

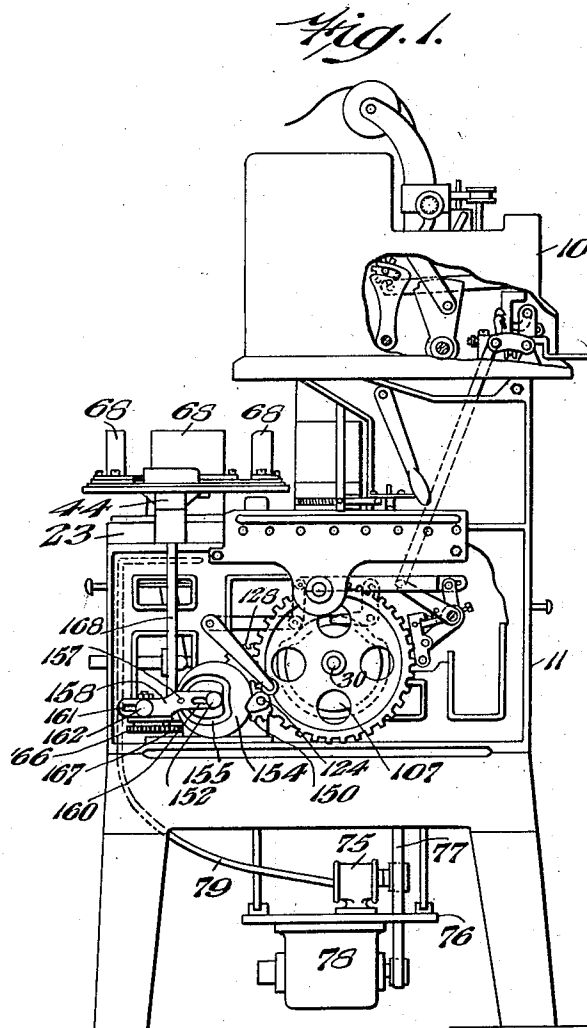
April 10, 1928.

1,665,218

J. POWERS

FEEDING MECHANISM FOR TABULATING MACHINES

Original Filed Oct. 16, 1924 7 Sheets-Sheet 1



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FEEDING MECHANISM FOR TABULATING MACHINES

Original Filed Oct. 16, 1924 7 Sheets-Sheet 2

Fig. 2.

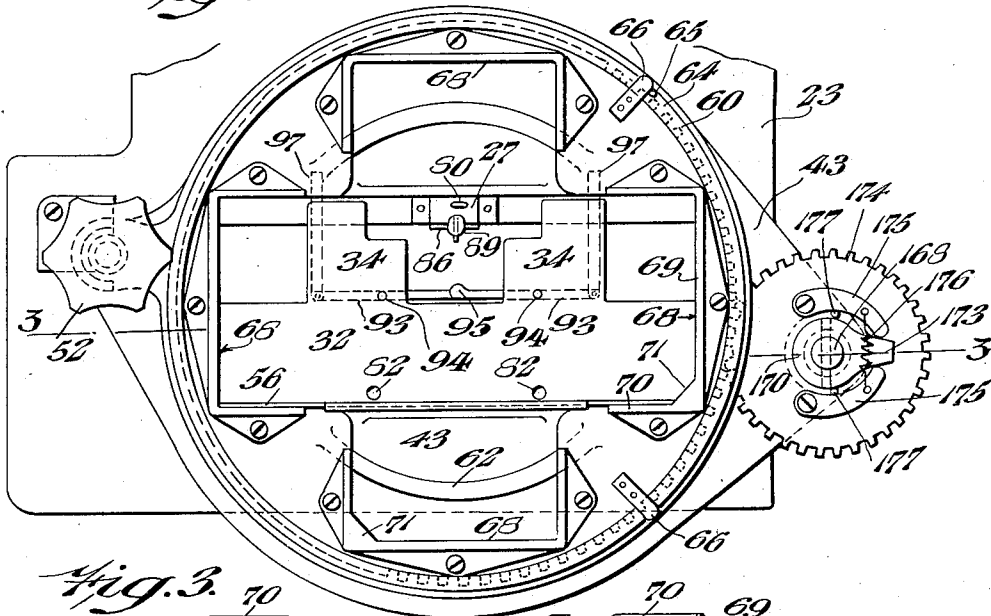


Fig. 3.

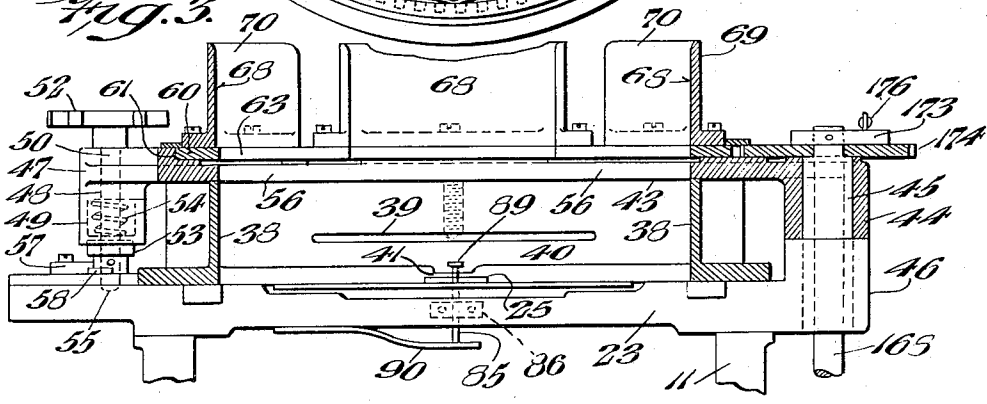
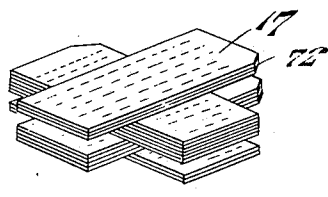


Fig. 4.



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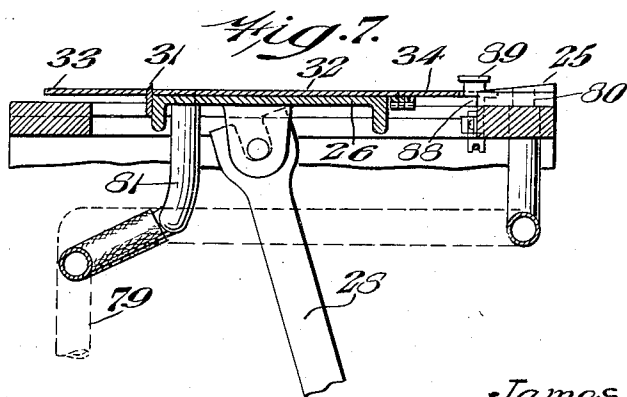
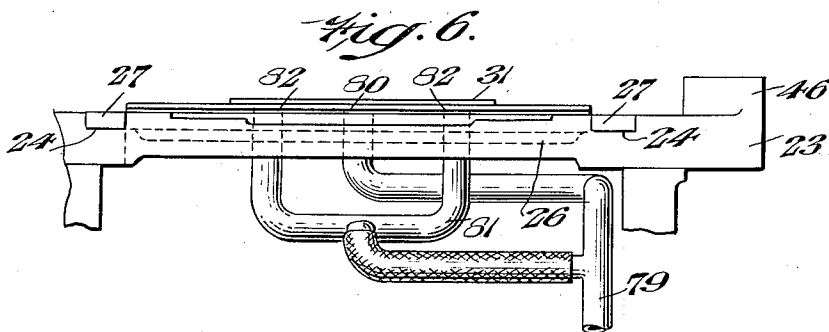
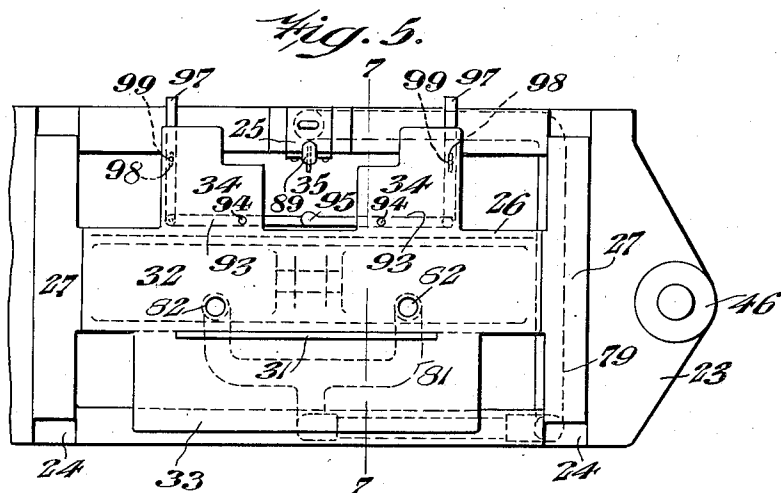
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FEEDING MECHANISM FOR TABULATING MACHINES

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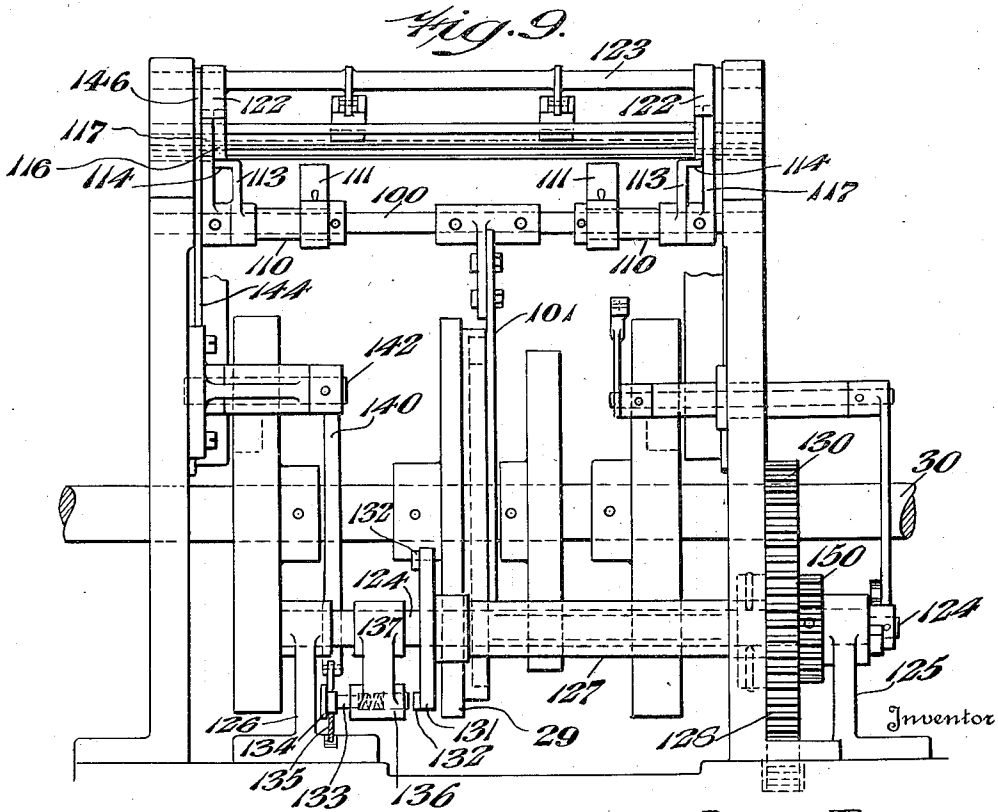
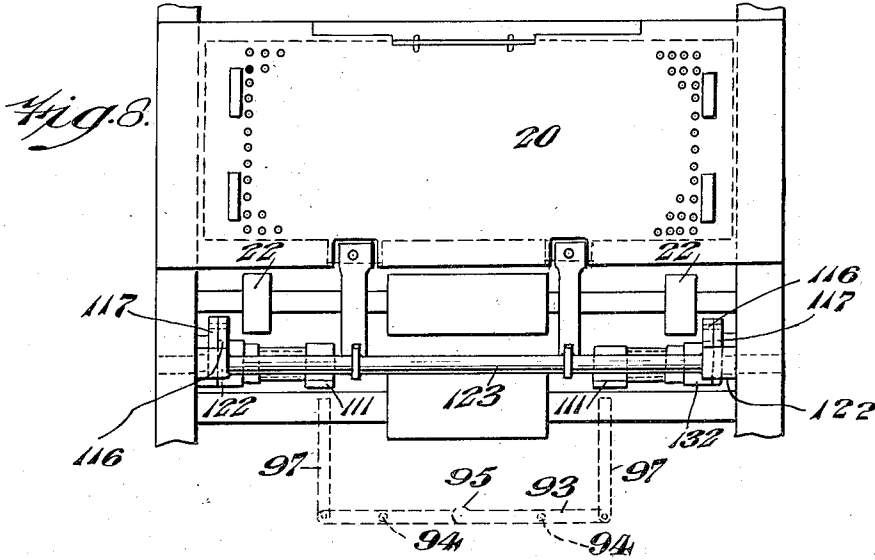
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FEEDING MECHANISM FOR TABULATING MACHINES

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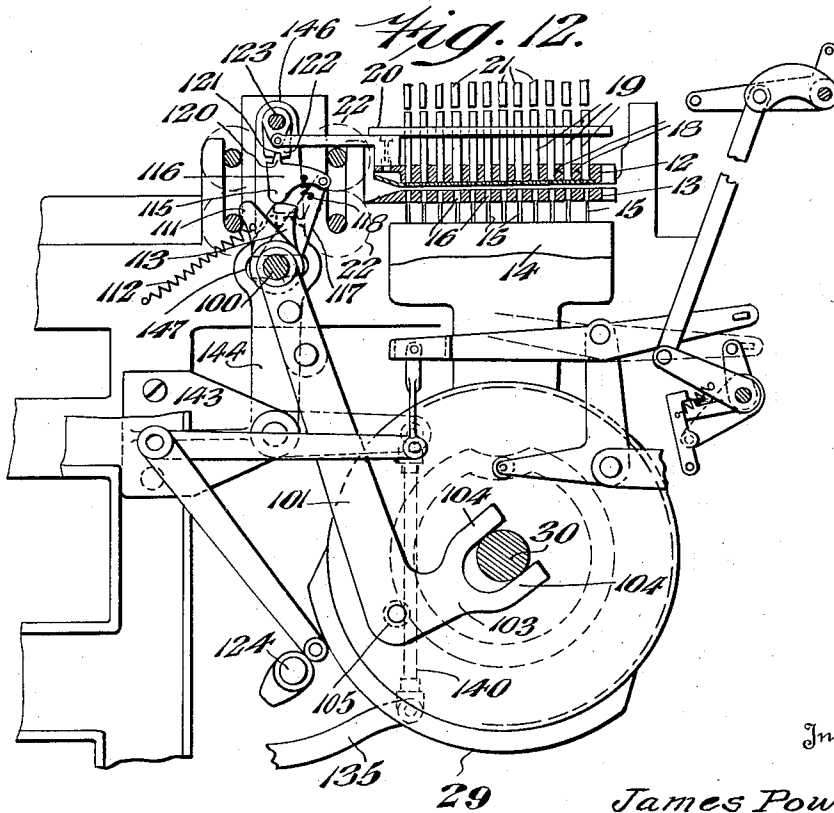
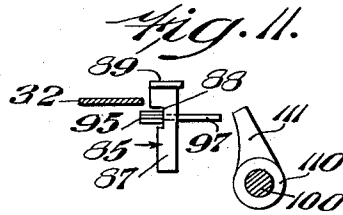
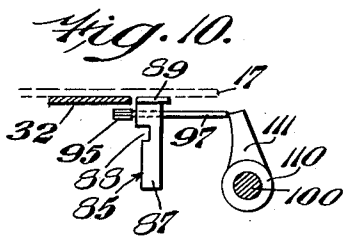
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FEEDING MECHANISM FOR TABULATING MACHINES

Original Filed Oct. 16, 1924 7 Sheets-Sheet 5



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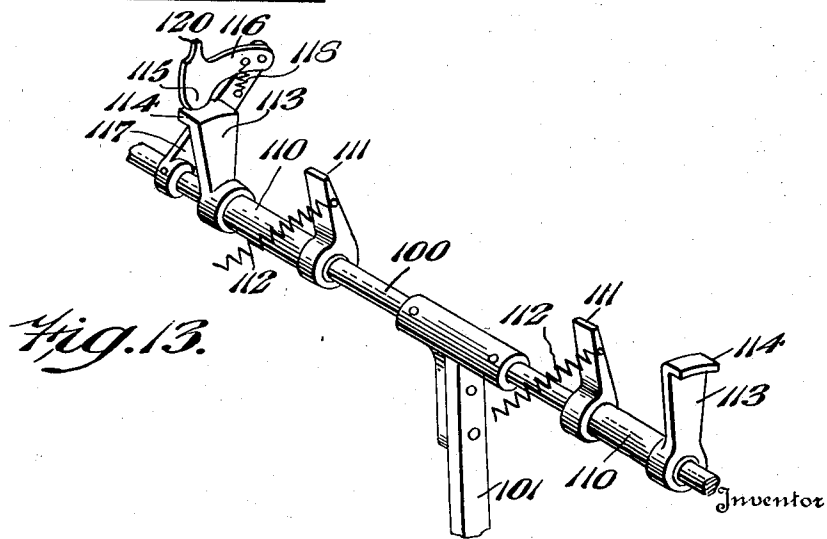
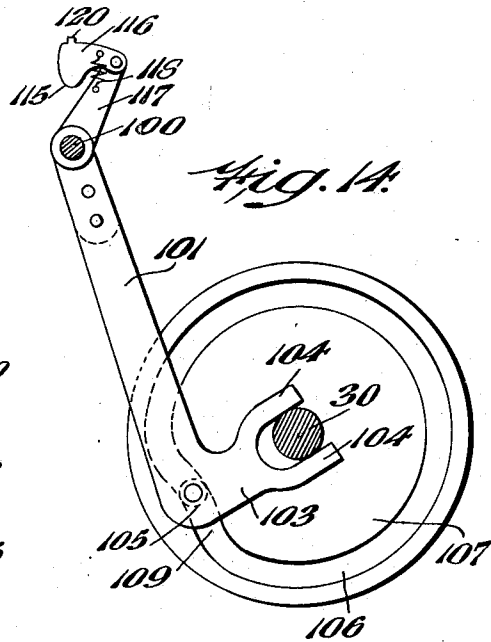
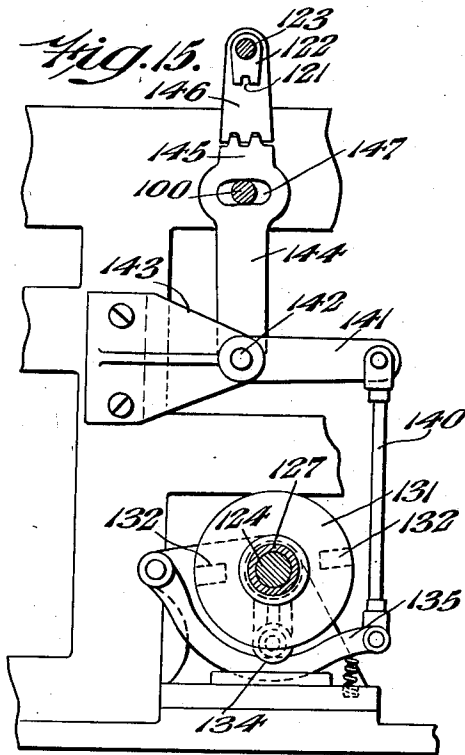
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FEEDING MECHANISM FOR TABULATING MACHINES

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FEEDING MECHANISM FOR TABULATING MACHINES

Original Filed Oct. 16, 1924 7 Sheets-Sheet 7

Fig. 16.

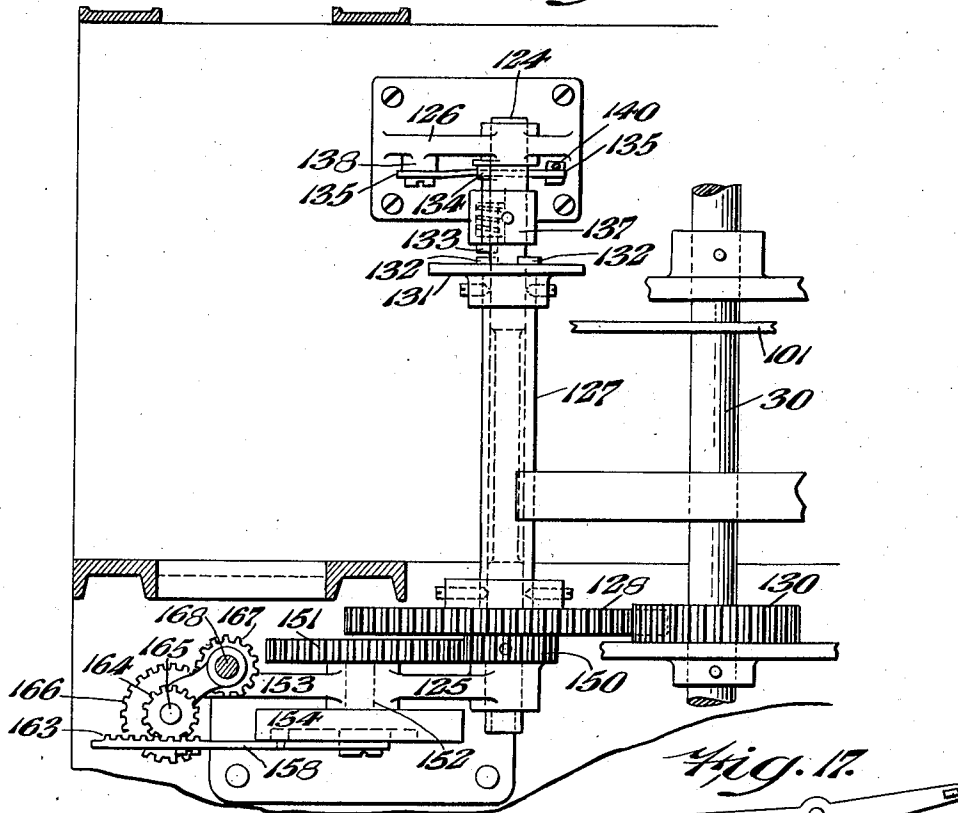
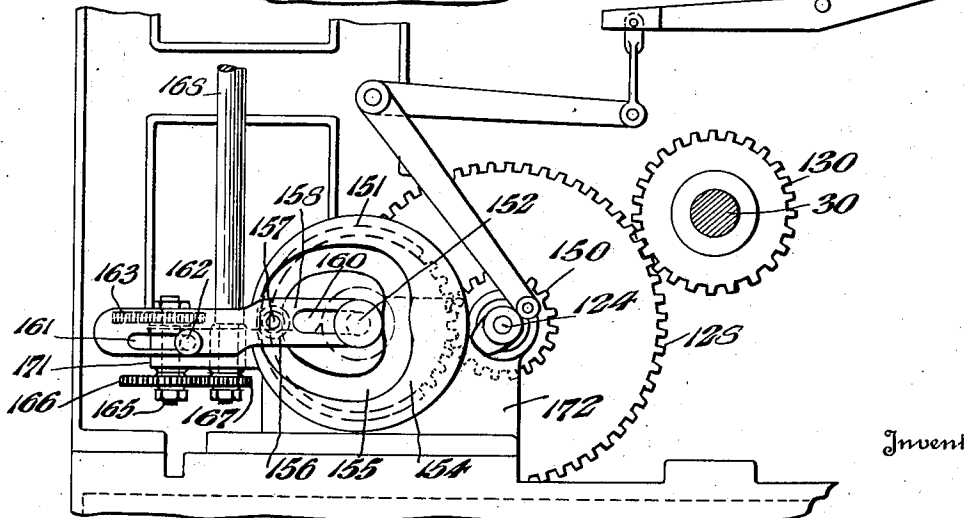


Fig. 17.



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UNITED STATES PATENT OFFICE.

JAMES POWERS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO REMINGTON RAND INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

FEEDING MECHANISM FOR TABULATING MACHINES.

Original application filed October 16, 1924, Serial No. 743,940. Divided and this application filed May 11, 1925. Serial No. 29,470.

This invention relates to automatic tabulating machines controlled by analyzers or sensing mechanisms in turn operated by perforations in record cards and relates more particularly to a card feeding means which while adaptable for use with various kinds of card controlled machines has more particular reference to an automatic total taking mechanism as shown in my copending application, Serial No. 743,940, filed October 16, 1924, and of which this application for patent is a division.

Heretofore I have invented several machines of the tabulating, accounting and other types embodying card feeding means, and the present invention is an improvement over such feeding means and any others of which I am aware.

Some of the objects of the present invention are to provide a card magazine which cannot be loaded with the cards upside down or backwards; to provide a card magazine and picker mechanism capable of taking at one loading a very large number of small groups of cards without objectionable pressure on the picker such as would interfere with feeding; to provide a card feeding mechanism having suction means for properly positioning the card adjacent to the picker blade to effect positive and reliable feeding; to provide a picker mechanism in which the feeding may be prevented or disabled without the necessity of stopping the reciprocation of the picker, and to provide a magazine support over the picker which is supported to one side thereof to be swung out of the way to give convenient access to the picker for inspection or adjustment; to provide apparatus of this kind which is durable, economical to manufacture, easy to operate, which will not easily get out of order, and in general to improve the simplicity and efficiency of card control mechanisms; and to provide other improvements as will hereinafter appear.

One form of the present invention for the accomplishment of these and other objects is shown herein in connection with a tabulating machine having a card analyzer provided with analyzing pins arranged to pass

through perforations punched in control cards, and a magazine for holding groups of the control cards which are fed by a picker mechanism from the magazine to the analyzer. The magazine embodies a feature of the invention in that it is constructed to permit the feeding of one card group while withholding the next successive group from feeding until there has been a change in position of the magazine. The feeding of the cards and the group control feeding is automatically controlled by a feeler device which is caused to function as soon as it is relieved of the weight of a card.

In the accompanying drawings, Fig. 1 represents a side elevation of a tabulating machine embodying one form of the present invention; Fig. 2 represents a detail in plan of the card magazine and picker mechanisms; Fig. 3 represents a section on line 3—3 of Fig. 2; Fig. 4 represents a perspective of one form of card group stacking; Fig. 5 represents a plan of the card picker and associated parts; Fig. 6 represents a rear elevation of parts of the picker mechanism; Fig. 7 represents a section on line 7—7 of Fig. 5, the parts being on a slightly larger scale; Fig. 8 represents a fragmental plan of the pin box and details of the feeler control; Fig. 9 represents a rear elevation of the lower part of the machine; Fig. 10 represents a detail in side elevation and part section of the card feeler pressed down by the weight of a card; Fig. 11 represents the same showing the card feeler as released by the removal of the card; Fig. 12 represents a fragmental side elevation in part section showing the main shaft and certain adjuncts controlled thereby; Fig. 13 represents a perspective of a rock shaft control member and its parts; Fig. 14 represents a detail in side elevation of the actuating means for the rock shaft of Fig. 13; Fig. 15 represents a side elevation of the clutch actuating mechanism; Fig. 16 represents a fragmental plan of the clutch and magazine shift mechanism; and Fig. 17 represents a fragmental side elevation showing the magazine shift mechanism and certain associated parts.

Referring to the drawings, one form of

the present invention is shown by way of example in conjunction with an automatic accounting machine of the general type shown in U. S. Letters Patent Nos. 1,245,502 and 1,245,506, issued November 6, 1917, and also No. 1,388,271, issued August 23, 1921, and comprises an adding machine 10, mounted upon a frame 11, which also carries a card analyzing device and card feeding means embodying one form of the present invention.

In the home or neutral position of the machine at the end of a listing operation, the picker is in a forward position, the pin box is in the raised position, the total mechanism is not thrown, the clutch for the total initiating shaft is disengaged, and the pin shield is withdrawn. Certain parts of the mechanism such as the picker, the pin box, and the clutch and shield throwing mechanism are shown in operated position in certain of the views for purposes of description.

The analyzer comprises fixed upper and lower spaced perforated analyzer or registration plates 12 and 13 (Fig. 12), between which perforated cards are fed and positioned, so that a vertically reciprocatory pin box 14, carrying yieldable projected analyzer pins 15, can coact therewith. The pins 15 in the upper or operative position of the pin box pass through the perforations 16 of the lower plate 13 to engage a card 17 (Fig. 4), at points where no perforation exists in the card or to pass through perforations in the card and into the registering perforations 18 of the upper plate 12 where they respectively engage and raise terminal pins 19, slidably mounted in a fixed member, of which a perforated plate 20 forms the upper guide for the pins. Such pins 19 as are projected upwardly by reason of the perforations in the card function in a well-known manner to control the setting and registering of numbers in the adding machine 10 by raising the pins 31. For the purpose of feeding cards to the registration plates pairs of feed rolls 22 are located adjacent to the inlet side of the registration mechanism and properly aligned with respect thereto, so that the cards fed through these rolls are delivered one after another into the registration passage in proper timed relation. The delivery of the cards to the rolls 22 and the proper timing thereof takes place through the medium of a feeding mechanism comprising a picker supporting frame 23 (Figs. 1, 2 and 5) provided with guide channels 24 across the ends and a throat block 25 at the discharge side or side toward the feed rolls 22, the guide channels 24 serving to slidably support an elongated picker block 26 by means of end shoes 27. This picker block 26 is reciprocated by means of a picker lever 28 (Fig. 7) actuated from a cam 29 on the main shaft 30, as described in the aforesaid patents. The picker blade 31, which is secured on the rear of the block

26, projects a short distance through a slot in a card supporting plate 32 (Fig. 7), this latter being mounted fast on the picker block 26 and provided with a rear extension 33, (Fig. 5), and a pair of forward extensions 34 so arranged as to form an opening 35 to receive the throat block 25 as the picker block moves forward. A card positioning guide frame 38, (Fig. 3), is carried by the picker supporting frame and is provided at its forward end with a horizontal slit 39 forming an elongated adjustable member 40 cooperating with the throat block 25 to form the card gate or throat 41 through which the cards are projected by the picker blade to the feed rolls 22.

The card magazine.

A magazine base 43 resting on said guide frame 38 is provided at one end with a boss 44 pivotally received on a bearing bushing 45 carried in a projection 46 of the frame 23. A bolt bracket 47 at the opposite end of said base is provided with a vertical bore 48 having an enlarged lower portion 49 defining a shoulder. A bolt 50 slidable in said bore is provided at the upper end with a manipulating wheel 52 and at the lower end with a collar 53 guiding the bolt in the bore at the lower end. A spring 54 in said enlarged portion compressed between the said shoulder and said collar presses the lower rounded end of the bolt into an opening 55 to hold the card shaped opening 56 of said base in registration with the guide frame 38. A retaining member 57 mounted on said frame is provided with an undercut groove in which may be engaged an arcuate projection 58 on said collar 53 to hold the bolt in locked position. When the bolt 50 is unlocked and raised the base 43 may be swung entirely clear of the guide frame 38, thus to give unobstructed access to the picker. A gear plate 60 rotatably disposed in an annular groove 61 of the magazine base and on bearing ribs 62 on said base is provided with an intra marginal cross-shaped opening 63 (Figs. 2 and 3).

The opposite ends of this opening are adapted to register with said card shaped opening 56 of the base when the gear plate is disposed at either of its two normal positions at right angles to each other. A retaining ring 64 fast on base 43 holds said gear plate in position and carries a stop pin 65 adapted to be engaged by stop plates 66 mounted fast on said gear plate 60 to stop said plate in the registering positions. Card end guides 68 mounted on said gear plate are formed with end and side walls 69 and 70 for engaging and positioning the cards 17 to hold them in the crossed or staggered relation in which they are stacked, as shown in Fig. 4, before they are placed in the magazine. One corner 71 of one of each pair of end guides is bevelled to engage the cut-

off corners 72 of the cards to prevent the misplacing of the cards in the end guides, so the cards cannot be fed backwards or upside down.

5 The lower cards of the lowest group, or all of the lowest group, if the group be small, drop through the opening 56 into the guide frame 38, whereupon the lowest card rests on the supporting plate 32 to be engaged by the picker blade and fed through the card gate to the feed rollers and thence to the analyzer. The feeding action continues until all of the cards are fed from the lowest group, the cards of the group next above in the meantime resting on the base 43 and the ribs 62 thereof, which thus act as a preventing means to hold said group from the picker. When the last card is fed from the lowest group, certain automatic actions, later to be described, are set up which causes the taking of the total of said lowest group and the shifting of the gear plate 60 and everything carried thereon through 90° to bring said next to the lowest group, which has now become the lowest group, into registration with the card shaped opening 56 and the guide frame 38, whereupon the feeding of cards is resumed. The gear plate 60 is slightly grooved to receive the ribs 62 to prevent cards getting between the gear plate and base when the gear plate is shifted.

If the card groups are small and of less height than the guide frame 38, the next to the lowest group will always be supported by the base 43 and thus carry the load of all the cards above and relieve the pressure on the lowest group and the picker. This is an important advantage of the present invention. With my former machine it was not possible to feed the cards properly when a large number of cards was placed in the magazine as the weight of these cards exerted too great a pressure on the picker, whereas with the present invention a hundred or more of these small groups can be placed in the magazine at once, while only the weight of the lowest group bears on the picker. This advantage permits a single operator to load one machine while other machines are working and thus attend several more machines than was possible with my former machine.

The suction card positioner.

55 In my earliest machine, some difficulty was experienced in making the cards lie flat on the picker and throat block for effecting positive and reliable feeding. To remedy this it has been customary to place a flat weight upon the cards, but even this fails to give perfect results every time, especially when only one or a few cards are in the magazine. I overcome this difficulty by suction means which will now be described.

A suction pump 75 (Fig. 1) mounted on the motor supporting frame 76 and driven by the belt 77 from the motor 78 of the machine produces a vacuum in a suction pipe 79 (Fig. 6) extending from said pump to a suction orifice 80 (Fig. 7) through the throat block. A U-shaped pipe 81 extending to orifices 82 near the picker blade and extending through the picker block and the supporting plate 32 is connected by a flexible tube to said suction pipe, whereby suction from the pump acts to hold the cards firmly upon the plate 32 and the throat block as the cards are fed, thereby insuring the positive feeding of the cards.

This suction means is much more effective than the above mentioned weight and is positive and reliable even with a single card in the magazine.

The card feeler or sensing mechanism.

The above mentioned automatic actions are brought about by the action of a card feeler 85 (Figs. 2, 3, 5, 7, 10 and 11) supported in a strap bracket 86 mounted on the base 23 at the rear face of the picker block to provide a vertical guideway for the thin feeler shank 87 (Fig. 10) disposed in said guideway with its edges in the direction of the path of the cards and provided at the rear edge with a recess 88. The upper end of the shank is provided with a flat head 89 for engagement with the bottommost card. A flat spring 90 (Fig. 3) mounted on the lower face of the picker supporting frame 23 engages the lower end of said shank and is just strong enough to raise the feeler when no card is resting thereon and weak enough to be depressed by the feeler when a single card rests thereon.

Levers 93 (Fig. 5) disposed longitudinally of the picker block are intermediately fulcrumed, as at 94, on the lower face of said forward extensions 34 for movement in a horizontal plane and have their inner ends 95 disposed directly behind the shank 87 (Figs. 10 and 11), whereby when the feeler is depressed and said picker block is moved forward, said inner ends 95 will engage the said shank and will be oscillated, (Fig. 10). On the other hand, if said feeler is raised by said flat spring when no card is resting on the feeler, said inner ends 95 will engage in said recess 88 (Fig. 11) and said levers will not be oscillated.

When said levers are oscillated they project forwardly a pair of push rods 97 (Figs. 5 and 10) having their rear ends pivoted to the outer ends of said levers 93 and provided intermediately with longitudinal slots 98 receiving retaining pins 99 mounted on said forward extensions 34 for retaining and guiding the push rods forwardly.

A rock shaft 100 (Figs. 9, 12 and 13) dis-

posed transversely across the machine below the path of the cards and mounted in the side frames of the machine for rocking movement is rocked during each operation 5 for a reason which will presently be stated, by means of an oscillating lever 101 having its upper end fast on said rock shaft and its lower end forwardly turned to form an elbow portion 103 (Figs. 12 and 14) and bifurcated to provide a pair of lateral members 104 engaging on both sides of the main shaft 30 for guiding the lever. A roller 105 10 mounted on the side face of said elbow part engages in a lateral cam groove 106 of a cam 107 mounted on said main shaft. The major portion of said groove is concentric with main shaft, a small portion 109 of the groove being inwardly curved to give a quick movement of the oscillating lever 101 15 during that part of each cycle when the analyzer pins 15 are in their lowered position.

The rock shaft 100, (Figs. 9 and 13), carries two sleeves 110 loosely mounted for independent movement relative thereto and having lever arms 111 fast thereon and respectively in the path of movement of the push rods 97, (Figs. 8, 10 and 11), so that when the latter are actuated the arms 111 will be rocked clockwise against the action of the springs 112. The sleeves 110 are respectively provided with lifting arms 113 fixed thereon, each of which has a laterally turned flange 114 arranged in normal position of the arms 111 to engage and support 35 a downwardly projecting cam face 115 at one end of a dog 116. The dogs 116 are respectively pivoted upon upwardly and forwardly inclined arms 117, which are fast upon the rock shaft 100. Springs 118 yieldably hold the dogs 116 in depressed engagement with the respective flanges 114. In operation the rods 97 are normally projected each time the picker feeds a card forwardly, thus pushing the arms 111 forwardly and moving the arms 113 from beneath the dogs 116 which thereupon fall when moved to the left so that the teeth 120 respectively upon the opposite side of the dogs 116 from the faces 115 are caused to move respectively out of mesh with notches 50 121, (Figs. 12 and 15), of segments 122. When the picker moves back, the rods 97 and the arms 111 and 113 are returned to normal position by the retraction of the springs 112, and the dogs 116 are again raised to bring a tooth of each into its segment notch 121 as the dogs are moved to the left. Thus the dogs 116 are lowered once for each adding cycle of the machine and are held lowered at the time the cam groove 109 is at the position of Figs. 12 and 14. This timing relation is arranged so that the rocking movement of the shaft 100 is transmitted through the dogs 116 to the segments 65 122, when the dogs are held raised as in the

absence of a card, to rock an upper shaft 123 mounted in the frame 23, by which certain functions of the machine are carried out.

The magazine shift.

In accordance with the present invention, whenever a total is taken the card magazine is so arranged that it is shifted one-quarter of a rotation in order to bring the next card 75 group into position to be fed to the analyzer as heretofore described. In order to actuate this card shift and move it in timed relation with the other adjuncts of the machine, a total initiating shaft 124 is provided and 80 mounted across the lower part of the machine in bearing brackets 125 and 126 (Fig. 9), and this shaft 124, as fully explained in my original application, serves to cause the total taking mechanism to function. Motion 85 is periodically transmitted to the initiating shaft 124 by the provision of a sleeve 127 (Figs. 16 and 17), rotatably mounted on the shaft 124 and receiving motion by means of 90 reduction gears 128 and 130 interposed between the sleeve 127 and the main shaft 30, the arrangement being such that the sleeve is rotated in the present instance at half the speed of the aforesaid main shaft. A disc 95 131 fast on the sleeve 127 is provided with diametrically opposite lugs 132, which are arranged to be engaged by a shiftable clutch bolt 133 provided with a head 134 which is normally engaged by a cam lever 135. The clutch bolt 133 is splined in a horizontal 100 bore 136 of a crank body 137 fast to the shaft 124. The cam lever 135 is slightly forwardly inclined away from the crank, as shown in Fig. 16, and is pivoted at its rear end to a bearing bracket 138 on bracket 126, 105 while its movable end is connected to a pendant link 140, (Fig. 15), the upper end of which connects to a laterally projecting arm 141. This arm 141 is fast to a shaft 142 mounted for rocking movement in a bracket 110 143 and receiving motion from a lever 144 having a toothed end 145 in mesh with a toothed sector 146 which is fast on the upper shaft 123. The lever 144 is provided with a transverse clearance opening 147 115 through which passes the rock shaft 100, though the parts are out of contact, to permit the proper relative movement, as will be understood.

For transmitting motion from the initiating shaft 124 to the magazine shifting mechanism, a gear 150, (Figs. 16 and 17), fixed to the shaft 124 is in mesh with a gear 151 fast on a cam shaft 152 journaled in a bracket 153 and provided with a cam 154 125 having a side face cam groove 155, the ratio of the gearing being such that the cam 154 is rotated one-half of a rotation for each complete rotation of the shaft 124. A roller 156 is arranged to travel in the groove 155 130

and is mounted upon a pin 157 attached to a shift link 158 having a slot 160 at one end to receive the shaft 152 and a slot 161 at the opposite end to receive a guide pin 162 secured to a fixed part whereby the link is arranged to reciprocate with a straight line movement. This movement of the link 158 is transmitted through a rack 163 formed on the link to a pinion 164 which is fast on a vertically disposed stud shaft 165, to the lower end portion of which is keyed a gear 166 in mesh with a smaller gear 167 which is keyed to the lower end of a spindle 168 in order to transmit motion to a collar 170, (Fig. 2), on its upper end. The spindle 168 is journaled at its lower end in an extension 171, (Fig. 17), of a bracket 172, while its upper end is journaled in the bearing bushing 45, (Fig. 3), of the picker frame 23. The collar 170 is provided with a radially disposed lug 173, (Figs. 2 and 3), which extends parallel and in close proximity to the face of a drive pinion 174 and is arranged to transmit motion to the latter by engagement with the free ends of pawl-like members 175 respectively pivoted on the upper face of the drive pinion and held together abutting opposite sides of the lug 173 by means of a spring 176. In this way the two members 175 are yieldably held pressing against the lug 173 while interposed pins 177 limit the inward movement of these members so that a yielding action is made possible between the spindle 168 and the drive pinion 174 to prevent the breaking of any of the gears should the magazine be accidentally held stationary. It will thus be seen that each time the shaft 124 is rotated the cam 154 moves 180° and the bar 158 moves from one limit to the other and rotates the pinion 164, the gears 166 and 167 to transmit motion to the spindle 168 and by means of the yielding connection rotate the pinion 174 so that the gear plate 60 is turned. The teeth and diameters of the pinions, gears and gear plates are such that one complete movement of the link 158 gives a quarter rotation to the gear plate 60 and the parts carried thereon.

The operation.

The cards are separated and arranged in crossed or staggered relation as shown in Fig. 4. If the groups correspond to perforations on the cards, this grouping is done on the sorting machine. If the grouping is according to colors not corresponding to any perforations of the cards, the grouping is done by hand, the various colors having previously been placed together. If perforated cards are grouped without regard to the perforations thereon, or if picture or printed cards or imperforated cards of any kind are grouped as for counting, the grouping will take place as the various cards

are selected depending upon the manner of selection under the given circumstances.

The cards having been grouped or stacked as shown in Fig. 4, a suitable number of groups are placed in the magazine, the bevelled corners 71 (Fig. 2) insuring that they are properly directed. The lowest group should preferably register with the card shaped opening 56. The height of the end guides 68 and the card guide 38 need not be limited to the heights illustrated; and if the card groups are small, a large number of them may be placed in the magazine at once as hereinbefore fully explained.

Preferably the machine is started after the cards are in the magazine, since if not, the machine will go through the action of taking and clearing zero totals, that is, taking a total with no number registered in the machine. If the lowest group is not in the card guide frame 38, the machine will take a zero total and shift the magazine 90° and drop the lowest group into the guide frame 38.

With the magazine loaded and with cards in the guide frame 38 and the machine started, the suction at the orifices 80 and 82 positions the lowest card to the picker blade and on the throat block, depressing the feeler 85, so that when the picker blade moves forward to feed the card to the feed rolls 22, the recess 88 (Fig. 10) will be out of register with the ends 95 of the levers 93 causing said levers to project forward the push rods 97 and push forward the arms 111 and 113 to permit the dogs 116 to drop down. The dogs 116 are in their lowered position at the time that the cam groove portion 109 and lever 101 are in the position shown in Fig. 14. When the dogs are thus dropped down out of engagement with the notched arms 122, the shaft 123 is not rocked, the sector 146 and the lever 144, (Fig. 15), are not rocked, the cam lever 135 is not lowered, the bolt 133 is not released and the total is not taken, nor is the position of the magazine changed.

From the feed rolls, the cards pass between the analyzer plates 12 and 13, and the cards are analyzed in the ordinary way and pass on to the usual card receptacle (not shown).

The above analyzing or registering operation continues until all of the cards of a group have been fed from the magazine.

When the cards of any group are exhausted, the cards of the group next above are still resting crosswise of the card shaped opening 56 (Fig. 3) and on the base 43 (Fig. 2) so that no more cards can reach the picker until the magazine is rotated a quarter turn, as previously explained. When it thus happens that the last card is fed from the picker and no card rests on the feeler, the feeler will rise (Fig. 11) under the action of the spring

90 (Fig. 3), the ends 95 of the levers 93 (Fig. 11) will be received in the recess 88, the push rods 97 (Fig. 2) will not be pushed forward as the picker moves forward, arms 111 and 113, (Fig. 13), will not move forward and the dogs 116 will not be dropped down when the cam groove portion 109 reaches the position of Fig. 14.

When the cam groove portion 109 passes position of Fig. 14, it rocks the lever 101 and arm 117 in a direction clockwise as shown in Figs. 12 and 14, whereby the dogs 116 move the notched arms 122, (Fig. 15), rocking the upper shaft 123 and sector 146 in a counter-clockwise direction, thus rocking the lever 144 and associated parts causing the depression of the cam lever 135 and the release of the bolt 133 (Figs. 15 and 16) to move into engagement with one of the constantly revolving lugs 132, whereby the total initiating shaft 124 is given one complete rotation, bringing the bolt head 134 again into camming engagement with the cam lever 135 (see Fig. 16) and causing the withdrawal of the bolt from the lug 132 to permit the shaft 124 to come to rest. As the sleeve 127 rotates with half the speed of the main shaft, it is necessary to have two lugs 132 in order that a lug be presented to the bolt 133 once during every cycle of the machine.

This single rotation of the initiating shaft 124 is so arranged, as explained in the original application, that during the first half of rotation there will be no actuation of the total taking mechanism, because it is necessary for the main shaft and the pin box which make two cycles during the rotation of the initiating shaft to complete an idle cycle while the analyzer pins are being held down. This gives time for the completion of the adding operation and at the proper time in the cycle the total taking shaft is caused to function in the required manner. This single rotation of the initiating shaft 124 also brings about a half rotation of the shift cam 154, and the consequent shifting of the bar 158 from one limit to the other. The movement of the shift bar 158 is transmitted by way of the rack 163 and gearing 164, 166 and 167 to the spindle 168 and there transmitted through gear 174 to the magazine supporting gear plate 60 to cause the latter to rotate through 90° to bring the card group which was resting on the base 43 in registration with the card shaped opening 56 to permit this group, which has now become the lowest group, to take a position resting upon the picker and depress the feeler 85 so that further rocking of the upper shaft 123 is prevented until the analyzing and adding of the group is complete, as heretofore described. The above operations are repeated as long as cards are supplied to the magazine.

While only a single form is shown in which this invention may be embodied, it is to be understood that the invention is not limited to any specific construction, but might be applied to various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, I claim:

1. In combination, a magazine for holding groups of cards, a feeding means for feeding the respective cards of each group from said magazine, and means associated with said magazine for delaying co-operation of said feeding means with the group next succeeding the group being fed, whereby an interruption of feeding automatically takes place between groups.

2. In combination, a shiftable magazine for holding groups of cards in different relative positions; a feeding means for feeding from the magazine the cards of each group; and means associated with the magazine for preventing the passage of the cards of the next group until the magazine is shifted.

3. In combination, a card feeding device; and a magazine movable from and over said device while the magazine remains vertical.

4. In combination, a guide frame; a card feeding device on said frame; and a magazine disposed over said device and pivoted on said guide frame for movement on a vertical axis.

5. In combination, a feeding means for feeding cards to an adding machine including a supporting frame; a picker on said frame; a magazine base disposed over said supporting frame and pivoted at one end thereof for movement on a vertical axis and provided with a card opening over said picker; a card magazine on said base; and means opposite to the pivoted end for locking said base on said frame.

6. In combination, a picker supporting frame; a picker on said frame; a vertical bearing member mounted in one end of said frame; a bolt bracket at the opposite end of said frame provided with a vertical bore; a magazine base over said frame and pivoted on said member and provided with a card opening over said picker; a card magazine on said base; a bolt in said bore provided at the lower end with an arcuate projection, the frame being provided with a recess to receive the bolt; and a retaining member on said frame provided with a groove receiving said projection.

7. In combination, a means for presenting the cards to an adding machine, said means including a picker supporting frame; a reciprocating picker on said frame; a guide frame on said supporting frame; a vertical bearing member mounted in one end of said supporting frame; a magazine base resting on said guide frame and pivoted on

said member and provided with a card shaped opening registering with said guide frame; a card magazine on said base; a bolt bracket at the opposite end of said base provided with a vertical bore; a bolt in said bore provided at the lower end with an arcuate projection, the supporting frame being provided with a recess to receive the bolt; and a retaining member on said frame provided with a groove receiving said projection.

8. In combination, a feeding means; a magazine for holding cards in position to be pressed toward said means; and means for engaging intermediate cards at a predetermined time to break contact with the preceding cards and cause a temporary interruption of the card feeding.

9. In combination, a feeding means; a magazine for holding groups of cards in position to be pressed toward the feeding means; and means engaging a group other than the group being fed to break contact between said groups to cause a temporary interruption of the card feeding.

10. In combination, a reciprocatory picker; a magazine for holding groups of cards stacked one above the other over said picker; and means engaging the group next to the group on said picker for entirely holding the weight of it and the succeeding groups off of the group on said picker.

11. In combination, a feeding means; a base provided with a card-shaped opening over said feeding means; a cross-shaped magazine over said base, the members of which are adapted to register with said card-shaped opening; and means for oscillating said magazine.

12. A magazine for cards having one corner cut off, said magazine comprising card end guides formed with end and side walls for positioning the cards, one corner of one of the end guides being bevelled to engage the cut-off corner of the cards.

13. In combination, a feeding means for cards having one corner cut off; and a magazine over said means provided with card end guides formed with end and side walls for positioning the cards, one corner of one of the guides being bevelled to engage the cut-off corners of the cards.

14. In combination, a magazine; a feeding means for feeding the cards from the magazine to an adding machine, said means including a reciprocatory picker block; a picker blade on said block; said picker block being provided with orifices passing therethrough near and just forward of said blade; a suction pump; a suction pipe extended from said pump to near the picker block; a U-shaped pipe connected to said orifices of the picker block; and a flexible tube connecting said suction pipe to said U-shaped pipe.

15. In combination, a feeding means for feeding the cards to an adding machine, said means including a picker supporting frame provided with a throat block; a reciprocatory picker on said frame; a guide frame on said supporting frame and cooperating with said throat block to form the card gate; a magazine on said guide frame; said throat block being provided with an orifice passing therethrough; a suction pump; and a suction pipe extended from said pump to the orifices of the throat block.

16. In combination, a feeding means for feeding the cards to an adding machine, said means including a picker supporting frame provided with a throat block; a reciprocatory picker block on said frame; a picker blade on said block; a supporting plate on said picker block; a guide frame on said supporting frame and cooperating with said throat block to form the card gate; a magazine resting on said guide frame; said throat block, picker block, and plate being provided with orifices passing therethrough; a suction pipe extended to the orifice of the throat block; a U-shaped pipe connected to said orifices of the picker block; and a flexible tube connecting said suction pipe to said U-shaped pipe.

17. In combination, a magazine; a feeding means including a reciprocatory picker under the magazine for feeding cards from the magazine; a yieldably raised vertically movable feeler mounted forward of the picker provided with a rear recess; levers on said picker received in said recess when the feeler is depressed; and an operating means controlled by said levers.

18. A card feeding mechanism comprising a base having an opening to receive a plurality of superposed record cards and shaped to conform to the shape of said cards, a magazine for holding a plurality of superposed cards, and means for moving said magazine to bring the cards therein into register with the opening in said base whereby the cards in said magazine are delivered into said base opening.

19. A card feeding mechanism comprising a base having an opening to receive a plurality of superposed cards and shaped to conform to the shape of said cards, a magazine movably mounted on said base and shaped to hold superposed groups of cards respectively arranged at an angle to each other, and means for turning said magazine to bring first one group of cards into register with said base opening and then the next group of cards into register with said opening.

20. A card feeding mechanism comprising a base having an opening to receive a plurality of superposed cards and shaped to conform to the shape of said cards, a magazine

movably mounted on said base and shaped to hold superposed groups of cards respectively arranged at an angle to each other; means for turning said magazine to bring first one group of cards into register with said base opening and then the next group of cards into register with said opening, and means effective to support the group or groups of cards in said magazine when the last card of the group enters said opening. 10

Signed at Los Angeles, county of Los Angeles, State of California, this 29th day of April, 1925.

JAMES POWERS.

CERTIFICATE OF CORRECTION.

Patent No. 1,665,218.

Granted April 10, 1928, to

JAMES POWERS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 44, for number "31" read "21"; page 4, line 22, strike out ("Figs. 9 and 13"), and insert the same to, follow after the number "110" in line 23; same page line 88, for "Figs. 16 and 17" read "Figures 15 and 16"; page 6, line 18, after the abbreviation "Figs." insert the numeral and comma 9,; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of May, A. D. 1928.

(Seal)

M. J. Moore,
Acting Commissioner of Patents