the same time, four additional magnets 167 or 168 and four additional switches for each group would be required. If columns not adjacent are to be analyzed at the same time, separable or separated rows of brushes would be required.

For alphabet work, more than four holes to the column are required, in which case the lower plugs 177 would be inserted as in Fig. 7 and the upper plugs 173 would also be inserted in the upper holes 172 of the same row. The combinations of the switches could be in any arbitrary or usual arrangement, but unless sufficient compartments be provided for all of the letters of the alphabet, more than one analysis would be required to alphabeticalize each order of the letters of words.

Many uses for this machine other than those above described will readily suggest themselves when needed.

Sometimes it is desirable to select only one group or less than ten groups of cards from other cards without changing the arrangement of the normally closed and normally open switches. For example, suppose that it be required to select only cards destined for the third and fourth compartments 20, and it is not desirable to sort the cards normally destined to the other compartments. This may be accomplished by disabling the deflectors of the first and second compartments and converting the fifth station into a discard station, and preventing cards being sorted into the seventh and remaining stations to obviate unnecessary travel of a card to the end discard station.

This may be accomplished by means of an L-shaped member 320 (Figs. 3 and 3a) pivoted at its elbow part upon a pivot 321 carried on the wall 13 under the free end of the armature 88 and provided on one arm 322 with an end hook 323 adapted to engage its lower face 324 over the end of the armature when the armature is depressed, as shown by the dotted lines, to hold the latter in retracted position, and adapted to engage its upper face 325 under the armature to hold the armature raised. On the other arm 326 of the L-shaped member is an end weight 327 tending to hold the hook in either engaging position with either the arm 322 or an extension 328 against the end of the armature. Said member 320 when not in engaging position moves, by its own weight, to a position below its pivot point as shown by the full lines. The extension 328 is frontwardly offset from the arm 90 so as not to interfere with it.

By use of the pivot member 320 when the ace 325 engages under the armature, any deflector, for instance in the above example, the first and second deflectors, may be held in non-deflecting position so that no cards can enter the first and second compartments, but all must pass to the third deflector. When the face 324 is engaged over

the armature, for instance, of the fifth deflector, that deflector is caused to move by the action of the spring 92 to deflect every card that passes, thereby to convert such station into a discard station to prevent cards entering subsequent stations and to obviate unnecessary travel of a card, over all of the stations, to the end station.

The screen 330 (left of Fig. 3) prevents the accidental falling of a card into the mechanism below.

I claim as my invention:

1. In combination, a plurality of stations; an analyzer; transmitting means including an electrically controlled deflector means for each station; normally open and normally closed switches controlled by perforations of cards in the analyzer and arranged in groups, one group corresponding to each station; and means connecting the switches of each group in series circuit with each other and the corresponding electric control means.

2. In combination, a plurality of stations; actuating devices and disabling devices arranged in groups corresponding to the respective stations; and a selector means for each station prevented from operation by one or more of the disabling devices and rendered operable by the action of actuating devices, if not thus prevented.

3. In combination, a plurality of stations; an analyzer; transmitting means including a selector means for each station; actuating devices and disabling devices controlled by perforations of cards in the analyzer and arranged in groups, one group corresponding to each station; said selector means prevented from operation by one or more of the disabling devices and rendered operable by the action of an actuating device, if not thus prevented.

4. In combination, a plurality of stations; an analyzer; transmitting means for transmitting including selector means for each station; setting members controlled by index points of cards in the analyzer; moving tripping means settable by said members; actuating devices and disabling devices arranged in groups disposed along the path of said tripping means to be operated thereby, each group having an operative connection with corresponding selector means; each of said connections being prevented from operation by the operation of one or more of the disabling devices and rendered operable by the action of an actuating device, if not thus prevented; each group being such a distance beyond said member that tripping means set by a card will reach such group at the instant such card reaches the corresponding deflector means.

5. In combination, a plurality of stations; an electrically controlled selector means for each station; normally open and normally closed switches arranged in groups corresponding to the respective stations; and means connecting the switches of each group in series circuit with each other and the corresponding electrically controlled means.

6. In combination, a plurality of stations; a transmitting means including a selector means for each station; setting means; moving tripping means settable by said setting means; open and closed switches arranged in groups disposed along the path of said means; the switches of each group being connected in series with each other and corresponding selector means; each open switch being closable and each closed switch being openable by a set tripping means; each group being such a distance beyond said tripping means that a set tripping means will reach such group at the instant an object transmitted by the transmitting means reaches the corresponding selector means.

7. In combination, a plurality of stations; an analyzer; transmitting means including an electrically controlled selector means for each station; setting members controlled by index points of cards in the analyzer; moving tripping means settable by said members; open and closed switches arranged in groups disposed along the path of said tripping means; the switches of each group being connected in series with each other and corresponding selector means; each open switch being closable and each closed switch being openable by a set tripping means; each group being such a distance beyond said members that tripping means set by a card will reach such group at the instant such card reaches the corresponding selector means.

8. In combination, a card analyzer having groups of analyzing members simultaneously engageable with different groups of index point; a plurality of stations; transmitting means from the analyzer to the stations including selector means controlled by both of said groups of members; and means controlled by other of said members for preventing the selector means from selecting.

9. In combination, a card analyzer having analyzing members simultaneously engageable with different rows of index points representing different digits; a plurality of stations respectively corresponding to combinations of the rows; transmitting means from the analyzer to the stations including selector means controlled by both of said rows; and means controlled by other of said members for preventing the selector means from selecting.

10. In combination, a card analyzer having groups of analyzing members simultaneously engageable with different groups of index points representing characters of different orders; a plurality of stations respectively corresponding to combinations of groups of the analyzing members; transmit-

ting means from the analyzer to the stations including selector means controlled by both of said combinations; and means controlled by other of said members for preventing the selector means from selecting.

11. In combination, a plurality of stations; an analyzer comprising contact pins registerable with card perforations and brushes engageable with the contact pins; transmitting means including selector means for each station; electromagnets adapted to be connected respectively to any of said contact pins; a current source having one terminal connected to all of said brushes and the other to all of said magnets; setting members actuated by said magnets respectively; and means controlled by a combination of said members for controlling the selector means.

12. In combination, a casing having parallel extensions provided with upwardly opening transverse recesses, longitudinal vertical slots intersecting said recesses, and vertical bores intersecting the outer end part of the slots and having a lower reduced portion forming a shoulder; bearing bushings slightly upwardly movable in said recesses each provided with a depression in the top; pressure levers in said slots each having an intermediate downward extension pivoted in the slot and at the inner end with a downward projection engaging in said depression; a rod slidable in said reduced portion having a head engaging under the lever; a spring compressed between said head and shoulder for yieldably raising the outer end of the lever and depressing the bushings; pairs of upper and lower roller shafts, the upper roller shafts being disposed in said bearing bushings over said lower shafts respectively; a plurality of stations under said pairs; transmitting means from the analyzer to the station including rollers on said shafts between which the cards are carried.

13. In combination, a plurality of stations; an analyzer; transmitting means including a deflector for each station; a pivoted armature engaging and holding each deflector in non-deflecting position; a spring holding the armature in holding position; a spring tending to move the deflector to deflecting position; and a magnet controlled by index points of cards in the analyzer for attracting the armature releasing the deflector from non-deflecting position.

14. In combination, a casing having side walls; a card analyzer bed plate between the side walls including an insulating block provided with apertures; contact pins in said apertures; a bridge member having downturned ends resting on the side walls each having an inner flange engaging the inner face of the side wall; a brush block carried on said bridge; brushes mounted in said block and engageable with the contact pins; a plurality of stations; transmitting means including selector means for each station; and electric means connected in circuit with said pins and brushes for controlling said selector means.

15. In combination, a casing having side walls; a card analyzer bed plate therebetween including an insulating block provided with apertures; contact pins in said perforations; a bridge member over the contact pins and having downturned ends resting on the walls; brushes carried by said bridge and engageable with said pins; a plurality of stations; transmitting means including a selector means for each station; electric means connected in circuit with said pins and brushes for controlling said selector means; lugs on the outer face of said downturned ends; a pair of horizontally alined studs in the outer face of the side plates just below said downturned ends; and a latch plate having alined slots slidably receivable on said studs, and a horizontally disposed hook engageable over said lugs to hold the bridge member in place.

16. In combination, a card analyzer bed plate, over which the cards pass, including an insulating block provided with apertures; contact pins in said perforations; a bridge member having an elongated guide opening over the contact pins; a slide block slidably adjustable in said guide opening; brushes carried by said block insulated therefrom and engageable with said pins; a plurality of stations; transmitting means including a selector means for each station; and electric means connected in circuit with said pins and brushes for controlling said selector means.

17. In combination, a card analyzer bed plate including an insulating block carrying rows of contact pins; a bridge member having an elongated guide opening over the contact pins; a slide block slidably adjustable in said guide opening and provided with a vertical bore; a brush holder having an upright rod in said bore; brushes carried by said holder and engageable with said pins; a plurality of stations; transmitting means including selector means for the stations; means including electric devices connected in circuit with said pins and brushes for controlling said selector means; a locating plate secured upright on the rear edge face of the bridge member and provided with locating notches; a bracket plate fast on said upright rod and, when lowered, engageable in one of the notches; and a releasing lever pivoted on said bracket plate and provided with a handle and hook, the latter engageable under the retaining plate to hold the brush holder down and the bracket plate in the notches.

18. In combination, a card analyzer bed plate, over which the cards pass, including an insulating block provided with apertures; contact pins in said perforations; a bridge member having an elongated guide opening over the contact pins; a slide block slidably

adjustable in said guide opening and provided with a central vertical bore; a brush holder vertically adjustable in said bore; an insulated brush block carried on said holder; brushes carried by said brush block and engageable with said pins; a plurality of stations; transmitting means including a selector means for each station; and electric means connected in circuit with said pins and brushes controlling said selector means.

19. In combination, a card analyzer, a bed plate, over which the cards pass, including an insulating block carrying rows of contact pins; a brush block over the contact pins; a plurality of rows of brushes mounted in said block and respectively engageable with different rows of said contact pins; a plurality of stations; transmitting means including selector means for each station; and electric means adapted to be connected in circuit with said pins and brushes for controlling any one of said selector means from a combination of contact pins of a plurality rows simultaneously.

20. In combination, a card analyzer bed plate over which the cards pass, said plate having a large opening: an insulating block disposed in said opening provided with rows of apertures; contact pins in said apertures; a bridge member having an elongated guide opening over the contact pins; a slide block slidably adjustable in said guide opening and provided with a central vertical bore; a brush holder vertically adjustable in said bore; insulated brush blocks carried on said holder; rows of brushes mounted in said block and engageable with the contact pins; and translating means including electric means adapted to be connected in circuit with said pins and brushes.

21. In combination, a plurality of stations; an analyzer comprising contact devices registerable with card perforations; transmitting means for transmitting cards from the analyzer to the stations and including a selector means for each station; electric operating means adapted to be connected respectively in series circuit with said contact devices; setting members controlled by said electric means; retarded tripping means settable by said members; and means controlled by the tripping means for controlling the selector means.

22. In combination, a plurality of stations; a card feeding means; an analyzer comprising contact devices registerable with card perforations and brushes engageable with the contact pins; transmitting means for transmitting cards from the feeding means through the analyzer to the stations and including a selector means for each station; a source of current; electromagnets adapted to be connected respectively to any of said contact devices and in series with said source of current; setting members controlled by said magnets; moving tripping means settable by said members; and means controlled by the tripping means for controlling the selector means.

23. In combination, a card analyzer including an insulating block carrying rows of contact pins; a plurality of rows of brushes engageable with different rows of said pins; a plurality of stations; transmitting means including selector means for each station; selector actuating means including a plurality of magnets; a plug board provided with sockets corresponding to said contact pins; insulated cables having terminals respectively connected to said pins and connected to corresponding sockets respectively; flexible cables connected to said magnets respectively and each having a plug contact engageable in one of said sockets, whereby the magnets may be respectively connected to six contact pins of a single column for alphabet work or to four pins of adjacent columns for two column work, or to four pins of a single column or one column work; and a source of current and a timing switch connected in series with said magnets and brushes.

24. In combination, a plurality of stations; a card feeding means; an analyzer comprising contact devices registerable with card perforations and brushes engageable with the contact pins; transmitting means including superposed roller shafts and rollers thereon for transmitting cards from the feeding means through the analyzer to the stations and including a selector means for each station; a timing switch; a cam on one of said shafts for operating the timing switch once for each cycle of the feeding means when the card is in analyzing position; electromagnets adapted to be connected respectively to any of said contact devices; conductors connecting said brushes, timing switch and source in series with the magnets; setting members controlled by said magnets; and means controlled by the setting members for controlling the selector means.

25. In combination, a plurality of stations; an analyzer for cards having groups of index points; a plurality of groups of setting magnets controlled by index points of the group of cards in the analyzer; transmitting means from the analyzer to the stations including deflector means for each station; a plurality of intermediately pivoted setting levers including armatures attracted by said magnets respectively, each lever comprising an active end; timing disks; and tripping levers on said disks settable by said active ends and controlling said deflector means.

26. In combination, a plurality of stations; an analyzer for cards having groups of index points; a plurality of groups of setting members controlled by index points of the groups of cards in the analyzer; transmitting means from the analyzer to the stations including electrically controlled deflector means for

each station; a timing shaft; a plurality of spaced disks on said shaft, one disk for each setting member; tripping levers on said disk settable by said members; switches arranged in groups disposed around the disks and respectively corresponding to said stations and actuated by set tripping levers; and means connecting the switches of each group in series circuit with each other and the corresponding deflector means.

27. In combination, a plurality of stations; an analyzer; setting members controlled by index points of the cards in the analyzer; a rotary timing shaft; spaced disks on said shaft; tripping levers on said disks yieldably held unset and settable by said members; detent means for holding a set tripping lever set; a shaft passing eccentrically through all of said disks; releasing means fast thereon for releasing all of said detent means for restoring set tripping levers; an arm on said shaft; a fixed bracket adapted to engage said arm to actuate said shaft; devices arranged in groups around the disks and actuated by set tripping levers; and transmitting means from the analyzer to the stations including selector means for each station controlled by said devices.

28. In combination, a plurality of stations; an analyzer; setting members controlled by index points of the cards in the analyzer; transmitting means from the analyzer to the stations including selector means for each station; a timing shaft; spaced disks on said shaft; tripping levers on said disks yieldably unset and settable by said members; detent means for holding a set tripping lever set; means releasing all of said detent means for restoring set tripping levers; actuating devices and disabling devices arranged in groups disposed equal distances around the disks and respectively corresponding to said stations and actuated by set tripping levers; said selector means being prevented from operation by the action of the disabling device and operable by one or more of the actuating devices, if not thus prevented.

29. In combination, a plurality of stations; an analyzer; transmitting means from the analyzer to the stations including electrically controlled selector means for each station; setting members controlled by index points of the cards in the analyzer; a rotary timing shaft; spaced disks on said shaft; tripping levers on said disks settable by said members; switch supporting bars disposed parallel to the shaft around the disks; normally open and normally closed switches in groups on said bars respectively corresponding to said compartments and actuated by set tripping levers; and means connecting the switches of each group in series circuit with each other and the corresponding selector means.

30. In combination, a plurality of stations; an electrically controlled selector means for each station; switch supporting plates; normally open and normally closed switches mounted on said plates and arranged in groups corresponding to the respective stations; means connecting the switches of each group in series circuit with each other and the corresponding electrically controlled means; each switch comprising a pair of flat springs substantially parallel to the plate and spaced, insulated and mounted on the supporting plates; contact points on the inner face of the outer ends of the springs of each switch and engageable with each other; switch actuating means controlled by index points of cards in the analyzer and including push pins engageable with one of the springs; each normally open switch having said contacts normally yieldably held spaced apart and having its spring nearest the push pin engaged by the associated pin whereby an actuated push pin closes the switch.

31. In combination, a plurality of stations; an electrically controlled selector means for each station; switch supporting plates; normally open and normally closed switches mounted on said plates and arranged in groups corresponding to the respective stations; means connecting the switches of each group in series circuit with each other and the corresponding electrically controlled means; each switch comprising a pair of flat springs substantially parallel to the plate and spaced, insulated and mounted on the supporting plates; contact points on the inner face of the outer ends of the springs of each switch and engageable with each other; and switch actuating means controlled by index points of cards in the analqzer and including push pins engageable with the switches; each normally closed switch having its contacts normally yieldably held contacting, its spring most remote from the push pin engaged by the associated pin whereby the actuation of such push pin opens such switch.

32. In combination, a plurality of stations; an electrically controlled selector means for each station; normally open and normally closed switches arranged in groups corresponding to the respective stations; means connecting the switches of each group in series circuit with each other and the corresponding electrically controlled means; each switch comprising a pair of flat springs and contact points on the inner face of the outer ends of the springs; switch actuating means controlled by index points of cards in the analyzer and including push pins; each normally open switch having said contacts normally yieldably held spaced apart and having its spring nearest the push pin engaged thereby, whereby an actuated pin closes the switch; each normally closed switch having its contacts normally yieldably held contacting, its spring most remote from the push pin being engaged by the associated pin whereby

the actuation of such push pin opens such switch.

33. In combination, a plurality of stations; an electrically controlled selector means for each station; switch plates, each having a marginal portion turned to form a portion parallel to the main portion of the plate, said portion being provided with alined perforations; normally open and normally closed switches mounted on said plates and arranged in groups corresponding to the respective stations; means connecting the switches of each group in series circuit with each other and the corresponding electrically controlled means; each switch comprising a pair of coacting flat springs; and switch actuating means controlled by index points of cards in the analyzer and including actuating push pins in said perforations each having an enlarged insulating portion engaging one of said springs.

34. In combination, a casing; a plurality of stations; an analyzer; transmitting means from the analyzer to the stations including electrically controlled selector means; setting members controlled by index points of cards in the analyzer; a rotary timing shaft transverse to the casing; spaced disks on said shaft; tripping levers on said disks settable by said members; interchangeable switch supporting bars slidably and removably disposed transversely across the casing around the disks; normally yieldably open and normally yieldably closed switches in groups on said bars respectively corresponding to said compartments; means including slidable push pins actuated by set tripping levers and engaging the switches; means connecting the switches of each group in series circuit with each other and the corresponding selector means; and means for depressing all of the push pins of the switches carried on the bar when the latter is removed.

35. In combination, a casing; a plurality of stations; an analyzer; transmitting means from the analyzer to the stations including electrically controlled selector means; setting members controlled by index points of the cards in the analyzer; a rotary timing shaft transverse to the casing; spaced disks on said shaft; tripping levers on said disks settable by said members; interchangeable switch supporting bars slidably and removably disposed transversely across the casing around the disks; fulcrum bars near and parallel to the supporting bars; movable interposed pieces pivotally carried on the fulcrum bars and engaged by the tripping levers; normally yieldably open and normally yieldably closed switches in groups on said bars respectively corresponding to said compartments; slidable pins engaged by said interposed pieces and engaging the switches whereby the latter are actuated by set tripping levers; means connecting the switches of each group in series circuit with each other and the corresponding selector means; and means for simultaneously depressing all of the pins of a bar.

36. In combination, a casing; a plurality of stations and an analyzer therein; setting members controlled by index points of the cards in the analyzer; transmitting means from the analyzer to the stations including electrically controlled selector means for each station; a rotary timing shaft transverse to the casing; spaced disks on said shaft; tripping levers on said disks settable by said member; switch supporting bars slidably and removably disposed transversely across the casing around the disks; normally open and normally closed switches in groups on said bars respectively corresponding to said compartments and actuated by set tripping levers; and means connecting the switches of each group in series circuit with each other and the corresponding selector means.

37. In combination, a plurality of stations; an analyzer; transmitting means from the analyzer to the stations including electrically controlled selector means; setting members controlled by index points of the cards in the analyzer; a pair of widely spaced mounting plates having oppositely notched peripheral recesses; a rotary timing shaft concentric with said plates; spaced disks on said shaft between said plates; tripping levers on said disks settable by said members; interchangeable switch supporting bars having lateral tongues slidably and removably disposed in the notches of said recesses and transversely across the casing around the disks; interchangeable normally yieldably open and normally yieldably closed switches in groups on said bars respectively corresponding to said compartments and actuated by set tripping levers; and means connecting the switches of each group in series circuit with each other and the corresponding selector means.

38. In combination, a plurality of stations; transmitting means to the stations including a deflector for each station to deflect the cards into the station; means for selectively causing the deflector to move to deflecting position as the card is about to pass the station; and means for at will causing any deflector to assume deflecting position at every instant that a card might pass.

39. In combination, a plurality of stations; a card analyzer; transmitting means from the analyzer to the stations and including a deflector for each station to deflect the cards into the stations; means controlled by index points of cards in the analyzer for causing the deflector to move to deflecting position as the card is about to pass the station; means for at will causing any deflector to assume deflecting position at every instant that a card might pass, thereby to convert such station into a discard station.

40. In combination, a plurality of stations arranged in horizontal series; a card analyzer; transmitting means carrying the cards in a path above the stations and including a deflector for each station to deflect the cards from said path in the station; a pivoted armature engaging and holding each deflector in non-deflecting position; a spring holding the armature in holding position; a spring tending to move the deflector to deflecting position; a magnet controlled by index points of cards in the analyzer for attracting the aramature for releasing the deflector from non-deflecting position; and an L-shaped member pivoted at its elbow part under the free end of the armature and provided on one arm with an end hook adapted to engage over the end of the armature to hold the latter in retracted position, and on the other arm with an end weight tending to hold the hook on the armature; said member when not in engaging position moving to a position below its pivot point.

41. In combination, a plurality of stations; transmitting means to the stations including a deflector for each station to deflect the cards into the station; means for causing the deflector to move to deflecting position as a card is about to pass the station; and means for at will causing any deflector to assume non-deflecting position at every instant that a card might pass, thereby to prevent the deflecting of cards to such station, and for at will causing any deflector to assume deflecting position at every instant that a card might pass, thereby to convert such station into a discard station.

42. In combination, a plurality of stations; a card analyzer; transmitting means from the analyzer to the stations and including a deflector for each station to deflect the cards into the station; means controlled by index points of cards in the analyzer for causing the deflector to move to deflecting position as the card is about to pass the station; and means for at will causing any deflector to assume non-deflecting position at every instant that a card might pass, thereby to prevent the deflecting of cards to such station, and for at will causing any deflector to assume deflecting position at every instant that a card might pass, thereby to convert such station into a discard station.

43. In combination, means controlled by card index points for causing the selection of cards, said means being settable to non-selecting condition; and means controlled by other index points for preventing selection.

44. In combination, means for selecting certain items and means controlled by associated items for causing the rejection of said certain items, said last named means being settable to non-rejecting condition.

45. In combination, a plurality of selector means; means controlled by different card index points for causing the respective selector means to select cards, said means being settable to non-selecting condition; and means controlled by other index points for preventing the respective selector means from selecting.

46. In combination, means including a member operable to cause selection; and another member operable for preventing selection, both of said members being settable to selecting or selection-preventing condition.

47. In combination, means including members operable to cause selection; and other operable members for preventing selection, all of said members being settable to selecting or selection-preventing condition.

48. In combination, a selector means; and members settable at will to cause the selector means to select or to reject.

49. In combination, a selector means, an analyzer having members engageable with a group of different card index points to cause the selector means to select; and means controlled by any one of others of said members on engagement with index points for preventing the selector means from selecting, all of said members being settable to selecting or selection-preventing condition.

50. In combination, an analyzer having analyzing members each settable to selecting or non-selecting condition and simultaneously operable in either condition; and a selector means controlled by all of different groups of said members for causing such selector means to operate only when the members are set to selecting condition.

51. In combination, a card analyzer having a plurality of analyzing members each settable to selecting or non-selecting condition and all simultaneously engageable, when set with different index points, in either condition; and a plurality of selector means each controlled by all of different selected groups of said members, only when set to selecting condition for causing such selector to select.

52. In combination, a card analyzer having analyzing members each settable to selecting or non-selecting condition and simultaneously engageable with different index points in either condition; a selector means controlled by any of said members for causing the selector means to select only when the member is set to selecting condition and means controlled by any other of said members for preventing the selector means from selecting.

53. In combination, a card analyzer having a plurality of analyzing members each settable to selecting or non-selecting condition and all simultaneously engageable with different index points in either condition; a plurality of selector means each controlled by all of different groups of said members, only when set to selecting condition for causing such selector means to select; and means controlled by any one of others of said members

for preventing the selector means from selecting.

54. In combination, an insulating bed; rows of contact pins in said bed; means for passing over said bed perforated cards having index point locations adapted for simultaneous registration with the pins respectively; rows of insulated brushes mounted above said rows of pins, the brushes being simultaneously engageable with the pins respectively and inclined toward the bed in the direction of the passage of the card; and selecting means electrically connected with said pins and brushes.

55. In combination, an insulating bed; rows of contact pins in said bed; means for passing over said bed perforated cards having index point locations adapted for simultaneous registration with the pins respectively; rows of insulated brushes mounted above said rows of pins, the brushes being simultaneously engageable with the pins respectively and inclined toward the bed in the direction of the passage of the card; selecting means connected in series with each pin and the corresponding brushes; and means for causing the passage of current through the engaging pins and brushes at the instant of registration, and while the cards are in transit.

56. In combination, a casing having extensions provided with upwardly opening transverse recesses; upper shafts in said recesses; spring pressed pressure lever separately yieldably engaging said shafts to hold them in place; lower roller shafts under the upper shafts respectively; stations under said shafts; an analyzer; transmitting means from the analyzer to the station including rollers on said shafts between which the cards are carried.

57. In combination, a casing having extensions provided with upwardly opening transverse recesses; upper shafts in said recesses; separately releasable members yieldably engaging said shafts to hold them in place; lower roller shafts under the upper shafts respectively; a plurality of stations under said shafts; an analyzer; and transmitting means from the analyzer to the station including rollers on said shafts between which the cards are carried.

58. In combination, a casing having parallel extensions provided with upwardly opening transverse recesses; upper shafts in said recesses; pressure levers intermediately fulcrumed on said extensions and having their active ends engaging said shafts; a spring compressed between said extensions and the motive ends of the levers for depressing the shafts; lower roller shafts below said upper shafts respectively; a plurality of stations under said shafts; an analyzer; and transmitting means from the analyzer to the stations including rollers on said shafts.

Signed at New York in the county of New York and State of New York this 10th day of January, A. D. 1927.

JOHN S. WYLLIE.