

March 29, 1955

W. T. GOLLWITZER

2,705,142

FEED MEANS FOR CONTROL CARDS OR THE LIKE

Original Filed May 27, 1946

6 Sheets-Sheet 1

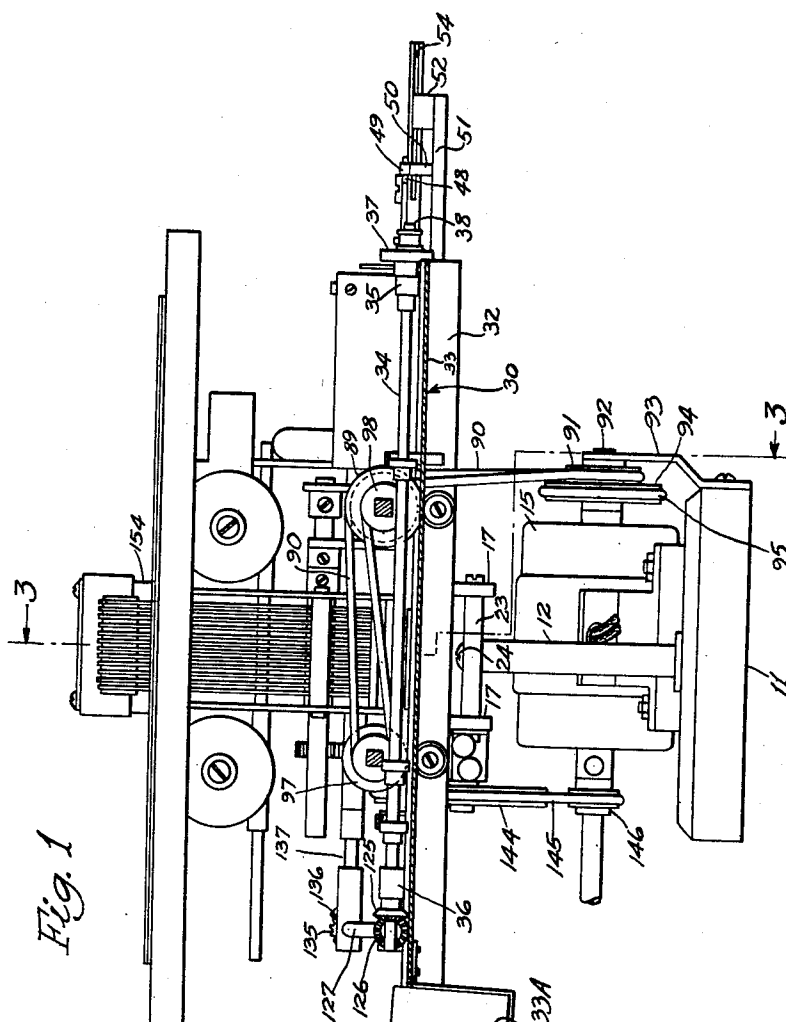


Fig. 1

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6 Sheets-Sheet 2

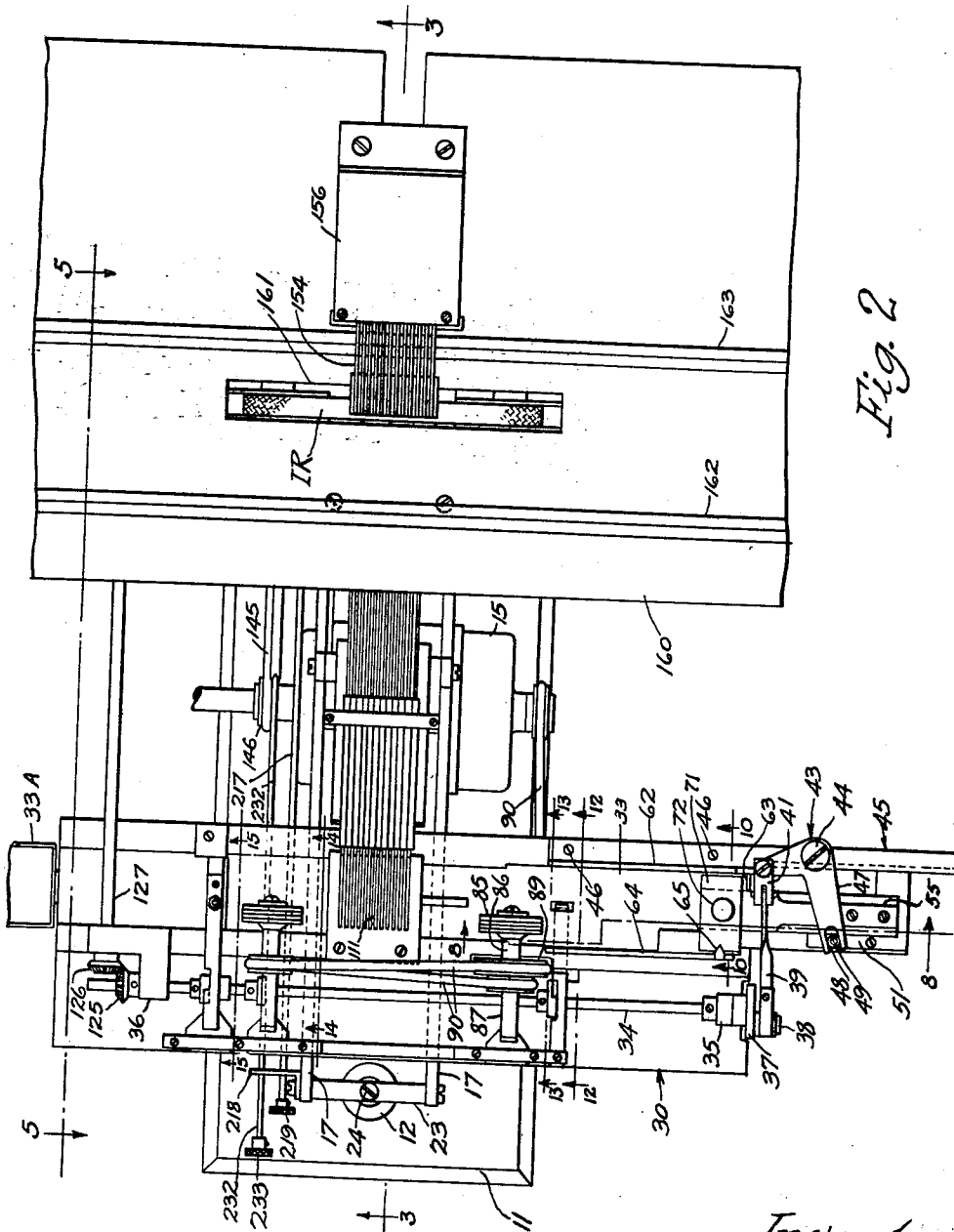


Fig. 2

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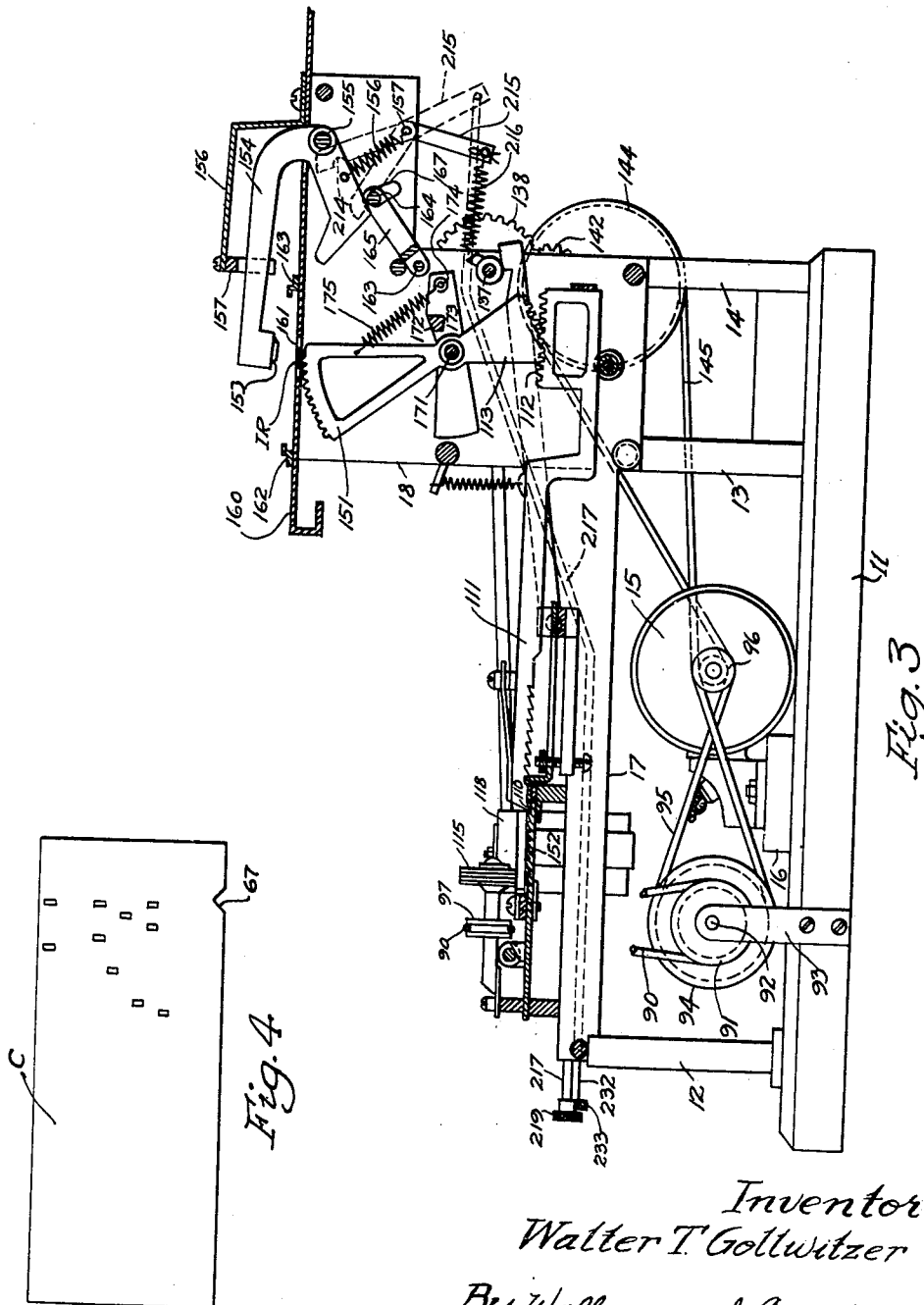
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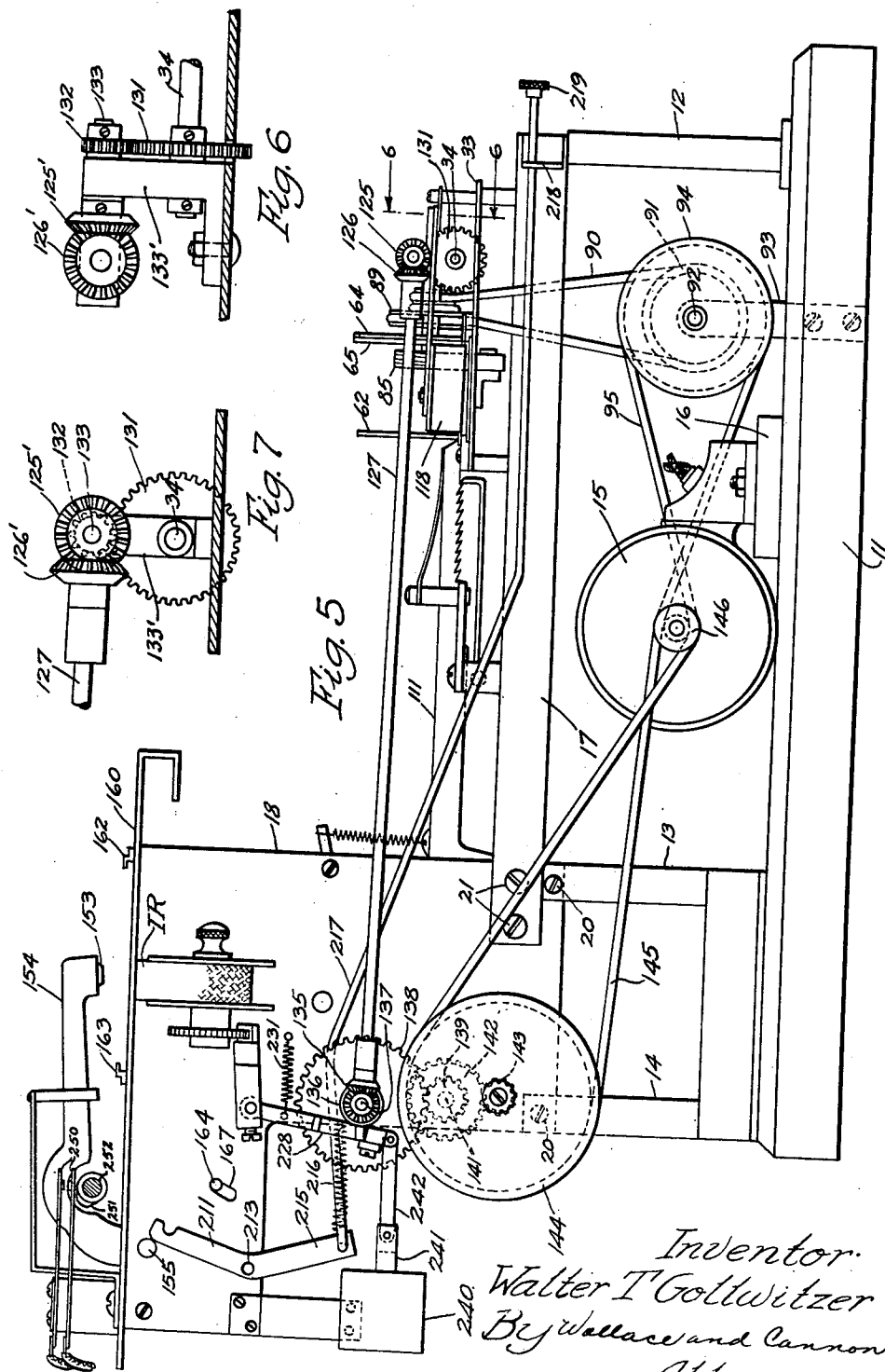
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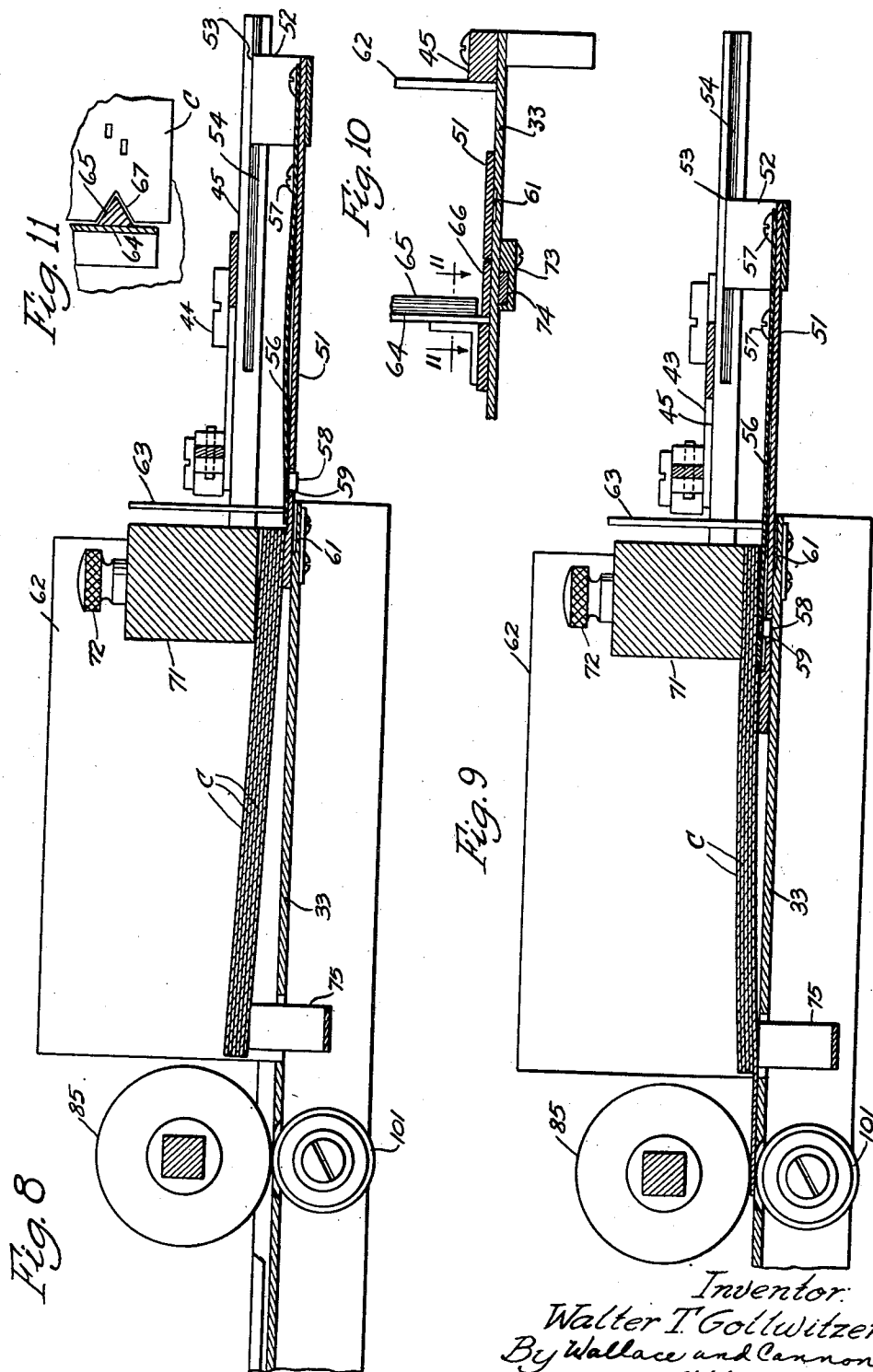
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Fig. 12

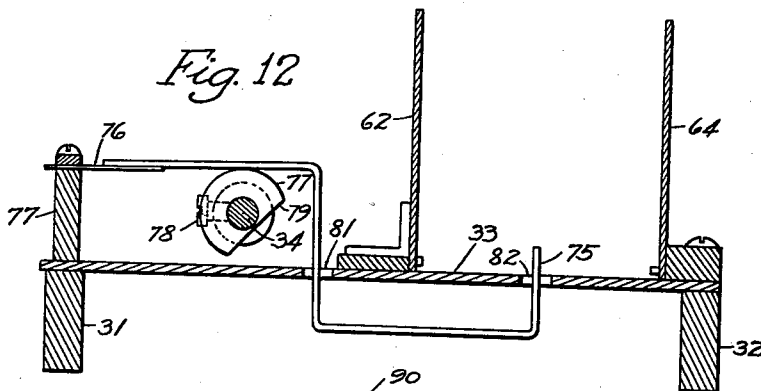


Fig. 13

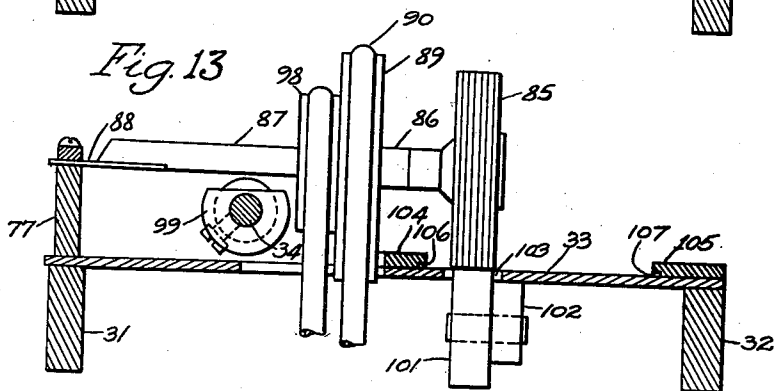


Fig. 14

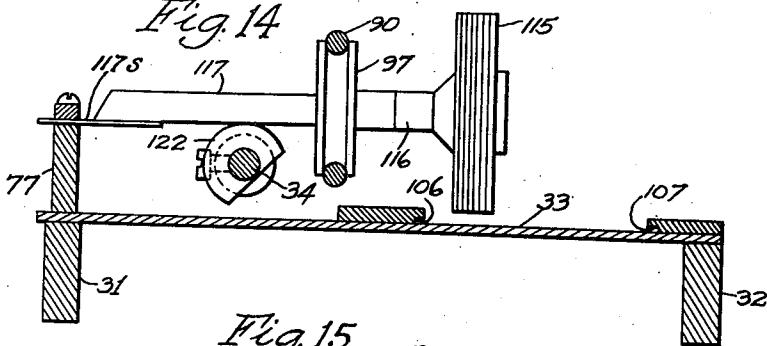
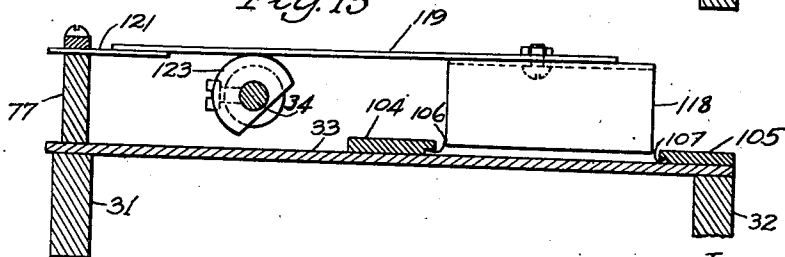


Fig. 15



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2,705,142

FEED MEANS FOR CONTROL CARDS OR THE LIKE

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Original application May 27, 1946, Serial No. 672,581.
Divided and this application October 12, 1951, Serial No. 251,084

4 Claims. (Cl. 271—44)

This application is a division of my co-pending application, Serial No. 672,581, filed May 27, 1946, now Patent No. 2,605,699, patented August 5, 1952.

This invention relates to a separating and feeding mechanism for cards and the like such as perforated cards employed to control the functioning of apparatus in machines through which the cards are passing.

Feeding and separating mechanisms for cards and the like of the aforesaid nature heretofore have comprised a hopper in which the cards were stacked and means were effective on one end of the lowermost card of the stack to advance the other end of the stack through a gate disposed adjacent to said other end of the card, this gate being effective to confine the feeding and separating movement to the lowermost card in the stack. Since it is essential that only the lowermost card in a stack thereof in a hopper be advanced in the manner just described, it has been necessary to accurately construct and maintain arrangements at opposite ends of the hopper in order that advance movement could be limited to the lowermost card in a stack thereof in the hopper, and so to do it has been relatively expensive and somewhat difficult to maintain in card feeding and separating mechanisms as these have been made heretofore. It is therefore an object of this invention to confine to a restricted area those parts of a card feeding and separating mechanism which must be accurately constructed and maintained so as to thereby enable these ends to be attained in an inexpensive and exact manner.

Another object of this invention is to provide a vertically extending guide member in a hopper of the aforesaid character with which complementary shaped portions of the cards to be fed from the hopper may be engaged and to so arrange the guide member that the cards will be accurately positioned in the hopper, especially with reference to the means to be effective to separate the lowermost card from the stack thereof in the hopper.

Yet another object of this invention is to dispose the means effective to separate the lowermost card in a stack of cards in the hopper in relatively close and accurate relationship with the means which orient the cards in the hopper with reference to the separating means.

Separation of cards in the stack thereof disposed in the hopper may be expedited if the cards in the stack are flexed between separating operations thereon, and so to do is yet another object of this invention.

Yet another object of this invention is to provide feeding means exteriorly of the hopper which may be moved to and from cooperating relation with a card advanced from the hopper.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a front elevation of a printing machine in which my invention has been embodied;

Fig. 2 is a plan view of the machine with certain parts

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broken away, showing my novel feeding and separating arrangement in plane;

Fig. 3 is a vertical sectional view through the machine and which is taken substantially on the lines 3—3 on Figs. 1 and 2;

Fig. 4 is a plan view of a card of the nature adapted to be fed and separated by my novel mechanism;

Fig. 5 is a side elevational view of the printing machine in which my invention is embodied and which is taken substantially on the line 5—5 on Fig. 2, and which shows a modified form of driving arrangement;

Fig. 6 is a view of the modified driving arrangement taken substantially on the line 6—6 on Fig. 5;

Fig. 7 is a view of the elements shown in Fig. 6, this view being taken in 90° relationship with the plane in which Fig. 6 is taken;

Fig. 8 is a vertical sectional view through my novel feeding and separating arrangement and which is taken substantially on the line 8—8 on Fig. 2;

Fig. 9 is a view similar to Fig. 8 showing certain parts in different operative positions from those in which these parts are shown in Fig. 8;

Fig. 10 is a transverse vertical sectional view through my novel feeding mechanism and which is taken substantially on the line 10—10 on Fig. 2;

Fig. 11 is a horizontal sectional detail view taken substantially on the line 11—11 on Fig. 10; and

Figs. 12, 13, 14 and 15 are transverse sectional views taken substantially and respectively on the lines 12—12, 13—13, 14—14 and 15—15 on Fig. 2.

The printing machine in which my novel feeding and separating mechanism is embodied in the present instance is of the nature described and claimed in detail in my aforesaid co-pending application, Serial No. 672,581, of which this application is a division. This printing machine embodies a sensing means which coacts with cards advanced by my novel feeding and separating means, and this sensing means is described in full detail in my Patent No. 2,508,603, patented May 23, 1950.

The printing machine embodies a supporting base 11 on which a supporting block 16, Fig. 3, for driving is mounted and which carries a driving motor 15.

Extending along the front of the machine is a feed table generally indicated by 30 over which cards advanced from my novel feeding and operating mechanism are moved into and from a sensing position whereat the aforesaid sensing means cooperates therewith. The feed table 30 is supported by a pair of spaced horizontal bars 31 and 32 which are secured to the frame of the machine in any appropriate manner. A flat member 33 mounted on and secured to the bars as 31 and 32 constitutes the table surface, as best shown in Figs. 12 to 15, inclusive.

My novel feeding and separating mechanism is mounted at the right-hand end of the table as the machine is viewed in Fig. 1, and cards or similar control members C are stacked in the hopper of my feed means to be advanced over the feed table 30. As shown in Fig. 4, such cards or control members may be provided with perforations at selected positions to represent indicia, and such perforations are sensed by the aforesaid sensing means. It will be understood, however, that the representations might be in the form of protuberances or other distinctive elements formed on a flat or substantially flat member and capable of being sensed by the aforesaid mechanical sensing elements. As shown in Figs. 1 and 2, the station whereat the cards or the like are sensed is located substantially midway in the longitudinal extent of the table 30. A receiving hopper 33A is provided at the delivery end of the table and the cards are advanced from sensing station to this hopper to be collected therein.

A rotatably mounted shaft 34 is mounted above the table 30 and in spaced parallel relation therewith in suitable bearings 35 and 36. This shaft extends substantially the full length of the table and controls and operates various mechanisms associated with the feeding and advancing of the control cards C. At its right end, as shown in Fig. 1, the shaft 34 carries a disc 37 which bears an

eccentric crank pin 38. The disc 37 is secured to the shaft 34 for rotation therewith.

A pitman 39 is connected at one end to the crank pin 38 and extends rearwardly of the machine, its rear end being connected to a link 41. The link 41, as best shown in Fig. 2, is pivotally connected to an arm 42 of a bell crank 43 which is pivoted on a stud 44 for oscillation in a horizontal plane. The stud 44 is mounted on an auxiliary or extension frame member 45 which is secured as by screws 46 to the rear edge of the table top and its supporting bar 32. The bell crank 43 is oscillated when the pitman 39 is reciprocated by rotation of the shaft 34. The shaft 34 is rotated by means to be described hereinafter.

The free arm 47 of bell crank 43 is slotted as indicated at 48 to receive a roller 49 carried on a stud 50 which is mounted on a slidably mounted horizontal plate 51. The plate 51 is provided on its rear edge and near the outer or right end thereof, as seen in Figs. 1, 8 and 9, with a vertical extension 52, and this vertical extension terminates in a horizontal flange portion 53 which is bent rearwardly to engage a guide slot 54 in the forward vertical face of the extension frame member 45. Oscillation of the bell crank, therefore, causes the plate 51 to move alternately to the right and to the left, the plate extension 52, 53 serving to guide movement of such plate in a horizontal plane.

The plate 51 has a longitudinal recess 55 in its upper face in which a leaf spring 56 is secured as by screws 57. This leaf spring functions as a feed plate, as will be more fully described below. It is so arranged as to be normally self-biased toward the supporting plate 51 so that it lies substantially flush but projecting slightly above the surface of plate 51. The amount of this projection is equal to or just slightly less than the minimum thickness of one of the cards C. Near its left end, as seen in Figs. 8 and 9, the leaf spring 56 carries a rivet 58, the head of which is mounted in and extends through an opening 59 in the supporting plate 51. The head is somewhat thicker than the part of plate 51 which underlies the leaf spring 56. Plate 51 is adapted to reciprocate over and to ride upon the top surface of the plate 33 which constitutes the feeding surface of the table. At its extreme right end, as shown in Figs. 8 and 9, and aligned with the head or rivet 58, the plate 33 is provided with a groove or slot 61 which is so shaped as to receive the rivet head as the plates 51 and 56 are advanced to the left, as seen in these views. This groove becomes shallower toward the left end and finally merges with the top of the table so that the plates 51 and 56 move to the left, the rivet 58 is raised thereby lifting the forward end of the feed plate 56 into more effective feeding relationship with the lowermost card C in the stack of cards.

As best shown in Figs. 8 and 9, the stack of cards C is retained in feeding position by a hopper which comprises a side wall 62, an upright part 63 at the right or rear end of the stack and a side wall member 64, shown in Figs. 2, 10 and 11. The side wall member 64 has secured thereto a vertical bar 65 which, as shown in Fig. 11, is triangular in cross section and is located so that its lower end clears plate 66, which constitutes part of the bottom of the hopper at this point, by an amount equal to or very slightly greater than the thickness of a single card C. As shown in Figs. 4 and 11, each of the cards as C is provided with a notch 67 of a size and shape complementary to the configuration of the bar 65. Cards of this specific character are more fully described in the application filed jointly by myself and John H. Gruver, Serial No. 648,075, filed February 16, 1946 (Patent No. 2,521,118, patented September 5, 1950). Since the side plates 62 and 64 are spaced apart a distance which is equal to the width of a card C, cards can only be put in the hopper when properly oriented, that is, when the notch 67 in each card will properly engage the triangular bar 65.

The bar 65, therefore, together with the underlying plate 66 and with the cooperation of the side walls 62 and 64, constitutes a feed gate which controls the feeding of cards by the feed plate 56 in such a manner that only one card can be fed at a time. The parts are so arranged that the end of the plate 51 when in its extreme right hand position, as shown in Fig. 8, is never fully withdrawn from under the stack of cards. Hence the feed plate 56 is always in position to engage the bottom

card of the stack and this is the only card that is free to be fed out below the lower end of the bar 65.

In order that cards will always be firmly positioned against the forward end of the supporting plate 51, for engagement with the feed plate 56, a weight 71 is provided. This weight may be equipped with a suitable handle, as shown at 72. As shown in Fig. 2, the block 71 includes a groove that is complementary to and which embraces the bar 65 and this prevents the block from sliding relative to cards on which it is rested especially during the time the feeding mechanism is operated.

As shown in Fig. 10, a channeled bar 73 is secured to the bottom of the plate 33 and the channeled portion thereof slidably receives a tongue member 74 which extends from and is secured to the plate 51. Engagement of the tongue member 74 with this channel, together with the sliding engagement between the flange 53 and the slot 54, as previously described, keeps the sliding plate 51 in proper alignment with the table top.

Near the left hand or exit end of the hopper, as seen in Figs. 8 and 9, there is mounted a flexing device 75 which is operated at each rotation of the shaft 34 to lift the left end of the stack of cards, as viewed in these figures, and flex them somewhat so as to make certain that the lowermost card will be engaged by the feed plate 56. As shown in Fig. 12, the member 75 comprises a flat bar which is bent at three points and is secured at its front end to a leaf spring 76. The spring 76 is secured by appropriate means to an auxiliary front bar 77 mounted above and secured to the front edge of the table and the supporting bar 31. A cam 77 on shaft 34 is fixed to rotate with the shaft as by means of a set screw 78. This cam has a flat portion 79 which permits the leaf spring 76 to lower the member 75 during a part of each cycle of the feeder. This occurs at the time that the feed plate 56 is pushing the bottom card out of the stack into the bite of feed rollers. Subsequently, rotation of the cam 77 raises the cards to the position shown in Fig. 8. The table top 33 has two openings 81 and 82 through which vertical portions of the bent bar 75 are extended, as shown in Fig. 12.

As shown in Figs. 2 and 13 a first feed roller 85 is mounted in a position to engage the advancing end of the bottom card as it is pushed out of the stack by the feed plate 56 in the manner described above. The feed roller 85 is mounted on a sleeve 86 for rotation therewith, the sleeve 86 being mounted on a non-rotatable shaft 87. At its forward end the shaft is secured to a leaf spring 88 which is anchored to the bar 77 in the same manner as the leaf spring 76 which mounts the flexing bar or member 75, as described above. A belt pulley 89 is secured to the sleeve 86 for driving the roller and a belt 90 which passes about this pulley is driven by a pulley 91 supported on a jack shaft 92 mounted in a bracket 93, as shown in Figs. 1 and 3. The pulley 91 is secured to a larger pulley 94 which is driven by a belt 95 which passes about a pulley 96 on the motor 15. The belt 90 also passes forward, as shown in Fig. 1, about another pulley 97, Fig. 1, which drives another feed roller to be described presently. Returning, the belt 90 passes over a small idler pulley 98 which is mounted freely on the shaft 87 beside the pulley 89. By the means just described, the feed roller 85 is continuously driven but it is effective to advance a card only when it is in the lowered position, as shown in Fig. 13, that is, when the flat portion of a cam 99 on shaft 34 is disposed so as to lower the feed roller 85 into cooperating position with respect to a small idler roller 101 which is rotatably mounted on a bracket 102 beneath the table top and has its periphery extending through a slot 103 in the table top to a position substantially flush with or very slightly above the table surface.

To guide the cards C as they advance, undercut guide bars 104 and 105 are mounted on the feed table, one being suitably fastened thereto at either side of the feed path so as to keep the cards in proper alignment. The front and rear edges of the cards ride in the grooves 106 and 107, respectively, and thus the cards are presented squarely to the sensing station, the guide bars 104 and 105 being spaced apart a distance equal to the width of a control card C.

It will be apparent from the foregoing description that all of the mechanisms which are effective to feed a card from the supply hopper to the receiving hopper are operated or controlled by elements associated with the

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shaft 34. This shaft is driven in predetermined timed relation with operative elements of the printing machine. Thus, a bevel gear 125, Figs. 2 and 5, is fast to the shaft 34 near the left-hand end thereof. This gear meshes with the bevel gear 126 fast on the shaft 127 which, as shown in Fig. 5, extends rearwardly from the guideway through which the cards are advanced. The shaft 127 is operated in proper time relation with the operating elements of the printing machine and consequently the feeding of the cards or the like is accurately synchronized with operations of the printing machine. As shown in Figs. 1 and 2, the bevel gears 125 and 126 are the same size so that the shafts 34 and 127 rotate in synchronism. When the machine is arranged in this manner a card is fed for each printing operation of the printing machine. However, for some purposes it may be desirable to print data sensed from the cards as C more than once as, for example, on the body and on one or more of the stubs of a check, receipt, utility bill or the like.

An arrangement for effecting more than a single card feeding operation for each operation of the printing machine is illustrated in Figs. 5, 6 and 7 and by referring thereto, it will be seen that the shaft 34 has a relatively large spur gear 131 mounted thereon which meshes with the spur gear 132 carried by a jack shaft 133 that is supported in a suitable bracket 133. A bevel gear 125' is carried by the jack shaft and meshes with a similar bevel gear 126' on the rearwardly extending shaft 127. The ratio between spur gears 131 and 132 determines the number of revolutions that will be made by the drive shaft 127 to one revolution of the control shaft 34.

The feed roller 85 in cooperation with the underlying idler roller 101, Figs. 8 and 13, advances a card C fed forwardly by the plate 56 into sensing position where it is operated on by sensing means such as those referred to hereinabove. The card is retained in this sensing station by stop finger arrangement including a vertical plate 118, Fig. 15, supported by an arm 119 that is connected to the front bar 77 through a leaf spring 121. Normally plate 118 is disposed in the position shown in Fig. 15 so as to permit cards to advance through the guideway defined by the grooves 106 and 107 and during this time the arm 119 rests on the periphery of a cam fast on the shaft 34. When, however, a card is to be stopped and retained in sensing position, the flat portion of the cam 123 moves into association with the arm 119 and this permits the plate 118 to move into position between the grooves 106 and 107 and in such position as to be engageable by the leading end of a card as C so as to thereby accurately dispose the same in sensing position.

The card is retained in sensing position and is ejected therefrom by a feed roller 115, Figs. 3 and 14, which is mounted on a sleeve 116 which, in turn, is carried by a shaft 117 that is secured by a leaf spring 117S to the front bar 77. A pulley 97 fast on the sleeve 116 is driven by the belt 90 in the manner described above and imparts rotative movement to the sleeve 116 and the feed roller 115. When the feed roller 115 is to be effective, the flat portion on the cam 122 moves into alignment with the shaft 117 and this permits the roller to move downwardly into cooperating relation with an underlying card. When the stop finger 118 is elevated the roller 115 is effective to advance the card from sensing position through the guideway into the collecting hopper 33A.

Whether the shafts 127 and 34 are arranged for one to one operation as shown in Figs. 1 and 2, or whether the multiple relation is established in the manner shown, for example, in Figs. 5, 6 and 7, the shaft 127 is driven by bevel gears 135 and 136, Fig. 5, the bevel gear 135 being mounted on the shaft 127, while the bevel gear 136 is mounted on the shaft 137 journaled in bearings afforded in the printing machine. The shaft 137 has a large spur gear 138 rotatably mounted thereon and this spur gear is connected to this shaft through a one-revolution clutch of the kind disclosed in my Patent No. 2,265,133, patented December 9, 1941. Rotative movement is imparted to the gear 138 from the small gear 139, Fig. 5, mounted on a jack shaft 141 journaled in bearings provided in the frame of the printing machine. A relatively large spur gear 142 is integral with the small spur gear 139 and meshes with a small spur gear 143 mounted coaxially with and driven by the pulley 144. The pulley 85

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144 is driven by a belt 145 from the small pulley 146 on the shaft of the motor 15.

From the foregoing, it will be seen that I have described a feeding means for cards on other plate-like articles that is highly efficient in assuring that only the lowermost one of such cards will be fed from a supply magazine or hopper, and one in which the articles to be fed are accurately positioned and aligned.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a machine of the character described comprising a magazine in which cards or similar plate-like articles each having a notch formed in one longitudinal edge are positionable, the notches being in alignment when the articles are stacked vertically in registration one with respect to another, a work-performing station to which said articles are to be fed from the magazine through an opening at one end thereof, and a guideway extending from said one end of the magazine to the station and along which said articles are to be advanced one by one, feed means for advancing the lowermost one of said articles positionable at the bottom of the magazine through said opening and onto the guideway, said feed means comprising, a feed roller adjacent the opening in the said one end of the magazine, a vertically disposed bar located in the magazine at a point removed rearwardly of said opening and having a cross-sectional configuration complementary to the notch in each of the said articles whereby said article may be stacked in vertical alignment therein, said bar terminating short of the bottom of the magazine a distance slightly greater than the thickness of one of said articles but less than the combined thickness of two of said articles, a feed plate reciprocable at the other end of the magazine to abut against the trailing edge of the said lowermost article to feed the same through said opening and onto the guideway, and means adapted to flex the leading end portions of the said articles positionable in the magazine when the plate means move theretoward to advance the said lowermost article to the feed roller.

2. In a machine of the character described comprising a magazine in which cards or similar plate-like articles each having a notch formed in one longitudinal edge are positionable, the notches being in alignment when the articles are stacked vertically in registration one with respect to another, a work-performing station to which said articles are to be fed, and a guideway extending from one end of the magazine to the station and along which said articles are to be advanced one by one, feed means for advancing the lowermost one of said articles positionable at the bottom of the magazine through an opening at the said one end thereof and onto the guideway, said feed means comprising a bar-like element vertically disposed in the magazine at a point removed rearwardly of said opening, said element having a vertical portion configured complementary to the notch in each of the articles and terminating short of the bottom of the magazine a distance slightly greater than the thickness of one of said articles but less than the combined thickness of two of said articles, a feed member reciprocable at the other end of said magazine and being slidable along a predetermined portion of the bottom thereof in the direction of the said one end of the magazine, a flexible plate fixed to one end of said member and having a free end abutable against the trailing edge of the said lowermost one of the articles, and cam means for urging said flexible plate firmly into engagement with the underside of the next lowermost plate positionable in said magazine as the reciprocable member moves in the direction of the said one end of the magazine thereby assuring effective advancement of the said lowermost article to the guideway.

3. In a machine of the character described comprising a magazine in which cards or similar plate-like articles each having a notch formed in one longitudinal edge are positionable, the notches being in alignment when the articles are stacked vertically in registration one with respect to another, a work-performing station to

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which said articles are to be fed, and a guideway extending from one end of the magazine to the station and along which said articles are to be advanced one by one, feed means for advancing the lowermost one of said articles positionable at the bottom of the magazine through an opening provided in the said one end onto the guideway, said feed means comprising, a bar-like holding and aligning element vertically arranged in the magazine at a location therein rearwardly of said one end and having a vertically extended portion configured complementary to the notch in each of said articles, said holding and aligning element terminating short of the bottom of the magazine a distance slightly greater than the thickness of one of said articles but less than the combined thickness of two of said articles whereby only the lowermost one of said articles in the magazine will be free of engagement with said holding and aligning element, a reciprocable feed member adapted to move along the bottom of the magazine a predetermined distance in the direction of the said one end of the magazine, one end of said reciprocable member being disposed in the magazine at all times in position to lie beneath the trailing end portion of the lowermost one of the stacked articles positionable therein, a flexible plate attached to and urged against one face of said member and having a free end adapted to abut against the trailing edge of the said lowermost one of the articles to feed the same through said opening and onto the guideway, and cam means at the bottom of said magazine for urging the free end of said flexible plate vertically upward with respect thereto as the plate is moved toward the said one end of the magazine.

4. In a machine of the character described comprising a magazine in which cards or similar plate-like articles each having a notch formed in one longitudinal edge adjacent the trailing end are positionable, the notches being in alignment when the articles are stacked vertically in registration one with respect to another, a work-

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performing station to which said articles are to be fed from the magazine, and a guideway extending from an opening formed in one end of the magazine to the station and along which said articles are to be advanced one by one, feed means for advancing the lowermost one of said articles positionable at the bottom of the magazine through said opening and onto the guideway, said feed means comprising, an element vertically disposed in the magazine at the other end thereof and being of a configuration complementary to the notch in each of the said articles positionable in the magazine and terminating short of the bottom of the magazine a distance slightly greater than the thickness of one of said articles to thereby define a passageway at the bottom of the magazine for the said lowermost article, a cam-end slot provided in a portion of the bottom of the magazine and opening at the said other end thereof, a feed member adapted to reciprocate in the passageway, a flexible plate attached to the upper face of the reciprocable feed member and having a free end adapted to abut against the trailing edge of the said lowermost article to feed the same out through said opening, and means carried on the lower face of the flexible plate and adapted to slide in the slot and engage the cammed end thereof to urge the flexible plate upwardly into accurate alignment with the said trailing edge of the said lowermost article.

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