

Jan. 6, 1959

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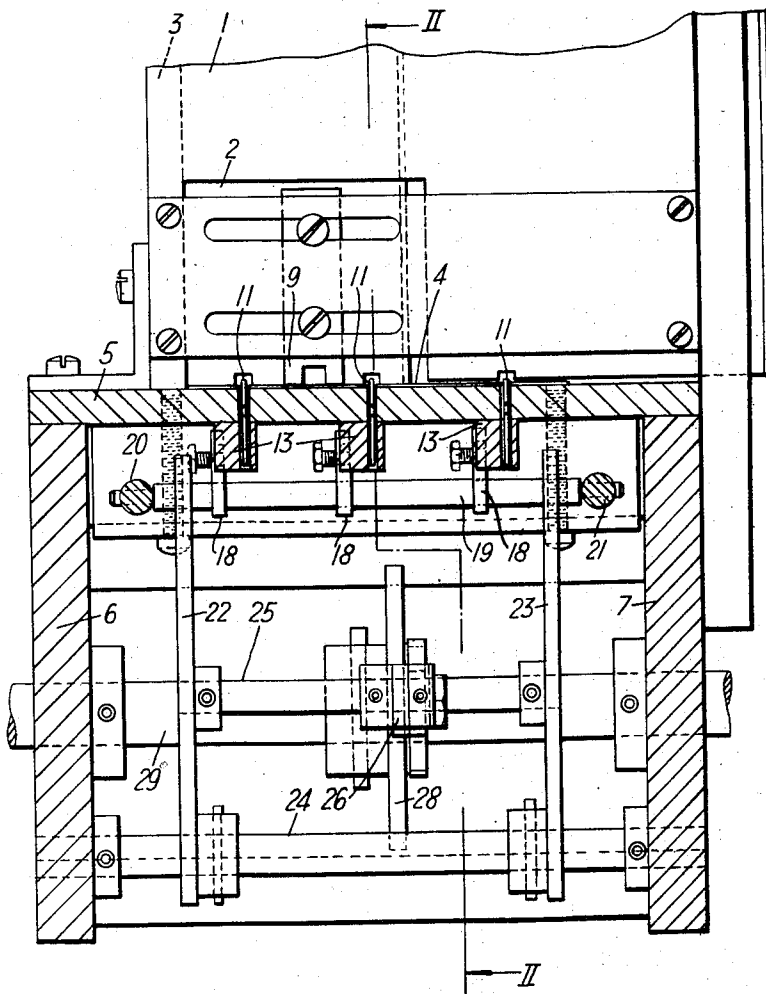
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CARD FEEDING APPARATUS

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4 Sheets-Sheet 1

Fig. 1.



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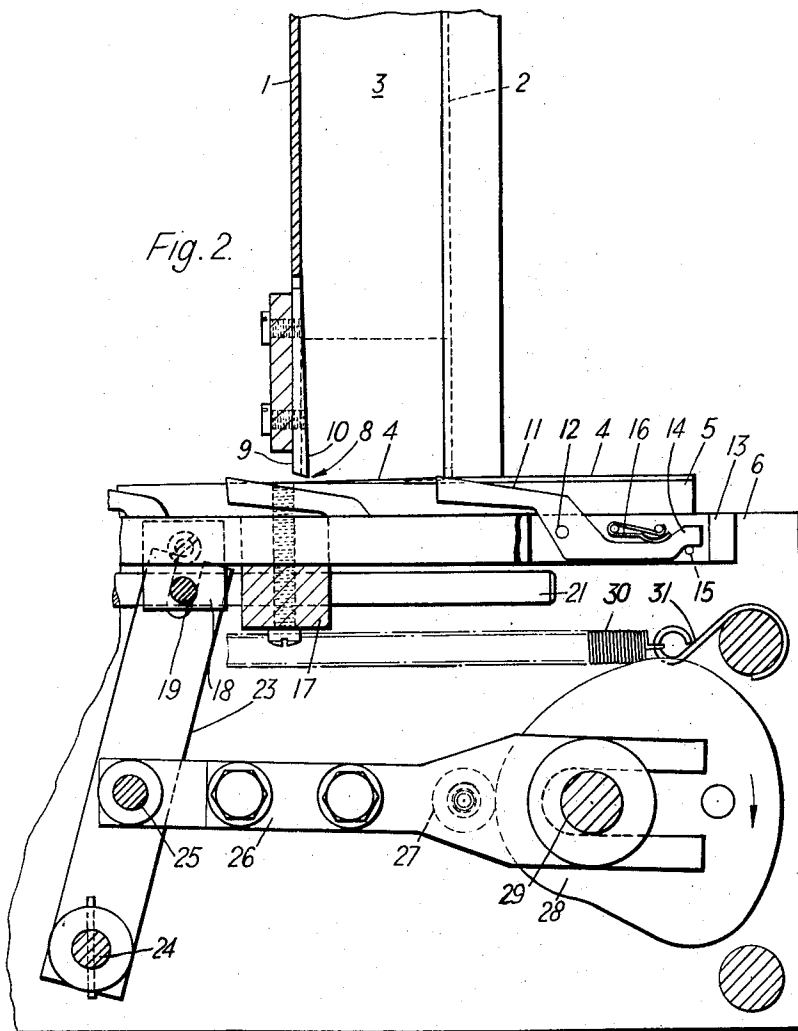
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Fig. 3.

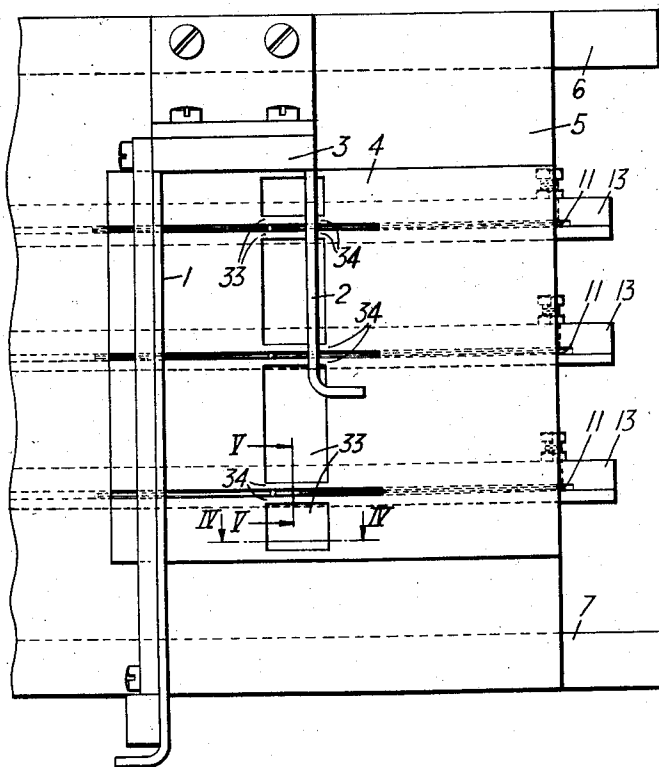


Fig. 4.

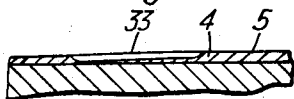
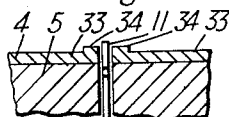


Fig. 5.



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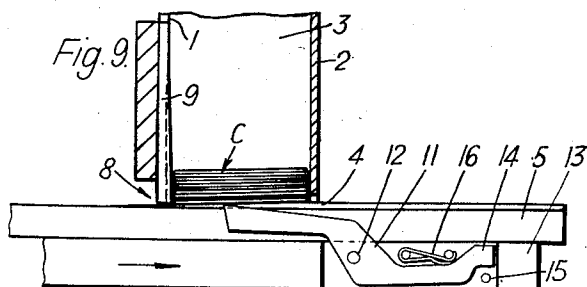
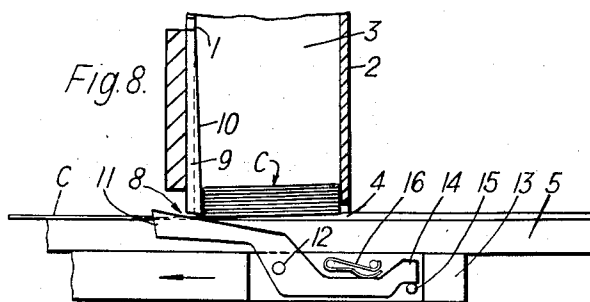
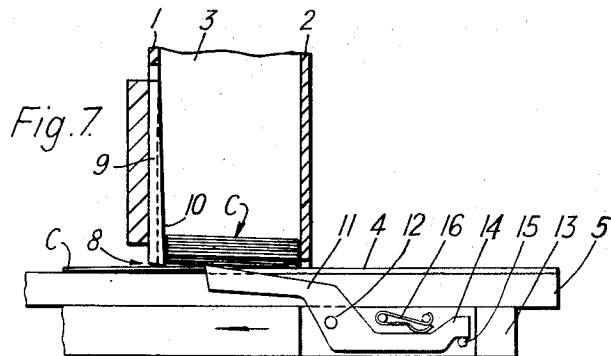
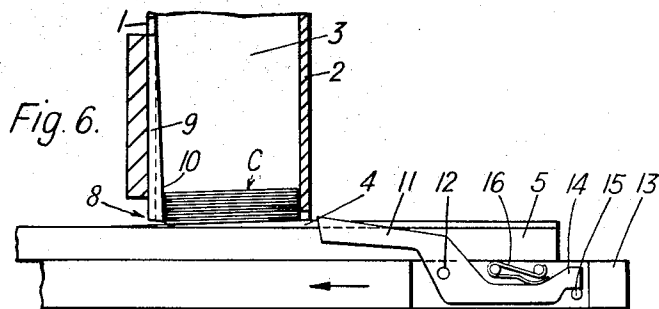
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CARD FEEDING APPARATUS

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Claims priority, application Great Britain June 3, 1955

4 Claims. (Cl. 271—44)

This invention relates to card feeding apparatus and in particular to apparatus for feeding the bottom card from a pile contained in a magazine.

It is a main object of the present invention to provide a card feeding apparatus whereby a pusher element or elements, on initial engagement with an edge of the bottom card contained in the magazine, will engage the edge sufficiently to initiate the feeding movement of the card and will thereafter be so moved relative to the bottom of the magazine as progressively to increase the effective card-engaging area of the pusher element or elements thereby to ensure positive feeding movement of the card through a throat located at the forward end of the magazine.

It is a further object of the invention to provide a card feeding apparatus whereby as a card feeding element is moved through the magazine and removes the bottom card from the pile contained therein, it also relieves from the card being removed the downward pressure exerted by the pile thereby to ensure the positive free movement of the card through the throat at the forward end of the magazine.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Fig. 1 is an end view of card feeding apparatus according to the invention,

Fig. 2 is a longitudinal section on line II—II, Fig. 1,

Fig. 3 is a top plan of Fig. 2,

Fig. 4 is a section on line IV—IV, Fig. 3,

Fig. 5 is a section on line V—V, Fig. 3, and

Figs. 6 to 9 diagrammatically illustrate the mode of operation of the card feeding apparatus.

Referring to the drawings, a pile of cards C, Figs. 6 to 9 is supported on the bottom of a magazine consisting of front and rear walls 1, 2 and a single end wall 3. The magazine is provided with three walls only so that it is constructed to accommodate cards of different lengths.

The bottom of the magazine is formed by a ramp 4, secured in any suitable manner, as for example by screws not shown, to a plate 5 supported by side frames 6 and 7, Fig. 1. The upper surface of the ramp 4 is parallel with the surface of the plate 5 until it reaches the inner face of the magazine wall 2 and thereafter, as illustrated in the drawings, the upper face of the ramp is a card-engaging surface which declines progressively from said inner face of wall 2 towards a throat 8 through which the bottom card of the pile is fed by pusher elements described below. The throat 8 is formed by the space between the thin end of ramp 4 and the lower edge of a throat knife 9 which is adjustably secured to the front wall 1 of the magazine. The inner face 10 of the throat knife 9 projects inwards into the magazine, as illustrated in the drawings, to engage the front edges of cards as they descend towards the bottom of the magazine thereby to guide the cards of the pile laterally towards the rear wall 2 of the magazine. This feature of the throat

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knife is of particular usefulness when the cards to be fed from the pile are used cards which may or may not have ragged or burred lateral rear edges. The sloping face 10 of the throat knife ensures that the cards are properly located against the rear wall 2 of the magazine so as to be in proper position for initial engagement by the pusher elements which are to remove the bottom card from the pile.

The means by which the bottom card of the pile is removed from the magazine comprises a plurality of pusher elements 11. In the construction shown in the drawings three such pusher elements are provided, as can be seen from Figs. 1 and 3. Each pusher element 11 is rockable about a pivot 12 carried by a reciprocable feed bar 13 by which the pusher element 11 is moved in a fixed straight-line path relative to the bottom of the magazine, and the axes of the three pivots 12 are aligned. Each pusher element 11 is provided with a tail 14 normally urged into engagement with a fixed stop 15 by a spring 16 carried by the feed bar 13.

The feed bars 13 are supported for reciprocable lengthwise movement by slotted bars 17, of which one is shown in Fig. 2, spaced apart along the length of and secured to the under side of the plate 5. Secured to each of the feed bars 13 is a depending block 18, Figs. 1 and 2, through which passes a drive bar 19 common to the three feed bars. The opposite ends of the drive bar 19 are located in drive rods 20, 21 slidable lengthwise in the slotted bars 17 and arranged to take the thrust from drive arms 22, 23 which engage the drive bar 19 and are secured to a rocking shaft 24 pivotally mounted in the frames 6, 7. Rocking movement of the drive arms 21, 22 is effected through a bridge bar 25 which connects the drive arms and to which is connected a drive link 26 carrying a cam follower 27, Fig. 2, co-operating with a cam 28 rotatable with a continuously rotatable drive shaft 29. Springs 30 are anchored at one end to fixed anchors 31 and at the other end to plates, not shown, secured to the drive rods 20, 21 and these springs act to restore the feed bars and pusher elements to the starting positions thereof, illustrated in Fig. 6.

Referring to Figs. 6 to 9, on movement of the pusher elements 11 from the starting position thereof, as shown in Fig. 6 and to the left as viewed in that figure, the pusher elements are moved through the rear wall 2 of the magazine and the card-engaging faces of the pusher elements project above the card-engaging surface of the ramp only for a distance, for example 0.010 inch, sufficient to ensure initial engagement of the pusher elements with the rear edge of the bottom card of the pile resting on the ramp. The initial engagement of the pusher elements with the rear edge of a card resting on the bottom of a magazine is, however, ensured by the card-engaging face of the pusher elements being provided, considered in the direction of feeding movement of the pusher elements, with a rearward rake, as illustrated in the drawings. From Fig. 7, it will be seen that, as the pusher elements continue their forward movement, due to the progressive declination of the card-engaging surface of the ramp 4, the effective card-engaging faces of the pusher elements are progressively projected above the card-engaging surface of the ramp so that the card-engaging faces of the pusher elements effect engagement with the full thickness of the card edge and the upper portions of the pusher elements extend above the upper face of the card engaged thereby and ensure the positive movement of the bottom card through the throat 8. At the same time the upper edges of the pusher elements 11 co-operate with the ramp 4 to support the pile of cards so that the weight thereof is removed from the card being moved out of the magazine by the pusher elements. As the pusher elements 11 leave the magazine, as illus-

trated in Fig. 8, the pile of cards again becomes wholly supported by the bottom of the magazine which is formed by the inclined upper surface of the ramp 4. During the return movement of the pusher elements 11 to the starting positions thereof, as the pusher elements are returned beneath the magazine, they are engaged by the bottom card to the pile and rocked counter-clockwise, as viewed in Figs. 6 to 9, about their pivots 12 and against the action of the springs 16, so that they pass freely beneath the magazine and when the card-engaging faces of the pushers pass the rear wall 2 of the magazine the springs 16 again restore the pusher elements into engagement with the stops 15 so that they are in the operative feeding positions thereof.

The card-feeding apparatus herein described is suitable for feeding new cards, that is cards which have not previously been fed through a machine, or for feeding old cards, that is cards which have been previously used. In some instances, the cards may have burred or broken rear edges, that is the edges to be engaged by the card-engaging faces of the pusher elements 11 and, should this be so, the burred edges may tend to prevent the bottom card of a pile from being properly seated on the bottom of the magazine for initial engagement by the card-engaging faces of the pusher elements 11. The card-feeding elements are, however, as can be seen from Figs. 2 and 3, each of very narrow width, about 0.035 inch, so as to engage only a short length of the rear edge of a card to be fed and this arrangement of the card feeding elements permits the ramp 4 to be provided with recesses 33 in areas thereof which, as can be seen from Figs. 4 and 5, are disposed on opposite sides of the paths of the pusher elements through the magazine. By this arrangement the edge of the card to be engaged by the pusher elements 11 is supported only by relatively narrow ramp areas 34, see Fig. 5, and the weight of the pile of cards, particularly when increased as is sometimes the case by a top weight, is sufficient to maintain the portions of the card edge to be engaged by the pusher elements closely in engagement with the areas 34 of the ramp.

It will be understood that the apparatus described above can, if desired, be modified in that the bottom of the magazine may consist of a horizontal plate and the progressive increase of the card-engaging areas of the pusher elements obtained by stationary cams co-acting with the pusher elements to obtain the effects herein described during the removal of the bottom card from a pile contained in a magazine.

I claim:

1. Card feeding apparatus comprising a magazine having a bottom by which a pile of cards is supported and a throat through which the card resting on the bottom is fed, a pusher element reciprocable in a straight line path towards and from said throat and having a card-engaging face projecting through said bottom to engage the rear edge of the card resting thereon and to maintain engagement with said edge until it is moved through said throat, said bottom including a ramp having on opposite sides of the path of the pusher element card-engaging surfaces the level of which at the position of first engagement of a card by the pusher element is such as to permit said face to engage a portion only of the thickness of the card edge and which declines progressively from said position towards said throat to permit progressive projection of said face above said surfaces to effect engagement of the full thickness of the card edge during movement of the card by said face through said throat.

2. Card feeding apparatus comprising a magazine having a lengthwise slotted bottom by which a pile of

cards is supported and a throat through which the card resting on the bottom is fed, a reciprocable feed bar operable beneath said bottom, a pusher element pivoted on said feed bar for movement therewith, a spring acting on said pusher element to project it through the slot in said bottom during movement of the pusher element towards the throat while engaging the rear edge of a card resting on the bottom and to maintain projection of the pusher element through the slot until the element is moved through the throat, said bottom including a ramp having on opposite sides of the path of the pusher element card-engaging surfaces the level of which at the position of first engagement of a card by the pusher element is such as to permit said face to engage a portion only of the thickness of the card edge and which declines progressively from said position towards said throat to permit progressive projection of said face above said surfaces to effect engagement of the full thickness of the card edge during movement of the card by said face through said throat.

3. Card feeding apparatus comprising a magazine having a lengthwise slotted bottom by which a pile of cards is supported and a throat through which the card resting on the bottom is fed, a reciprocable feed bar operable beneath said bottom, a pusher element pivoted on said feed bar for movement therewith, a spring acting on said pusher element to project it through the slot in said bottom during movement of the pusher element towards the throat while engaging the rear edge of a card resting on the bottom and to maintain projection of the pusher element through the slot until the element is moved through the throat, said bottom including a ramp having on opposite sides of the path of the pusher element card-engaging surfaces the level of which at the position of first engagement of a card by the pusher element is such as to permit said face to engage a portion only of the thickness of the card edge and which declines progressively from said position towards said throat to permit progressive projection of said face above said surfaces to effect engagement of the full thickness of the card edge during movement of the card by said face through said throat, said sloping card-engaging surfaces of the ramp being of relatively narrow width in the areas thereof at which the card is initially engaged by the pusher element.

4. Card feeding apparatus comprising a magazine having a bottom including a card-engaging surface by which a pile of cards is supported and a throat through which the card resting against said card-engaging surface of the bottom is fed, a pusher element reciprocal in a straight line path towards and from said throat and having a card-engaging face projecting beyond said card-engaging surface of said bottom to engage the rear edge of the card resting against said card-engaging surface and to maintain engagement with said card edge until the card is moved through said throat, the level of said card-engaging surface at the position of first engagement of a card by the pusher element being such as to permit said face to engage a portion only of the thickness of the card edge, said surface declining progressively from said position towards said throat to permit progressive projection of said face beyond said surface to effect engagement of the full thickness of the card edge during movement of the card by said face through said throat.

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