Dec. 10, 1957 W. T. GOLLWITZER 2,815,947

SHEET SEPARATING AND FEEDING MECHANISMS

Original Filed Dec. 16, 1950 4 Sheets-Sheet 1

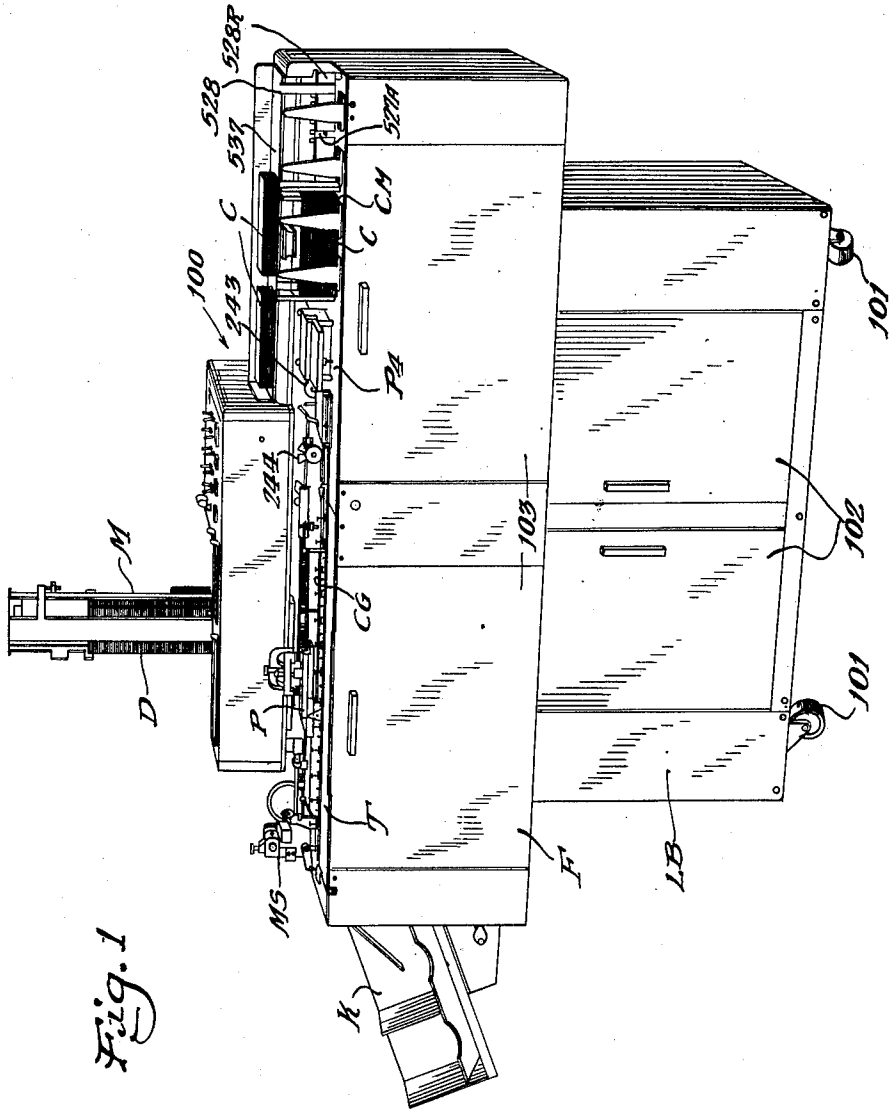


Fig. 1

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SHEET SEPARATING AND FEEDING MECHANISMS

Original Filed Dec. 16, 1950 4 Sheets-Sheet 2

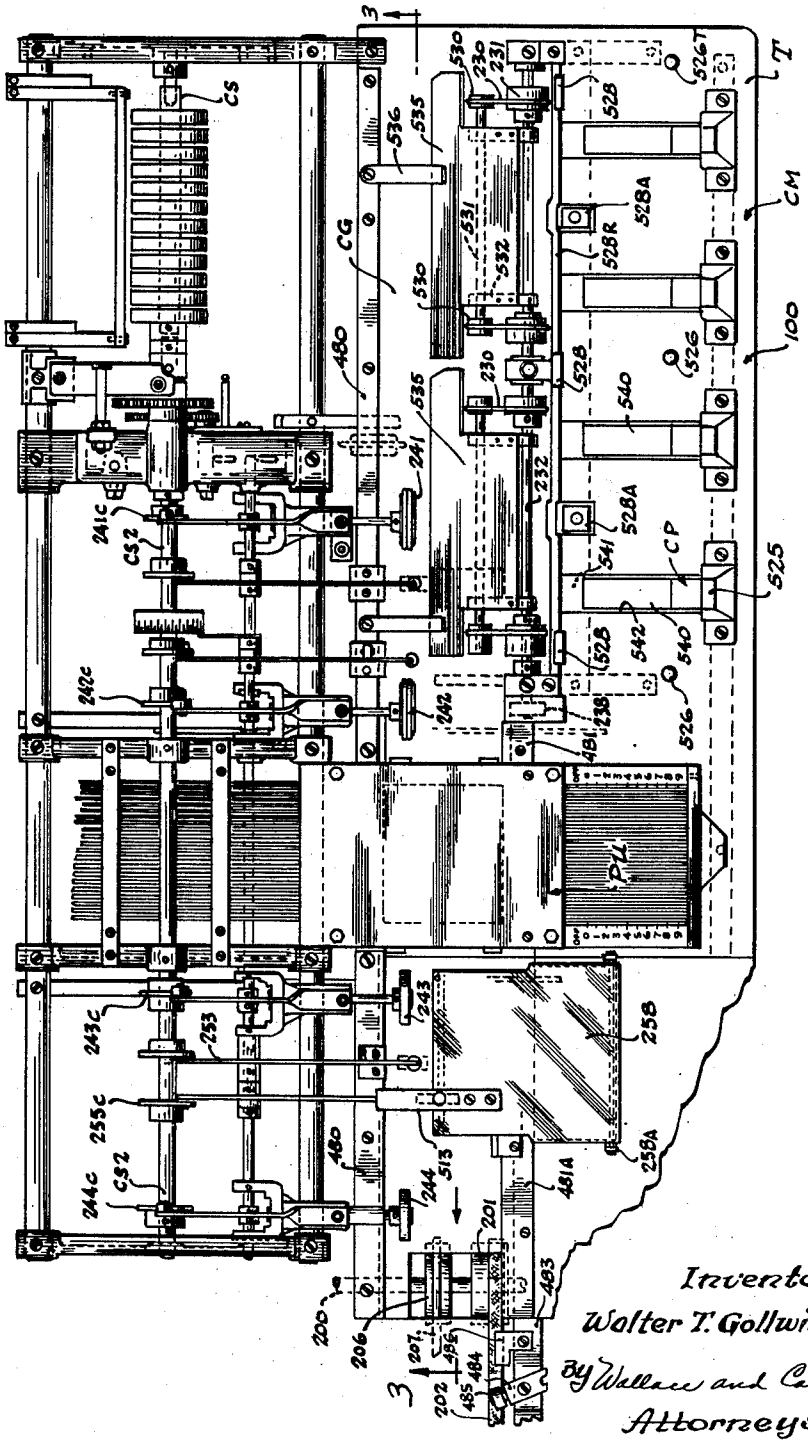


Fig. 2

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SHEET SEPARATING AND FEEDING MECHANISMS

Original Filed Dec. 16, 1950 4 Sheets-Sheet 3

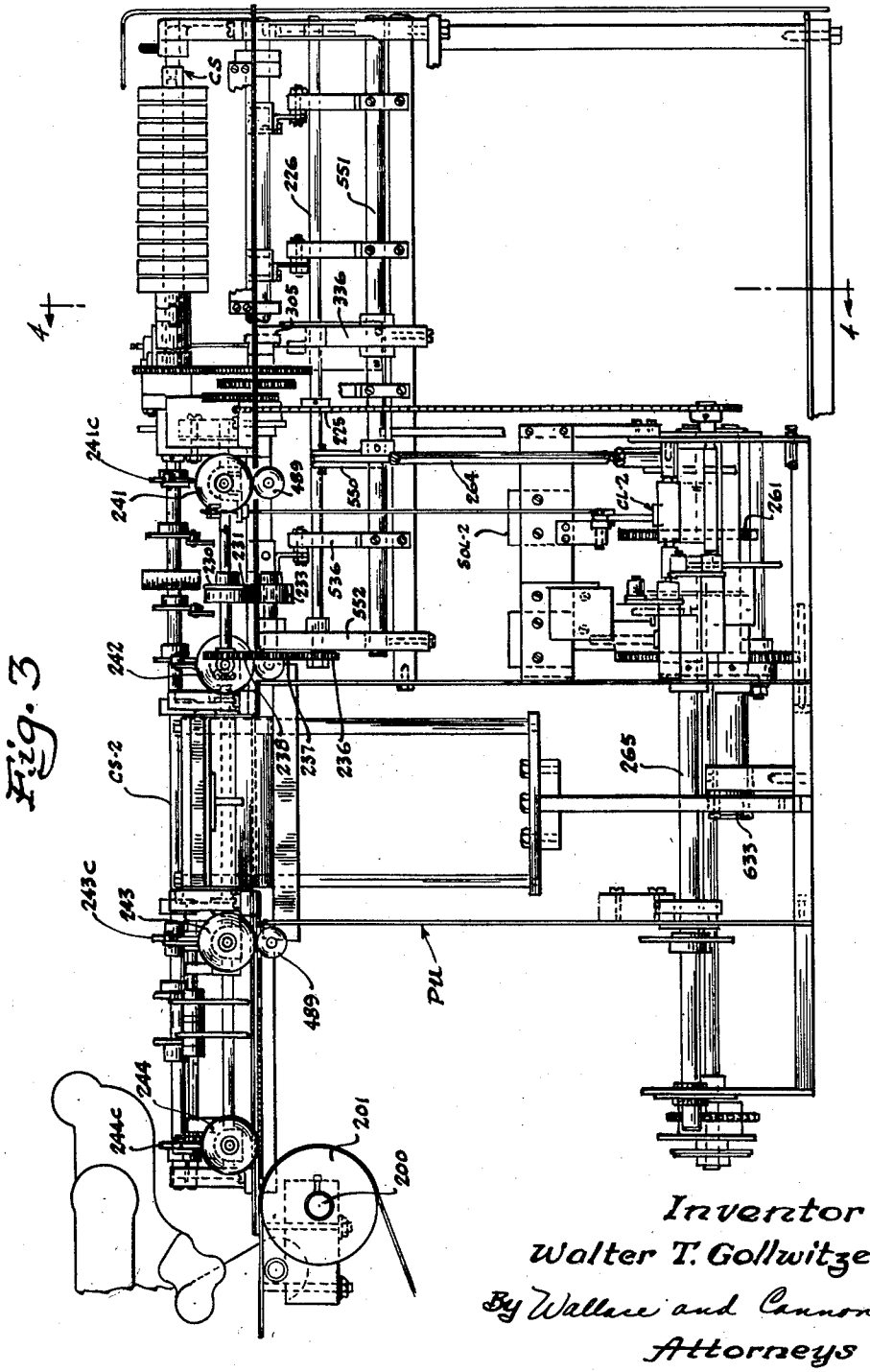


Fig. 3

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SHEET SEPARATING AND FEEDING MECHANISMS

Original Filed Dec. 16, 1950 4 Sheets-Sheet 4

Fig. 5

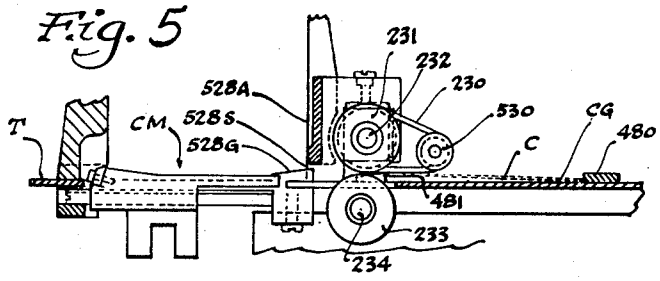
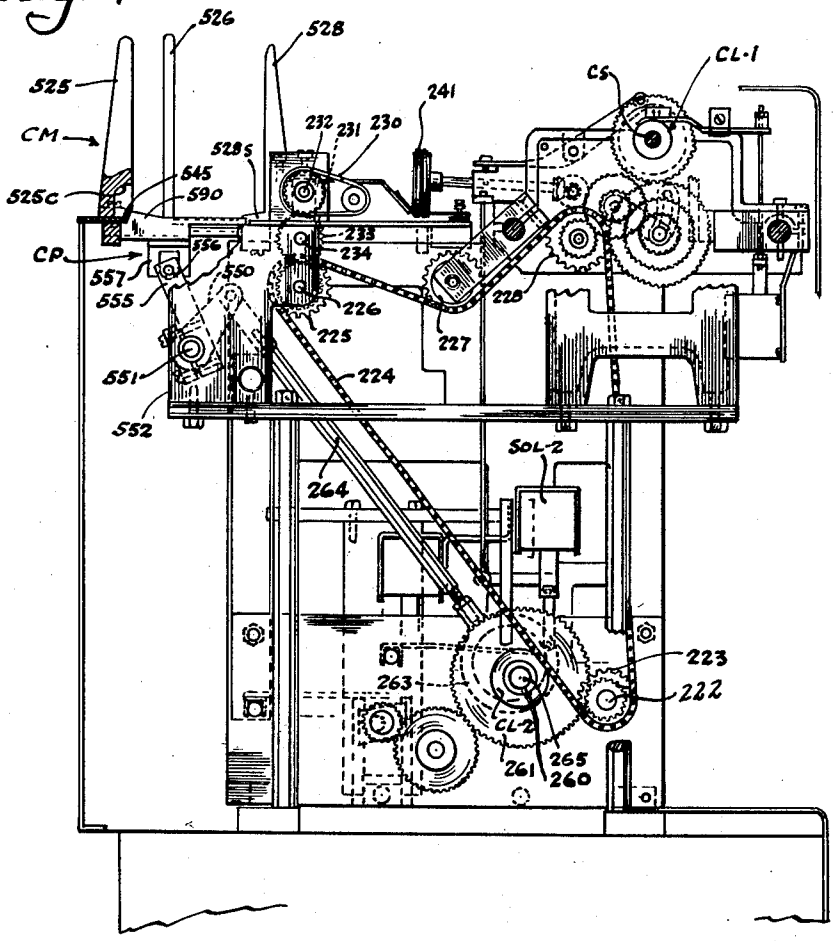


Fig. 4



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United States Patent Office 2,815,947 Patented Dec. 10, 1957

2,815,947

SHEET SEPARATING AND FEEDING MECHANISMS

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Original application December 16, 1950, Serial No. 201,102, now Patent No. 2,710,406, dated June 7, 1955. Divided and this application March 31, 1953, Serial No. 345,903

4 Claims. (Cl. 271—10)

This case is a division of my copending application, Serial No. 201,102, filed December 16, 1950, now Patent No. 2,710,406, of June 7, 1955.

This invention relates to machines for producing business instruments such as checks, insurance premium notices, bills and the like.

Where bills, checks and the like are intended to be used in connection with a relatively large accounting system, it is quite common to prepare these business instruments in the form of cards which may take the general form of the usual Holerith card. In machines of this character, it is, of course, essential to have the cards, upon which the printed and punched information is to be placed, fed into the machine in a reliable and yet simple manner, and an important object of the present invention is to simplify the feeding of such cards into a machine of the aforesaid character. More specifically, it is an object of the present invention to afford a card feeding mechanism that is adapted for feeding single cards, double cards or pairs of related cards into the machine, and to enable this to be accomplished in a simple manner such that conversion of the machine from one type of operation to another may be easily accomplished.

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 principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. 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 perspective view of a machine having a card feed mechanism embodying the features of the invention;

Fig. 2 is an enlarged plan view of the right hand portion of the machine, the cover plates being removed in some instances;

Fig. 3 is a front view taken partially in vertical section and showing the portion of the machine illustrated in Fig. 2;

Fig. 4 is a vertical sectional view taken substantially along the line 4—4 of Fig. 3; and

Fig. 5 is a detail view of the transverse card feed and guideway.

The machine in general

For the purpose of disclosure the invention is herein illustrated as embodied in a printing machine **100** that is adapted to produce business instruments such as bills, checks and the like in the form of tabulating cards containing printed data, as well as physically represented data afforded by means of perforations in the cards, and such documents in the form of cards C are produced from

and under control of printing devices D that are passed through the machine. The machine **100** has a main enclosed frame F that is supported on top of a lower base LB which in the present instance is mounted on casters **101**. The lower base LB has access doors **102** afforded as parts of the usual enclosing cover plates, and the upper frame F is similarly provided with access doors **103** as well as other removable cover plates whereby access may be had to mechanism enclosed within the frame. The machine frame F also affords a table top T that is relatively elongated and which has an elongated card guideway CG extended along what may be termed the forward edge portion of the table top. The cards C are supplied in a stack to a card magazine CM which in the present instance is adjustable as to its overall size so as to provide for handling cards C of double or different length cards, and these cards C are discharged edgewise or in a rearward direction one by one from the bottom of the card magazine CM by means including card pickers CP, and into the card guideway CG. In the machine herein shown the cards are thereafter fed along the card guideway CG by means to be hereinafter described and into cooperation, first, with a punching unit PU, which produces the desired coded perforations in the card C, and such card C is thereafter advanced in a left-hand direction, as viewed in Fig. 1, into a printing position beneath a platen P whereby a printed impression may be made from the printing means of a printing device D onto the card C, and the card is thereafter released from printing position and is discharged through a micrometer sensing or safety device MS into a collector hopper K that is afforded at the left-hand end of the machine as viewed in Fig. 1.

The drive for the card picker CP, Figs. 2 and 3, includes an operating sleeve **260** mounted loosely on a shaft **265**, Figs. 3 and 4, and a gear **261** is loosely mounted on the shaft **265** adjacent the sleeve **260**. This gear **261** is constantly driven by a pinion **262** fixed on a constantly driven shaft **222**, as described in my aforesaid parent application. The gear **261** serves as the driving element of a one-revolution clutch CL–**2**, the driven element of which is rotatively fixed to the sleeve **260**, and this clutch is governed by a solenoid SOL–**2**. The sleeve **260** has an eccentric **263** fixed thereon, and a connecting link **264** has a bearing surrounding such eccentric and is operatively connected to the card picker, as will be described, so that whenever the clutch CL–**2** is engaged for its single revolution cycle, the card pickers CP will be driven through a card-feeding cycle.

The card guideway CG and related elements

The card guideway CG is defined along its rear edge by rear rails **480**, Figs. 2 and 5, that are secured to the table top T. In that portion of the card guideway CG that is opposite the card pickers CP, the forward edge of the card guideway is defined by a strip **481** as shown in Fig. 5, and the cards are advanced in a transverse direction by constantly driven feed rolls **231** and **233** over the strip **481** and then are dropped into the card guideway CG between the strips **480** and **481**.

In providing such constant drive for the feed rolls **231** and **233**, a sprocket **223** is fixed on the right hand end of the constantly driven shaft **222**. An endless chain **224** extends about the sprocket **223** and upwardly over and about a sprocket **225** that is fixed on a shaft **226**, and the chain then extends rearwardly beneath an idler sprocket **227** and then upwardly and over a sprocket **228** from which it extends downwardly to the sprocket **223**.

The shaft **226** serves as a drive for a plurality of transverse feed belts **230** that are over a part of the card guideway CG opposite the card magazine CM. The feed belts **230** are arranged in relatively deep annular slots or

grooves in the upper feed rollers **231** that are fixed on a shaft **232**, and beneath the feed rollers **231**, the opposed feed rollers **233** are arranged and are fixed on a drive shaft **234**. The feed rollers **231** and **233** cooperate to continue the in-feeding movement of each card C after the card has been projected for a short distance from the magazine by the reciprocating card picker CP, and after discharge of the card from the bight of the rollers **231** and **233**, the feed belts **230** become effective to complete the in-feeding movement as will be described. Gears **236**, **237** and **238** meshed in series, are fixed respectively on the shafts **226**, **234** and **232** to transmit drive from the constantly operated shaft **226**. To the left of the card magazine CM, the forward edge of the card guideway is defined by a continuation of the strip **481** that extends to the punching unit PU, and by a similar strip **481A** that extends from the left hand side of the punching unit PU beneath the stop finger rocker **258** and to a point just beyond the pulley **201**. In the left hand portion of the card guideway CG, the forward edge of such card guideway CG is defined by a rail that is fixed to the table top T, and on this rail, a mounting bar **483** is secured. This mounting bar **483** has a plurality of angularly arranged support brackets **484** arranged thereon and these brackets have skid rollers **485** rotatably supported thereon so as to tend to displace the cards laterally in a forward direction and thereby maintain the same in engagement with the forward guide rail, while at the same time holding such cards downwardly in engagement with the feed belt **202**. A plurality of guide shoes **486** are also secured to the mounting rail **483** so as to maintain the cards C in engagement with the feed belt **202** in the spaces intermediate the skid rollers **485**. The rear portion of the card guideway CG in the zone that is opposite the feed belt **202** is defined by a rear rail **488** that is secured to the table top T.

When the card C that is in its initial position in the card guideway CG opposite the card magazine CM is to be advanced in a left hand direction, as viewed in Fig. 2, the constantly driven card feed wheel **241**, which has been in an elevated position, is moved downwardly into engagement with the card C by the action of its cam **241C** and the card is thus advanced into position beneath the card feed wheel **242** which is at all times in its lowered position and which at this time has had downward pressure applied thereto by its cam **242C** that is mounted on the cam shaft CS–2. The card is then advanced into the throat of the punching unit PU and its forward end moves on through this throat and under the card feed wheel **243** which at this time has downward pressure applied thereto. The card, however, comes to rest with its forward end beneath the stop finger element on the rocker **258**. The card C remains in this position and is held against the stop finger by the continued feeding action of the feed wheel **243**, while the punching operation takes place, and the stop finger rocker **258** is raised just prior to completion of the withdrawal of the punching elements so that when such withdrawal releases the card, the card feed wheel **243** immediately starts the advancing movement of the card into position beneath the card feed wheel **244** which continues such movement of the card and causes the forward edge of the card to move into position over the feed belt **202** which continues such advancing movement. With particular reference to the card feed wheels **241** to **244**, it should be observed that when a card is not in position beneath such wheels, these wheels engage free running idler rollers **489** that are disposed in position beneath slots in the card guideway.

The card magazine and related card feed means

The card magazine CM is provided on the table top T forwardly of the right hand portion of the card guideway CG, and this card magazine is defined on its forward edge by a plurality of upstanding stationary columns **525**. In the present instance, the card magazine CM is constructed so that it may be arranged to accommodate either a single length card C or a card D of double length and for this purpose provision is made for threading upstanding retaining pins **526** into threaded openings in the table top at positions which define either the single length card or the double length card. Three such mounting positions are provided, and these mounting positions are defined by tapped openings **526T**, one such opening appearing in Fig. 2, while two pins **526** are shown in this figure. As thus set up, the card magazine CM is adapted to have cards placed therein in a stack between the two pins **526**, and these cards may be advanced one by one from the bottom of the stack and laterally or rearwardly toward the card guideway CG through the operation of the card picker CP, as will hereinafter be described. It should be observed that on the rear side of the card magazine, upstanding columns **528** are afforded near the ends thereof and that these columns are supported by a rail **528R** that is spaced upwardly from the table top. The rail **528R** carries a plurality of vertically adjustable members **528A** so that the lower ends thereof may be adjusted with respect to upwardly and rearwardly sloping card guide blocks **528G** to thus form a clearance throat or slot **528S** through which the lowermost card may be fed into the bight formed by the upper and lower feed rolls **231** and **233**. In this regard it should be noted that the guide blocks **528G** serve to elevate the advancing card to the level of the front strip **481**, and the bight of the feed rolls **231** and **233** is located at this level. Moreover, the lower feed roll **233** is recessed into the forward edge of the strip **481**, as shown in Fig. 5 so that the card C is fed over this strip.

It should be observed that the two feed belts **230** are afforded opposite each section of the card magazine, and the rear ends of such belts are supported on guide pulleys **530** that are supported on shafts **531**, such shafts being held in spaced relation with respect to the shaft **230** by spacer bars **532**. The belts **230** are recessed into annular grooves in the feed rolls **231** so that the feed rolls **231** act as normal feed rolls so long as the card is between such rolls. Rearwardly of the rolls **231**, however, the feed belts **230** are effective with a feeding action on the cards so as to complete the in-feeding movement of the cards, and this action is attained by downward pressure of the belts toward the upper face of the rail **481**. The belts **230** thus complete the rearward movement of the card so that it drops downwardly past the rear edge of the rail **481** and into the card guideway CG. As each card C is fed into the guideway, it passes into position under a guard plate **535** that maintains the advancing rear or leading edge of the card in engagement with the bottom of the card guideway, thus to assure that the card passes into position beneath the feed wheel **241**, and two such guard plates **535** are provided in the present instance, and such guird plates are supported by means including support bars **536** extended from the rear rail 483 on the card guideway.

Rearwardly of the card guideway CG an elevated work or storage surface **537** is provided and this may be used as a supply source for cards C, two stacks of which are shown on this surface as illustrated in Fig. 1.

The card picker mechanism CP is arranged to afford four reciprocable slides **540** that are mounted on guide bars **541** so as to be movable back and forth in slots **542** formed in the bottom of the card magazine. It will be observed that two slides **540** are provided in each section of the card magazine CM, and these slides are arranged so as to be in front-to-rear alignment with the respective upstanding columns **525**. The columns **525** have clearance recesses **525C** in their lower rear portions so that the rear end portions of the slides **540** may move into these recesses when the slides **540** are at their most forward portions. These forward ends of the several slides have individual card engaging bars **545** fixed thereon, as shown in Fig. 4 of the drawings, and

these bars engage a slight distance above the adjacent surface of the slides **540** so that when the slides **540** are moved in a rear or card advancing direction, the bars **545** will engage the forward edge of the lowermost card and will advance the same forwardly and into engagement with the card feed belts **230**. In this respect it should be observed that the reciprocating stroke of the slides **540** is relatively short and is terminated soon after a card C has been engaged by the feed rolls **531** and **533**.

The reciprocating movements are imparted to the slides **540** by means associated with the operating link **264**. Thus, as shown in Figs. 3 and 4, the upper forward end of the link **264** is pivotally connected to the end of an upwardly and rearwardly extending arm **550** that is fixed on a rock shaft **551**. This rock shaft is supported in bearings **552** that are suspended from the lower face of the card magazine. The rock shaft **551** has a plurality of operating arms **553** fixed thereto and extended upwardly and forwardly into positions beneath the respective slides **540**, and a roller **556** on the upper end of each arm **555** is arranged to ride in a vertical slot in a connecting bracket **557** secured to the lower face of the related slide **540**. Thus, in a rotation of the sleeve **260**, the link **264** is moved downwardly and is then returned in an upward direction to the position shown in Fig. 4 and in this reciprocation, the rock shaft **551** is operated through a rocking movement in which the slides **540** are first moved in a rearward direction through a card picking or ejecting stroke and are then returned to their retracted positions, as shown in Fig. 3.

From the foregoing description it will be apparent that the present invention affords an improved card feed mechanism for feeding cards into a printing or punching machine or the like, and that such card feed as afforded under the present invention is simple in character and reliable in operation. It will also be evident that this card feed, as afforded by the present invention, enables either single or double cards to be fed into the machine, and the arrangement of the card feed mechanism is such that it may be readily converted from one type of operation to another.

Thus, I have illustrated and described the preferred embodiment 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 printing machine having a sheet guideway along the plane of which sheets may be fed from an in-feed position to successive operating positions along said guideway, a sheet magazine located at one side of said sheet guideway at said in-feed position, upstanding side rails extending above the plane of and defining the sides of said sheet guideway along the length thereof, sheet feed means in the form of engaged feed rollers having a bight above the plane of said guideway at said in-feed position between said magazine and the adjacent one of said side rails for feeding the sheets one at a time over said one of said side rails from said sheet magazine, means to advance sheets one by one into the bight afforded by said feed rollers, and means located in part over said one rail and in part over the plane of said guideway for applying continued feeding forces to the sheets at points located over said guideway to thereby continue the in-feeding movment of the sheets into said sheet guideway at said in-feed position, and said last named means being adapted to press said sheets downwardly into said guideway during such continuing in-feeding movement thereof.

2. In a printing machine having a sheet guideway along the plane of which sheets may be fed from an in-feed position to successive operating positions along said guideway, a sheet magazine located at one side of said sheet guideway at said in-feed position, a first side rail extending above the plane of and defining the side of said sheet guideway adjacent said magazine, a second upstanding side rail defining the other side of said guideway, sheet feed means at said in-feed position comprising a card picker located outside of one of said side rails and constantly driven feed rolls located over said first side rail affording a bight for receiving the sheets from said card picker and for feeding the sheets one at a time over said first side rail from said sheet magazine and into said sheet guideway at said in-feed position, and a constantly driven belt operating between said feed rolls and said guideway for applying downward pressure to the sheets as the sheets emit from the feed rollers.

3. In a printing machine having a sheet guideway along the plane of which sheets may be fed from an in-feed position to successive operating positions along said guideway, a sheet magazine located at one side of said sheet guideway at said in-feed position, upstanding side rails extending above the plane of and defining the sides of said sheet guideway along the length thereof, a sheet picker associated with said magazine for feeding sheets one by one toward and over the adjacent one of said side rails, constantly driven feed rolls affording a bight and disposed in part over said one of said side rails and in part beneath said one of said side rails to receive sheets from said picker and continue the in-feed movement of such sheets, and feed belts driven by certain of said feed rolls and located in part over said one rail and in part over said guideway for applying downward pressure to and continuing the in-feeding movement of the sheets into said sheet guideway at said in-feed position.

4. In a printing machine having a sheet guideway along the plane of which sheets may be fed from an in-feed position to successive operating positions along said guideway, a sheet magazine located at one side of said sheet guideway at said in-feed position, upstanding side rails extended above the plane of and defining the sides of said sheet guideway along the length thereof, a sheet picker associated with said magazine for feeding sheets one by one toward and over the adjacent one of said side rails, constantly driven feed rolls having a bight above the plane of said guideway and disposed in part over said one of said side rails and in part beneath said one of said side rails to receive sheets from said picker and continue the in-feed movement of such sheets, feed belts driven by certain of said feed rolls and located in part over said one rail and in part over said guideway for applying downward pressure to and continuing the in-feeding movement of the sheets into said sheet guideway at said in-feed position, a feed wheel located over said guideway at said in-feed position, and control means for said feed wheel operable to raise said feed wheel when a sheet is being advanced into said guideway by said feed belts, and to then lower said feed wheel to feed such sheet out of said in-feed position and along said guideway.

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