

June 12, 1934.

J. W. BRYCE

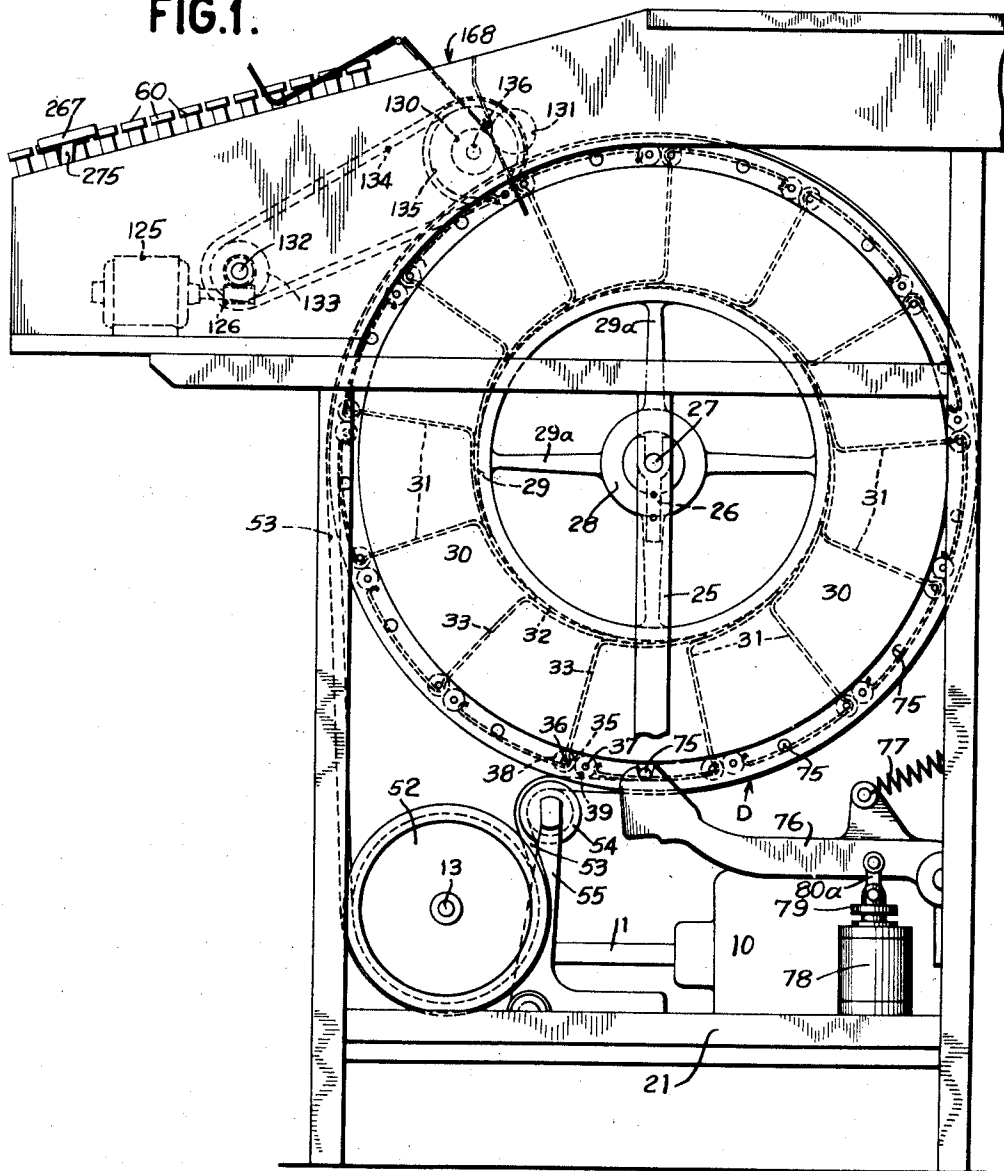
1,962,731.

SORTING MACHINE

Filed Jan. 19, 1933

7 Sheets-Sheet 1

FIG. 1.



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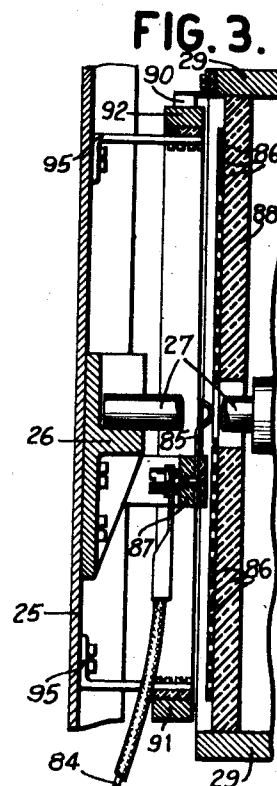
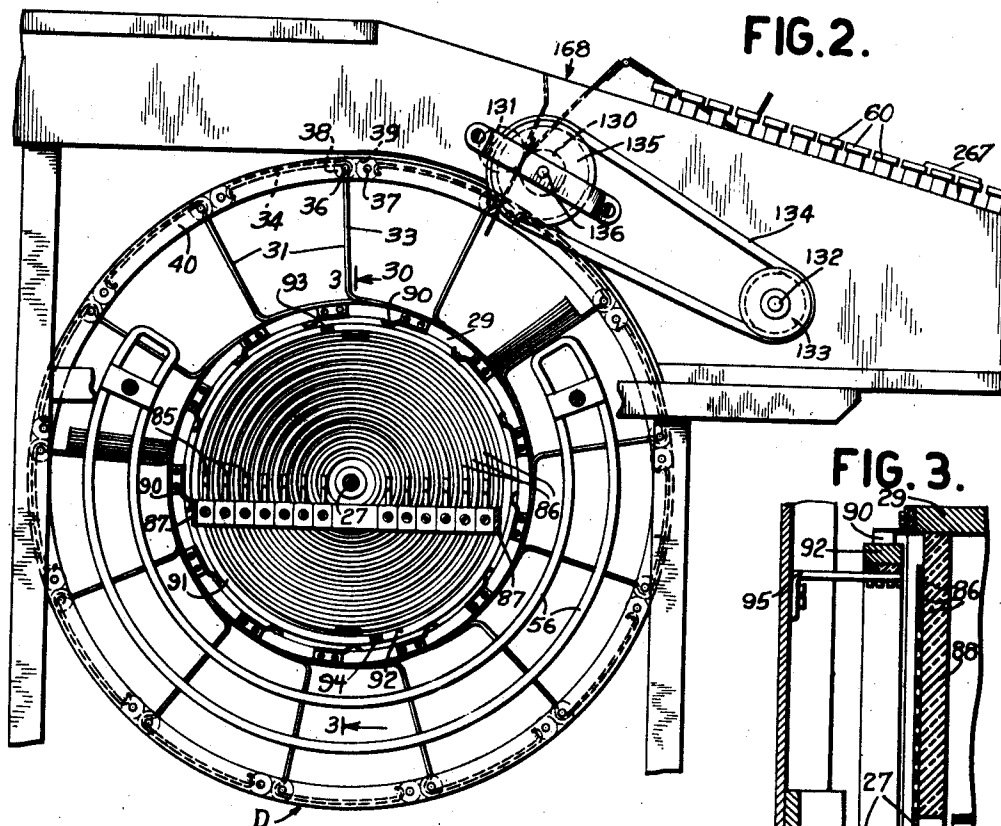
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7 Sheets-Sheet 2



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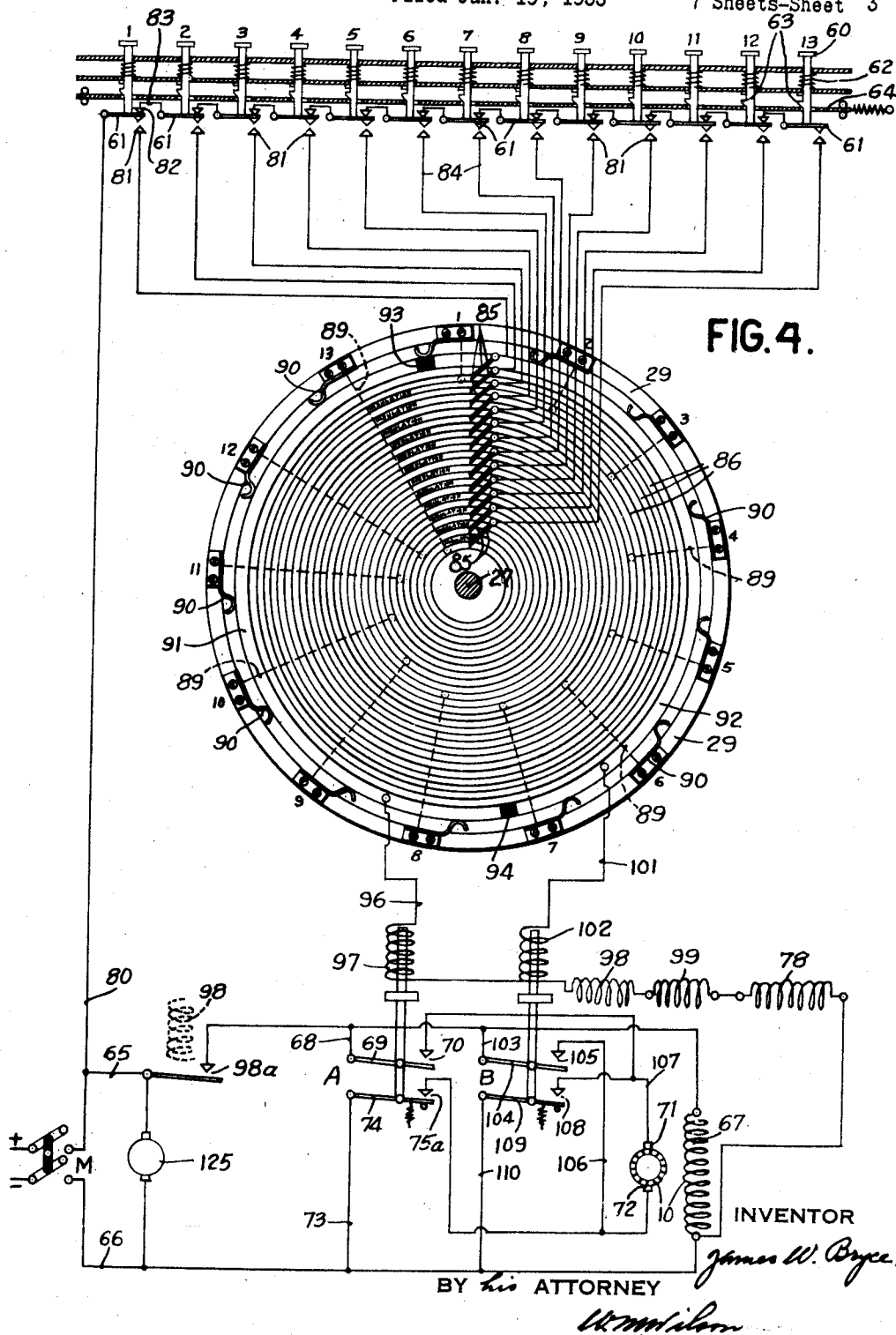
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SORTING MACHINE

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FIG. 6.

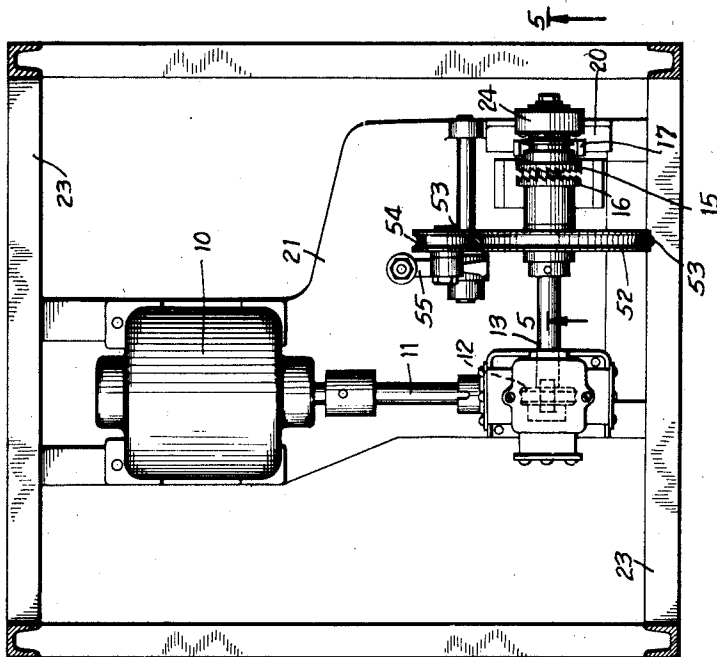
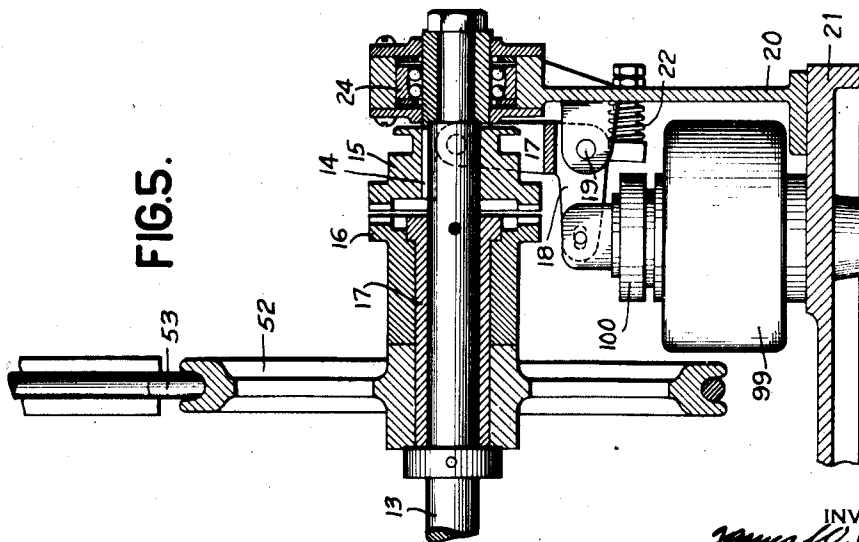


FIG. 5.



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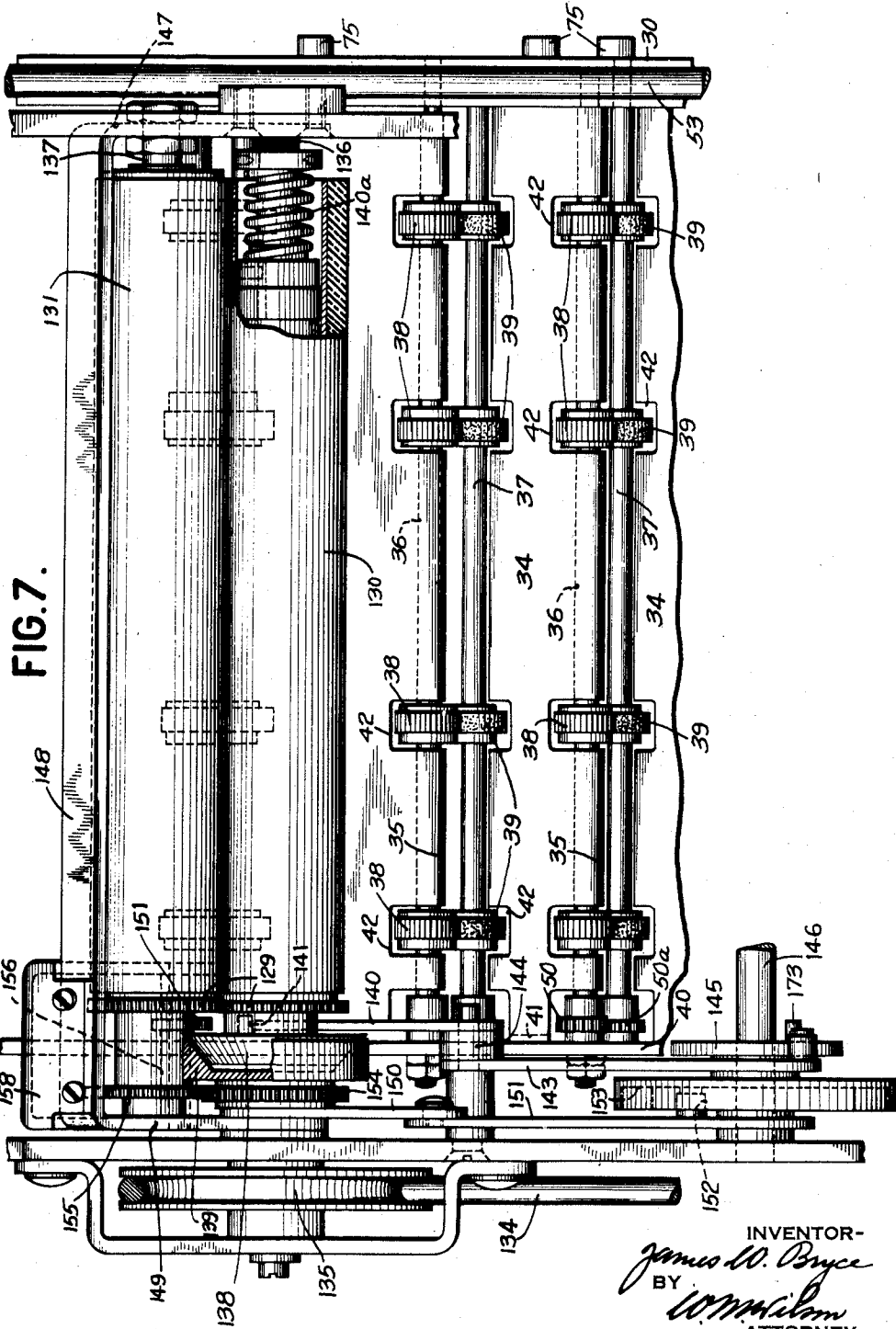
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SORTING MACHINE

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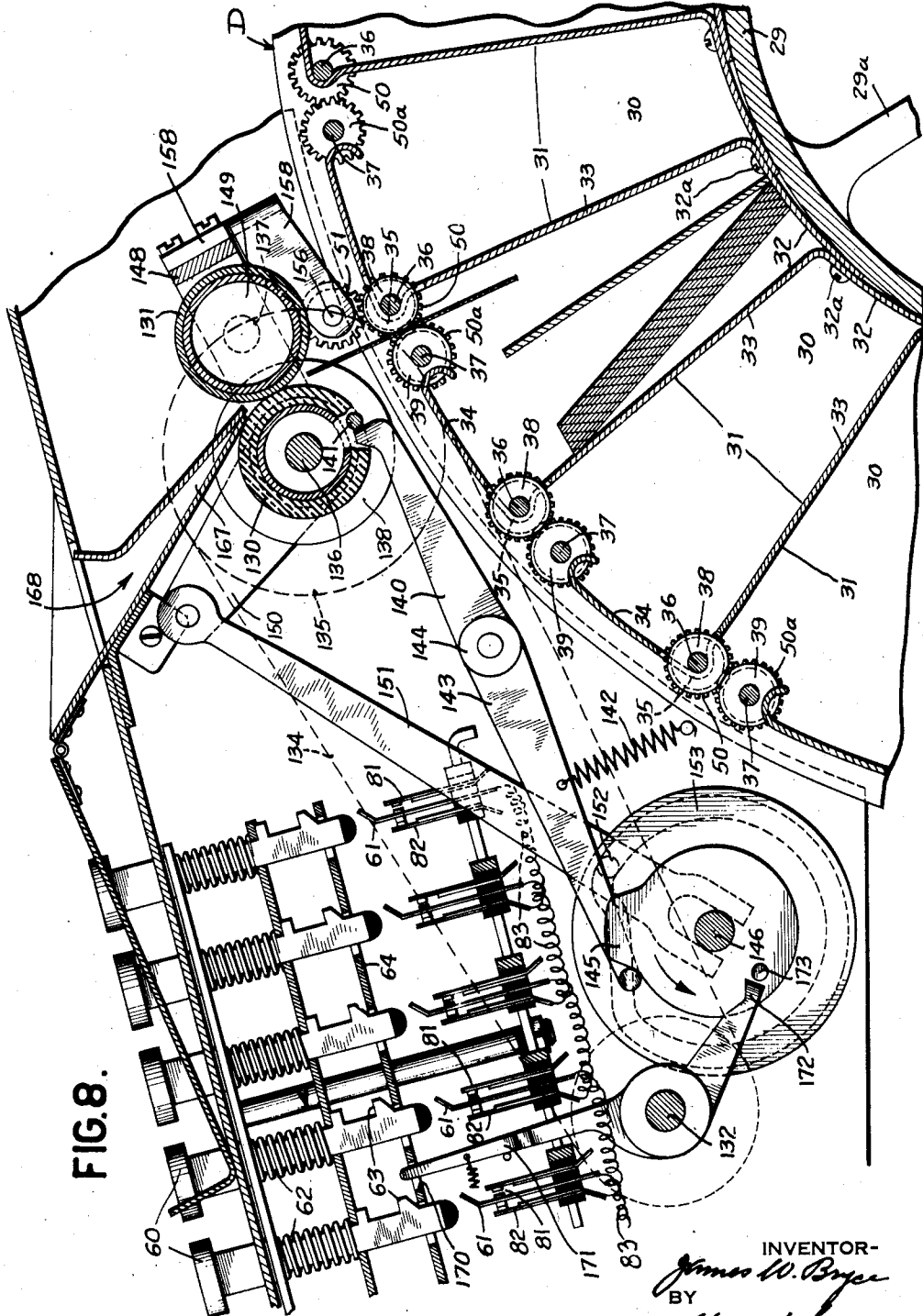
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SORTING MACHINE

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1,962,731

SORTING MACHINE

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FIG.9.

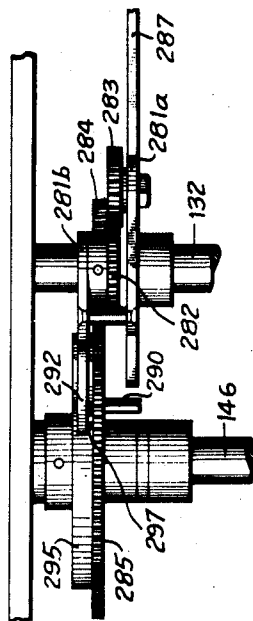
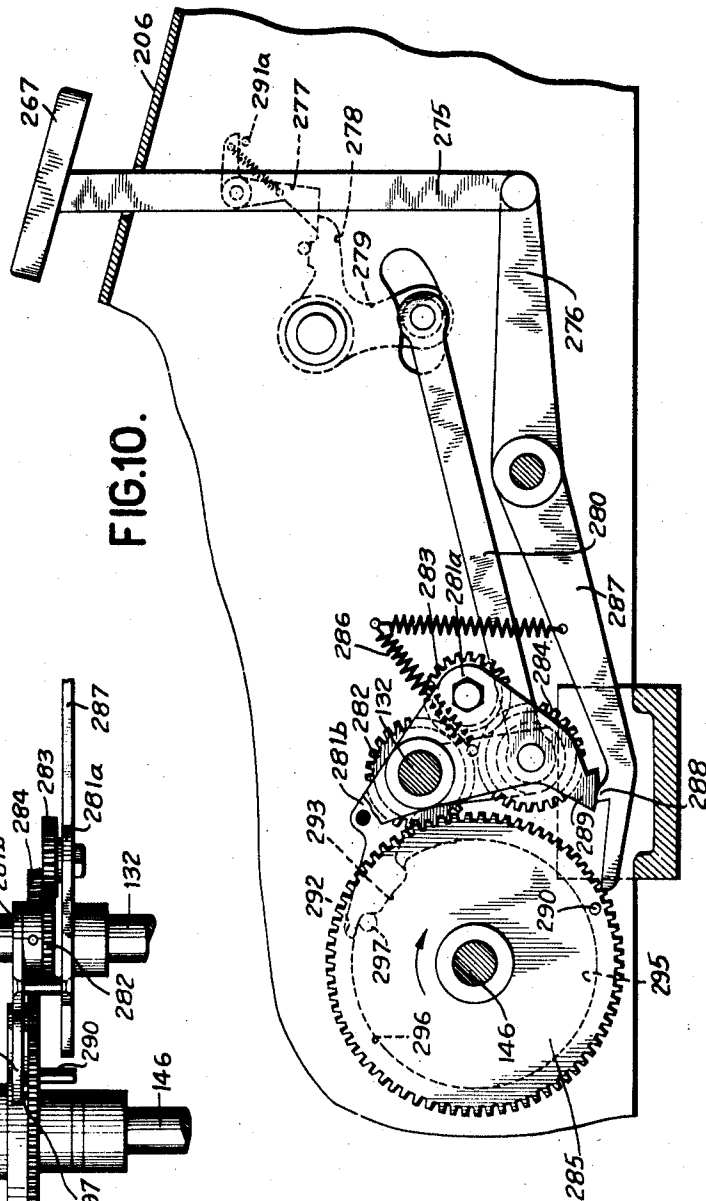


FIG.10.



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UNITED STATES PATENT OFFICE

1,962,731

SORTING MACHINE

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Application January 19, 1933, Serial No. 652,492

24 Claims. (Cl. 214—11)

This invention relates to sorting machines and has for its main object the improvement of machines of this general type to attain the segregation of groups of records, such as bank checks, for example, quicker than has been possible heretofore.

The segregation of records has previously been attained in one construction by the use of a sorting receptacle which is always moved in the same direction to effect the registration of the selected compartment in the receptacle with a common record feeding mechanism. In another prior art construction the receptacle was moved in either direction from a common starting point to select the desired compartment. In both arrangements the selection was effected without any reference to the fact that the compartment desired might have been directly adjacent the last compartment selected permitting a minimum of movement of the receptacle in selecting operations.

Hence, in either arrangement considerable valuable time was lost in effecting the selection of the compartments and an unnecessary amount of power was also utilized.

In the improved arrangement the sorting compartments are contained in a drum and the compartments are manually selected as usual, by appropriate keys, but the actual selection is obtained by a power drive which is capable of rotating the drum from any previous position in either direction, so that the compartment may be directly selected by a movement of the drum which comprises the shorter path.

To make it more clear how the object is attained, if it is supposed that a certain compartment is already in registration with the record feeding mechanism and it is desired to select a compartment in the uni-directionally rotatable drum, and which compartment is adjacent in the direction of rotation of the drum to the compartment already in registration with the record feeding mechanism, almost a complete revolution of the drum in the direction of rotation is necessary to select such a compartment.

In the present arrangement, under such circumstances, the direction of rotation of the drum is reversed so that only a step of movement or the shorter path is required to select the adjacent compartment. The saving of valuable time is readily understandable and considering that savings in time of different extents is effected for successive and different compartment selections, as in every case, as will be evident later, the short-

er path is used, the over-all efficiency of the sorting machine is greatly increased.

To facilitate selection of compartments, keys are utilized and associated with such keys are selector plates which automatically determine the direction of rotation, dependent, of course, upon which compartment is already at the record feeding position so that one direction or the other is necessary to bring the desired compartment to the record feeding position by the shorter path.

The reversing devices comprise, preferably, electrical devices for changing the direction of electric current through the armature of the electric motor that turns said drum although by simple modifications the use of a uni-directional motor and gear reversing devices are contemplated.

The particular means for causing the accurate and quick positioning of the drum to the desired position may also find application in other machines and the drum may carry instead of compartments, other devices which may be used in record accounting systems.

The particular form of receptacle and number of compartments are not to be construed as limitations but only as illustrative embodiments, as the novel control and general arrangement may find application in other forms of receptacles and other elements carrying any number of compartments, where the major consideration is the necessity for elimination of unnecessary movements to provide a direct and immediate selection of devices carried by the receptacle or element.

The feeding of the records to the compartment selected is preferably placed under manual control so that the record involved in the operation is fed to the selected compartment when the drum has been properly positioned.

Other and subordinate, but relatively important objects will be obvious as the description progresses, such description being considered in connection with the annexed drawings in which:

Fig. 1 is a view in side elevation of the right side of the machine in which is incorporated the present improvements.

Fig. 2 is a view in side elevation of a part of the left side of the machine.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a wiring diagram of the electrical instrumentalities of the machine.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 6.

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Fig. 6 is a plan view of the motor drive and associated clutch for the sorting drum.

Fig. 7 is a plan view of part of the drum showing the selectable pairs of feeding rollers and the common feeding rollers and their associated drive and control.

Fig. 8 is a cross sectional view of the sorting drum and associated feed rollers and also showing a part of the keyboard selecting devices.

Fig. 9 is a plan view of some of the parts disclosed in Fig. 10.

Fig. 10 is a view in side elevation of the preferred form of clutch which controls the record or check feeding operations.

In the following description the machine will be described in sections and in sequence of operation so that the operation of the machine as a whole for sorting of records, such as bank checks may be more clearly understood as the description progresses. It is obvious, of course, that other record materials, such as sales slips, tabulating cards, etc., may also be sorted by the machine, and the use of checks is merely a single specific application of the machine.

Prime mover

The power to drive certain of the mechanisms of the machine is derived from a reversible motor 10 (Figs. 1 and 6) adapted to run in either direction according to the requirement. From Fig. 6, it will be observed that the motor 10 drives a shaft 11 and through a reduction gear mechanism 12 a shaft 13 is also driven at a reduced speed. By the provision of a spline 14 (Fig. 5) the shiftable element 15 of a clutch has a constant driving engagement with the shaft 13. A companion clutch element 16 is loosely mounted on a sleeve 17 pinned to the shaft 13.

A driving engagement between the clutch elements 15 and 16 is effected by the shifting of a vertical arm 17 of a bell crank lever 18 (Fig. 5) pivoted at 19 to a bracket 20 secured to a base plate 21. The companion clutch elements 15 and 16 are normally separated by means of a spring 22 acting on bell crank 18.

Base plate 21 is carried by a pair of oppositely arranged cross members 23 and provides a mounting at the lower part of the machine for the motor 10, reduction gear 12, and by bracket 20 a support for the outer end of shaft 13, the shaft 13 being suitably mounted at this end in a ball bearing assembly 24.

Sorting drum

Referring particularly to Figs. 1 and 3, it will be observed that secured to a pair of vertical supporting frame members 25 at opposite sides of the machine are bearing brackets 26 which support the ends of a rod 27. This rod is the horizontal axis or support about which the sorting drum D rotates. The particular manner in which the drum is constructed to form sorting compartments is preferably as follows:

The central portion 28 (Fig. 1) of the drum in which is fitted rod 27 has integral radial ribs 29a extending to an integral portion 29, parallel to the rod 27 and extending completely around so as to form a ring.

The right side (Fig. 1) of the drum has an integral annular wall plate 30 providing at the right end of the machine a closure for a series of thirteen compartments 31. Upon the ring 29 is secured a series of adjacently mounted bent plates and each comprising, in part, as best

shown in Figs. 1 and 8, a concentric base portion 32, the plates of the series overlapping each other and each overlapping pair fastened together and to the ring 29 by suitable fastening means such as screws 32a (Fig. 8).

Portions 32 have integral radially extending plates 33 (Figs. 1 and 8) forming the radial side walls of the compartments and they extend the width of the drum. Plates 32—33 also have portions 34 concentric with respect to the drum center which comprise either the top or bottom of a compartment, while the bend between 33 and 34 is formed as a semi-circular portion 35 to receive a shaft 36. Each pair of shafts 36 and 37 has secured thereto feeding rollers 38 and 39, respectively, and such shafts are journaled at one of their ends in the end wall plate 30 and at their opposite ends in an annular ring 40 (Fig. 2), suitably carried by the plate portions 34 by means of integral tabs 41 (Fig. 7), thus holding the ring 40 in place.

As best shown in Fig. 7 the shaft 36 has loosely mounted thereon the rollers 38, preferably of brass and with smooth peripheries. The shaft 37 has secured thereto a plurality of rubber feeding rollers 39 and in immediate frictional engagement with the rollers 38. The concentric portions 34 as well as the radial portions 33 are suitably cut away at 42 (Fig. 7) to receive the plurality of sets of cooperating rollers.

By the above described arrangement, the bottom of each compartment (when the compartment is below rod 27) is suitably closed to prevent the dropping out of the checks sorted therein by the concentric plates 34 and coacting sets of rollers 38 and 39, while entrance of a check or paper to the compartment (when it is above shaft 27) may be effected by insertion of a check to the compartment between such sets of rollers and then suitably rotating them.

To this end on the shaft 36 there is loosely mounted a pinion 50 having a driving engagement with a pinion 50a (Fig. 7), secured to shaft 37, said pinion 50 having a driving engagement with a pinion 51 (Fig. 8) at the proper time so as to drive the feeding rollers of the compartment selected to receive and feed a check thereto. The particular means whereby this is effected will be described more in detail hereinafter.

To prevent the checks from falling out by shifting edgewise, rails 56 (Fig. 2) are secured to the framework and since the compartments are open at the left end (Fig. 2) of the machine, the checks may be easily withdrawn when such compartments are not in cooperation with the rails 56.

To rotate the drum D through the clutch device 15—16 there is rotatable with the clutch element 16 a grooved driving wheel 52 (Figs. 1, 5 and 6) receiving an endless belt 53 passing around the edge of plate 30 which is suitably grooved to receive the belt. The belt is kept taut by a pulley 54 carried by a spring urged arm 55.

Compartment selection by keys

The drum is rotated differentially whenever a compartment not already in position to receive a check fed thereto is to be shifted to the required position to receive a check and such rotation is under control of a series of compartment selecting keys 60 (Figs. 1, 4 and 8), there being one key 60 for each compartment and arranged in a single line. In the instant case 150

13 compartments are provided, and correspondingly, there is a group of 13 keys.

The key caps are serially numbered as indicated in Fig. 4 so that each designates the compartment that may be selected but they may be lettered according to the classification indicia of the checks, vouchers, etc., comprising the material to be sorted.

The keys 60 may be suitably guided for a vertical depression and when depressed each shifts a pivoted switch blade 61 against the action of a spring 62. Each key is held depressed by virtue of a lug 63 thereof engaging below a slidable detent plate 64 when a key is sufficiently depressed. The lugs 63 of the keys are inclined in such a manner that a depression of a key 60 will shift detent plate 64, which is common to the group of keys, sufficiently to restore a previously depressed key, and if desired, the newly depressed key will be held depressed by detent plate 64 if pressed down far enough.

As will be explained later, the detent plate 64 is automatically shifted after a check has been fed to the selected compartment to thereby automatically release the depressed key at the end of a machine operation.

Electrical controls

When main switch M (Fig. 4) is closed, current is supplied from a source by a positive line side 65 and a negative line side 66. From the positive line side, when contacts 98a are closed, there is a connection to the field winding 67 of the motor 10 and there is also a connection from the negative line side 66 to the field winding.

When contacts 98a are closed, and a switch A operated simultaneously current is supplied to the armature of motor 10 so that the latter turns normally in a certain direction, say clockwise. To this end, by a wire 68, contact blade 69 and contact point 70 the positive line side 65 is connected to the armature brush 71. The negative line side 66 is connected to the other armature brush 72 by a wire 73, switch blade 74, and contact point 75a. As such connections are made when switch A is operated the motor 10 will turn in the assumed or clockwise direction.

Referring particularly to Figs. 1 and 7, it will be seen that the plate 30 carries a series of studs 75, one for each compartment, and all in the plane of a stop lever 76. In the normal position of the lever 76 a notch in the lever 76 engages the stud 75 of the previously selected compartment and such engagement is maintained by a spring 77.

Each time a key representing a compartment not previously selected is depressed a magnet 78 is energized thus attracting its armature 79 downwardly and by means of a link connection 80a to the lever 76, the armature 79 will rock the lever to disengage it from the stud 75 related to the compartment previously selected. At this time, as will be later described the clutch 15—16 will be established, and the motor 10 will thereby drive the drum in one direction or another dependent upon the key depressed.

Referring now to Fig. 4, it will be observed that each key as it depresses its related switch blade 61 effects a connection by a wire 80 from the positive line side 65 to a related contact 81 and when the key is fully depressed to engage blade 61 with the associated contact 81. The blades 61 of the keys are interconnected by contacts 82 and wire connections 83 so that the positive line side 65 is normally connected to all of the switch blades 61.

Each contact 81 is connected by a related wire 84 to an associated brush 85, each of which contacts a related concentric metallic ring 86, the rings being insulated from each other.

As best shown in Figs. 2 and 3, the brushes 85 are carried by a bracket 87 of insulating material which is secured to the frame member 25 and are, therefore, stationary. The rings 86, however, are carried by a disk 88 (Fig. 3) of insulating material, which is carried by the ring 29, and therefore, the disk is rotatable.

From each ring 86, as best shown in Fig. 4, there is a related wire connection 89 to an associated contact brush 90. There are thirteen of such brushes 90 and in normal position six brushes contact with a segment 91 and six contact with a segment 92, while one normally contacts with an insulating block 93. By such block 93 and another insulating block 94 the segments 91 and 92 are insulated from each other, and as best shown in Fig. 3, the segments 91 and 92 are carried insulatably by brackets 95 secured to the frame member 25.

Considering Fig. 4, it will be clear, that with the position of brushes 90 shown, depression of any of the keys 8—13 of the keys 60 will cause a circuit connection by the related blade 61, contact 81, brush 85, ring 86, wire connection 89 to the related brush 90 and thence to the segment 91. From this segment there is a wire connection 96 to a magnet 97, which operates switch A by a connection between its armature and blades 69 and 74, thence through a relay magnet 98 which causes contacts 98a to close, thence through a magnet 99 and the magnet 78 to the negative line side 66.

The magnet 99 is shown in Fig. 5 and when energized attracts its armature 100 downwardly to rock lever 18 and establish the clutch connection 15—16. Since magnet 78 has been energized and arm 76 shifted to unlock the drum, the latter is now turned in the normal direction, clockwise.

Contacts 61, 81 of the key depressed are held in electrical contact to retain magnets 97, 98, 99 and 78 continuously energized so that as the drum continues to turn in a clockwise direction the ring 29 carries all the brushes 90 in the same direction. Considering the brushes 90 of keys 8—13, it will be obvious that when the brush 90 of any key of this group reaches the block 93, the circuit to magnets 97, 98, 99 and 78 will be opened. The clutch 15—16 is disabled by deenergization of magnet 99 and spring 77 (Fig. 1) is effective to shift lever 76 since magnet 78 has been deenergized so as to engage the stud 75 related to the compartment selected.

As the clutch 15—16 is now disengaged the motor revolves idly and comes to rest this occurring because relay magnet 98 has been deenergized to open contacts 98a preventing current from passing to the armature of the motor 10.

Considering now that it is desired to select any of the compartments 2—7 the desired key of the group will be depressed but in this case the related contacts 81—61 will close a circuit to the segment 92 instead. From the segment 92 there is a wire connection 101 to a magnet 102 which controls in a likewise manner the operation of the B switch. From the magnet 102 the circuit extends through magnets 98, 99 and 78, as before, so that the same operations are effected.

When magnet 102 is energized the circuit to

the brushes of the motor 10 is completed as follows: from the positive line side 65, a wire 103, switch blade 104, contact 105, wire 106 to armature brush 72, through the armature to armature brush 71, wire 107, contact 108, switch blade 109, and wire 110 to the negative line side. As the direction of the current to the armature coils is now reversed the motor 10 will turn in a counterclockwise direction. It is understood that the switch blades 104 and 109 are shifted due to their connection to the armature of the magnet 102 to establish the circuit connections just traced.

As ring 29 turns in a counterclockwise direction the brushes 90 will successively contact the insulating block 93 until the brush 90 of the depressed key of the group 2-7 contacts with the same. This will open the circuit formerly closed so that the drum will be locked in position in the manner previously described so that the compartment selected is at the appropriate check feeding position, as will be later explained.

In the event that the "1" key 60 was depressed neither magnet 97 or 102 will be energized as the brush 90 of such key is in normal contact with block 93, indicating that this key was previously depressed and its related compartment is already in the proper check feeding position. This, of course, is true for each key if previously depressed.

From what has been said it is clear that the drum may turn in either direction dependent upon the position of the brushes 90 with respect to segments 91 and 92 and the key depressed. For example, if the compartment #13 is to be selected in the position of brushes 90 shown in Fig. 4 the drum will turn one step in a clockwise direction. Now, if the compartment #2 is to be selected instead of turning twelve steps in a clockwise direction as would occur if no reversing devices were employed the drum turns only one step in a counterclockwise direction thereby the drum is positioned by the shorter path. This minimum movement occurs with any key depressed, as the selector segments 91 and 92 determine the direction of turning necessary from any previous position of the drum to bring the selected compartment to the appropriate check feeding position by the shorter of two different directions.

Check feeding devices

In the preferred construction, after a compartment has been selected to receive a check, the latter is fed to the compartment feeding rollers by suitable feeding means and which, in the instant case, comprises a pair of feeding rollers 130, 131 (Figs. 7 and 8) between which the check or paper has been manually inserted previously.

The driving devices for driving the feeding rollers receive their power from a constantly rotating motor 125 (Fig. 1) driving by a worm wheel drive 126 a shaft 132 which extends completely through the upper controlling section of the machine, the left end of the shaft 132 (Fig. 2) carrying a pulley 133 having a belt connection 134 to a pulley 135 secured to the constantly rotating shaft 136.

Loosely mounted upon shaft 136 is the lower feeding roller 130 (Fig. 7) operatively engaged by intermeshing gears 129 with the upper feeding roller 131; that is, the rollers are turned oppositely by gears 128 and 129 so as to feed a check inserted therein. For driving the feeding roller 130 by the shaft 136 a friction drive comprising a bevelled disk 138 secured to the roller 130 and

an internally recessed flange member 139 secured to shaft 136 is provided. A coil spring 140a is provided to give the required amount of friction between the elements 138 and 139 to drive the rollers 130 and 131.

While the shaft 136 and, therefore, element 139 are constantly rotating, the lower roller 130 is normally locked against movement by a lock arm 140 (Fig. 7) normally engaging a stud 141 secured to disk 138, this action being maintained by a spring 142. When it is desired to feed a check by rollers 130-131 the arm 140 is rocked to bring its extremity away from the path of the stud 141 to permit the frictional drive of the pair of feeding rollers, this being preferably effected by rocking an arm 143 secured to the arm by a sleeve 144 (Fig. 7) the arm 143 having a roller in engagement with the periphery of a profile cam 145 secured to shaft 146.

After the sorting compartment has been selected, a check feed bar 267 (Fig. 1) is depressed by the operator so that shaft 146 is driven a complete revolution as will be later described so that the initial rotation of the cam 145 in the arrow direction (Fig. 8) will shift arm 140 to unlock the feeding roller 130 to cause an opposite rotation of rollers 130 and 131. During the check feeding operation the arm 140 is restored by spring 142 to again come in the path of stud 141 to stop the movement of rollers 130 and 131. The above mechanism provides for an invariable operation of the feeding rollers of the same extent for each feeding operation.

The upper feeding rollers 131 are journaled by shaft 137 in a yoke shaped frame comprising a side plate 147 (Fig. 7) a cross member 148 (Fig. 8) and a side plate 149, both of said plates being loosely mounted upon the shaft 136. Pinned to the plate 149 is an upwardly extending arm 150 to which is articulated a link 151 bifurcated to receive the shaft 146 but having a roller 152 engaging the race of a box cam 153 secured to shaft 146.

Secured to the clutch element 139 is a gear 154 in continuous engagement with a gear 155 secured to a stub shaft 156. This shaft is carried by a ball shaped frame 158 (Fig. 8) secured to the cross member 148 to receive like movements of the latter. Pinned to the shaft 156, which it will be observed constantly rotates, is the roller driving pinion 51.

Under the action of cam 153 the frame members 148 and 158 are initially rocked about shaft 136, roller 131 rolling slightly over roller 130. Movement of frame 158 downwardly causes the pinion 51 to engage one of the pinions 50 to thereby rotate the selected set of feeding rollers 38 and 39 to receive the check or paper issuing from the rollers 130, 131 which are simultaneously driven thereby transferring the check to the selected compartment. At the termination of such feeding movement the frames 148 and 158 are restored and pinion 51 is elevated to give the necessary clearance and permit a subsequent rotation of the drum to select another compartment.

When the drum is suddenly stopped, the checks already in the selected compartment are shifted so as to lie in an inclined manner against the left wall 33 thereof (as shown in Fig. 8) so as to permit an unobstructed entrance of a new check thereto so that all of the checks remain in the same sequence as they are sorted to a compartment.

For facilitating the entry of checks for reception by rollers 30 and 31 an inclined chute 167 150

is provided and in which a check is manually inserted. The weight of the checks is usually sufficient to insure that they pass in the "bite" of rollers 130 and 131 but in case they are crumpled, forcible entry may be required and to this end the upper portion of chute 167 is flared at 168 to permit entry of the fingers of the operator's hand when depositing a check in said chute.

Motor bar control

The performance of the check feeding operations just described is placed under control of a check feed bar 267 depressible by the operator when a desired compartment is in registration with rollers 130 and 131. Depression of bar 267 effects the clutching of the constantly rotating shaft 132 (Fig. 10) with the shaft 146 which causes the check feeding operation when rotated. The preferred form of clutch mechanism will now be described in detail, reference being had particularly to Figs. 9 and 10.

The motor bar 267 is operable externally of the machine and is carried by a stem 275 (Fig. 10) slidably mounted at its upper end in the casing 206 and pivoted at its lower end by an arm 276. The stem carries a pawl 277 the lower end of which is adapted to engage one arm 278 of a bell crank, the vertical arm 279 being pivoted to a link 280 which is connected to the lower end of a pinion carrying frame comprising parallel plates 281a and 281b both loosely mounted on shaft 132. Secured to the constantly rotating shaft 132 is a pinion 282 in mesh with an idler pinion 283 pivotally mounted on the frame plate 281a. Pinion 283 is in constant mesh with a broader pinion 284 also pivotally mounted on plate 281a. The pinion 284 when rocked into mesh is sufficiently broad to mesh with and drive a gear 285 secured to the cam carrying shaft 146.

A spring 286 (Fig. 10) connected to the frame 281a-281b retracts the latter so a normal disengagement is effected between pinions 284 and gear 285. When the bar 267 is depressed pawl 277 rocks bell crank 278-279 to shift the link 280 so that when the pinion carrying frame is rocked sufficiently to effect a driving engagement between pinion 284 and gear 285 a lug 288 of a spring urged latch arm 287 will spring behind a projection 289 of frame plate 281a.

Shaft 146 will now be driven to effect the check feeding operation. Towards the end of a complete revolution of shaft 146 a pin 290 secured to gear 285 will coact with a tail of the latch arm 287 permitting spring 286 to restore the frame to effect disengagement between pinion 284 and gear 285.

When stem 275 is depressed pawl 277 will rock the bell crank and by the coaction of a tail of the pawl with a fixed stud 291a the pawl will be rocked in its downward movement and will pass by the arm 278 after the pinion carrying frame is rocked to be latched by pawl 287. The engaging end of pawl 277 now being below the arm 278 it will be observed that repeated operations of the drive shaft 146 cannot be effected by holding the bar 267 depressed. The provision of the above "non-repeat" device requires restoration of the bar 267 and a subsequent manual depression for each operation of the drive shaft 146.

The plate 281b has an extension 292 the lower concentric edge 293 thereof being adapted to be engaged by a pin 297 secured to the gear 285 rotatable with shaft 146. The passage of the pin 297 in a clockwise direction beneath the concentric edge 293 retains initially the desired clutch-

ing engagement of the drive pinion 284 and gear 285 and this is maintained after the pin has cleared the edge 293 by the concentric edge 296 of disk 295 coacting with the lower edge 293. When the shaft 146 returns to its home position and the frame 281a, 281b is unlatched by rocking of lever 287 spring 286 will be active so that the lower projecting portion of plate 292 fits in and engages a similar shaped cut out portion of the disk 295, the parts now being at normal.

Key release mechanism

At this point there will be described the means for automatically releasing the depressed key at the end of a check feeding operation.

Detent plate 64 is provided with a slot 170 (Fig. 8) which is received by the upper end of one arm 171 of a bell crank. This slot in the normal position of the bell crank permits free movement of the detent plate 64 by the depression of a key.

The lower arm 172 of the bell crank is engaged by a pin 173 carried by the cam 145 at the end of the rotation of shaft 146. This arm 171 is rocked to shift the detent plate 64 to the right (Fig. 8) to release the detent plate from the lug 63 of the depressed key which is then restored to normal by its spring 62.

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

What is claimed as new is as follows:—

1. In a machine of the class described, in combination, a rotatable frame, a plurality of record sorting compartments rigidly carried thereby for sorting records of different classifications, an operating mechanism for rotating said frame, means for preventing records from falling out of the compartments during the rotation of said frame, and means for causing said operating mechanism to rotate said frame from any previous position of the frame always in the shorter of two different directions of rotation to select the compartment related to the classification of the record involved in a record sorting operation.

2. In a machine of the class described, the combination with a rotatable frame, of a plurality of record sorting compartments carried thereby for sorting records of different classifications, a record feeding mechanism, means for rotating said frame always in the shorter of two different directions of rotation from any previous position to associate any one of the compartments with the record feeding mechanism to cause the sorting compartments to receive records of related classifications, and means for causing the operation of the record feeding mechanism.

3. In a machine of the class described, a rotatable frame, a plurality of record sorting compartments carried thereby for sorting records of different classifications, compartment selecting means, operating mechanism independent of the selecting means for rotating said frame, means for effecting a mechanical driving connection between said frame and said operating mechanism, and means effective after the driving connection

is established for causing said operating mechanism, under control of the selecting means, to rotate said frame from any previous position always in the shorter of two different directions of rotation to bring any one of the compartments to a common record receiving position to receive a related record and then disabling the mechanical driving connection.

4. In a machine of the class described, a rotatable frame, a plurality of record sorting compartments carried thereby for sorting records of different classifications and adapted to remain in any position as a result of a previous compartment selecting operation, individual compartments selecting means one for each of the compartments and each selected for operation in accordance with the classification of a record, means whereby the depression of a single selecting means causes the minimum extent of rotation of the frame necessary to rotate the frame from any previous position to bring the selected compartment to the record receiving position, means for feeding the record to a selected compartment, and means for causing the operation of said feeding means.

5. In a machine of the class described, a circular frame carrying rigidly a full complement of sorting compartments for sorting records in accordance with the classifications of the records, means for selecting any one of the compartments, means for preventing records from falling out of the compartments during the rotation of said frame, means under control of the selecting means for rotating said frame in the shorter of two opposite directions of rotation to position any one of the compartments to a record receiving position by a minimum extent of rotation of said frame, and means for thereafter feeding the record to the selected and related compartment.

6. In a machine of the class described, a rotatable frame carrying a plurality of sorting compartments for sorting records of different classifications, a series of compartment selecting keys one for each record classification, a power drive independent of said keys for rotating said frame, means for effecting a mechanical driving connection between said power drive and said frame, means whereby said power drive under control of the keys rotates the frame in either direction from any previous position the minimum extent of rotation necessary to bring the selected compartment to a record receiving position, and means for thereafter effecting a disconnection between said power drive and said frame.

7. In a machine of the class described, a movable frame carrying a plurality of sorting compartments for sorting records of different classifications, a driving means for moving said frame and revoluble in either direction, means for effecting a mechanical driving connection between the driving means and said frame, means dependent upon the previous position of said frame for determining the direction of revolution of the driving means whereby said frame is moved in either direction from any previous position by a minimum extent of movement necessary to bring any one of the compartments to a predetermined record receiving position to receive a correlated record, and means for thereafter disabling the driving connection.

8. In a sorting machine, a receptacle carrying a plurality of record sorting compartments for sorting records of different classifications, selecting elements, one for each compartment and se-

lected for operation in accordance with the classification of the records, a driving means independent of said elements and revoluble in either direction for moving said receptacle in either direction, means whereby any one of said selecting elements causes the automatic operation of said driving means and determines which direction of movement of said receptacle is necessary to bring by the shorter path the selected compartment to a predetermined record receiving position, means for feeding a record to the selected compartment, and means for operating said feeding means.

9. In a record sorting machine, a movable receptacle carrying a plurality of rigidly mounted sorting compartments for sorting records of different classifications, keys, one for each compartment, and selected for operation in accordance with the classification of the records, means for retaining the records sorted in the compartments during the movement of the receptacle, and an electrical control apparatus under control of said keys and dependent upon the prior position of the receptacle for determining the direction of movement of said receptacle from any previous position necessary to bring a desired compartment to a record receiving position by the minimum extent of movement of the receptacle.

10. In a sorting machine, a receptacle carrying a plurality of record sorting compartments for sorting records of different classifications, selecting elements one for each compartment and operated according to the classification of the record sorted, electrical controlling means under control of said selecting elements for causing the bodily movement of said receptacle from any previous position by a movement of minimum extent necessary to place any of the compartments to a record receiving position, means for feeding the record to the selected compartment and means for operating said feeding means.

11. In a sorting machine, a receptacle carrying a plurality of sorting compartments for sorting records of different classifications, a series of compartment selecting keys operable in accordance with the classification of the records, means independent of said keys for moving said receptacle, means whereby any of said keys determines the subsequent direction of movement of the receptacle, a receptacle arresting means comprising a single member shiftable during the movement of said receptacle to hold the selected compartment at a predetermined record receiving position, and means when set in operation for automatically feeding the record to the selected compartment.

12. In a sorting machine, a receptacle carrying a plurality of sorting compartments, a series of compartment selecting elements, a clutch for controlling the movement of the receptacle, means operable in either direction as determined by said selecting elements for moving said receptacle when the clutch is enabled, and means whereby said clutch is disabled when the movement of the receptacle in either direction brings the selected compartment to a predetermined record receiving position.

13. In a sorting machine, a receptacle carrying a plurality of compartments for sorting records of different classifications, means comprising a motor for moving the receptacle, means for moving said receptacle in either direction from any one of the previous positions to bring a selected compartment to a predetermined record receiving position, electrical controlling

means for controlling the receptacle moving means, and means operable when set in motion for automatically feeding a record to the selected compartment.

5 14. In a sorting machine, a receptacle carrying a plurality of compartments for sorting records of different classifications, means for moving said receptacle, a clutch device between said moving means and said receptacle, means for moving
10 said receptacle in either of two directions to bring a selected compartment to the predetermined record receiving position, and electrical controlling means for controlling the clutch and said receptacle moving means and including a
15 plurality of compartment selecting elements operable in accordance with the classifications of the records, any one of which determines in which of the two different directions the receptacle is to be moved.

20 15. A machine of the class described comprising, a receptacle carrying record receiving devices, a reversible motor for moving said receptacle in either direction, means including a pair of selector plates for determining the direction
25 of movement of said motor, a plurality of keys for selecting the record receiving devices and divisible into groups, each group correlated with a related selector plate, means for effecting a mechanical driving connection between said motor
30 and said receptacle, and means whereby the selection of either selector plate causes the effectiveness of the last named means.

35 16. In a sorting apparatus, a receptacle carrying a plurality of compartments for sorting records of different classifications, a pair of means for determining the direction of movement of said receptacle, a motor, a single means
40 for causing the movement of said receptacle by said motor, a plurality of compartment selecting elements, divisible into groups, and each selected for operation in accordance with the record classification, and means whereby each of said
45 direction determining means is correlated with a different group of compartment selecting elements in each different position of the receptacle but both are always correlated with the receptacle moving means for control thereof.

50 17. In a sorting machine, a receptacle carrying a plurality of sorting compartments for sorting records of different classifications, compartment selecting elements selected for operation in accordance with record classifications, clutch elements,
55 a motor for moving said receptacle by said clutch elements in either direction as determined by said selecting elements, and means for disconnecting said motor from a driving connection with said receptacle by separating the clutch elements as the selected compartment arrives at a record receiving position.

60 18. In a sorting machine a receptacle carrying a plurality of sorting compartments for sorting records of different classifications, compartment selecting elements selected for operation in accordance with record classifications, a motor,
65 electrically controlled means whereby all of said elements cause an operative mechanical driving connection of said motor and said receptacle, and electrically controlled means whereby said selecting elements determine the direction of movement of the receptacle by said motor.

70 19. In a sorting machine, a reversible motor for moving a receptacle carrying record receiving devices in either direction, switches for reversing the direction of said motor, selecting elements
75 for selecting the record receiving devices, means

whereby said selecting elements cause the mechanical driving connection between said motor and said receptacle and operation of either of said switches selectively dependent upon the position of the receptacle when a selecting element
80 is operated, and means for thereafter breaking the mechanical driving connection.

20. In a sorting machine, a receptacle, a plurality of sorting compartments carried by said receptacle for sorting records of different classifications, a motor for moving said receptacle,
85 means whereby said motor moves said receptacle by the shorter path of two directions from any previous position to select a desired sorting compartment, means for effecting a mechanical driving connection between said motor and said receptacle, and means for disabling said connection
90 when the selected compartment of the receptacle is at a record receiving position, whereby said motor operates idly.

21. In a sorting machine, a receptacle carrying a plurality of sorting compartments for sorting records, a member engageable with a part of said receptacle to normally hold the previously selected compartment after it has received a record
100 in a record receiving position, a motor, means comprising a clutch to establish a mechanical driving connection between said motor and receptacle to drive the latter, a plurality of keys, means under control of said keys for causing
105 said clutch to establish said driving connection until a selected compartment is at the record receiving position, and means effective during the same compartment selecting operation for shifting said member to first release said receptacle
110 and then cause it to engage a part of said receptacle to continue to hold the latter when the selected compartment is at a record receiving position.

22. In a record sorting machine, in combination, a receptacle having a plurality of sorting compartments, a motor, keys, means under control of said keys for selecting said compartments by causing said motor to effect predetermined movements of said receptacle, a supplemental motor,
120 a record feeding means, and manually controlled means for causing the supplemental motor to operate said record feeding means to convey a record to the selected compartment.

23. In a record sorting machine, in combination, a receptacle having a plurality of sorting compartments, a motor, keys, means under control of said keys for causing said motor to shift said receptacle by the shorter of two different directional movements to select a desired compartment, record feeding means, and manually controlled means for causing the operation of the latter for feeding a record to the preselected sorting compartment, the last named means including a motor supplemental to the first named
135 motor.

24. In a sorting machine, in combination, a receptacle adapted to be given differential movements to selected desired sorting compartments, means normally holding said receptacle in the position effected by the previous compartment selection, a plurality of compartment selecting elements, means whereby the latter causes the holding means to first release said receptacle and then causes it to engage said receptacle at differential
140 times during the movement of the receptacle, and manually controlled feeding means for feeding a record to the preselected compartment.

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