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3,261,602

APPARATUS FOR INSERTING CARDS

Filed March 30, 1964

2 Sheets-Sheet 1

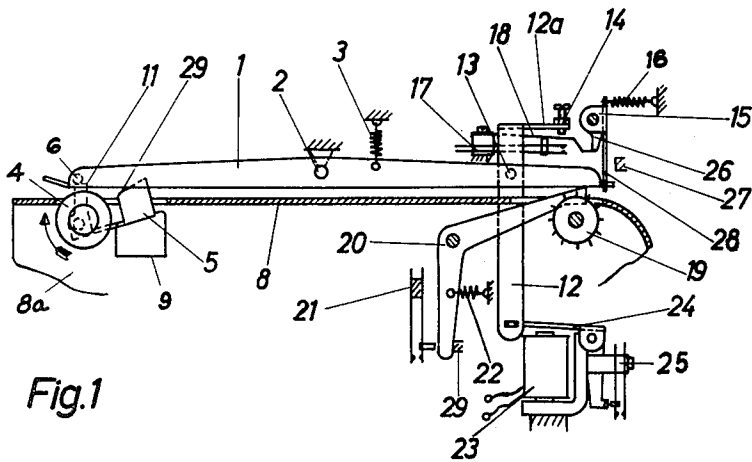


Fig. 1

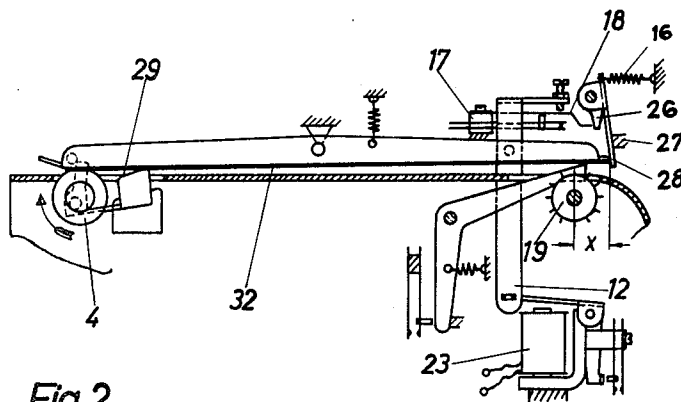


Fig. 2

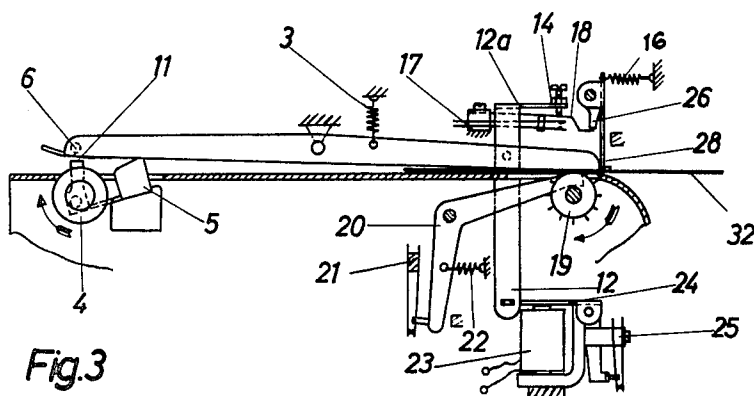


Fig. 3

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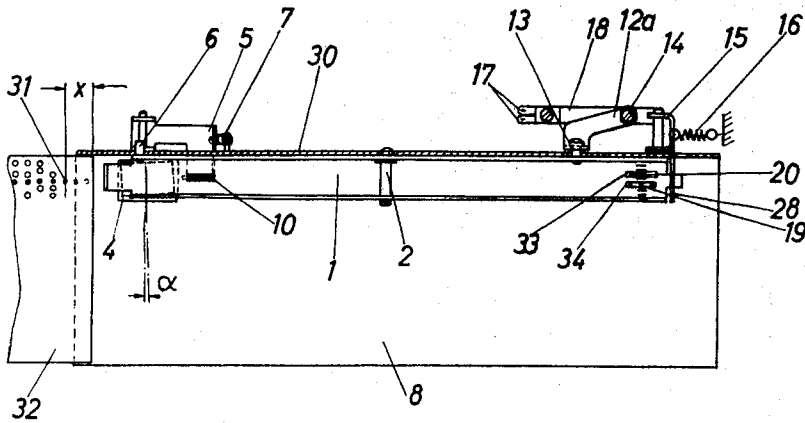


Fig. 4

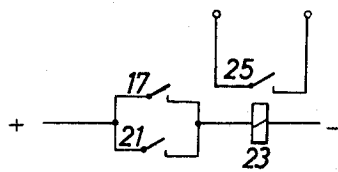


Fig. 5

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APPARATUS FOR INSERTING CARDS

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9 Claims. (Cl. 271—51)

This invention relates to apparatus for the automatic feeding or insertion of flat items such as cards, and, more particularly, to apparatus for inserting or feeding one flat item at a time.

Many arrangements are known for feeding flat items one at a time. Known arrangements are relatively expensive due to the use of mechanical and electromechanical devices such as electromagnetically actuated feed rollers and photoelectric devices for controlling the feed rollers. In one known arrangement, the rollers seize a card when it is inserted. The photocells sense the card and inhibit the entry of another card until the seized card has been fed to a further conveyance or a step-by-step feeding device in the case of punched cards. Other known arrangements depend on an operator to feed cards in singly and at a minimum rate.

All of these disadvantages are avoided by the arrangement according to the present invention which, at a minimum expenditure on mechanical and electrical means, provides for an extensively reliable operation. The invention is characterized by the fact that the distance between the center of the feed roller of the quick insertion and the center of the evaluating device is shorter than the length of one punched card, and that over both there extends a rocker which, from a neutral initial position is unblocked by the insertion of a punched card and presses the latter against the feed roller. The rocker retains this position until the previously transported card, by meeting against a stop limit, completes the circuit of a control magnet which, in turn, tilts the rocker into a position in which the punched card is brought into engagement with the step-wise advanceable feed device. The rocker is now held in this position until, by the end of the card, a sensing lever is released for interrupting the circuit of the said control magnet, thus permitting the rocker to return to its neutral initial position.

The above-mentioned and other features and objects of this invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 shows an arrangement according to my invention in the ready-to-operate normal position, which is particularly adapted to operate with slotted or edge-coded cards provided with feed holes;

FIG. 2 shows the arrangement of FIG. 1 at the moment in which the inserted punched card has assumed the proper position in relation to the sensing or scanning device;

FIG. 3 shows the arrangement according to FIG. 1 in the condition where the punched cards are evaluated;

FIG. 4 shows a plan view of the arrangement according to FIG. 1; and

FIG. 5 shows the circuit arrangement of the control magnet of my inventive arrangement.

In the following example the arrangement according to the invention is adapted to the processing of slotted or edge-coded cards which are provided with feed holes. The special construction which is required on account of this fact, however, does not prevent the arrangement, by maintaining its characteristic features, from being designed capable of processing also normal types of punched cards without feed holes or similar types of flat items.

As may be seen in FIG. 1, the arrangement according to the invention is provided with a feed roller 4 which is continuously rotated in the direction indicated by the arrow. The feed roller 4 may be provided with a rubber coating. Roller 4, according to its function as a high-speed or quick insertion device, has a relatively high circumferential speed. Between it and the beaded sprocket wheel 19, which is part of the not shown stepping device, there is a distance which is shorter than the length of the cards to be inserted. The two feed members 4 and 19 are so arranged in the conventional way opposite a guiding table 8, that they project from below it through recesses, and in accordance with their function, above the upper surface of the table. The position of the two elements 4 and 19 in relation to the fixed position of the table is unchangeable. According to FIG. 4 the rear longitudinal edge of guiding table 8 is in alignment with a vertical guide sheet 30 which, simultaneously, may form part of the housing of the equipment. For reasons of clarity this part has been omitted in FIGS. 1-3.

Rocker 1 is arranged over the two feed members 4 and 19. This rocker is pivoted on a firmly arranged bolt 2. The arrangement of the rocker 1 is that it, in the neutral initial position as shown in FIG. 1, is so positioned over the feed members 4 and 19, that between the circumference thereof and the bottom side of the rocker 1 there is a distance permitting the free insertion of a single punched card. Rocker 1 is acted upon by a spring 3 which urges the rocker into a counter position against feed roller 4. According to FIG. 1, this is prevented by a locking lever 5 which is designed in accordance with FIG. 4, and which, under the action of the spring 7, always tends to assume the position as shown in FIG. 1, in which the lever 5 with its face edge 11, comes to lie underneath the blocking bolt 6 of the rocker 1. Its other end, according to FIGS. 1 and 4, extends through the opening 9 of the supporting wall 8a extending rectangularly in relation to the supporting table 8, and projects upwards through the supporting table 8 to such an extent into slot 10 of rocker 1, that the inclined portion 29, in its lower half, constitutes an acute angle with the bottom side of the rocker.

Rocker 1 is connected to a switching rod 12 by means of pin 13. One end of switching rod 12 is in a form-locking connection with the armature 24 of a control magnet 23. Armature 24 controls contact 25 which is closed when the armature is in the attracted condition. At its upper end the switching rod 12 is provided with a rectangularly bent extension 12a which is provided with an adjusting or set screw 14. Below the set screw, stationarily supported, there is arranged a contact 17 which, via a switching spring 18, is capable of being actuated in such a way that the contact is only closed when the switching spring is not actuated. According to FIG. 1, the contact 17 is opened, because the switching spring 18 with its front beaded end, is held downwards by the acting portion 26 of limit-stop lever 15. Limit-stop lever 15 is pivotably mounted and is connected to spring 16 which establishes the normal position shown in FIG. 1. The actual limit stop 28 of lever 15 is set-off at the side according to FIG. 4. It projects through the guide sheet 30 into the plane of the rocker 1. Both the length and the width of the limit stop 28 are chosen so that it, throughout the width of the rocker 1, projects to such an extent downwards over the latter, that in the position of the rocker 1 shown in FIG. 2, there is provided a reliable limit stop for an inserted punched card, but that a release of the punched card is effected whenever the card has assumed the position as shown in FIG. 3. The swivel range of the lever 15 or its limit stop 28 respec-

tively, is determined by an adjustable limiting member 27.

Below the guide table 8 there is rotatably arranged a sensing lever 20 which, according to FIG. 1, is pulled with its lower arm against a limit stop 29 by the action of spring 22. To this lever arm there is assigned a contact 21 which is open in the aforementioned position of the sensing lever 20. The upper arm of the lever 20 projects slantingly through an opening of the guide table 8 in the upward direction. At its upper end lever 20 is designed in such a way that an inserted punched card is pushed by it over the beaded sprocket wheel 19. Within the range of action of the sensing lever 20 and of the beaded sprocket wheel 19, the rocker 1 according to FIG. 4 is provided with slot-like recesses 33 and 34.

The operation of my apparatus will now be described. Starting out from the normal position of the arrangement as shown in FIG. 1, and upon switching-on, the feed roller 4 is caused to rotate in the direction as indicated by the arrow. Upon insertion of the first card, the latter meets against the inclined portion 29 of the lever 5 and presses it away in the downward direction. On account of this the supporting surface 11 is withdrawn from the blocking bolt 6, and the rocker 1, by the action of the spring 3, is caused to swing down so that the punched card is pressed against the rotating feed roller 4 causing the card to be pulled into the arrangement. This pull-in process is performed relatively quickly on account of the circumferential speed of the roller. According to FIG. 4 the driving shaft of the feed roller 4 is slantingly arranged with respect to the vertical line by the amount of the angle α . On account of this, a card is always caused to meet against the guide sheet 30, irrespectively of whether the card is inserted straight or slantingly. Moreover, this arrangement does not require any special guiding devices.

After the pulling-in of the card 32, the latter moves over the sensing lever 20 permitting the card to slide over the beaded sprocket wheel 19 so that it reaches the position shown in FIG. 2 in which the card 32, by the action of the drive 4, swivels limit stop 28 in opposition to the action of the spring 16, until meeting against the limit stop (limiting device) 27. This, in turn, causes the switching spring 18 to be released from the actuating portion 26, so that contact 17 closes. According to FIG. 5, this contact is arranged in series with the control magnet 23 and a voltage potential is maintained across the series connection so that the magnet will attract and, via the switching rod 12, pull rocker 1 into the other operating position, in which the punched card 32 is released from the drive by the feed roller 4, for being engaged to the beaded sprocket wheel 19 of the evaluating station ahead.

Since the punched cards intended for being fed by the action of beaded sprocket wheels, are ones which are provided from the beginning with feed holes 31 (FIG. 4), it is necessary that the beaded sprocket wheel, when engaging the card, exactly seizes the feed holes. Moreover, practice has shown that there exists the danger of a tearing-out of the perforation whenever the pins of the sprocket wheel seize the first feed hole because the strap is very narrow (FIG. 4). For this reason it is desired that the card is always brought into engagement with the sprocket wheel via its second or third feed hole. This requirement has been considered in the construction as shown in FIGS. 1 to 4 in such a way that the punched card 32 according to FIG. 2 passes over the center of the sprocket wheel by the amount x . This amount x , according to FIG. 4, equals the distance of the third feed hole 31 from the front edge of the card. The respective adjustment is effected via the correspondingly adjustable limiting device 27.

The sprocket wheel 19 which is at a standstill at this particular time position, is so adjusted that one of its feed pins will point vertically upwards so that the latter

(FIG. 3), upon attraction of control magnet 23 will engage the feed hole of the punched card 32 which is pressed down by rocker 1. Also, the sensing lever 20 is turned in opposition to the action of its spring 22, thus closing the contact 21 assigned thereto. At the same time there is effected a reopening of the contact 17 because the set screw 14 in the projecting portion 12 α of the switching rod 12 causes a pressing-down of the switching spring 18 by the attracting motion of the magnet armature 24 which thus also actuates its contact 25. The set screw 14 is adjusted in such a way that the contact 17 is only open after the contact 21 has closed. According to FIG. 5 it is safeguarded in this way that the control magnet 23 is continuously energized. By the action of the contact 25 the (not shown) stepping mechanism of the sprocket wheel 19 is switched on and the likewise not shown evaluating device is released, with the latter effecting the sensing of the perforation of the punched card 32 which is advanced in a step-by-step manner by the sprocket wheel 19.

By the pressing-down of the punched card 32 the limit stop 28 is released again, and will return to its normal position due to the action of its spring 16. Since the switching spring 18 is still held down at this particular time position by the set screw 14, the projecting portion 26 can freely proceed to the blocking position.

Due to the step-wise evaluation of the punched card 32, the latter slowly travels through the evaluating station, so that the blocking lever 5 is the first one to be released, moving with its portion 11 into the path of the blocking bolt 6. However, if a new card is inserted immediately, then this presetting with respect to the normal position is cancelled again. By the action of the spring 7 acting upon the blocking lever 5, the newly inserted card is pressed against the bottom of the rocker 1, thus preventing the card from contacting the continuously rotating feed roller 4.

As soon as the punched card 32, after having been completely evaluated finally reaches a position in which the sensing lever 20 is released, the contact 21 is opened on account of the fact that the lever 20 is moved by spring 22 back to its normal position, so that in accordance with FIG. 5 the magnet 23 is deenergized, and the armature 24 drops off. A further stepping-on is prevented due to the release of contact 25.

Upon release of the armature 24 the rocker 1, by the action of the spring 3, either jumps back into its neutral initial position, in which the blocking bolt 6 comes to rest on the face side 11 of the lever, or else the rocker is tilted at once into the operating position shown in FIG. 2, if another punched card has been inserted prior thereto.

As already mentioned hereinbefore, the above described arrangement may also be designed for the use with punched cards without feed holes. In this case the sprocket-wheel feed merely has to be replaced by a friction-roller feed. This also may require that the slot-like opening 34 in the rocker 1 is replaced by a press-on roller corresponding to the friction roller.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claims.

I claim:

1. Apparatus for the automatic insertion of flat items having a uniform length comprising: means for drawing said flat items into said apparatus; means for feeding said flat items out of said apparatus positioned a predetermined distance away from said drawing means, said predetermined distance being shorter than the length of said flat items; a tiltable rocker positioned above said drawing means and said feeding means, said rocker being pivotably mounted for movement toward either said drawing

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or said feeding means for cooperation therewith, and means causing said rocker to tilt towards said drawing means when a flat item is inserted into said apparatus and towards said feeding means when the drawing means has pulled said flat item into said apparatus whereby said flat item is drawn into and fed out of said apparatus.

2. Apparatus according to claim 1 further comprising means for preventing a flat item from being drawn into said apparatus by said drawing means when another flat item is in said apparatus.

3. Apparatus according to claim 1 wherein said drawing means comprises a friction roller.

4. Apparatus for the automatic insertion of cards comprising: a tiltable beam, means for cooperating with said beam to pull cards into said apparatus, means for cooperating with said beam to feed cards out of said apparatus, a first card sensing means adjacent said pull-in means responsive to the presence of a card to tilt said beam into cooperative pull-in relationship with said card pull-in means, and a second card sensing means responsive to the presence of a pulled-in card for tilting said beam into cooperative card feed-out relationship with said feed-out means.

5. Apparatus according to claim 4 wherein said cards are perforated with feed holes and have a uniform length, said feed-out means comprises a sprocketed feed roller, and said second sensing means further comprises means for initially causing a desired one of said feed holes in each said card to be brought into operative relationship with said feed roller.

6. Apparatus according to claim 4 further comprising means for preventing a card from being pulled into said apparatus by said pull-in means while another card is in said apparatus.

7. Apparatus according to claim 4 further comprising a plane surface on which cards are fed into and through said apparatus, guide means for guiding said cards along a predetermined path on said plane surface through said apparatus and wherein said pull-in means comprises a roller and means for mounting said roller so that the circumference of the roller extends above said surface and cards pulled-in by said roller are forced to cooperate with said guide means and follow said predetermined path

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due to the angle between the axis of said roller and said predetermined path.

8. Apparatus for the automatic insertion of cards having a uniform length comprising: a first roller for pulling cards into the apparatus, a second roller for feeding pulled-in cards out of the apparatus positioned a predetermined distance away from said first roller, said predetermined distance being shorter than the length of said cards, a rocker positioned above and extending over both said first and second rollers, and means causing said rocker to tilt toward and cooperate with said first roller when a card is fed into said apparatus and to tilt toward and cooperate with said second roller when the card is pulled-in by said first roller whereby said card is fed out of said apparatus.

9. Apparatus for the automatic insertion of cards having a uniform length comprising: a tiltable beam disposed above the path of said cards, means for pulling cards into said apparatus disposed below said beam in the path of said cards, means for feeding cards out of said apparatus positioned a predetermined distance away from said pulling-in means below said beam and along the path of said cards, said predetermined distance being shorter than the length of a card, and means for tilting said beam to alternately cooperate with said pulling-in means and said feeding-out means when a card is in operative relationship with said pulling-in means whereby the card is pulled into and fed out of said apparatus.

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