

Nov. 3, 1936.

R. E. PAGE

2,059,805

VERIFIER

Filed April 30, 1935

3 Sheets-Sheet 1

FIG. 1

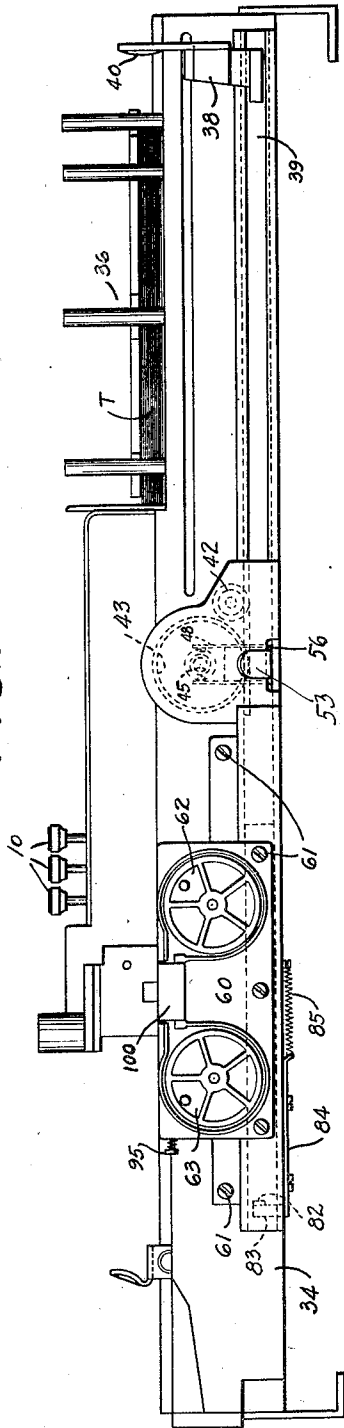
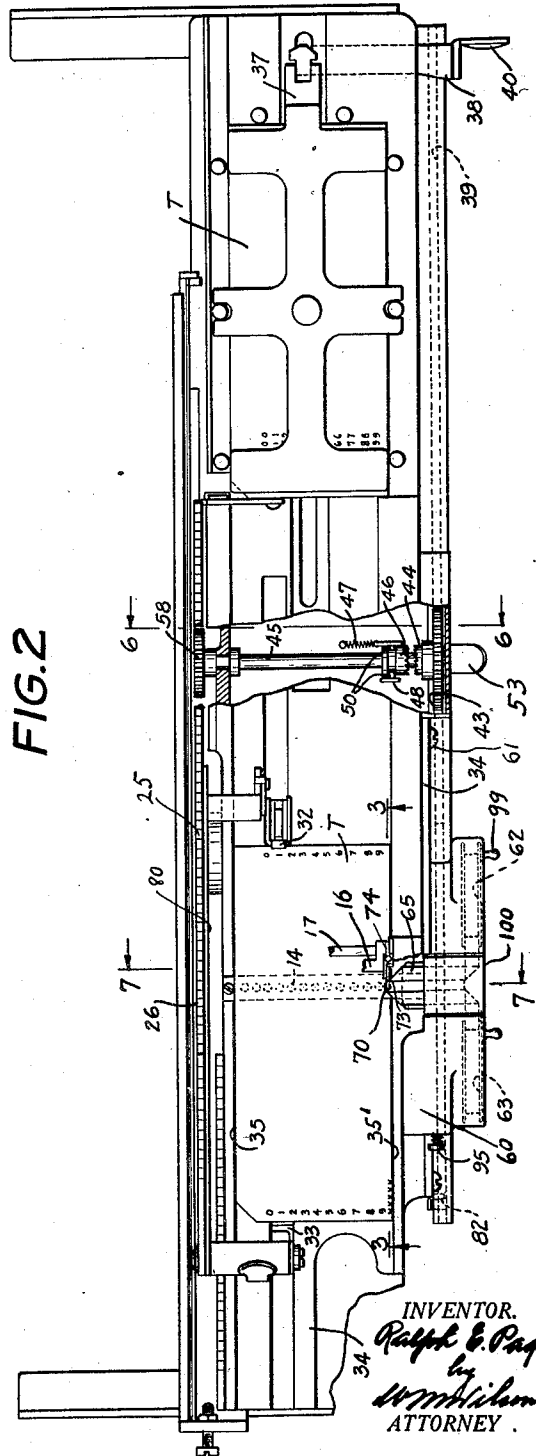


FIG. 2



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FIG. 3

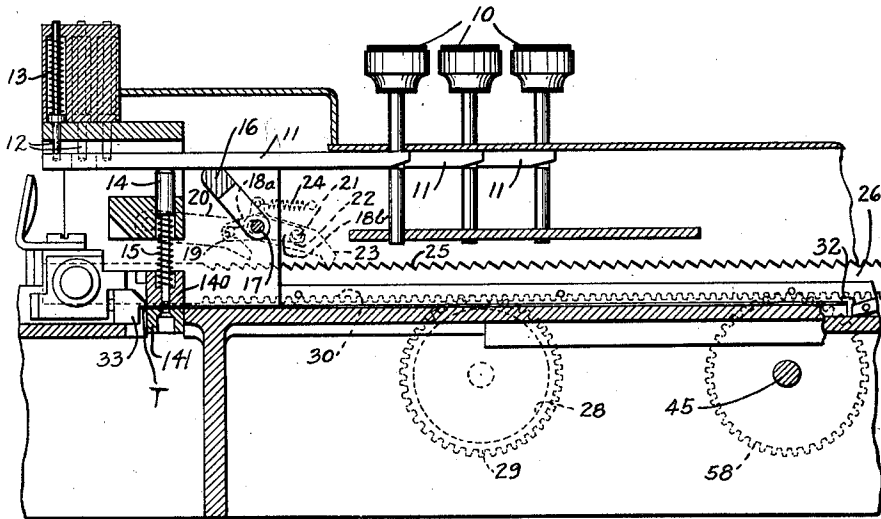


FIG. 5

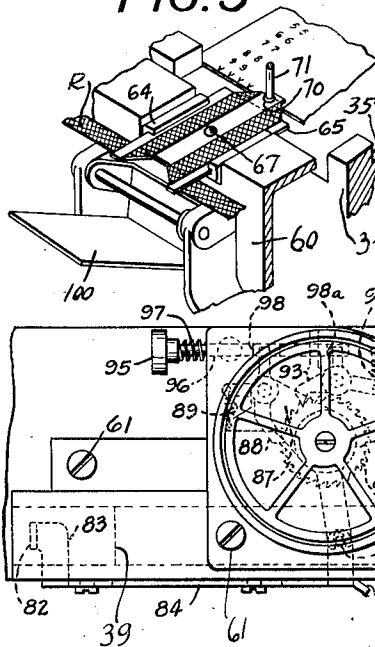
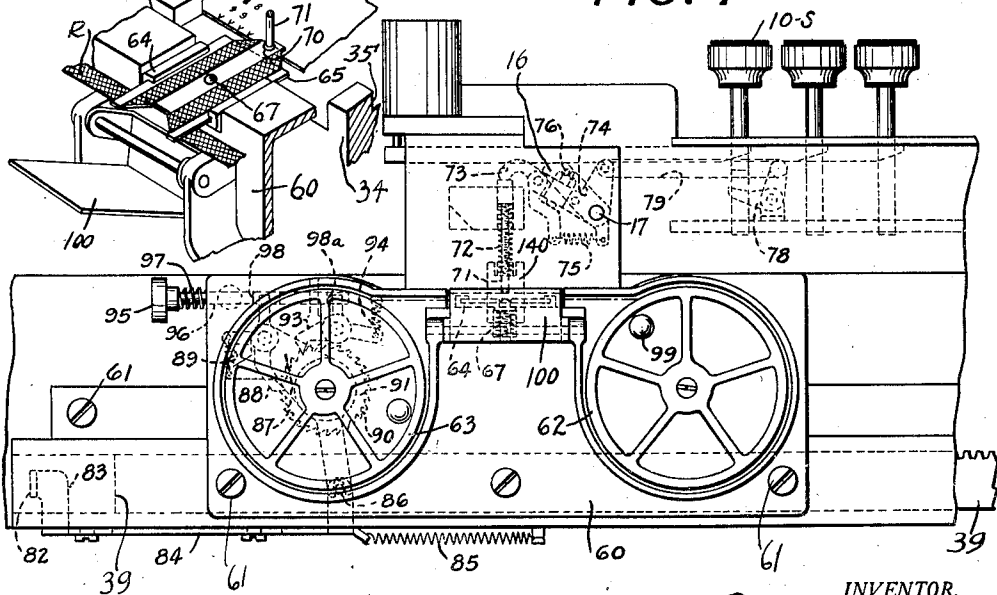


FIG. 4



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FIG. 6

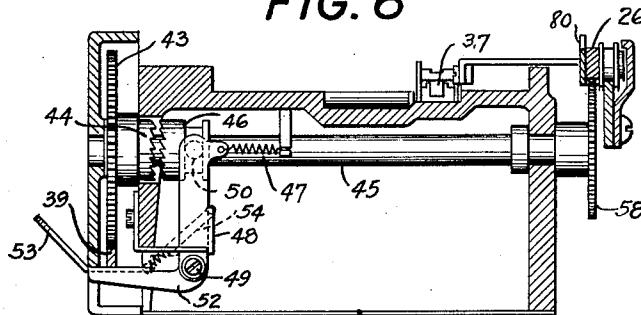


FIG. 7

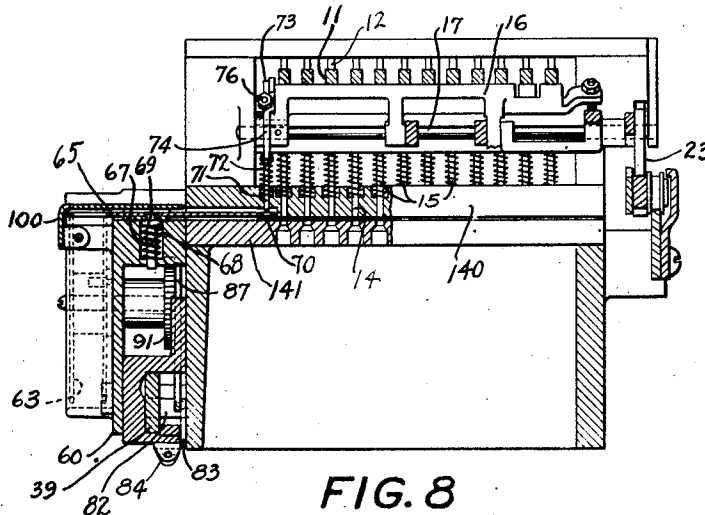
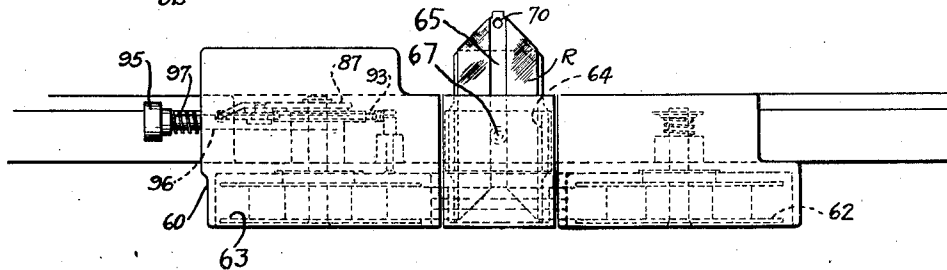


FIG. 8



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2,059,805

VERIFIER

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Application April 30, 1935, Serial No. 19,041

11 Claims. (Cl. 101—93)

This case relates to a machine for determining whether the columns of a tabulating card have been correctly punched.

Tabulating cards bear data in the form of perforations arranged in parallel card columns, each column having a line of differential index point positions. The perforations represent different items according to a selected code. In the instant case, the Hollerith, single hole, code is used. In this code, items 0 to 9 are each represented by a single perforation in the corresponding index point position 0 to 9 of a card column.

The cards are perforated in a punching machine by the depression of keys which correspond to the items read off by the operator from a printed sheet.

In order to verify the accuracy with which the card has been punched, a stack of punched cards is placed in a verifying machine, the operator of which also reads the items preferably from the same record source, i. e., the printed sheet and depresses the corresponding keys. If a card column is correctly punched, the next card column feeds to the verifying station; if incorrectly punched, the card feed is interrupted and the operator must remove the card.

It is often necessary to verify only certain card columns at one particular time and other card columns at a subsequent time. The verifying machine can be arranged to skip the columns not to be verified. When the card is verified as to certain columns, it is desirable to indicate first that the verifying operation has taken place and second which of the verified columns are correctly perforated.

The operator of the verifying machine is then given credit for verifying the card as to the desired columns. Upon a subsequent verifying operation of other columns, it is also desired to indicate the fact that the subsequent verifying operation has occurred and which of these verified columns are correct.

The object of the present invention is therefore, broadly, to mark each verified column which is correct with a distinguishing imprint. By so doing, the fact that a verifying operation has taken place is indicated along with an indication of the correctly punched columns and a corollary indication, by the absence of an imprint, of the first of the incorrectly punched columns of the group of columns verified.

More specifically, the object is to provide the marking means in the form of a simple printing attachment which can be applied to an existing machine.

Further, the object is to provide such a printing attachment with means for effecting an imprint under control of the card feeding means.

Still further, the object is to provide an inking ribbon within the printing attachment, which is advanced under control of the card feeding means.

Other objects will appear from the further parts of the specification and from the drawings.

In the drawings:

Fig. 1 is a front view of the machine.

Fig. 2 is a plan view of the machine.

Fig. 3 is a section along line 3—3 of Fig. 2.

Fig. 4 is an enlarged detail view of the portion of Fig. 1 showing the marking attachment.

Fig. 5 is a detail view in perspective of a portion of the marking attachment with the ribbon guide cover in retracted position.

Fig. 6 is a detail section along lines 6—6 of Fig. 2.

Fig. 7 is a detail section along lines 7—7 of Fig. 2, and

Fig. 8 is a detail plan view of the lower portion of the marking attachment.

The verifying mechanism is of the type disclosed in Patent No. 1,426,223 and comprises a set of character keys 10, each connected to the rear end of one of the interposer bars 11. The bars 11 are loosely fulcrumed at their forward ends on pins 12 pressed downwardly by springs 13. Intermediate its ends, each bar 11 rests on top of one of the row of verifying pins 14 slidably guided at their lower ends by a frame block 140. A column of card T is fed to verifying position between block 140 and a die block 141 having holes in line with pins 14. If the column in verifying position is correctly punched, its perforation will be directly underneath the pin 14 associated with the key 10 corresponding to the correct item. Now depression of the selected key 10 will depress its associated bar 11 to move its plunger 14 against resistance of spring 15 through the card perforation in line with the plunger and through the aligned hole in die block 141. During this operation, the interposer bar 11 will fulcrum about its connection to the associated pin 12 and while depressing the plunger 14 through the correct perforation will simultaneously rock a bail 16 rotatably carried by a shaft 17 counterclockwise (Fig. 3) against the action of a biasing spring (not shown).

One end of the bail 16 is operatively connected in the manner indicated in detail in aforesaid patent to an arm 18a pivoted about shaft 17

and to a second member 18b also journaled on shaft 17. Arm 18a has a pin and slot connection with a pivoted escapement pawl 20 and the other arm 18b has a pin 21 loosely seated in a hole 22 in a second escapement pawl 23 which is freely and loosely mounted on shaft 17. A spring 24 connected to pawl 23 tends to swing it clockwise (Fig. 3) to hold it engaged with a ratchet tooth 25 of escapement rack 26 which forms part of the card feeding carriage.

When ball 16 is depressed, it rocks members 18a and 18b counterclockwise (Fig. 3), causing member 18a to move pawl 20 into engagement with a tooth 25 of bar 26, thereby holding the bar stationary, and causing member 18b to release pawl 23 from the tooth 25 previously engaged by it.

When the pawl 23 is released, spring 24 moves it to the right, disposing its nose end above the next tooth 25. Now when key 10 is released, ball 16 rises, member 18a rocks clockwise (Fig. 3) to release holding pawl 20 from rack 26 while member 18b and pawl 23 rock downwardly under influence of spring 24. Pawl 23 thereby engages the rack bar to arrest its movement after it has moved the distance of a tooth, to the left. At the end of this feed, the parts are again in the relative positions shown in Fig. 3.

The power for feeding bar 26 to the left is supplied by a drum spring motor 28 acting through a gear 29 meshed with the lower rack teeth 30 of bar 26.

The single step feed of bar 26, just described, is sufficient to advance the card carriage the width of a card column. The card carriage comprises, in addition to escapement bar 26, a rear abutment 32 and a front abutment 33 both carried by bar 26. The card T resting on main frame 34 is held between these abutments 32 and 33 and between the side walls 35 and 35' of the frame (see Fig. 2). The card is thus accurately located and guided for feeding movement. When bar 26 advances one step, abutments 32 and 33 move along with the bar and feed the card the width of one column. In this manner, the verifying of a correct hole in a card column causes the next card column to move to verifying station beneath pins 14.

Should a column be incorrectly perforated, then upon depression of the key 10 corresponding to the correct item, the associated verifying pin 14 cannot move down because it is engaged with an uncut portion of the card column. The interposer bar 11 will thereupon pivot about the head of pin 14 and raise the pin 12 against the pressure of spring 13. As bar 11 pivots about the pin 14, its depression is insufficient to rock ball 16 to the extent necessary to cause release of pawl 23 from teeth 25 of escapement bar 26. Accordingly, the bar 26 will not advance and the card will remain stationary. The operator may then remove the card by hand or operate the usual release key to move the card to ejecting position.

While the cards T may be manually, individually, inserted in the card carriage to be fed to the verifying station, it is preferred to use semi-automatic means of the type disclosed in Patent No. 1,772,186.

Referring to Figs. 1 and 2, the cards T are stacked in magazine 36 and fed one at a time from the bottom of the stack by a picker 37. This picker is connected by a bracket 38 to a rack bar 39 slidably guided for horizontal movement along the operator's side of the machine.

Bracket 38 is provided with a handle or finger piece 40 which the operator uses to move the

rack to the left (Figs. 1 and 2). When this happens, picker 37 engages the bottom card T of the stack in magazine 36 and feeds it out of the magazine to a position in front of abutment 32 and against abutment 33. Further, as the rack moves to the left, it turns a spring motor 42 (Fig. 1) to energize it and also rotates a gear 43 (Figs. 1, 2, and 6) provided with a ratchet clutch member 44, both rotatably carried by a cross shaft 45. Opposite clutch member 44 is a companion clutch member 46 slidably keyed to shaft 45.

Referring to Figs. 2 and 6, clutch member 46 is normally held apart from clutch member 44 by a spring 47 connected to yoke 48 pivoted on pin 49. The upper end of yoke 48 is connected by pins 50 to clutch member 46. Also pivoted on pin 49 is a member 52 having a handle 53 and connected by a spring 54 to yoke 48.

Spring 54 is stiffer than spring 47 so that the latter normally moves yoke 48 and plate member 52 clockwise (Fig. 6) as a substantially rigid unit. When at its right hand limit (Figs. 1 and 2), rack 39 has a groove 56 (Fig. 1) formed in its lower edge and receiving plate member 52. Spring 47 is therefore effective initially to rock members 52 and 48 clockwise (Fig. 6) to uncouple clutch member 46 from clutch member 44.

However, when the operator actuates rack 39 to the left, groove 56 leaves member 52 and the lower edge of rack 39 depresses plate member 52 to rock the latter and yoke 48 counterclockwise (Fig. 6), thereby engaging clutch member 46 with clutch member 44. Thus as rack 39 makes its stroke to the left, which may be considered as its card feed stroke, clutch members 44 and 46 are engaged to cause rotation of shaft 45. When rack 39 completes its card feed stroke, the operator releases handle 40 and spring motor 42 automatically returns the rack to the right. The ratchet teeth of clutch members 44 and 46 are so shaped that they will grip only when rack 39 makes its stroke to the left and will slip when the rack makes its stroke to the right. Thus, shaft 45 is rotated only in one direction, clockwise, (as viewed in Figs. 1 and 3) upon reciprocation of rack 39.

Shaft 45 rigidly carries a gear 58 meshed with lower rack teeth 30 of the escapement bar 26. When picker 37 moves to the left to feed a card out of magazine 36, rack 39, by the means described above, causes rotation of shaft 45 in a clockwise direction (Fig. 3) to actuate escapement bar 26 to the right. At the end of these opposite movements of picker 37 and rack bar 26, the card will have been moved by the picker into position between abutments 32 and 33 of the card carriage. The latter is retained in its right hand position by pawl 23 and in this position, the first card column at the left of the card will lie beneath the column of the verifying pins 14.

During rotation of shaft 45 clockwise (Fig. 3) spring motor 28 is energized to furnish power for the column-by-column feed of the card to the left controlled by the verifying operation.

As explained in the objects of the invention, it is desired to mark each verified column in a distinctive manner. For this purpose, the machine is provided with an attachment including a frame block 60 secured by screws 61 to the machine frame 34. Block 60 carries two horizontally spaced apart ribbon spools 62 and 63. Between the spools, block 60 is recessed (Fig. 5) to receive a guide frame 64 which is rigidly fastened to the block 60 and flanged at the sides

to form guideways to receive and slidably mount a ribbon guide 65. The ribbon guide is shaped to guide the ribbon R at right angles to the direction in which it comes from the ribbon spools and to locate the intermediate portion of the ribbon underneath the tapered, narrowed, forward end of the guide. The ribbon guide extends forwardly between die blocks 140 and 141 to a position above the lower end of the card column which is at the verifying station, as indicated in Figs. 2 and 7. Thus, the ribbon strip at the forward end of guide 65 is above the lower end of said card column. A plunger 67 vertically slidably mounted in frame 60 projects at its upper end through aligned holes in frame 64 and ribbon guide 65 (see Figs. 4 and 7) to normally maintain the latter element against slidable movement and in fixed relationship to frame 60 and die blocks 140 and 141. Surrounding plunger 67 is a spring 68 for normally holding the plunger in raised position and in operative connection with ribbon guide 65.

The forward end of guide 65 has a hole 70 in line with the verifying pins 14 and above the portion of ribbon R located over the lower end of the card column in verifying position. Vertically above hole 70 is a type plunger 71 vertically slidably mounted in die block 140. The plunger 71 has a type lug at its lower end for printing a distinctive mark, a V-shaped mark being shown as an illustration. Type plunger 71 is in columnar alinement with verifying pins 14 and at the left of the column of said pins (as viewed in Fig. 7), thus being in position to print on the card column in verifying position and on a part of said column below the "9" index point position. Type plunger 71 is normally held in upper position by a spring 72, with the top of the plunger engaged by one end of a lever 73. Lever 73 is pivotally carried by a bell crank lever 74 and connected by a spring 75 to the bell crank lever. Lever 74 is rotatably carried by the end of shaft 17 opposite the escapement end and is rigidly pinned to one side of bail 16 to move rigidly with the bail.

As explained before, if a perforation in a card column is correct, then depression of the corresponding key sufficiently depresses interposer 11 to rock bail 16 counterclockwise (Figs. 3 and 4) for causing a feed of the card. At the same time, as bail 16 rocks counterclockwise, rigidly connected lever 74 acting through the lever 73 carried thereby depresses type pin 71, spring 72 being weaker than spring 75. The pressure of lever 73 on pin 71 may be varied by adjustment of a screw 76 carried by lever 74. When upon depression of type pin 71, it meets the surface of die block 141, spring 75 yields and permits levers 73 and 74 to rock further while plunger 71 remains stationary.

As type plunger 71 is depressed, it passes through hole 70 in ribbon guide 65 and presses ribbon R against the card to print a V-shaped mark at the bottom of the card column which is in verifying position.

When the key 10 is released, interposer 11 rises and bail 16 rocks clockwise, permitting spring 72 to raise type pin 71. The next card column is then moved, by the means previously described, to verifying position. Should this card column be incorrectly perforated, then interposer 11 will not be sufficiently depressed and bail 16 will not rock to the extent necessary to cause either a card feed or a printing operation by plunger 71.

If a card column is not intended to contain a

perforation, the operator depresses a space key 10-S to rock bell crank 78 counterclockwise (Fig. 4) the bell crank 78 through link 79 rocks lever 74 and therefore bail 16 counterclockwise to cause a verification printing and feeding operation.

Escapement bar 26 also carries the usual skip bar 80 which in connection with associated skip mechanism causes the card columns not to be operated on to be fed past the verifying position. By means of the skip mechanism, certain card columns may be selected for verifying operation and others omitted. For a full understanding of the skip mechanism, recourse may be had to aforementioned Patent No. 1,426,223.

When the verifying operations on a card T have been completed, the card is removed and the operator actuates handle 40 to move rack 39 to the left and cause the next card to be fed from magazine 36 to the card carriage, in the manner explained previously.

As rack 39 moves to the left, its left end engages a transverse lug 82 on the end of a finger 83 extending from a slide bar 84 and moves the slide bar to the left against resistance of a spring 85. Slide 84 has a pin and slot connection 86 to a lever 87 freely pivoted on the shaft of ribbon spool 63 and carrying pawl 88. This pawl is held by a spring 89 against ratchet teeth 90 of ratchet disk 91 rigidly carried by the shaft of spool 63. When the slide 84 moves to the left, it rocks lever 87 clockwise (Fig. 4) and pawl 88 rides over a tooth of ratchet disk 91. As rack 39 returns to the right and releases slide 84, spring 85 moves the slide to the right, rocking lever 87 counterclockwise causing pawl 88 to engage a ratchet tooth 90 to feed disk 91 and the ribbon spool 63 counterclockwise. The ribbon R is thus fed a slight amount from ribbon spool 62 to ribbon spool 63, each time a new card is moved into the card carriage.

A retaining pawl 93 is held by a spring 94 against ratchet teeth 90 to prevent reverse movement of spool 63 when pawl 88 moves clockwise.

When the ribbon is entirely unwound from spool 62 and completely wound on spool 63, the operator presses a button 95 of a rod 96 against resistance of a spring 97 and through engagement of surfaces 98 and 98a of the rod with the tails of pawls 88 and 93 releases the latter pawls from ratchet disk 91. The operator then rotates handle 99 on spool 62 to rewind the ribbon on the latter spool. When the ribbon is completely rewound, button 95 is released and pawls 88 and 93 return to engagement with ratchet teeth 90.

A cover 100 for the ribbon guide 65 and its carrier 64 is hinged to frame 60. To remove the ribbon guide 65, the cover is retracted to the position shown in Fig. 5 and the ribbon guide tilted and moved to the rear, camming the rounded head of plunger 67 downwardly to release the latter. Ribbon R may be threaded into guide 65 conveniently when the latter is removed in the manner explained. The ribbon guide may then be slid into its guide frame 64 and replaced in operative position with the top of plunger 67 projecting into the hole in the ribbon guide.

The operation of the machine is believed clear from the above explanation. It is to be understood that variations, modifications, and changes may be made within the field of the present invention without departing from the principles thereof. I, therefore, wish to be limited only by the scope of the following claims.

What is claimed is as follows:

1. In a machine dealing with record cards having columns of data designations; the combination of means for verifying the designations of the several columns of a card in succession, one column after another, and including escapement mechanism for feeding the card column by column as an incident to the verifying operation, a marking device, and means operated by the escapement mechanism for causing the marking device to distinctively mark the verified card, said escapement mechanism including a bail reciprocated upon each verifying operation, and connections between the bail and marking device to cause reciprocation of the latter upon reciprocation of the bail, the marking device upon its reciprocation distinctively marking the verified card.

2. In a machine dealing with record cards having columns of index point positions; the combination of a column of elements for operating on the card and corresponding to the index point positions of a card column, means for locating the card with a column thereof in confronting relation to the column of elements with the index point positions opposite their respective corresponding elements, instrumentalities for causing selective operation of the elements to selectively operate upon the confronting column of index point positions, card feeding means including a device reciprocated by operation of said instrumentalities to cause feeding of the card following an operation of said elements, a marking member in alignment with the column of elements, and means operated by said device upon its reciprocation for reciprocating said member to distinctively mark the card as an incident to operation of the elements.

3. In a machine dealing with cards bearing columns of data designations; the combination of mechanism for operating on successive cards, a supply magazine for the cards, a picker for feeding the cards one by one out of the magazine and into cooperative relation to the operating mechanism, a printing device for distinctively marking each card under control of said operating mechanism and including an inking ribbon, ribbon-feeding means, and connections between the card picker and the ribbon feeding means for causing operation of the ribbon feeding means as an incident to each card feed.

4. In a machine dealing with cards bearing data designations; the combination of means for operating on the cards one after another, a card supply magazine, a picker for feeding one card at a time out of the magazine and into cooperation with the operating means, a printing device controlled by said operating means to print on each card operated upon and including an inking ribbon, ribbon-feeding means, a reciprocatable member connected to the picker for operating the latter to feed the card, and means operated by the member upon its reciprocation for causing operation of the ribbon-feeding means.

5. In a machine dealing with record cards bearing columns of data designations; the combination of means for operating on the cards, a main frame carrying the operating means and including a generally horizontal surface for supporting a card in position to be operated on by said means, a marking device for marking each card operated upon and including a type element located above said surface in position to print on the card, an auxiliary frame attached to one side of the main frame adjacent said operating means, ink rib-

bon spools carried by the auxiliary frame, a ribbon shield carried by the auxiliary frame between the spools and arranged to bend the ribbon in the form of a loop and locate the forward, closed end of the loop above said horizontal surface, above a portion of the card lying on said surface, and beneath said type element, and means controlled by said operating means for causing the type element to coact with said ribbon to print on the card.

6. In a machine dealing with record cards having columns of index point positions for bearing item designations; the combination of means for verifying the item designations and including a column of index point position sensing elements and keys for selectively cooperating with said elements to verify the designations, a card marking device, and means mechanically, operatively, connected to and actuated by movement of a key to operate said device for marking the card as an incident to the verifying operation.

7. In a machine dealing with record cards having columns of index point positions for bearing item designating perforations; the combination of means for verifying the item perforations and including a column of index point position verifying pins, keys for causing selected pins to move through correct perforations, a marking device, and means cooperating with the keys and pins and effective when the selected pin moves through a perforation for operating the marking device to mark the card.

8. In a machine dealing with record cards having several distinct fields of data designations; the combination of means to separately verify the several fields for accuracy of designations, a card marking instrumentality arranged and constructed to individually mark each field, a device controlled by the verifying means for operation each time the verifying means finds an accurately designated field, and means rendered effective by said device, in accordance with the number of operations of said device significant of accurately designated fields, for operating the marking instrumentality the same number of times to individually mark each of the accurately designated fields.

9. In a machine dealing with record cards having several distinct fields of data designations; the combination of means to separately and successively verify the several fields for accuracy of designations, a card marking instrumentality arranged and constructed to individually mark each field, a device controlled by the verifying means for operation concomitantly with the verifying means finding a field to be correctly designated, and means rendered effective by successive operations of said device for operating the marking instrumentality to successively mark the accurately designated fields.

10. In a machine dealing with record cards having several distinct fields of data designations; the combination of means to separately and successively verify the fields for accuracy of designations, means to locate the fields successively at a verifying station to be verified by the verifying means, a marking instrumentality arranged and constructed for marking one field at a time, a device operated by the verifying means upon each of successive determinations of accurately designated fields, and means controlled by operations of said device for successively operating the marking instrumentality to successively mark the accurately designated fields.

11. In a machine dealing with record cards hav-

ing parallel columns of data designations; the combination of means to successively verify the columns for accuracy of designations, means to locate the columns successively at a verifying station for verification by said verifying means, a marking instrumentality arranged at the verifying station and constructed for individually marking the column located at said station, a device given a certain operation by the verifying means

upon the latter finding the column at the verifying station to be accurately designated, and means rendered effective by said device each time the latter is given said certain operation for operating the marking instrumentality to mark the accurately designated columns individually and successively located at the verifying station. 5

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