April 6, 1948. N. S. WELK 2,439,029

COMBINED CARD PUNCHING AND SLOTTING MACHINE

Filed May 14, 1945 4 Sheets-Sheet 1

FIG. 1

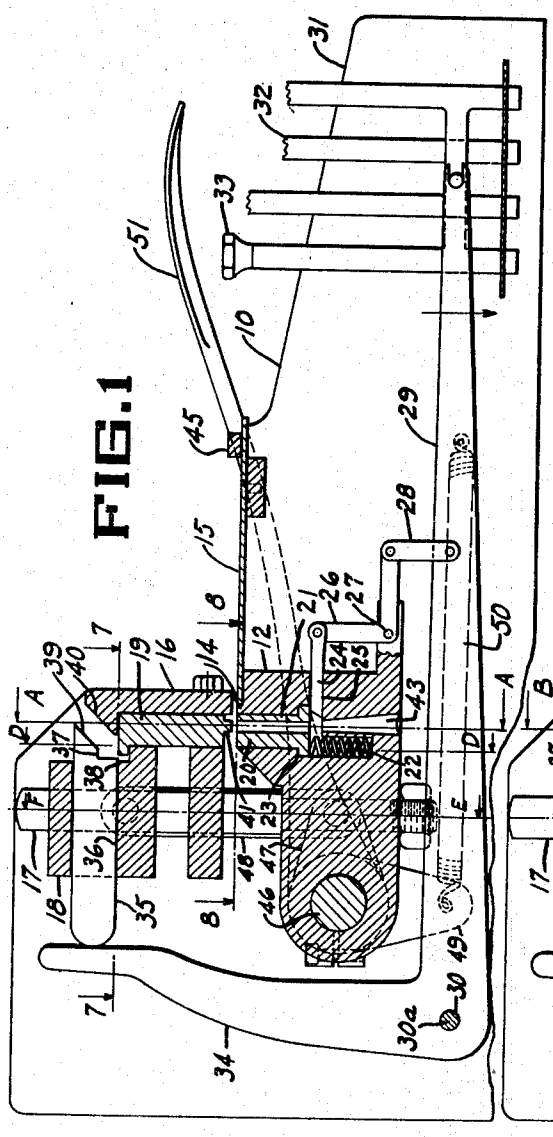
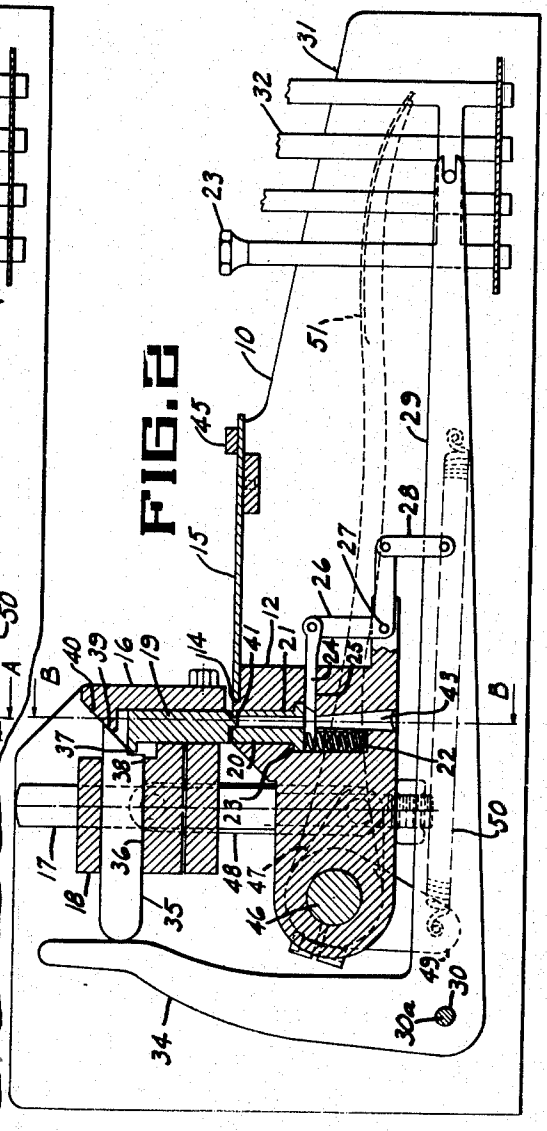


FIG. 2



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FIG. 3

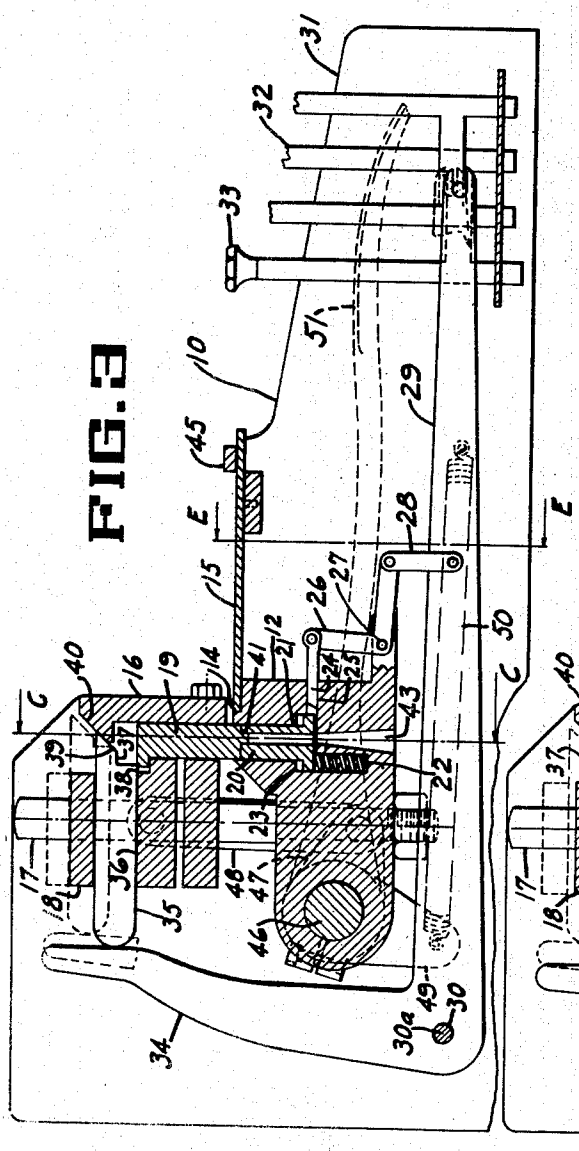
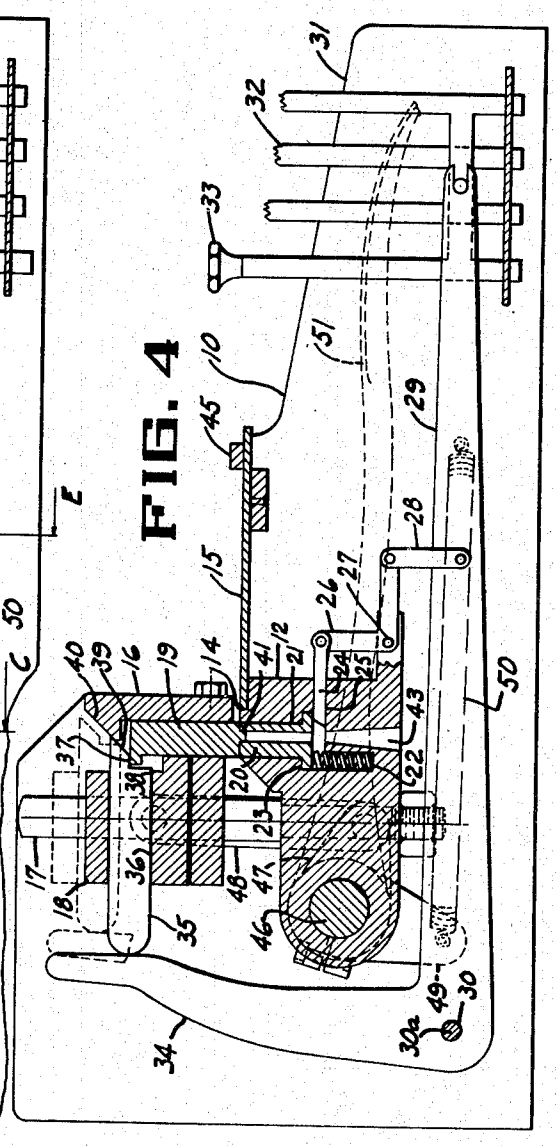


FIG. 4



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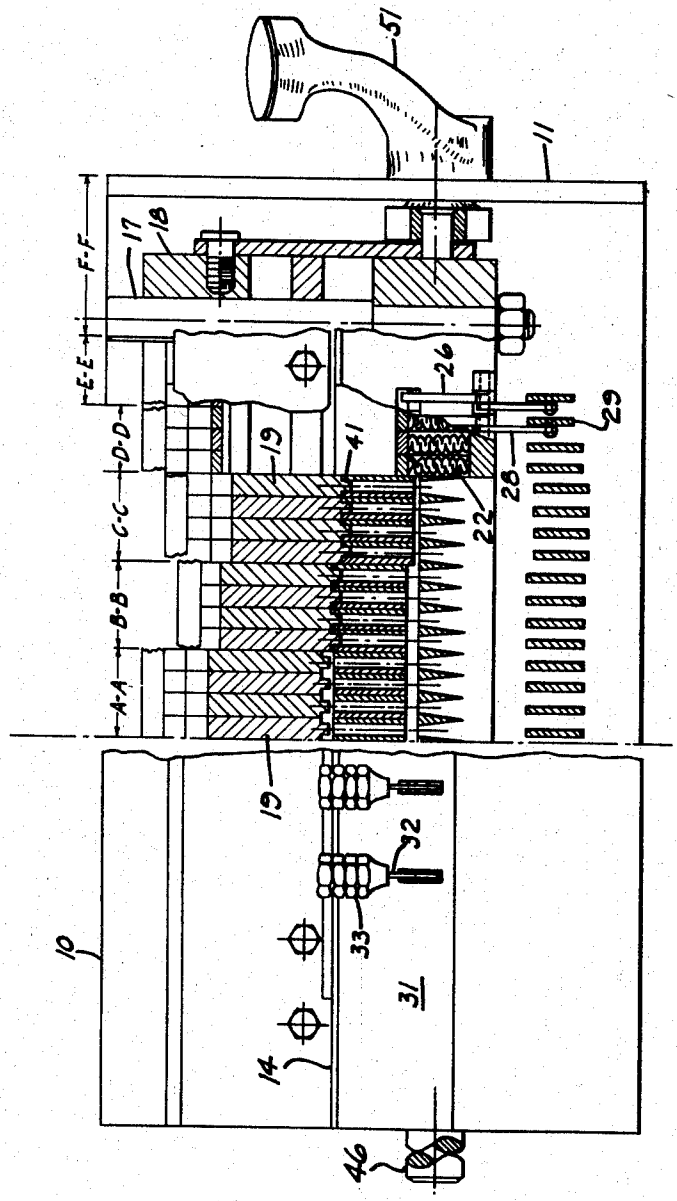


FIG. 5

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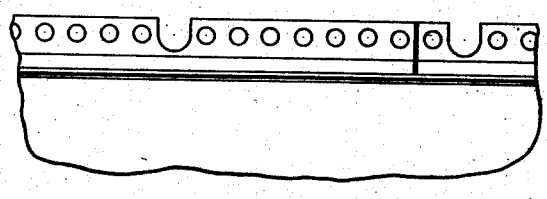


FIG. 6

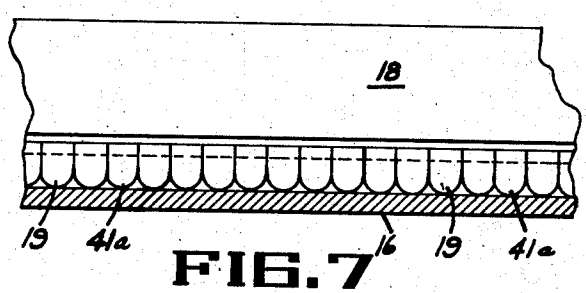


FIG. 7

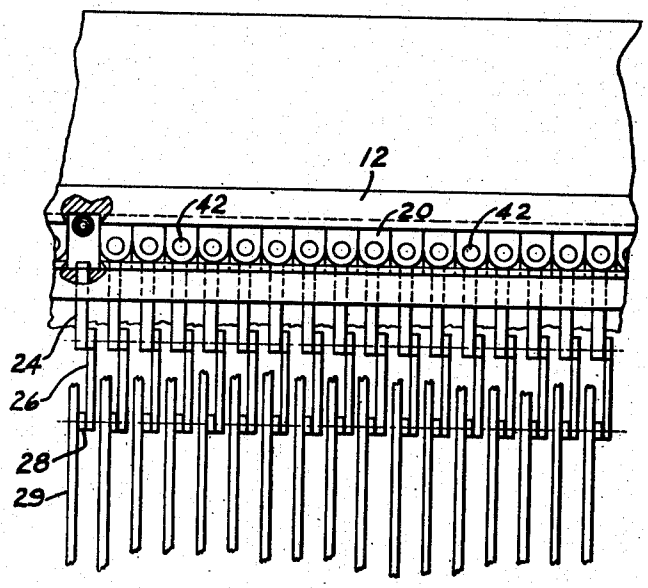


FIG. 8

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Patented Apr. 6, 1948

2,439,029

UNITED STATES PATENT OFFICE

2,439,029

COMBINED CARD PUNCHING AND SLOTTING MACHINE

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Application May 14, 1945, Serial No. 593,735

12 Claims. (Cl. 164—112)

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This invention relates to machines for punching and notching the marginal edges of cards, checks and the like.

The type of punched and slotted cards, checks and other paper forms which are adapted to be perforated and slotted by the machine here disclosed are of the general type disclosed in United States Letters Patent to Perkins No. 1,544,172, dated June 30, 1925.

In general, cards or checks of that type are provided with a series of perforations adjacent one or more edges of the card. These perforations are arranged into fields, each field designating units, tens, hundreds, etc. These perforations are designed and located so that the material of the card or check which intervenes between the perforation and the marginal edge of the card may be entirely punched out or slotted away. This construction permits the passing of a sorting rod or needle through the perforations, and on manipulating the needle, the cards which have not been slotted through at the selected perforation will remain on the needle, while those which have been slotted will be detached from the needle. The perforations are spaced apart along the edge of the card as desired.

Heretofore, cards of the type referred to have been perforated and appropriately printed and thereafter were separately classified by slotting away the edge of the card in the pattern of the selected classification, depending upon the coding. For this purpose hand punches have been provided for effecting the slotting, and also key-punch machines have been provided in which the card can be inserted and the selected classification notched out on the edge of the card by manipulation of the keys of the machine.

It is the principal object of my invention to provide a simple and efficient machine by which the perforating of the card and the slotting thereof in accordance with a selected pattern is accomplished in a single operation or perforating alone may be effected.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a transverse section through a machine embodying the preferred form of my invention, showing the parts in normal position so that a card inserted in the machine will merely be perforated.

Fig. 2 is a view similar to Fig. 1, with the exception that the machine is shown as actuated to perforate a card (the card not being shown).

Fig. 3 is a section through the machine similar

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to Fig. 1, showing one key depressed to index the machine for both perforating and slotting a card, with the parts conditioned to effect such operation.

Fig. 4 is a view the same as Fig. 3, with the exception that the parts are shown just at the end of the punching stroke, with the parts conditioned in the same manner as Fig. 3.

Fig. 5 is a view in front elevation and in longitudinal section through the machine, the sections being taken at different transverse points in the machine and along the lines A—A of Fig. 1, B—B of Fig. 2, C—C of Fig. 3, D—D of Fig. 1, E—E of Fig. 2, and F—F of Fig. 1.

Fig. 6 is a fragmentary view illustrating one type of card which may be perforated and slotted by the machine embodying my invention.

Fig. 7 is a fragmentary view in plan section through the machine taken on line 7—7 of Fig. 1.

Fig. 8 is a fragmentary view in plan section taken on line 8—8 of Fig. 1.

Referring more particularly to the accompanying drawings, 10 indicates a frame including end frame members 11 disposed at opposite ends of the machine. Relatively fixed to the end frames 11 and consequently to the frame of the machine is a longitudinally extending anvil 12 which, of course, is horizontally disposed, the upper surface 14 of which constitutes a card receiving surface upon which a card may be disposed in flatwise position. This card receiving surface 14 is extended outwardly from the anvil by means of a plate 15 relatively fixed to the frame of the machine and to the anvil. This plate is of sufficient dimensions to permit a card or sheet to be operated upon by the machine to be disposed flatwise thereon.

Overlying the anvil 12 is a punch guide 16 which is likewise secured to the end frames 11, and thus becomes a fixed part of the frame and is fixed relatively to the anvil 12. The lowermost edge of the punch guide 16 is spaced slightly above the card receiving surface 14 in order that a card may be inserted between the punch guide 16 and the surface 14 on the anvil for operation.

Relatively fixed to the anvil 12 and projecting upwardly therefrom is a pair of cross-head guides 17, one being disposed adjacent each end of the machine. These cross-head guides 17 extend perpendicularly with respect to the card receiving surface 14 and the anvil 12. Mounted for vertical reciprocation on the cross-head guides 17 is a cross-head 18 which extends longitudinally of the machine, and which is so mounted on the guides 17 that it will reciprocate toward and away from the anvil 12 in a direction per-

pendicular to the card receiving surface 14. The cross-head 18 is, of course, disposed parallel to said surface 14.

Mounted in the punch guide 16 is a plurality of punches 19 arranged in side by side relation longitudinally of the guides 16. These punches 19 are guided in the guides 16 for vertical reciprocation, the line of which reciprocation is perpendicular to the card receiving surface 14. Associated with each punch 19 and complemental thereto is a die 20 arranged in vertical alignment with its associated punch 19 and guided for vertical reciprocation in a die socket 21 formed in the anvil 12. A spring 22 is provided for each die member 20 which normally tends to maintain the upper end of the die flush with the card receiving surface 14. Precise alignment is maintained by cooperating shoulders 23 in the die socket 21 and on the dies 20. Each die 20 is normally latched in such a position by means of a latch 24, one being provided for each die 20. A latch socket 25 is provided in the anvil 12 for each latch 24, which socket is disposed so that when the die 20 is in its uppermost position, its associated latch 24 may be inserted beneath the lower end of said die 20 to maintain it in such position. The outer end of each latch 24 is connected to one leg of a bell crank 26 pivoted as at 27 to the anvil 12. The other end of the bell crank lever is connected by a link 28 to an associated key lever 29, which key lever is pivoted to the frame as at 30. There is, of course, a key lever 29 for each die 20 and punch 19.

The frame of the machine includes a keyboard 31 through which a plurality of key stems 32 vertically project so that the keys 33 thereon are disposed vertically above the keyboard 31. There is a key stem 32 and a key 33 for each key lever 29, and the key stems 32 are connected to the key levers 29 as illustrated in the drawings. This connection is such that depression of the key stem 32, by depressing the key 33 thereon, will swing the associated key lever 29 downwardly, in the direction of the arrow shown in Fig. 1, about its pivotal point 30. Pivoting of the levers 29 is accomplished by extending a rigid rod 30a between the end frames, upon which rod the key levers 29 are pivoted.

Each key lever 29 is formed with an integral actuator arm 34 which extends vertically at the rear of the cross-head 18. Associated with each actuator arm 34 and with each punch 19 is a punch actuator 35 which is reciprocably mounted transversely of the cross-head 18 in a socket 36. There is, of course, one actuator 35 for each punch 19 in register therewith. Each actuator is provided with two punch engaging abutments or faces 37 and 38 for engaging the uppermost end of its associated punch 19. These faces or abutments 37 and 38 are relatively offset, both longitudinally of the actuator 35 and transversely thereof, and each is adapted to engage the upper end of the punch, depending upon the longitudinal position of the actuator 35.

One end of the actuator 35 is formed with a cam face 39 complemental to a cam face 40 on the punch guide 16. As will be explained further on herein, these complemental cam faces 39 and 40 are for the purpose of resetting the actuator and its associated actuator arm 34 and key lever 29.

It should be stated that in normal position it is the actuator face or abutment 37 which actuates the associated punch 19, while it is the actuator face or abutment 38 which actuates the

punch 19 when the key lever 29 has been conditioned to effect notching of the card. In other words, in normal condition the punch 19 is actuated to punch a round marginal hole in the card, whereas when the key lever 29 is depressed, it is the abutment or face 38 which actuates the punch 19 and effects slotting of the card inwardly from its marginal edge.

It will be noticed that the punching end of the punch 19 is provided with a cylindrical punching member 41 which cooperates with a complemental die opening 42 in the die 20. This opening 42 extends completely longitudinally through the die 20 and aligns with an opening 43 which extends downwardly from the socket 21 through the bottom of the anvil 12. When the round punch 41 cooperates with the round die opening 42 to effect punching of a round hole in the card, the punching will pass through the hole 42 and thence through the opening 43 in the anvil and discharge.

A cylindrical perforating male die 41 projects from the lower surface of the punch 19 a short distance, which is greater than the thickness of a card. However, the end of the punch 19 at the upper end of the male die 41 constitutes a male slotting die 41a which cooperates with the upper end of the die socket 21 in effecting notching, such as shown in Figs. 3 and 5, when the punch 19 is to be actuated to effect slotting.

Therefore, it is seen that when a key lever 29 is not depressed, the punch 19 is actuated by the abutment or face 37 of the actuator sufficiently to cause punching of a perforation in a card by means of the cylindrical die 41 projecting into the die hole 42 of the die member 20. However, when the key lever 29 is depressed and the abutment or face 38 is registered with the upper end of the punch 19, the latter is moved downwardly a greater distance, or sufficient to cause the male die 41a thereof to cooperate with the die socket 21 to effect slotting of the card.

For reciprocating the cross-head 18 I have provided an operating shaft 46 which is disposed longitudinally of the anvil 12 and rotatably mounted therein and in the end frames 11. At each end of this shaft is a crank arm 47, which crank arms are fixed on the shaft 46 and their outer ends are connected by links 48 to the ends of the cross-head 18, so that oscillation of the shaft 46 will effect vertical reciprocation of the cross-head 18.

A second pair of crank arms 49 is provided which are likewise fixed on the shaft 46 and which are connected by springs 50 to the frame of the machine. These springs 50, through the crank arms 49, constantly tend to maintain the cross-head in its uppermost or normal position. Upward movement of the cross-head is, of course, limited by upward movement of the punches 19 in the punch guide 16, while lowering movement of the cross-head is limited by engagement of the lower ends of the dies 20 with the bottom of the die sockets 21.

To operate the shaft 46 to effect the punching operation, it is fitted at one side of the frame with an operating lever 51. By depression of this lever, the shaft 46 will be turned about its axis sufficiently to effect the punching operation. Upon release of the handle the springs 50 will return the cross-head to normal position. In returning the cross-head to normal position, the springs 22 will return the dies 20 to normal position. The punches 19, of course, will return to

normal position by the upward movement of the cross-head 18.

In operation of the machine, if it is desired merely to perforate a card edge, the card or sheet is inserted over the anvil on the card receiving surface 14 in proper register with the punches and dies 19 and 20. This registry is effected by abutting the rear edge of the card or sheet against an aligning member 45 arranged longitudinally of the plate 15. This aligning member extends parallel to the line of the punches and dies 19 and 20, so as to properly align the edge of the card with respect thereto. Such abutment of the card against the aligning member 45 places the inserted edge of the card just short of the innermost edges of the punches 19 and dies 20.

If it is desired to simultaneously perforate the edge of a card and notch out certain of those perforations to the edge of the card for a particular classification, the actuators 35 are indexed by depressing the proper keys 33 corresponding with the classification to be notched or slotted into the card. Referring particularly to Figs. 3 and 4 of the drawings, it will be seen that when a selected key 33 is depressed, it swings its associated key lever 29 downwardly, moving its actuator arm 34 forwardly and indexing its associated actuator 35 to effect a slotting operation. As is seen from these two figures, movement of the actuator forwardly places its lowermost abutment or punch actuating face 38 over the upper end of the punch 19 so that downward movement of the cross-head will cause downward movement of the punch 19 in unison with the actuator 35. Thus, the punch 19 will be given its maximum stroke so that it will notch or slot the card.

It should be pointed out that simultaneously with the downward movement of the key lever 29, the bell crank 26 will be actuated by the link 28 to move the latch 24 to an ineffective position, allowing the die member 20 associated with the particular key 33 selected to move downwardly and enable the slotting die at the lower end of the punch 19 to slot the card.

Assuming that only one key 33 has been depressed, the remaining dies 20 will be held from downward movement and the remaining actuators will stay in normal position, so that their abutment or actuating faces 37 will engage their associated punches 19 and move the same downwardly only sufficient to allow the male cylindrical dies 41 to perforate the card. Of course, the actuation of the cross-head, after the card has been inserted and the selected key 33 depressed, will be effected by depression of the lever 51 to its full stroke. Immediately that the lever 51 is released, the springs 50 will return the cross-head to its normal position, permitting the die 20 to assume its normal position under the urging of the spring 22, and the punches 19 will be returned to normal position by movement of the cross-head 18.

However, it is necessary, of course, to return the actuator 35 which has been indexed for slotting to normal position. This is accomplished just prior to the end of the punching and slotting stroke or operation. As will be seen in Figs. 4 and 5, the cooperating cam faces 39 and 40 effect this return of the indexed actuator 35 to normal position. It is accomplished by engagement of the cam surface 40 with the cam surface 39, prior to the end of the punching stroke, so that just at the end of the punching stroke the actuator 35 has been moved rearwardly by the cam action sufficiently so that its lower actuating or

abutment face 38 is moved out of register with the punch 19. Thus, it is returned to normal position. This rearward movement of the actuator 35 returns the key lever 29 and the key 33 to normal position and simultaneously reinserts the latch 24 under the cooperating die 20.

Thus, it is seen that by placing a card on the card receiving surface 14, overlying the anvil, that notches or slots in any number may be formed in the edge of the card to correspond with any selected classification, and that operation of the machine will not only effect such slotting, but will complete the perforation of the card between the slots so that the card will be properly notched and perforated along its entire edge for the purpose either of direct or sequence sorting.

From the foregoing it is obvious that I have provided a very simple but effective machine for simultaneously perforating and selectively slotting the marginal edge of a card, check, sheet and the like, and while I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a machine of the character described, a plurality of integrally combined perforating and slotting punches, each of said punches having different perforating and slotting portions, a die operatively associated with each of said punches, operating means normally conditioned to be constantly effective to simultaneously operate said punches to effect perforation but to be normally ineffective to effect slotting, selective means for conditioning said operating means to operate selected punches to effect slotting while operating the remainder of the punches to effect perforation only.

2. In a machine of the character described, a plurality of combined perforating and slotting punches, each of said punches having different perforating and slotting portions relatively fixed to each other, a die operatively associated with each of said punches, means for receiving and positioning a card to be operated upon by said punches and dies, said punches and dies normally operating to perforate a card and ineffective to slot the card, selective means for selectively rendering said punches and dies effective to slot the card, and means for operating said punches.

3. In a machine of the character described, a plurality of combined perforating and slotting punches, a die operatively associated with each of said punches, means for receiving a card and positioning the same to be operated upon by said punches, means for operating said punches, said means normally effective to operate said punches to perforate a card operatively positioned with relation thereto and ineffective to operate said punches to slot a card operatively positioned with relation thereto, selective means for conditioning said operating means to render the same effective to selectively operate said punches to slot a card, said dies being operative automatically by the punches selected to effect slotting to cooperate with said punches to effect slotting.

4. In a machine of the character described, a plurality of relatively fixed combined perforating and slotting punches, a die operatively associated with each of said punches, means for receiving a card and positioning the same to be

operated upon by said punches, means for operating said punches, said means normally effective to simultaneously operate said punches to perforate a card operatively positioned with relation thereto but to be ineffective to operate said punches to slot a card operatively positioned with relation thereto, selective means for conditioning said operating means to operate selected punches to slot a card while operating the remainder of the punches to perforate the card, said selective means conditioning the dies associated with the selected punches for cooperation therewith in the slotting operation.

5. In a machine of the character described, a plurality of integrally combined perforating and slotting punches normally operating to effect perforation but to be normally ineffective to effect slotting, a die operatively associated with each of said punches, key operated means operatively associated with said punches and dies and selectively operable to render said punches and their associated dies effective as slotting punches and dies, and means for operating said punches.

6. In a machine of the character described, a plurality of integrally combined perforating and slotting punches, each of said punches having different perforating and slotting portions, a die operatively associated with each of said punches, means for operating said punches, said means normally conditioned to simultaneously operate said punches to effect perforation but to be normally ineffective to operate the same to effect slotting, key operated means for selectively conditioning said operating means to render the same effective to operate selected of said punches as slotting punches, said key operated means conditioning the dies associated with the selected punches for cooperation therewith in the slotting operation.

7. In a machine of the character described, a plurality of punches capable of operation to perforate and slot a card, a die operatively associated with each of said punches, means for operating said punches, said means normally conditioned to operate said punches to effect perforation but to be ineffective to operate the same to effect slotting, key operated means for conditioning said operating means to operate selected punches to effect slotting while operating the remainder of the punches to effect perforation only, and means mounting said dies for movement along the line of action of said punches to cooperate with said selected punches to effect slotting.

8. In a machine of the character described, a plurality of cutting elements capable of operation as perforating punches or slotting punches, a die operatively associated with each of said cutting elements, key operated means for selectively operating said cutting elements as perforating punches or slotting punches, and means mounting said dies for movement along the line of action of said punches to cooperate with said cutting elements to effect perforating or slotting.

9. In a machine of the character described, a plurality of cutting elements capable of operation as perforating or slotting punches, a die operatively associated with each of said cutting elements, means for operating said cutting elements, key means for selectively conditioning said operating means to actuate said cutting elements as perforating or slotting punches, and means mounting said dies for movement by the cutting elements to effect slotting.

10. In a machine of the character described, a plurality of cutting elements arranged in line formation, a die operatively associated with each of said cutting elements, means for receiving a card with one edge in register with said cutting elements, said cutting elements being capable of actuation as perforating punches or slotting punches, operating means for operating said punches, and key controlled means for selectively conditioning the operating means to selectively operate all of said cutting elements simultaneously either as perforating punches or as slotting punches and means mounting said dies for movement by selected cutting elements to effect slotting.

11. In a machine of the character described, a plurality of relatively fixed combined perforating and slotting punches, a die operatively associated with each of said punches being normally operative to cooperate with said punches to effect perforation only, means for receiving a card and positioning the same to be operated upon by said punches, means for operating said punches, said means normally effective to simultaneously operate said punches to perforate a card operatively positioned with relation thereto but to be ineffective to operate said punches to slot a card operatively positioned with relation thereto, selective means for conditioning said operating means to operate selected punches to slot a card while operating the remainder of the punches to perforate the card, said selective means conditioning the dies associated with the selected punches for cooperation therewith in the slotting operation.

12. In a machine of the character described, a plurality of combined perforating and slotting punches, each of said punches having different perforating and slotting portions relatively fixed to each other, a die operatively associated with each of said punches being normally operative to cooperate with said punches to effect perforation only, means for receiving a card and positioning the same to be operated upon by said punches, means for operating said punches, said means normally effective to simultaneously operate said punches to perforate a card operatively positioned with relation thereto but to be ineffective to operate said punches to slot a card operatively positioned with relation thereto, key operated means for conditioning said operating means to operate selected punches to slot a card while operating the remainder of the punches to perforate the card, said key operated means conditioning the dies associated with the selected punches for cooperation therewith in the slotting operation.

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