

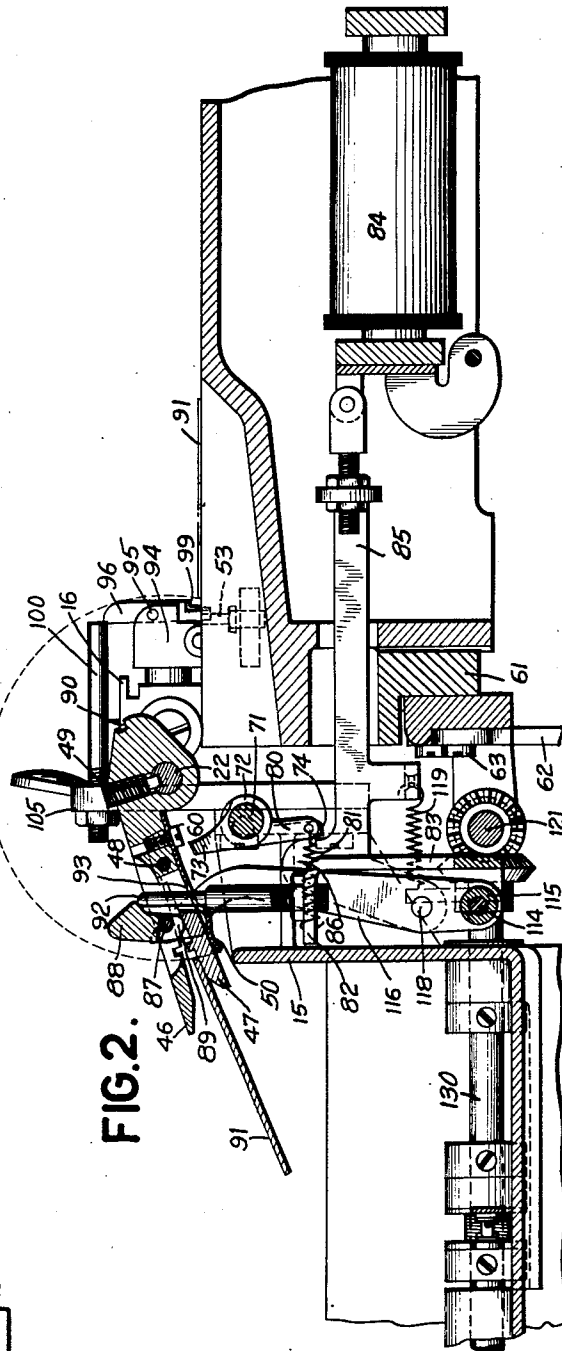
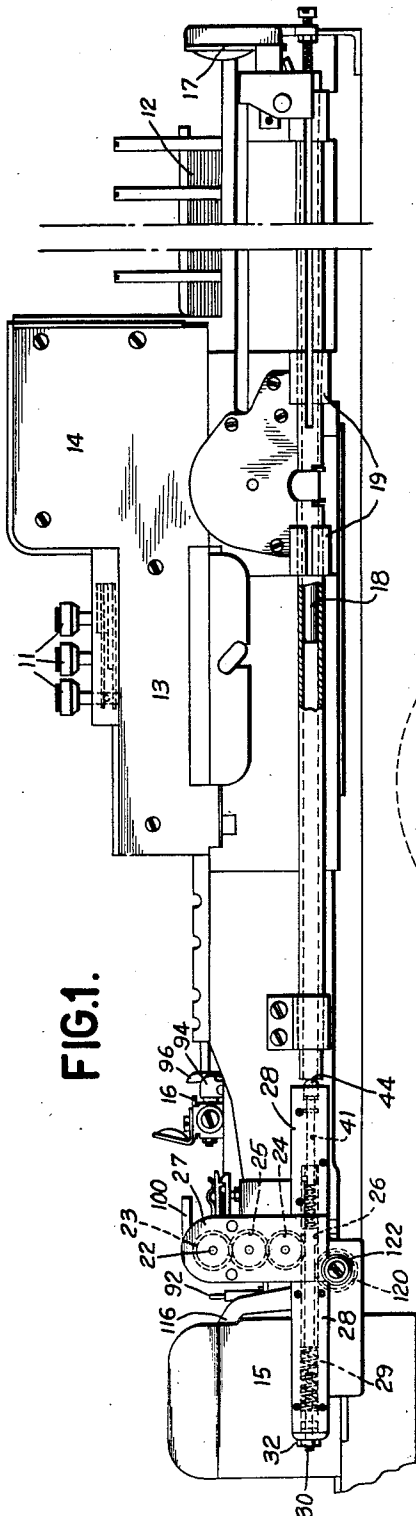
Feb. 13, 1934.

C. D. LAKE ET AL
CARD HANDLING MACHINE

1,946,910

Filed June 23, 1932

5 Sheets-Sheet 1



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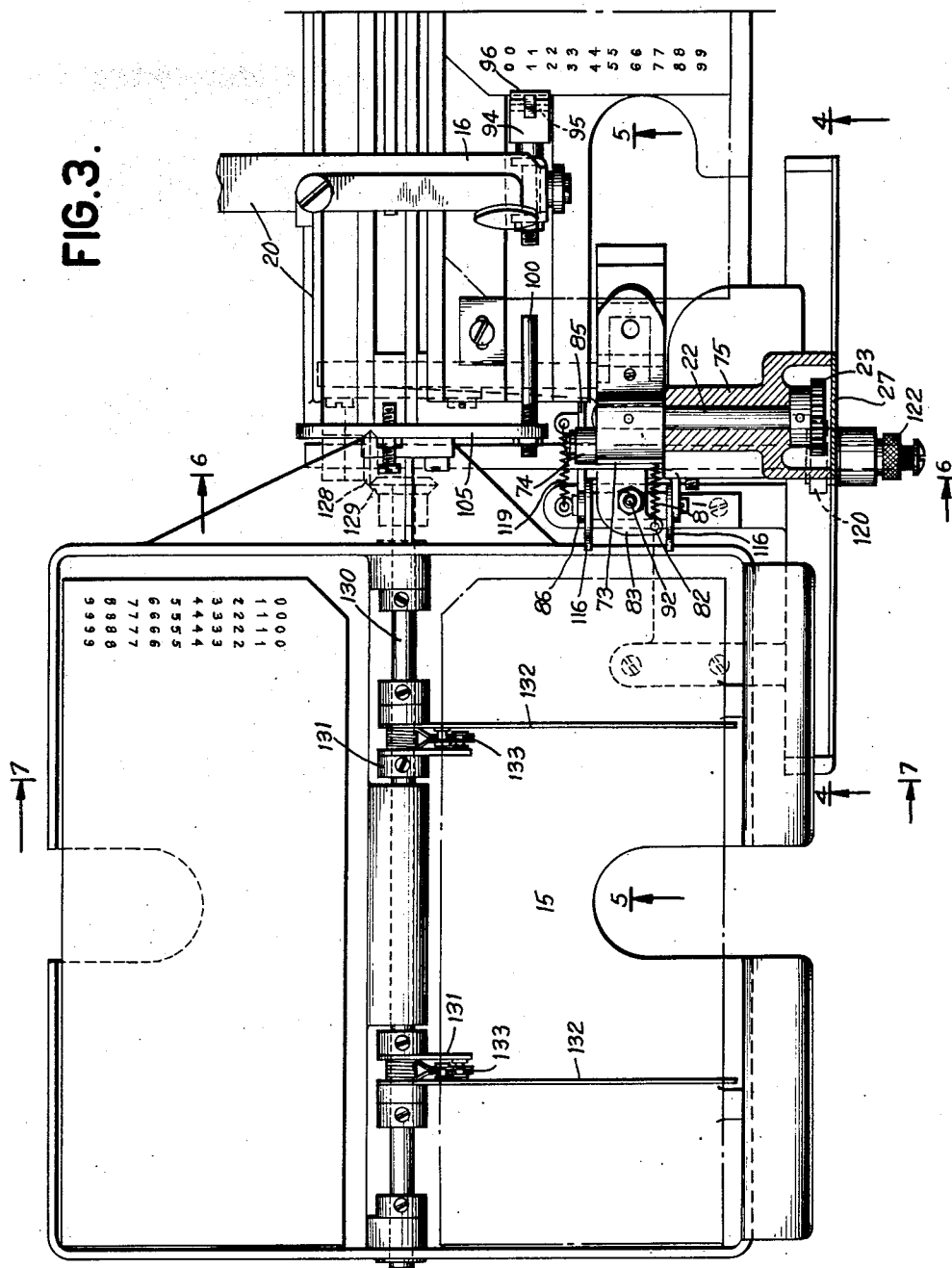
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5 Sheets-Sheet 2

FIG. 3.



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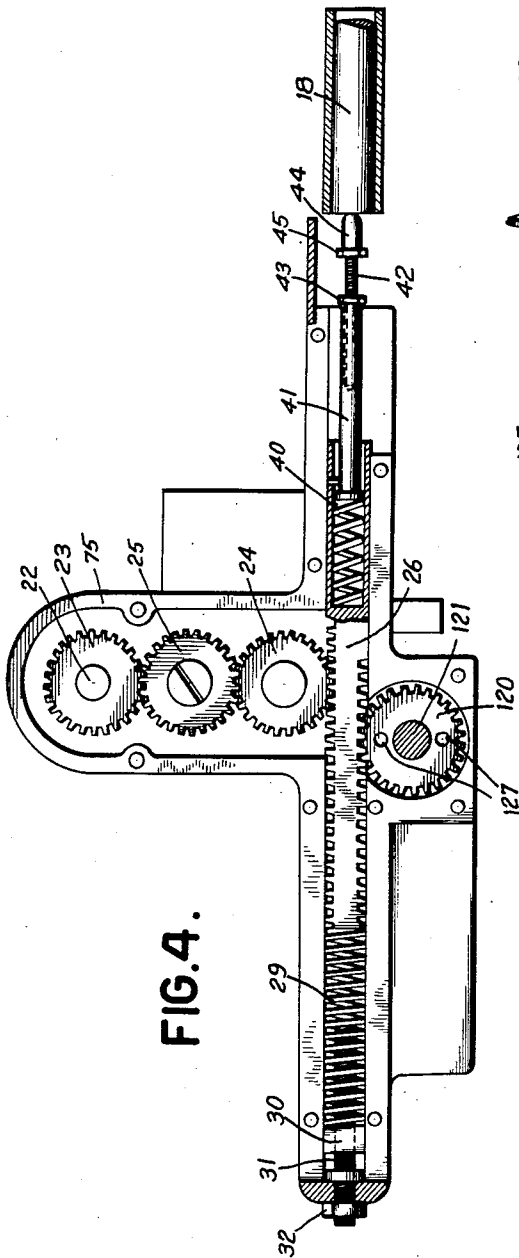


FIG. 4.

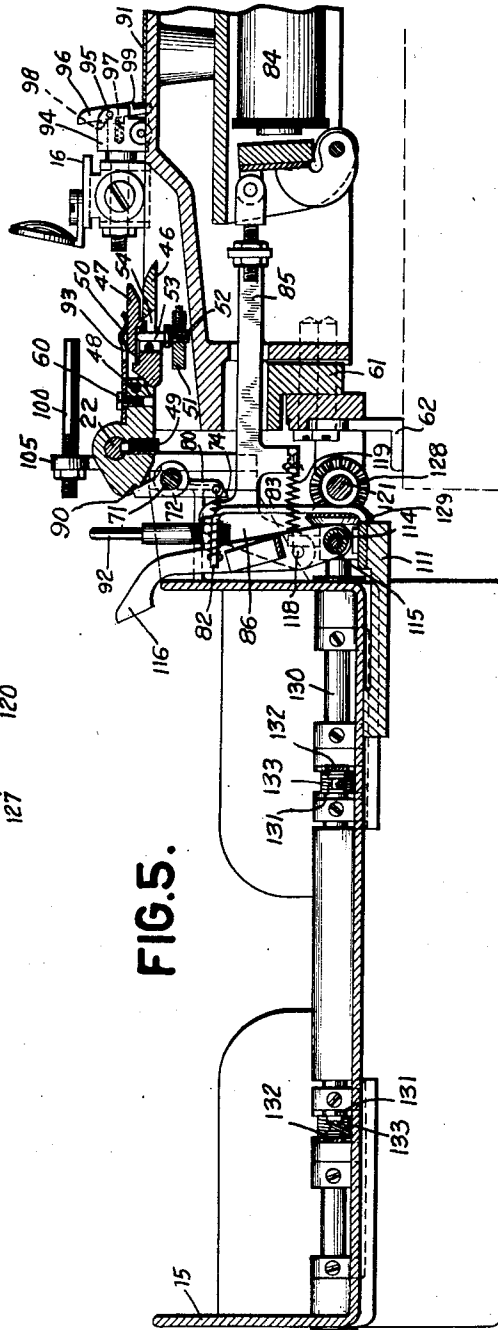


FIG. 5.

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5 Sheets-Sheet 4

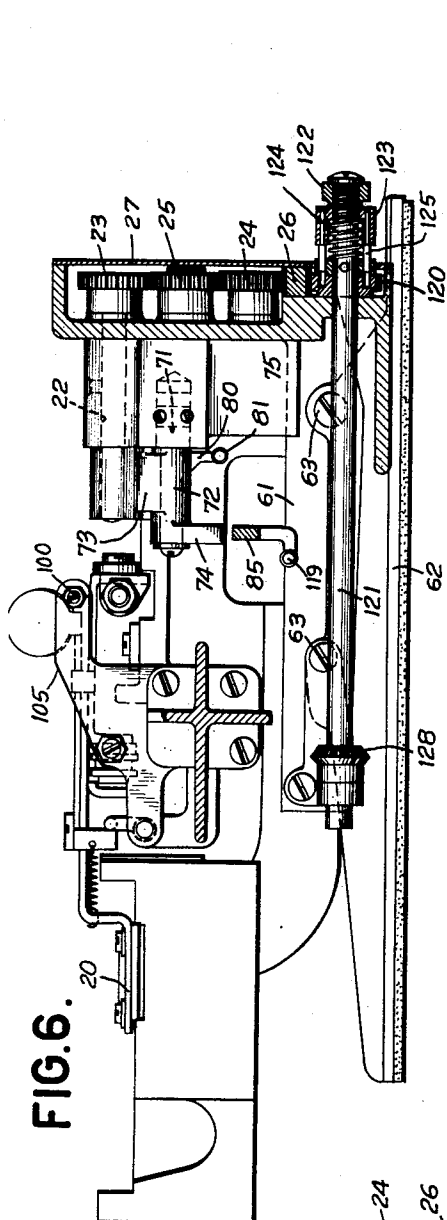


FIG. 6.

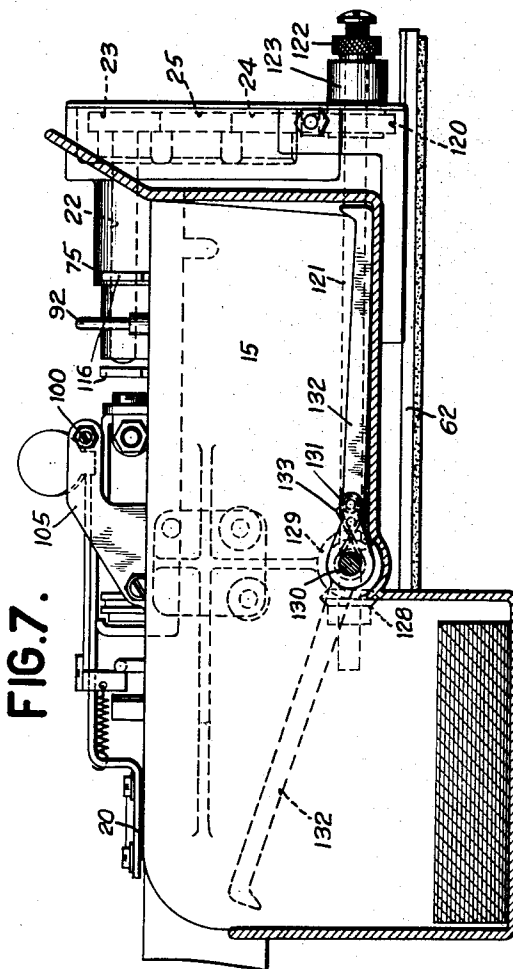


FIG. 7.

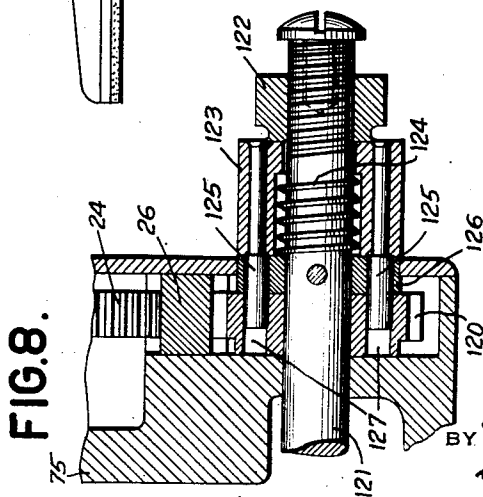


FIG. 8.

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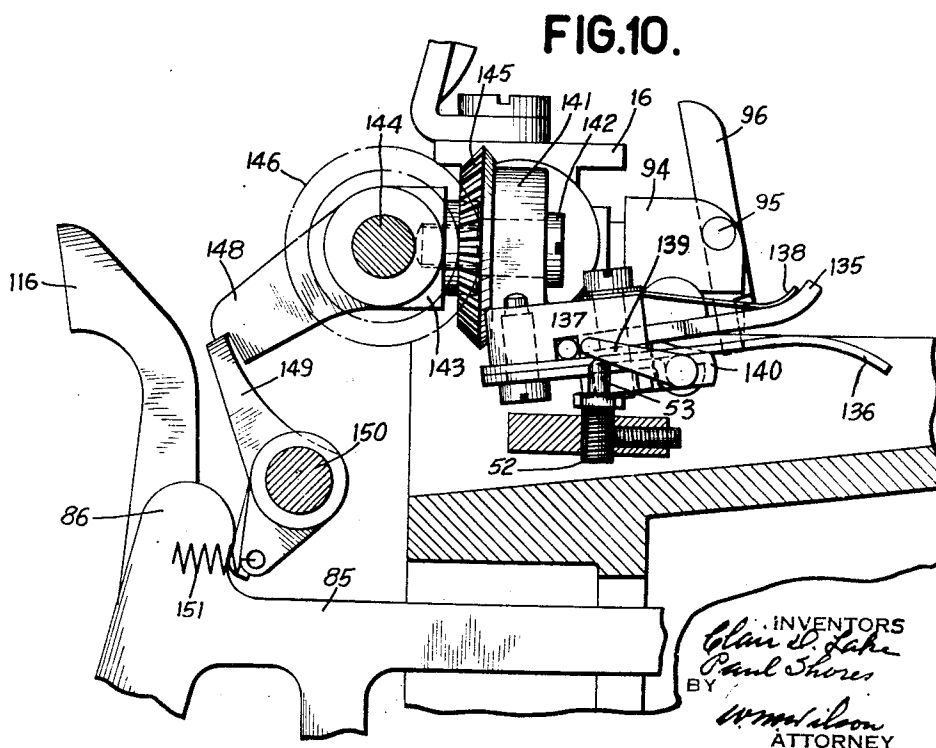
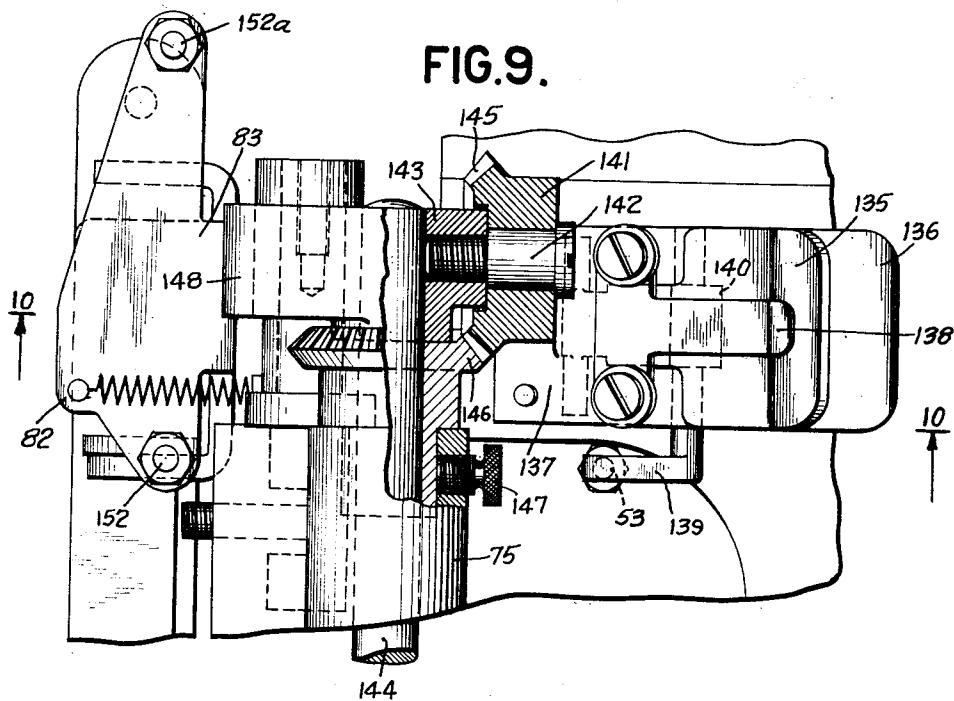
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5 Sheets-Sheet 5



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1,946,910

CARD HANDLING MACHINE

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Application June 23, 1932. Serial No. 618,846

10 Claims. (Cl. 271—82)

This invention relates to record handling machines and more particularly to a device for automatically ejecting records from a punching machine, tabulating machine or the like, after they have been operated upon.

The present invention relates specifically to an improvement upon the type of ejector shown in the copending application of J. M. Cunningham, Serial No. 390,755, filed September 6, 1929.

The main object of the present invention is to provide an adjustable means for removing cards from a card handling machine so that the arrangement of a group of ejected cards may be predetermined to suit various requirements.

In the machine disclosed in the application referred to, the ejecting mechanism is adapted to reverse the arrangement of a stack of cards fed through the machine. That is, if a group of cards is fed through the machine face up, upon being ejected into the receiving receptacle they will be arranged face down and when removed from the receptacle the original bottom card will be on top. This has been a source of inconvenience in certain classes of work, necessitating further handling of the cards to restore them to their original order of filing.

The present invention contemplates two separate receiving receptacles or pockets into one of which the cards may be ejected so as to remain in their original order and in the other, in reversed order by means of an adjustable coupling device either pocket may be selected to receive the cards accordingly as either arrangement is deemed desirable.

A modification of the invention contemplates a single receptacle and an ejecting card gripper which may be adjusted to deposit cards in the receptacle in the usual manner or to automatically reverse them before depositing them.

Various other objects and advantages of the invention will be obvious from the following particular description of two forms of mechanism embodying the invention or from an inspection of the accompanying drawings; and the invention also constitutes certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the drawings:

Fig. 1 shows a side elevation of the illustrative machine which is provided with an ejecting device constructed according to the invention.

Fig. 2 is an enlarged detail view of the ejecting mechanism in ejecting position.

Fig. 3 is a top plan view of a part of the ma-

chine illustrating the coordination of the ejecting mechanism with the punching machine.

Fig. 4 is a detail of the actuating mechanism for the ejector. The view is taken along the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3.

Fig. 6 is a sectional elevation taken on line 6—6 of Fig. 3.

Fig. 7 is a detail of the two card receptacles, the view being a section taken on line 7—7 of Fig. 3.

Fig. 8 is an enlarged detail view of the coupling device.

Fig. 9 is a plan detail of a modified form of the invention.

Fig. 10 is a side view of the modified form.

For the purpose of clearly disclosing the invention, it has been shown as applied to a duplicating punch of the type described in the patent to Lee and Phillips, No. 1,772,186, issued August 5, 1930. The operation of the punch is fully explained in that patent but will be described in the present case in sufficient detail to explain its functional and structural coordination with the ejector mechanism.

In Fig. 1 a stack of blank record cards is designated at 12. The cards are fed singly by the feeding mechanism to the punching section 13 where they are punched in different columns. The punching mechanism comprises a single row of punches, which may be manually controlled by keys 11 or automatically by a set of controlling magnets provided in a housing 14, which magnets, in turn, are under the control of a perforated master card. The feeding mechanism comprises a carriage for feeding the card relatively to the single row of punches as is well known in this type of punching machines.

When the last column of the card has been punched and the card fed a step to the extreme left position by the carriage, the ejecting mechanism according to this invention will grip the card and deliver it to a receptacle 15.

The improvements are preferably applied to the type of punching machine shown in the patent to Lee and Phillips 1,772,186, dated August 5, 1930 although it will be clear from the subsequent description that many of the improvements may be applied to other forms of machines, singly, or in combination.

The feeding carriage for the cards includes a picker knife and a feeding element which transport cards singly from the supply hopper 12 to the carriage which, in turn, moves the blank card

step by step past the punches. When the carriage is at the extreme left position it may be restored to initial punching position by moving handle 17 to the left. Handle 17 is slidably mounted on the machine and has suitable connections to shift a rod 18 (see also Fig. 4) which is guided in brackets 19 fast to the machine frame. Rod 18 cooperates with the card carriage as described in detail in the aforementioned patent to Lee and Phillips and moves the carriage to the right in order to receive the bottom card fed from the supply hopper 12 so that this card may be fed to the left, step by step, past the punches upon subsequent actuations of keys 11 or the controlling magnets. These magnets are controlled by a master card which is carried by an auxiliary carriage generally designated by numeral 20 (Figs. 3 and 6) which is fed in unison with the blank card. The auxiliary card carriage is suitably connected with the main card carriage for a simultaneous movement.

To the left end of the machine frame there is attached a casting 75 (Figs. 3, 4 and 6) which carries most of the parts of the ejector mechanism. This casting includes a cross bar 61 (Figs. 2, 5 and 6) which is clamped between foot 62 and the frame of the punching machine by means of screws 63.

In the top part of casting 75 is rotatably mounted a shaft 22 (Fig. 4) having a gear 23 fixed thereto at one end. Gear 23 is connected to a gear 24 through an idler gear 25, gear 24, in turn, meshing with a rack bar 26 (Fig. 4). Gears 23, 24 and 25 fit in a recessed portion of the casting 75, said recess being normally covered by a plate 27 (Fig. 4). Bar 26 is rectangular in cross section and is slidably mounted in a recessed groove of said casting which groove is covered by plates 28 (Figs. 1, 3 and 6). The left end of bar 26 (Fig. 4) coacts with a spring 29 which tends to move the bar to the right. At its opposite end, the spring abuts a threaded block 30 in which is threaded an adjusting screw 31. This screw is passed through a hole formed into the left terminal portion of casting 75 and its projecting end is threaded. When the screw 31 is turned the block 30, which is restrained from turning by reason of its rectangular shape, feeds along the screw and adjusts the tension of spring 29. The screw 30 is locked in its position of adjustment by a lock nut 32.

Fitting in a socket 40 (Fig. 4) in the right hand end of rack bar 26, is a spring urged plunger rod 41 which is tapped to receive a screw 42. The screw may be adjusted and locked in position by a nut 43. The right hand terminal of screw 42 is formed with a head 44 having a hexagonal portion 45 by means of which the screw 42 may be turned for adjustment. Head 44 coacts with rod 18 actuated by the handle 17 which, as has been previously explained, effects the restoring movement of the card feeding carriage. Rod 18 is in its extreme right position when the card carriage carrying the blank card is in left hand position and consequently bar 26 is also at its extreme right position. When handle 17 and rod 18 are moved to the left, the card carriage is moved into initial punching position and simultaneously therewith bar 26 is moved to the left against the tension of spring 29 as shown in Fig. 4. This causes gear 23 and shaft 22 to turn in clockwise direction to cause the gripping device to be moved into gripping position.

The parts including the interconnected gearing 23, 24, 25, and bar 26 are locked in this

position by a locking mechanism hereinafter described, permitting rod 18 to be returned to its home or rightward position. When the carriage reaches its extreme left position, subsequent to a plurality of punching operations, said locking mechanism will be automatically released and under the influence of spring 29, rack bar 26 will be pushed to the right (Fig. 4), thus causing shaft 22 to turn in counterclockwise direction.

The gripper unit includes, in its normal position shown in Fig. 5, a lower jaw 46 and an upper jaw 47 pivotally mounted by a pin 48 on jaw 46. Jaw 46 is fixed to shaft 22 by means of a screw 49. A leaf spring 50 attached to upper jaw 47 by a screw 60 rests on top of the jaw 47 and tends to press jaw 47 against jaw 46. On the cross bar 51 of the machine frame is adjustably mounted a screw 52 carrying a pin 53. This pin projects through a hole 54 in jaw 46 and engages the underside of jaw 47 when the gripper unit is in the position shown in Fig. 5. Screw 52 is adjusted and locked in position by a set screw so that the upper and lower jaws are normally spaced apart to permit the punched card to pass into the slit or separation thus formed.

The operation of the gripping unit is placed under the control of a releasing mechanism. On a stud 71 (Figs. 2 and 6) is loosely mounted a sleeve 72 having an integral latch bar 73 and a lever 74. Shaft 71 has an enlarged end portion which fits in the casting 75. Sleeve 72 is also provided with an integral arm 80 (Figs. 2 and 6) to which is connected a spring 81 anchored to a projection 82 of a sheet metal bracket 83 to bias the sleeve for rotation in one direction. In the position shown in Fig. 5 the latch bar 73 coacts with a shoulder 90 on the rear portion of jaw 46, this engagement being held by spring 81.

It should also be observed that the plunger 41 (Fig. 4) may have an independent movement subsequent to the latching operation, spring 40 being merely compressed during this overmovement. This eliminates any mechanical construction which requires the latching by bar 73 precisely at the moment finger piece 17 has reached its extreme leftward position.

When the card carriage reaches the extreme left position, coincident with a punching operation in the last card column, a magnet 84 is energized, (Figs. 2 and 5) attracting its armature and shifting a link 85. Link 85 has a projection 86 in the plane of lever 74 to thus rock lever 74 counterclockwise (as shown in Fig. 2) which causes disengagement of latch bar 73 and the notch 90 in jaw 46. Shaft 22 which is now unlocked for movement turns counterclockwise under the pressure of spring 29 (Fig. 4), as has been previously described, and rotates the whole ejecting unit. It will be understood that before this turning movement is initiated the left hand edge of the card has been fed between the head portions of jaws 46 and 47 but not yet firmly gripped by the same. However, as soon as jaw 46 is released by latch bar 73 and the ejecting unit starts to rotate jaw 47 leaves pin 53 allowing spring 50 to press jaw 47 towards the jaw 46 so that the card is firmly held between the two jaws. The card is then flipped around by the released gripping unit and at the end of this movement the gripping unit and the card will be shifted to the position shown in Fig. 2.

In this position the head portion of a pin 92 adjustably mounted on bracket 83 passes through a hole 93 in spring 50 and an aperture in jaw

47. The pin 92 engages a cam element 88 pivoted to jaw 47 at 87 and turns the element slightly counterclockwise (as seen in Fig. 2) so that a cam edge 89 separates jaws 46, 47 to release the card. When element 88 is turned to the position shown in Fig. 2 it will be retained in this position during the return movement of jaws 46 and 47 by the action of spring 50. At the termination of the restoration of the gripper unit the element 88 will strike pin 53 to shift it to the jaw closing position (see Fig. 5), pin 53 passing through a slot in the lower part of element 88 to retain the jaws 46-47 slightly separated to receive the next card fed.

Referring to Figs. 3 and 5 the carriage element 16 carries a block 94, in which is pivoted, at 95, a lever 96 biased by a spring 97 against a stop shoulder 98. This arrangement is well known in the art and serves to facilitate insertion of the card into the carriage and to position the card accurately therein. When the card 91 is being inserted, the left edge of the same encounters the lower arm of lever 96 (Fig. 5) and turns the same slightly clockwise until the card edge catches beneath an angular cross bar 99. Lever 96 will then return to the position shown in Fig. 5 and hold the card in position. When the carriage reaches its extreme left position and shortly before the ejecting unit becomes operative, the lever 96 is automatically rocked slightly clockwise (see Fig. 2) by a pin 100 secured to a plate 105 to free the card from lever 96 and permit its removal from the carriage by the gripping device.

It has already been explained how the card is gripped by the gripper unit and flipped around to the position illustrated in Fig. 2 where it will be observed that the inclined position of the card permits it to drop freely in the receptacle 15. It is preferable, however, to positively strip the card from the ejector jaws and push the card into the card receptacle. Attached to the bottom of receptacle 15 (Fig. 5) is a base 11 to which the previously mentioned sheet metal bracket 83 is fastened and which also serves to support a shaft 114 upon which is rotatably mounted a sleeve 115 to which is secured a pair of upwardly extending stripper arms 116. Link 85 is connected at 118 to one of the stripper arms 116 so that when the magnet 84 is deenergized, stripper arms 116 will be urged by a spring 119 to the position shown in Fig. 5 but as soon as the magnet is energized the arms 116 will be quickly moved to the right (as viewed in Fig. 2), the ejector unit in the meantime being swung to the flipper position. Deenergization of magnet 84 will then permit spring 119 to act to shift stripper arms 116 to the left to positively remove the card from the jaws and push it into the receiving receptacle 15.

Referring now to Figs. 4, 6 and 8, the bar 26 is provided with rack teeth along its lower edge which are in mesh with teeth of a gear 120, loosely mounted on a shaft 121. One end of shaft 121 is threaded to receive a knurled nut 122 which when it is threaded along shaft 121 to the position shown in Fig. 8 presses a member 123 toward gear 120 against the action of a spring 124. Member 123 carries pins 125 which pass through suitable openings in a collar 126 and into holes 127 in gear 120. Collar 126 is pinned to shaft 121 so that, with the parts in the position shown in Fig. 8, gear 120 is coupled to shaft 121 and the latter will turn with the gear. If nut 122 is withdrawn toward the end

of shaft 121 as in Fig. 6, spring 124 will move member 123 in the same direction and withdraw pins 125 from holes 127. This uncouples the parts and rotation of gear 120 will not disturb shaft 121.

At its opposite end shaft 121 carries a bevel gear 128 meshing with a bevel gear 129 (Figs. 3 and 7) secured to a shaft 130. Shaft 130 carries arms 131 secured thereto and arms 132 loose thereon with a spring connection 133 between the arms to form a resilient connection between them.

Rotation of shaft 121 will cause rotation of shaft 130 and movement of arms 132 from their full line position in Fig. 7 to their dotted line position and if a card is lying upon the arms in the right half of receptacle 15 it will be flipped or tilted into the left hand section.

If gear 120 and shaft 121 remain uncoupled, the cards will accumulate in the right hand section of receptacle 15 while if the gear and shaft are coupled as in Fig. 8, arms 132 will flip each card over into the left hand section after it has been deposited on the arms. This flipping action takes place as the latch or trigger mechanism is being reset or cocked under control of bar 26 in its movement toward the left as viewed in Fig. 4 and it will be recalled that this takes place when the card feeding rod 18 is moved to the left into engagement with head 44 (Fig. 4).

A modified form of ejecting mechanism is shown in Figs. 9 and 10. A pair of gripper jaws 135 and 136 are carried by a block 137, the latter being rigidly secured to the block and the former pivoted thereon and pressed downwardly by a leaf spring 138. An arm 139 carried by the block 137 is adapted to strike pin 53 when the parts are in the position of Fig. 10 and rock a camming member 140 integral with arm 139 against jaw 135, to move it away from jaw 136 and provide an opening to receive a card.

Block 137 has an extension 141 through which a stud 142 is passed and threaded into a collar 143 secured to shaft 144. Block 137 is free to rotate on stud 142 and its extension 141 has bevel gear teeth 145 formed thereon concentric with stud 142. These gear teeth 145 mesh with teeth of a bevel gear 146 loosely mounted on shaft 144, and having a portion of reduced diameter extending within housing 75. A thumb screw 147 when tightened will secure gear 146 to housing 75 and when loosened will free the gear for rotation within the housing.

Collar 143 has a latching arm 148 adapted to be engaged by trigger or latch 149, pivoted at 150. Movement of link 85 to the right will rock latch 149 against the tension of its spring 151 to release arm 148. Shaft 144 will thereupon be permitted to turn in an exactly similar manner as shaft 22 of Figs. 1, 2, 4, and 5 and will carry with it block 137 and jaws 135, 136 which will have closed upon the leading edge of a card. If thumbscrew 147 is loose, gear 146 will turn with block 137 due to its gear connection with teeth 145 and the card will be turned over on itself in the same manner as in the preferred form of the invention. Arm 139 will engage a pin 152, rocking cam 140 to open the jaws 135, 136 and the card will fall into the receptacle in the same manner as in the preferred form.

If it is desired to have the cards deposited in the receptacle in inverted position, it is simply necessary to tighten thumbscrew 147, thus locking gear 146 to the frame of the machine. Rocking

of shaft 144 under such condition will swing stud 142 as before, but gear teeth 145 and block 137 will be rotated about the stud substantially 180° thus flipping the card over but also twirling it around at the same time. At the end of the stroke arm 139 will engage a pin 152a to open the jaws and release the card.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to two modifications, it will be understood that various omissions and substitutions and changes in the form and details of the devices 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.

We claim:

1. In a card handling machine, a pair of card receptacles, a carriage for feeding record cards, gripping means controlled by said carriage and adapted to remove a card from said carriage and deposit it in one of said receptacles and further means coordinated with said gripping means for advancing the card to the second receptacle.

2. In a card handling machine, a carriage for feeding record cards, a plurality of card receptacles, a gripper adapted to remove a card from said carriage and deposit it in one of said receptacles, actuating means controlled by said carriage for said gripper and means controlled by said actuating means for subsequently advancing the card to another receptacle.

3. In a machine of the class described, means for feeding cards, singly from a stack of cards arranged in a predetermined order, ejecting means adapted to receive said cards from said feeding means to restack them and adjustable means for causing said stacking means to restack the cards in their original order or in reversed order.

4. In a card handling mechanism, a card carriage, a trigger mechanism for ejecting the card from said carriage and automatically operable to flip and turn the card over to first eject position, and means controlled by the carriage when the latter moves to card receiving position to flip

and turn the card over a second time to final eject position and to cock the trigger mechanism.

5. The invention set forth in claim 4 in which means is provided for rendering said second flipping ineffective, whereby the card will remain in its first eject position.

6. In a card handling mechanism, means including a pair of jaws automatically operable for receiving a card from a carriage of a punching machine, means for swinging said receiving means in an arc to deposit the card in a receptacle and means for rotating said receiving means, as it is moved in said arc.

7. In a card handling mechanism, a card gripper including a pair of jaws for receiving a card from a carriage of a punching machine, means for rotating said gripper in one direction to deposit the card in a receptacle and means for effecting rotation of said gripper in a different direction during its rotation in the first named direction.

8. The invention of claim 7 in which means is provided for disabling the means for effecting the additional rotation in a different direction.

9. A card ejecting mechanism adapted for cooperating with a movable card carriage to eject cards therefrom, said ejecting mechanism comprising a gripping means including a pair of jaws pivotally mounted for rotation about a fixed axis, whereby a tilting-over movement of the gripping means and the card carried thereby may be effected in ejecting the cards from the machine, and means for rotating the gripping means in a plane normal to the plane in which it is tilted-over.

10. A card ejecting mechanism adapted for cooperating with a movable card carriage to eject cards therefrom, comprising a pair of card gripping jaws rotatably mounted upon an axis, said axis being mounted for rotation about a second, fixed, axis, means for effecting a tilting-over movement of said jaws and said first named axis, about said fixed axis, and means for causing rotation of said pair of jaws about its axis during said tilting-over movement.

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