April 21, 1931. C. E. WHITEMAN 1,801,760

SORTING MACHINE

Filed March 28, 1928 6 Sheets-Sheet 1

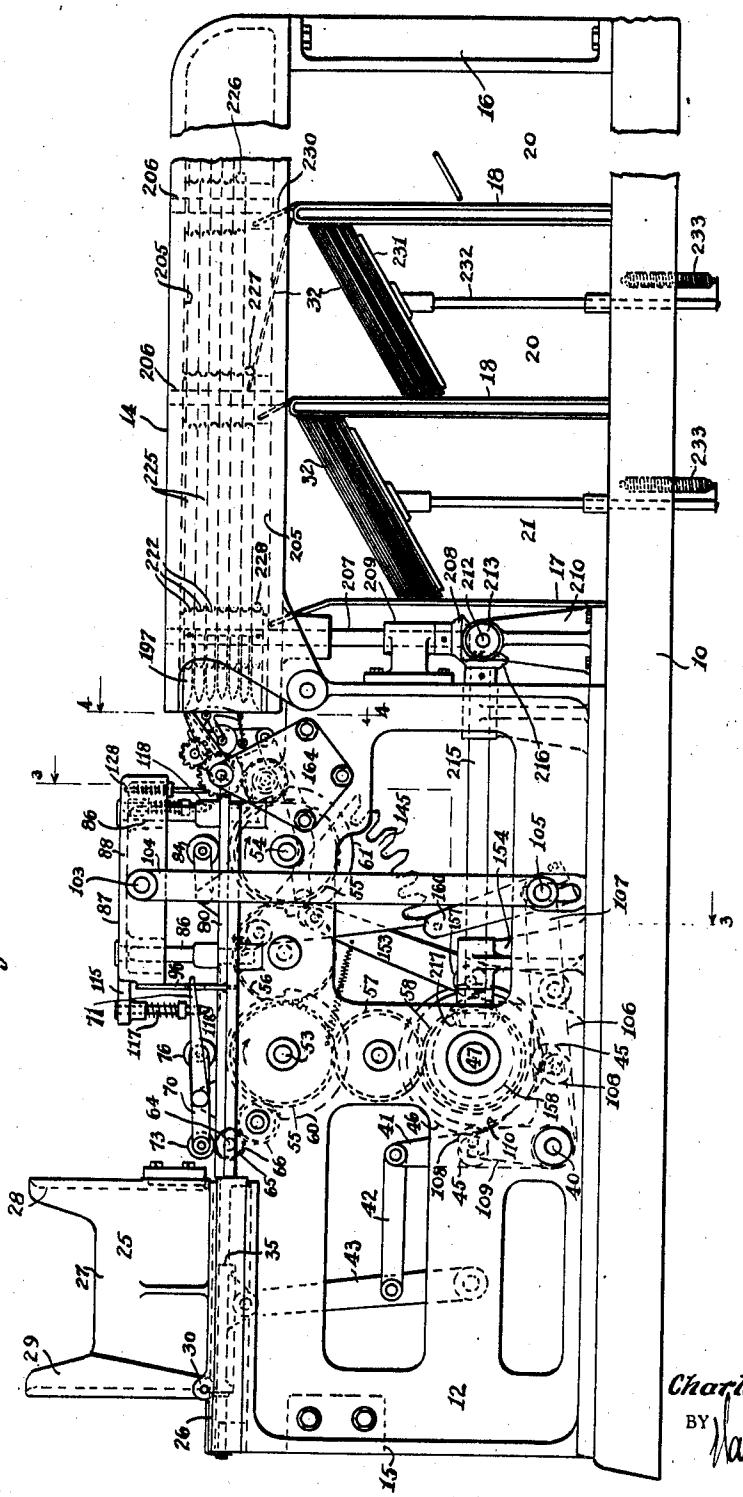


Fig. 1.

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SORTING MACHINE

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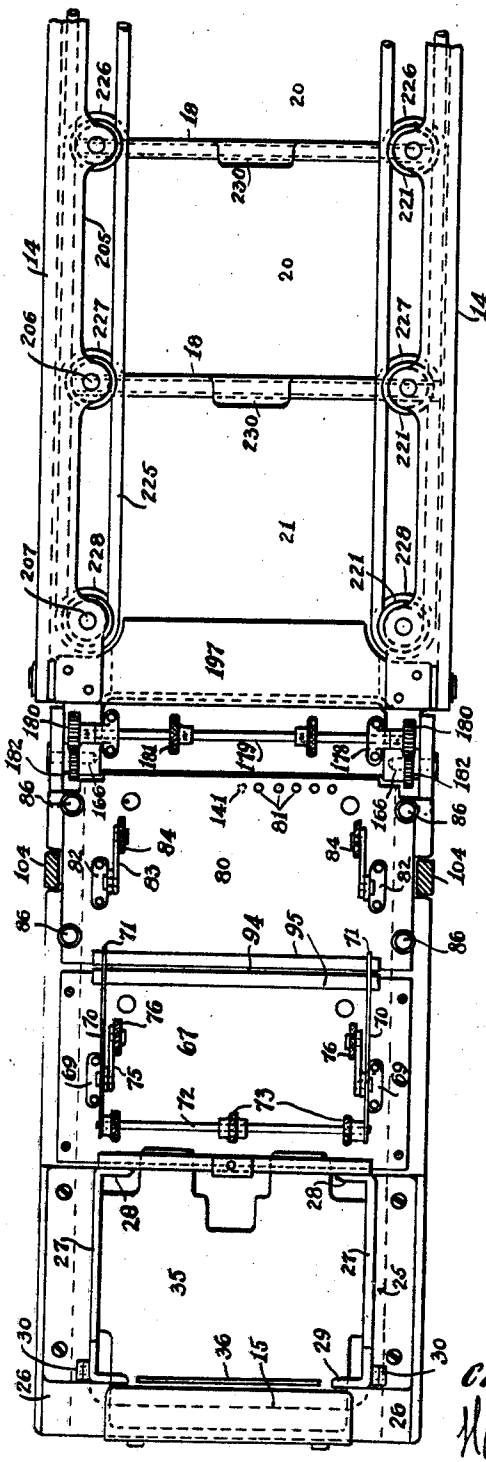


Fig. 2.

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SORTING MACHINE

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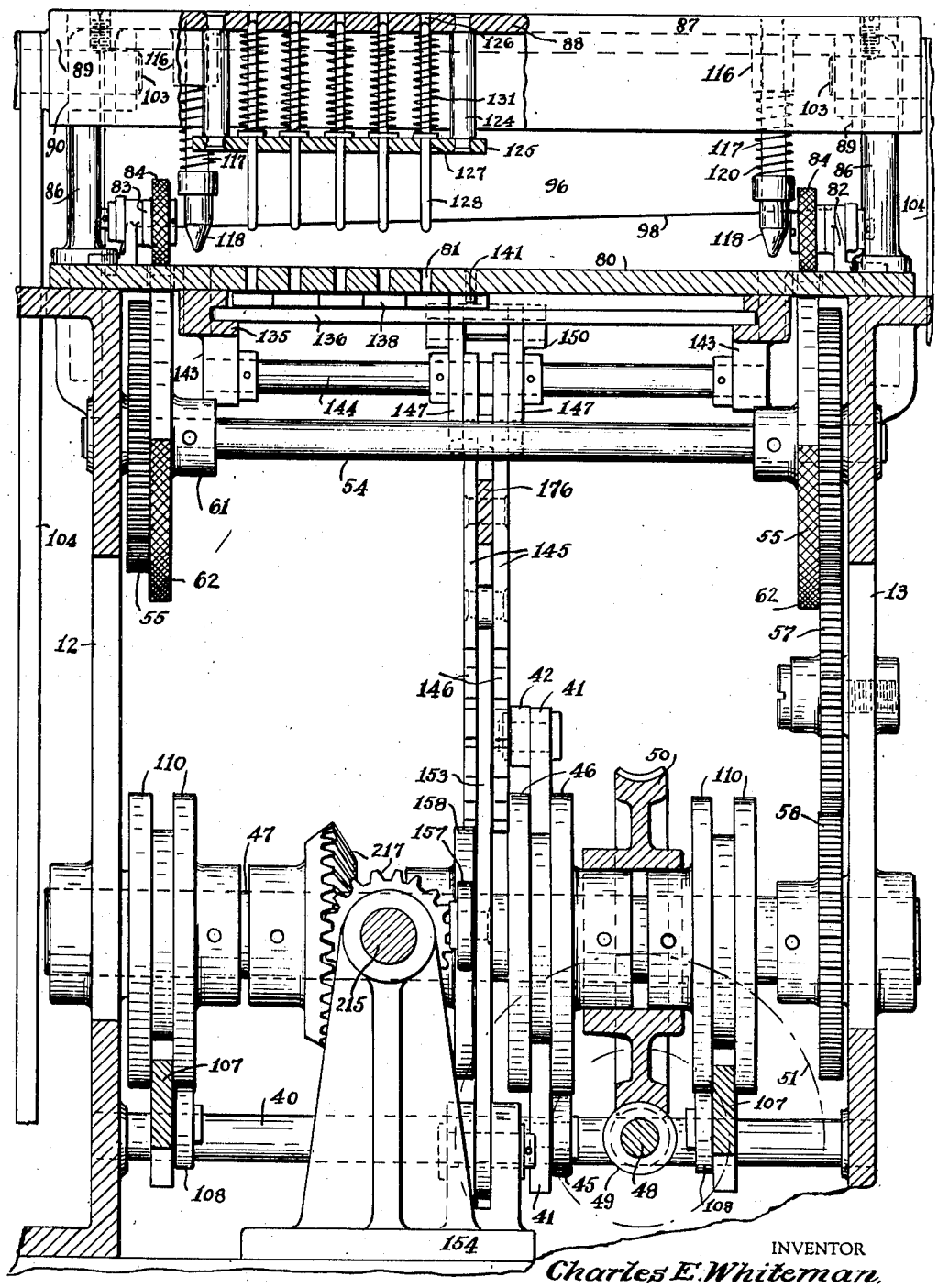


Fig. 3.

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SORTING MACHINE

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Fig. 4.

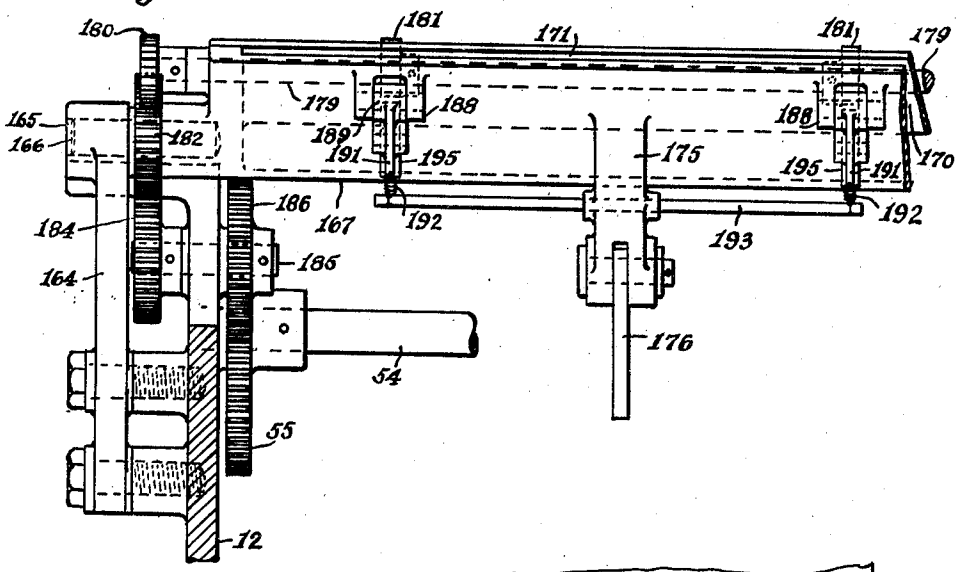
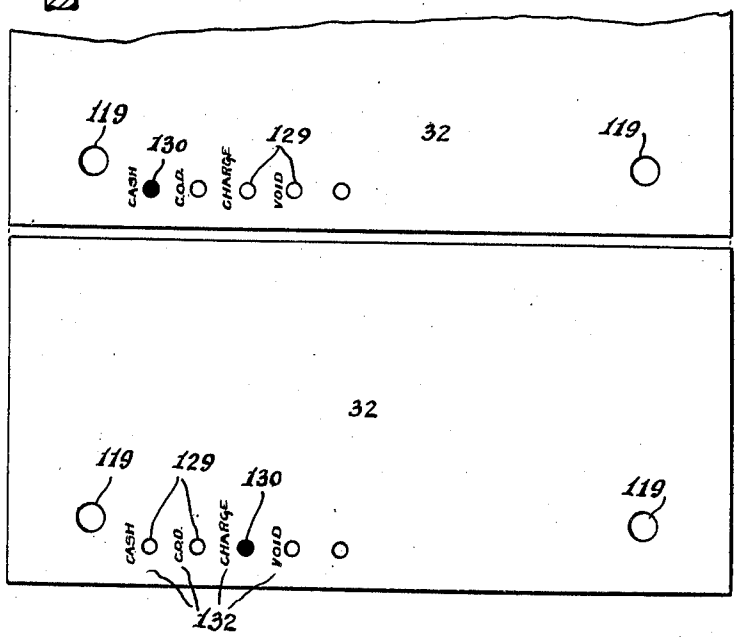


Fig. 7.



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SORTING MACHINE

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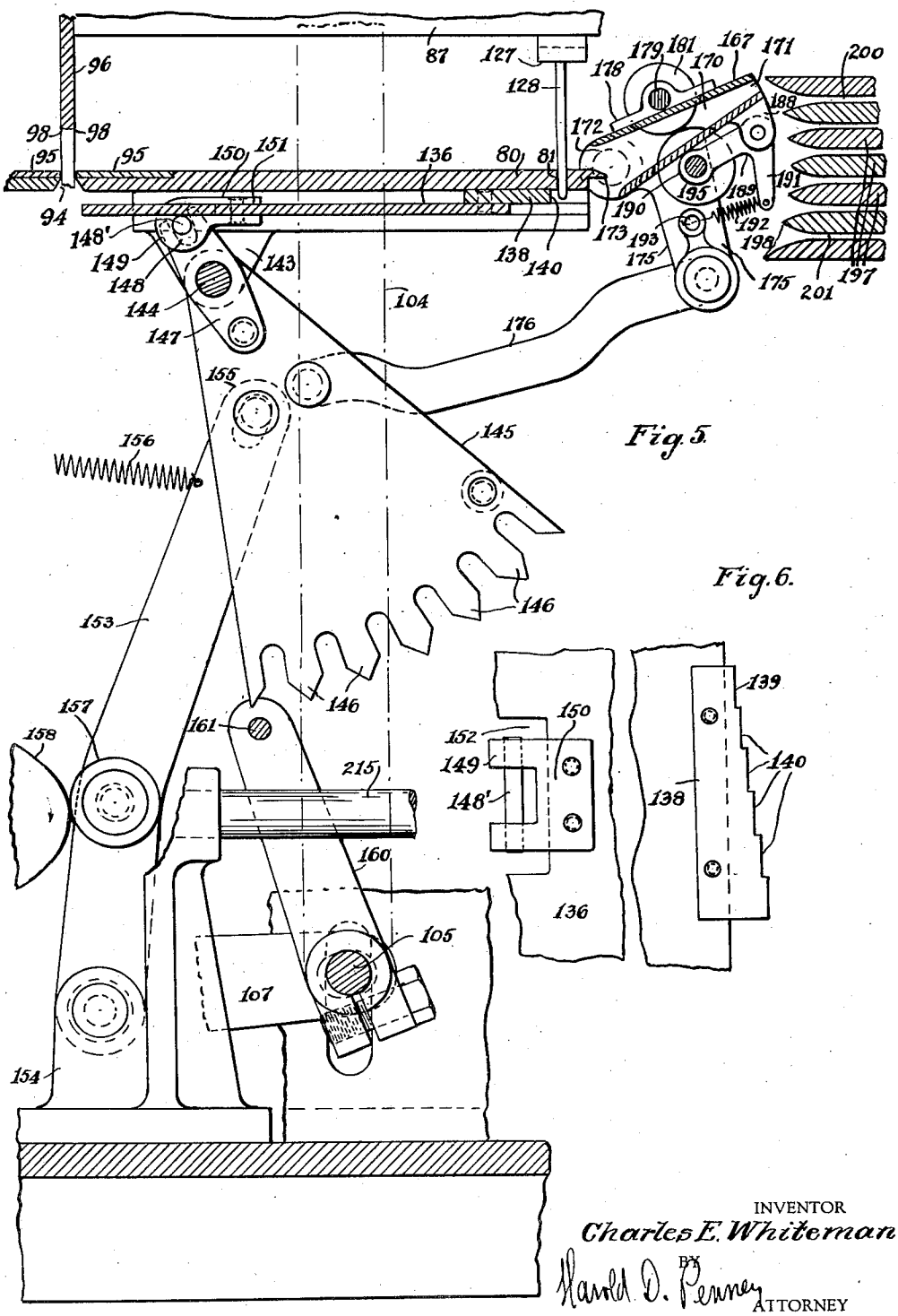


Fig. 5.

Fig. 6.

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SORTING MACHINE

Filed March 28, 1928 6 Sheets-Sheet 6

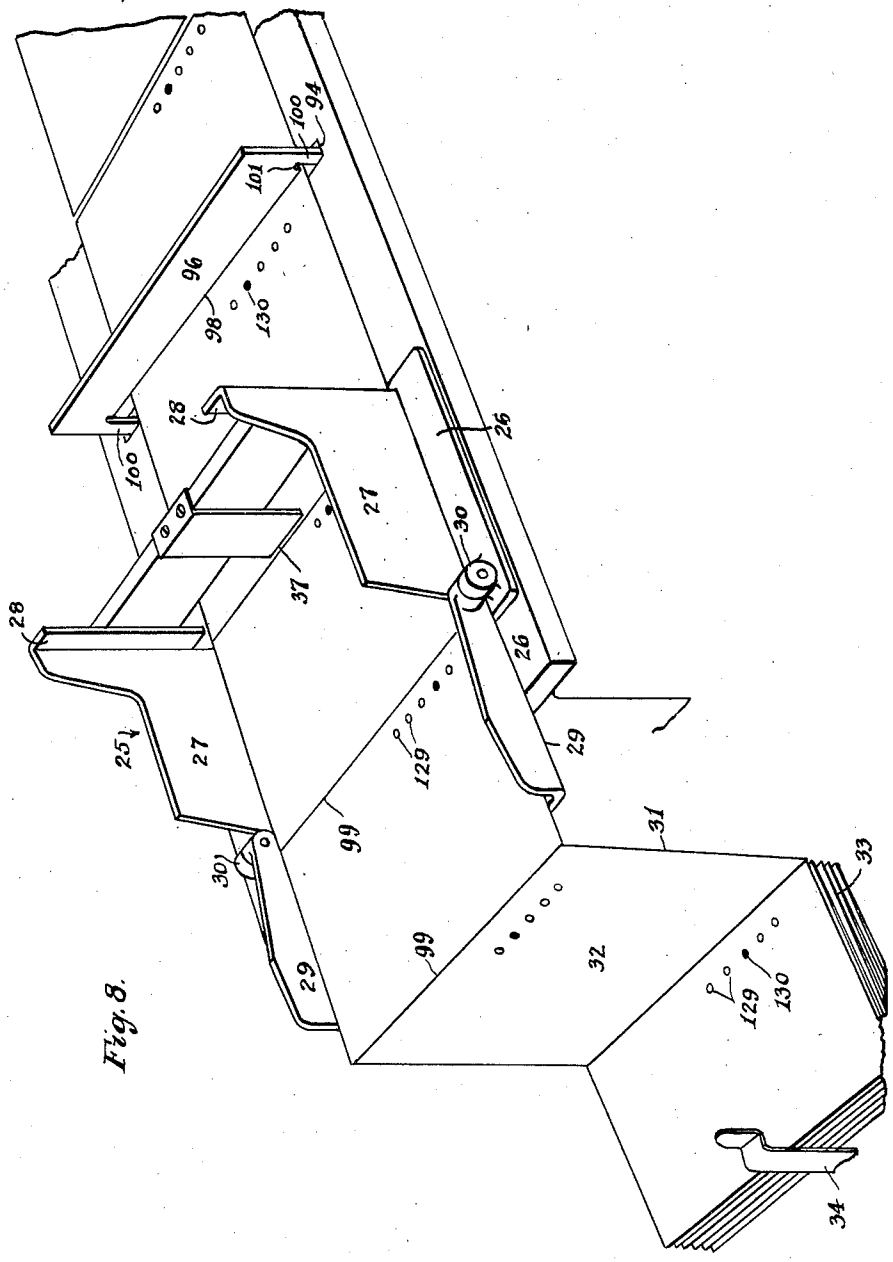


Fig. 8.

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UNITED STATES PATENT OFFICE

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SORTING MACHINE

Application filed March 28, 1928. Serial No. 265,490.

This invention relates to sorting methods and machines and more particularly to means for severing tickets, or slips from folded strip material and analyzing index point locations and perforations thereon and sorting the severed tickets, though it is noted that the invention is not limited to analyzing or severing of slips or tickets, nor in some respects to sorting.

One object of the invention is to provide an apparatus or device of this kind for sorting tickets in strip form or separate tickets.

Another object of the invention is to provide an apparatus or device for cutting apart folded tickets and eliminating the fold and for simultaneously cutting and analyzing the tickets.

Another object of the invention is to provide an apparatus or device of this kind in which the face of the ticket is visible while sorting.

Other objects of the invention are to improve generally the simplicity and efficiency of such machines and methods and to provide a continuously acting machine of this kind which is economical, durable, reliable and substantially noiseless, 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 are 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 or apparatus which, briefly stated, includes record supply means for either strips of perforated tickets later to be cut apart and a supply means for previously severed tickets, adapted to be analyzed and distributed to a series of stations. An intermittent feed and discharge means between the supply means and stations pass the tickets to and from an analyzer plate located at the discharge means and provided with analyzer holes. A reciprocatory pin box over the analyzer plate carries analyzer pins adapted to pass through ticket perforations and project from analyzer holes to analyze the tickets and also carries a wide knife having two edges engageable with suitable fixed cutting edges for cutting tickets from the strip.

A yieldably projected reciprocatory sensing plate adapted to be stopped in different positions by projected analyzer pins, controls a selector guide chute pivoted on a transverse axis at the end of the analyzer plate, whereby the guide chute is given different positions adjacent to means providing a plurality of guide slots with which said chute may selectively register. Rotating grooved vertical pulleys are located on each side of said series, at each station, the first pair having grooves at levels between the slots. Said pulleys carry superposed horizontal belts all extending from the first pulleys, the two uppermost belts terminating at the most remote station, each next lower belt terminating one station nearer the analyzer, whereby tickets passing through respective slots are caught by superposed belts and conveyed to corresponding stations.

In addition to sorting the tickets, the above described machine is adapted for feeding a strip of ticket material comprising perforated tickets from a pack folded in the form of a fan-fold having the sheet folded in zigzag fashion forming folded creases between the tickets. The machine is adapted for simultaneously analyzing tickets and severing them from the strip by cutting from the strip a narrow transverse portion including the fold whereby the disadvantage of a crease on the ticket is avoided.

While herein the perforated slips are referred to as tickets, it is understood that this term refers to any kind of sheet having folds or any form of object having any form of index points thereon which may be analyzed.

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

Fig. 1 is a fragmental side elevation of the sorting machine;

Fig. 2 is a fragmental plan of the machine;

Fig. 3 is a fragmental transverse vertical

sectional view, partly in elevation and on an enlarged scale, showing parts of the analyzer, the section being taken on the line 3—3 of Fig. 1, looking in the direction of the arrow of said line;

Fig. 4 is a fragmental transverse vertical sectional view, being mostly in elevation, showing the selecting guide chute, the section being taken on the line 4—4 of Fig. 1, looking in the direction of the arrows of said line;

Fig. 5 is a fragmental longitudinal vertical sectional view, partly in elevation, showing the guide chute and selecting means therefor, the section being taken on a line passing through the sensing plate;

Fig. 6 is a fragmental plan showing the slide and sensing plates;

Fig 7 is a fragmental plan showing severed tickets; and

Fig. 8 is a fragmental perspective view showing the tickets, magazine guide wall and knife.

My improved sorting machine is carried in and by a casing comprising an elongated base 10, upstanding plates or side walls 12 and 13 (Fig. 3) 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 (Figs. 1 and 2) over the distributing end of the base. End walls 15 and 16 are secured to said side walls and extensions.

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

A ticket or card magazine 25 disposed across the opposite end of the casing comprises base members 26 (Figs. 1, 2 and 8) end walls 27 forming upright front corner flanges 28, and upright rear corner members 29 adapted to receive the corners of the cards lying horizontally in the magazine. The rear members 29 are hinged at 30 at the lower part, to be lowered to form a guide way for a strip 31 of tickets 32 fed from a folded pack 33 placed in a holder 34 at the rear of the machine.

A reciprocatory picker member 35 is slidable under the tickets and carries a picker blade 36 projecting above its rear part adapted as the picker reciprocates to engage the rear edge of the lowest ticket to project said ticket forwardly through a micrometer throat slot 37 provided at the forward side of the lower part of the magazine.

A shaft 40 (Fig. 1) passing through the casing carries a bellcrank to the upper arm 41 on which is pivoted a link 42 linking said arm to the intermediate part of a picker lever 43 having its active end pivoted at the lower part of the picker block. Said bellcrank 41 carries rollers 45 on its arms engaging picker cams 46 carried on a main cam shaft 47 (Fig. 3) mounted in the side walls of the casing, and driven by a longitudinal power shaft 48 connected thereto by a worm 49 and worm wheel 50 and in turn driven by a belt connecting a pulley 51 (Fig. 3) with a suitable motor, whereby said picker block is reciprocated to project previously cut tickets forwardly.

A pair of main feed roll shafts 53, 54 (Fig. 1) passing transversely through the casing near and forward of the picker are each provided with an end spur gear 55 operatively connected with each other by an idler 56 and rotated by an idler 57 rotated by a gear 58 on the cam shaft.

Semi-circular feed and discharge rolls 60, 61, (Figs. 1 and 3), at the ends of the main feed roller shafts, have each a cut-away semi-circumference and a projected knurled semi-circumferential feed face 62, said feed faces being timed to be uppermost at the same time.

An initial feed roll shaft 64 between the first main shaft and the picker and driven by gears 55, 66, carries three initial feed rolls 65 over which are disposed a feed plate 67 (Fig. 2) extending also above the first main feed shaft and provided with openings for the rolls.

A pair of brackets 69 on said plate carry lifting levers 70 (Fig. 2) intermediately fulcrumed on said brackets and having forwardly projected motive ends 71 and active ends over said initial shaft carrying a releasing shaft 72 over the initial shaft provided with pressure rolls 73 pressing over the initial rollers. Said brackets also carry a pair of downwardly spring or gravity-pressed short levers 75 carrying pressure rolls 76 pressing down over the first semi-circular rolls 60.

An analyzer plate 80 (Fig. 2) over the second semi-circular rolls 61 is provided with a series of analyzer holes 81 along its discharge edge and carries brackets 82 carrying spring or gravity pressed levers 83 carrying pressure rolls 84 pressing over the second semi-circular rolls 61.

Guide posts 86 mounted on each end of the analyzer plate slidably receive a pin box 87 comprising a top plate 88 (Fig. 3), and a frame 89 the latter having end members having vertical bores 90 received on the posts.

The said plates 67 and 80 are slightly spaced from each other to form a knife slot 94 (Figs. 2 and 5) provided with hardened edge members 95 both forming cutting edges between which engages a knife 96 (Figs. 3 and 8) secured at the receiving edge of the box and provided with a slanting lower face having two knife edges 98 engageable with said edge members 95 respectively when the pin box is lowered thereby to cut out the fold 99 between the sections of the ticket strip.

The ends of the knife are provided with end guides 100 movable in the slot 94, and with vertical slots 101 receiving the forward ends of said motive arms 71 (Fig. 1) for lifting the initial rollers, against the action of gravity, when the pin box is lowered.

Stub shafts 103 (Fig. 3) in the ends of the box pivotally receive the upper ends of downwardly extended analyzing links 104 pivoted at their lower ends to a transverse rod 105 (Fig. 1) carried fast on the free ends of lower arms 107 of analyzing bell crank levers 106 having their elbow parts fulcrum on said shaft 40, said cranks carrying rollers 108 on the intermediate part of the lower long arm and the upper part of the upper arm 109, the rollers being engaged by analyzer cams 110 on the power shaft, whereby the analyzer box is reciprocated.

Rearwardly projected brackets 115 (Fig. 1) on the rear of the pin box and downwardly projected bosses 116 (Fig. 3) on the top plate 88 near the discharge edge of the pin box are provided with vertical bores in which are slidably mounted locating pins 117 provided with downwardly pointed heads 118 engageable in large locating perforations 119 (Fig. 7) in corners of adjacent tickets to locate the tickets before cutting off by the knife 96. Springs 120 (Fig. 3) compressed between the heads and bracket 115 or boss 116 permit the heads to yield as the knife lowers to cutting position, the upper end of the pins being staked to hold them in when the box rises.

A plurality of pillars 124 pending from the forward part of the top plate carry a pin plate 125 secured on their lower ends. Said pin plate and the forward part of the top plate are provided with series of vertically axially alined analyzer pin holes 126, 127 slidably receiving analyzer pins 128 each adapted to feel index point locations 129 (Fig. 7) on a ticket and if a perforation 130 is found to pass through and, under the action of springs 131, to project through the analyzer holes of the analyzer plate as the pin box is lowered. The index point locations 129 are shown as provided with designations 132 relating to accounts but the invention is in no way limited to these.

Undercut trackways 135 (Fig. 3) mounted across the ends of the lower face of the analyzer plate carry a slide plate 136 slidably mounted between and supported by said trackways and carrying a sensing plate 138 (Figs. 5 and 6) mounted on the forward end of the slide plate and having its forward edge projecting and stepped to form progressively retracted stop edges 139, 140, edges 140 being adapted to engage and to be stopped by a corresponding analyzer pin 128 if projected through the analyzer plate, the edge 139 being stopped by a fixed peg 141 if no pin is projected.

A pair of brackets 143 on the lower face of the trackways carries a rock shaft 144 carrying a pair of spaced sectors 145 mounted at their apex on said shaft and having deep pointed teeth 146 (Fig. 5) at the periphery. A pair of short levers 147 are intermediately mounted on the rock shaft against said sectors and having slots 148 in their upper ends receiving a pin 148′ fast in spaced ears 149 of a bracket 150 provided in its front edge with a horizontal slot 151 receiving and mounted fast on the inner margin of a recess 152 (Fig. 6) in the rear edge of the slide plate, whereby when the sector is rocked the sensing plate is reciprocated.

A sensing lever 153 (Fig. 5) fulcrumed at its lower end on a bracket 154 on said base and loosely pivoted at its upper end 155 to and between the sectors is provided with a spring 156 tending to retract the lever, and is intermediately provided with a roller 157 engageable with a sensing cam 158 on the cam shaft 47 for thrusting the sensing lever forward and thereby retracting the sensing plate when the analyzer pins are retracted and permitting the sensing lever to be retracted under the influence of the spring, after an analyzer pin has been projected through perforations of the ticket and analyzer plate, until the sensing plate engages the projected pin and is stopped in a selected position depending upon which pin is projected and consequently which stop edge 140 is engaged.

An upright bracket 160 fast on the transverse rod 105 carries a locating and retaining pin 161 projecting laterally from the upper end of the bracket and engageable behind a tooth 146 while the pin box is raised to hold the sector in selecting position until the ticket is fed from the analyzer as will be explained.

A pair of brackets 164 (Fig. 1) outwardly offset on the side walls 12 have alined bores 165 (Fig. 4), just forward of the analyzer plate, receiving inwardly pointed alined short shafts 166 pivotally supporting a selector guide member 167 having alined end bores receiving said short shafts 166. Said guide member is formed with a guide chute 170 (Fig. 5) extending across the end of the analyzer plate 80 more than the length of a ticket and having a forwardly tapering vertical cross section providing a narrow forward discharge chute 171 and a wide inlet 172 along the axis of the guide member or just forward of the discharge edge 173 of the analyzer plate.

An arm 175 on the lower face of the selector guide member is connected by a link 176 with the sectors 145, whereby as the sector is positioned the discharge slot of the selector member is given different selected positions.

A pair of brackets 178 (Figs. 2 and 5) on the ends of the upper face of the selector

guide member carry a roller shaft 179 projecting at one end and having a pinion 180 on that end, and provided intermediately with discharge rollers 181 projecting into the guide chute. A gear 182 (Figs. 2 and 4) on one of said short shafts 166 meshes with said pinion 180 and with an idler 184 fast on a shaft 185 in the adjacent side wall 12. Said shaft 185 carries another pinion 186 meshing with the gear 55 on the shaft 54 whereby the discharge rollers are continuously rotated. Pairs of ears 188 (Fig. 4) on the lower face of the guide pivotally carry elbow lever brackets 189 each pivoted at its elbow part between one of the pairs of ears and having a forked active arm 190 (Fig. 5) and a downwardly projected motive arm 191.

A tension spring 192 tensioned between said motive arm and a rod 193 carried in the arm 175 causes pressure rolls 195 journaled between the members of the active arm 190 to be pressed against said discharge rolls 181 for clearing from the chute tickets delivered thereto from the analyzer.

A plurality of horizontal guide slats 197 (Figs. 1, 2 and 5) disposed one above the other between the inner ends of said extensions 14 have pointed edges 198 (Fig. 5) adjacent to the path of the discharge slot 171, whereby are formed a plurality of horizontal guide slots 200 having flaring receiving ends with which said discharge slot will register when in said selected positions respectively, whereby the selector guide slot may selectively guide the tickets into one of said horizontal slots 200 depending upon which analyzer pin 81 is projected. If no pin is projected as when there is no perforation in the ticket, the sensing plate engages the peg 141 and the ticket is delivered to the lowest slot 201 and the discard compartment 21.

Upper and lower inwardly projected supporting flanges 205 (Figs. 1 and 2) formed on the inner face of said extensions 14 carry a plurality of vertical shafts 206, 207 mounted in said flanges at each end of the compartment division walls toward the analyzer, the shafts 207 next to the slots being belt drive shafts and downwardly extended between the first compartment 21 and the analyzer and having a miter gear 208 (Fig. 1) thereon near the level of the main cam shaft.

A bearing bracket 209 on the transverse wall of the casing receives the belt drive shafts; and a pair of brackets 210 on the base carry a transverse shaft 212 thereon having miter gears 213 meshing with the gears 208 of the pulley drive shafts, whereby the latter are constrained to rotate in unison.

A longitudinal shaft 215 and miter gears 216, 217 form a connection between the shafts 207, 212 and the main cam shaft 47, whereby both belt drive shafts are rotated.

Grooved pulleys 220, 221 (Fig. 2) are carried on said vertical shafts 206, 207, the drive pulleys 221 on the drive shafts 207 having grooves 222 (Fig. 1) at the level of and equal in number to the number of the slats and one more than the number of boxes, the number of grooves of the other pulleys being, if desired, progressively one less as the pulleys are more remote from the analyzer, the grooves being, as shown, omitted from the lower ends of the pulleys, the outer end pulleys (not shown) having two grooves each.

Superjacent horizontally disposed conveyor belts 225, 226, 227, 228 are disposed along said extensions on said pulleys, the belts 225 extending from the drive pulleys to the most remote pulley groove of the same level and side of the machine, whereby cards projected through said slots are frictionally held at both edges between adjacent superposed belts and are conveyed along and above the series of compartments.

The two uppermost belts 225 terminate at the near side of the most remote compartment to discharge tickets therein, each next lower belt terminating one compartment nearer the analyzer and discharges tickets therein. Thus the belts 226 and 227 terminate over the third and second compartments respectively and deposit tickets engaged above themselves into such compartments respectively. The bottommost belt 228 constitutes a ring around the lowest groove of the drive pulley and therefore terminates at the near side of the first compartment and depositing tickets therein.

The operation of the machine is as follows:

The machine is designed to sort previously cut tickets, or tickets cut from strips as illustrated in Fig. 3, the tickets being sorted after they have been cut into separate cards.

To load the machine with strip tickets, the magazine is opened as shown in Fig. 8, and the fan-fold-pack 33 is placed in the holder 34, and one end of the strip is pushed through the magazine throat slot 37 to the first set of rolls 65, 73 (Fig. 1) where the strip will be picked up by the rollers at the proper time and carried forward in the machine.

If previously cut tickets are used they are placed in the magazine while the magazine is in the position of Fig. 1 and said tickets are fed to the rolls 65, 73 in the usual manner.

The strip of tickets or a single ticket will be carried toward the knife 96 after each upward stroke of the knife, at which time the rolls 73 have been released from the knife (as shown in Figs. 1 and 2) and permitted to bear down by gravity upon the initial rolls 63, causing the strip to be moved to the semi-circular feed rolls 60. It will be seen from Figs. 1 and 2 that the cut-away portions of the semi-circular rolls and the

pressure rolls 73 release the rolls from driving tickets when the knife goes down.

It will be noted that the semi-circular feed and discard rolls have their enlarged diameter for one half of their periphery, and the knurled portions come in contact with the tickets rollers, at each turn and drive the ticket forward a distance to equal the width of one ticket. The tickets will then come to rest with their edges under the knife, and the knife starts down, lifting the rolls 73 off the tickets; and before the knife touches the ticket, the locating pin heads 118 (Fig. 3) enter the holes 119 (Fig. 7) in the ticket strip and position the strip accurately and hold it in place while the cutting takes place, cutting out a narrow strip with the ticket fold therein. If previously cut tickets are used the operation is the same except that no severing will take place.

After the edge of the ticket has been thus trimmed off the strip will be advanced the distance of another ticket, bringing the first ticket under the pin box.

As the strip ticket has been brought under the pin box and the pin box lowered, the tickets will be positioned by the second pair of heads 118 and the first and second tickets will be severed by the knife at the same time an analyzing pin 128 will go through a perforation 130 that has been perforated in the ticket, and the timing of the machine is such that the pin will dwell for a time sufficient to allow the sensing plate 138 (Fig. 6) to be moved to the pin.

The sensing cam 158 (Fig. 5) is located on the central portion of the main cam shaft 47 and is timed to give a smooth and noiseless action to the sensing plate, since the spring 156 draws the lower sector link back with its roller against the cam until an analyzing pin has been met by the sensing plate 138.

The sensing cam 158 on the main cam shaft is so timed, that the sector will remain in the position as shown in Fig. 5 for a time sufficient to allow a sensing pin to come through, as above stated, and then the cam lobe gradually recedes from the roller 157 allowing the spring 156 to slowly pull the link and sector back, causing the sensing plate to move towards the projected pin, until the sensing plate is stopped with an edge 140 in contact with the analyzing pin.

As there is possible only one hole in each ticket to be sorted, then only one sensing pin will come through; and as the stepped sensing plate is moved to such pin, the sector also will be moved and come to rest in a position determined by an edge 140 of the sensing plate. If no hole has been found by the sensing pins, then the sensing plate will stop at a stationary peg 141 located under the sensing base plate, and the sensing plate will be stopped by its last edge 139.

As the sector is moved to one of these stepped positions the locating or retaining rod is brought up against the rear of a tooth 146, and holds the sector in the selected position, and as the sector is connected, by the link 176, to the selecting guide member 167, the latter will also be registered in accurate position to deliver a ticket in the proper slot 200, 201 and thence to the belt conveyor.

As the retaining rod 161 is carried by the rod 105, the rod 161 is raised when the pin box is raised.

The timing of the pin box analyzing cams is such that when the pin box and analyzing pins have been raised approximately $\frac{1}{16}$ of an inch, the rod 161 is moved a distance sufficient to engage a tooth of the sector and hold the sector from retraction, until the pin box has been brought down again. If, when the pin box comes down, the previous lowering action had set the guide member 167, sector 145 and plate 138 to a forward position, a sensing pin about to go through a perforation in the ticket and the analyzer plate, will come down on top of the sensing plate 138 and be stopped until the sensing plate has time to move back, at which time the sensing pin will drop to its projected position under the action of the spring 131.

As the pin box is brought down and the sensing plate moved against an analyzing pin, and the movement of sensing plate and sector 145 set the guide member 167 to deliver a ticket through a slot 200 to the belts, the pin box then returns to its upward position, and immediately the tickets are advanced forward by the semi-circular rolls 60, 61 (Fig. 1) the distance of one ticket and the operation is then repeated. While the tickets are being thus advanced the retaining rod 161 (Fig. 5) holds the sector 145 and consequently the discharge edge 171 of the guide member in selected position until it is cleared by the rolls 181, 195.

The machine is so designed to give the ticket passing through the chute 170, 171 time to pass completely through, before the guide member will be set for the next ticket.

As the ticket passes through the chute 170 and into the slots 200, 201 its outside edges will be carried between opposite adjacent belts. These belts run continuously slightly faster than the rolls and carry the ticket to its designated box.

While Figs. 7 and 8 show five designations for holes in the ticket, the invention is in no way limited to five. Figs. 1 and 5 show six slots 200, 201 for tickets, one of which, slot 201, may be used for reject tickets or tickets without holes. The first box 21 is the reject box. If a ticket comes through with no hole the sensing plate will stop against the peg 141 and the ticket chute 170 will be registered with the lowest guide groove 201. The ticket is then passed through the groove and between the lower set of belts 227, 228 and

therefore will drop the ticket immediately to the box 21, which is slightly forward and beneath these belts.

Referring to Figs. 1 and 2 it will be noted the belts for conveying the tickets act as a pair of long fingers engaging both edges of the tickets, while the ticket is being conveyed to its compartment. It will also be noted that succeeding pairs of pulleys are spaced a distance apart equal to the width of one box, which will permit the tickets to be dropped. As the belts which have been conveying a card reach the end of the lower belt, the grasping action upon the two edges of the ticket will be broken, as the lower belt revolves around its last pulley; and the forward part of the card which then becomes suspended after leaving the lower belt comes into contact with a stop piece 230 (Fig. 1) just above the far side of each partition 18. This will stop the ticket with its advanced edge at the top of the partition and permit the ticket to fall into its compartment as the usual follower on spring-supported platform 231 supported on the vertically slidable rod 232 and held yieldably raised by the springs 233. The tickets therefor will stack upon these platforms in the previously selected compartment.

I claim as my invention:

1. In combination, sheet supply means; a series of compartments; feed and discharge rolls between the supply means and compartments; initial feed rolls between the feed rolls and the supply means; a feed plate above the initial and feed rolls and provided with openings for the rolls; lifting levers intermediately fulcrumed over said plate; releasable pressure rolls on said levers pressing over the initial rolls; and an analyzer comprising a perforated plate over the discharge rolls and a vertically reciprocatory pin box having yieldable pins adapted to be projected through the plate; and means on said box for actuating said levers.

2. A method comprising feeding a strip of ticket material having perforated tickets, the strip being folded in the form of a fan-fold pack having the sheet folded in zig-zag fashion forming folded creases between the tickets; simultaneously analyzing the end ticket and severing the end ticket from the strip by cutting from the strip a narrow transverse portion including the crease; and then distributing the tickets in accordance with the analysis.

3. In combination, record supply means for folded strips; a series of stations; intermittent feed and discharge means between the supply means and stations; a feed plate and an analyzer plate at the feed and discharge means; a reciprocatory analyzer pin box over the analyzer plate; said plates being slightly spaced from each other to form a knife slot provided with hardened edge portions, both forming cutting edges; and a knife secured at the receiving edge of the box and provided with a slanting lower face having two knife edges engageable with said cutting edges respectively when the pin box is lowered thereby to cut out the fold between the sections of the strip.

4. In combination, sheet supply means; a series of compartments; initial feed rolls between the apparatus and the supply means; lifting levers intermediately fulcrumed over said plate; pressure rolls on the active arms of said levers pressing over the initial rolls; an analyzer between the initial rolls and compartments comprising a vertically reciprocatory pin box; and a knife across the receiving edge of the pin box; the ends of the knife being provided with vertical slots receiving the forward ends of the motive arms of said levers for lifting the initial rollers when the pin box is lowered.

5. In combination, perforated-sheet strip-supply means; an analyzer comprising a perforated plate and a vertically reciprocatory pin box having yieldable pins adapted to be projected through the plate; means for feeding and guiding the strip to the analyzer; means for cutting off portions of the strips while analyzing; and yieldable locating pins mounted in said box provided with downwardly pointed heads engageable in locating perforations in the sheets to locate the portions before cutting off.

6. In combination, a series of stations; an analyzer comprising a perforated plate and a pin box having yieldable pins adapted to be projected through the plate; discharge means for the analyzer; reciprocatory sensing member adapted to be stopped in selecting positions by the pins; selector guide movable at the discharge end of the analyzer and positioned by said sensing member in selected positions; and means for conducting sheets from said positions to the respective stations.

7. In combination, a series of stations; an analyzer comprising a perforated analyzer plate and a pin box having yieldable pins adapted to be projected through the plate; sheet feed and discharge means for the analyzer; undercut trackways mounted across the ends of the lower face of the analyzer plate; a slide plate mounted between and supported by said trackways; a sensing plate mounted on the forward end of the slide plate and having its forward end projecting and stepped to form progressively retracted stop edges each adapted to engage and to be stopped by a corresponding pin if projected through the analyzer plate; selector guide pivoted at the discharge end of the analyzer and operatively connected to and positioned by said slide plate in selected positions; and means for conducting sheets from said positions to the respective stations.

8. In combination, a series of stations; an

analyzer comprising a perforated plate and pins adapted to be projected through perforations of sheets and the plates; a sensing plate slidably mounted beneath the plate and having its forward end stepped to form stop edges to engage and to stop by a projected pin; a sector pivotally mounted at its apex beneath the sensing plate; a short lever secured to said sector and having a loose connection with the sensing plate; a sensing lever loosely pivoted to the sector, a spring tending to retract the sensing lever; a sensing cam for thrusting the sensing lever forward and retracting the sensing plate, the spring causing the sensing plate to engage the projected pin as the lever is retracted by the spring; a selector guide pivoted at the discharge side of the analyzer and connected to said sector thereby to be positioned by said pins in selected positions; and means for conducting sheets from the guide in said position to the respective stations.

9. In combination, a series of stations; an analyzer comprising pins adapted to be projected through perforations of sheets; a yieldably projected reciprocatory sensing plate adapted to be stopped in different positions by projected analyzer pins; a selector guide pivoted on a transverse axis at the end of the analyzer plate; means connecting said sensing plate with the guide whereby the guide is given different positions; and means for conducting sheets from the guide in said positions to the respective stations.

10. An apparatus comprising a series of stations; an analyzer comprising pins adapted to be projected through perforations of sheets; a yieldably projected reciprocatory sensing plate adapted to be stopped in different positions by projected pins; a selector guide chute pivoted on a transverse axis at the end of the analyzer plate; means connecting said sensing plate with the chute whereby the guide chute is given different positions; means providing guide slots with which said chute may register selectively; means for holding the chute in said positions while the pins are retracted; and means for conducting sheets from said slots to the respective stations.

11. In combination, a series of compartments having division walls therebetween; an analyzer comprising pins adapted to be projected through perforations of sheets; selector guide pivoted at the discharge of the analyzer; means whereby the movement of said selector guide is selectively controlled by the projection of one of said pins; transverse guide slots forming horizontal guide slots with which said discharge chute is adapted to register selectively in said positions respectively; vertical shafts at the ends of the division walls, the shaft next to the slots being drive shafts; grooved pulleys on said shafts, the pulleys on the drive shafts having grooves at the level of the slots; superposed horizontal belts from the drive pulleys to the most remote pulley; the two uppermost belts terminating at the near side of the next remote compartment, each next lower belt terminating one compartment nearer the analyzer.

12. An apparatus comprising a base, and inner, outer and side walls thereon, the inner wall having a throat at the lower part, the outer wall having corner flanges and being hinged at the lower corners to be lowered to form a horizontal sheet strip guide way; an analyzer for sensing index point locations on the strip; means for feeding the strip from the throat to the analyzer; means for cutting the strip to sheets; and a sorting mechanism controlled by the analyzer for sorting the sheets.

13. An apparatus comprising means for feeding a strip of material folded in zig-zag fashion forming folded creases between the tickets; an analyzer for analyzing index point locations on the strip between the creases; and means for severing portions from the strip by cutting out a narrow transverse portion including the crease.

14. An apparatus comprising means for cutting a strip of ticket material folded in zig-zag fashion forming folded creases between the tickets, said means comprising a pair of plates slightly spaced apart and both provided with cutting edges and a knife having a wide lower face having two knife edges engageable with said cutting edges respectively; an analyzer for analyzing index point locations on the strip between said creases; and sorting means controlled by the analyzer for sorting the pieces of strip formed by the cutting.

15. A method comprising feeding a strip of perforated ticket material folded in zig-zag fashion forming folds between the tickets; simultaneously analyzing the end ticket and severing it from the strip by cutting out a narrow transverse portion including the fold; and sorting the severed portions under the control of the analysis.

16. An apparatus comprising means for feeding a strip of ticket material initially folded in zig-zag fashion producing folded creases between the tickets, means for analyzing index point locations on the strip between the creases, means for severing tickets from the strip by cutting out a narrow transverse portion including the crease, and means for sorting the tickets.

17. An apparatus comprising feeding means for a strip of ticket material having transverse fold crease lines between the ticket portions, an analyzer, means operable simultaneously with the operation of the analyzer for cutting a narrow transverse portion including the crease line from said strip to divide a ticket therefrom, a series of re-

ceiving stations, and a plurality of conveyor means for selectively delivering the tickets to said stations.

18. An apparatus comprising feeding means for a strip of ticket material, having transverse fold crease lines between the ticket portions, an analyzer, means controlled by the analyzer for cutting out a narrow transverse portion including a crease line from the strip to divide a ticket therefrom, a series of ticket receiving stations, a plurality of conveyor means for selectively delivering the tickets to said stations, an adjustable guide also controlled by the analyzer, a plurality of superposed plates spaced to form guide spaces, said conveyor means including endless belts in horizontal alinement with said guide spaces.

19. An apparatus comprising means for feeding a strip of ticket material having transverse fold crease lines between the ticket portions, an analyzer, a sensing device having reciprocatory movements thereunder, a selector guide chute, means connecting the sensing device with the chute to maintain the latter in selective positions, a plurality of horizontally superposed spaced plates arranged back of said chute providing guides for the tickets, endles belts in horizontal alinement with the guides, and means for severing tickets from said strip by cutting out a narrow transverse portion including the fold crease lines.

20. An apparatus comprising means for feeding a strip of ticket material having transverse fold crease lines between the ticket portions, and index perforations between the crease lines, an analyzer, a rockable chute at the delivery end of said analyzer, yieldingly engaged feed rollers operative centrally of said chute, a sensing device cooperable with the analyzer for determining the rocking movements of said chute, transverse guide slats forming horizontal guide slots with which said chute is adapted to selectively register, means for severing the said strip by removing a narrow portion including the fold crease to produce a ticket, a series of receiving stations and means registering with the guide slots for selectively conveying the tickets to said stations.

Signed at New York in the county of New York and State of New York this 27th day of March, A. D. 1928.

CHARLES E. WHITEMAN.