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APPARATUS FOR DUPLICATING SLOTTED CARDS

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2 Sheets-Sheet 1

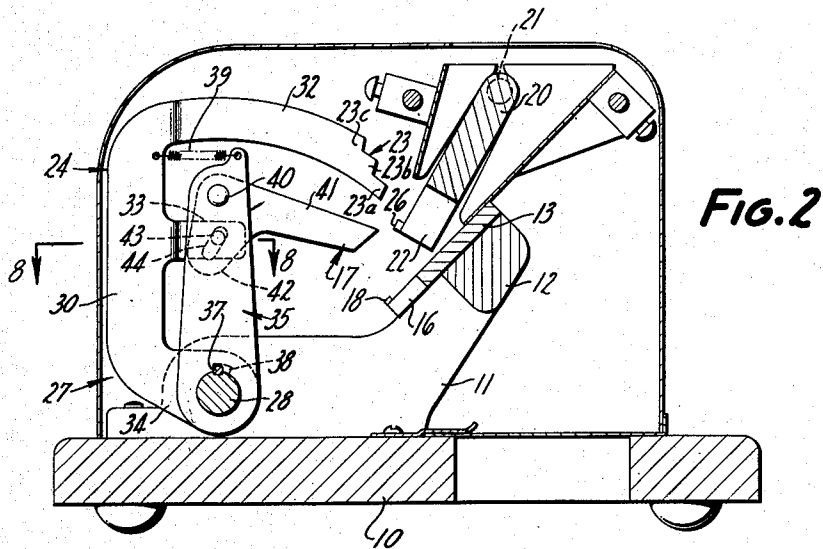


Fig. 2

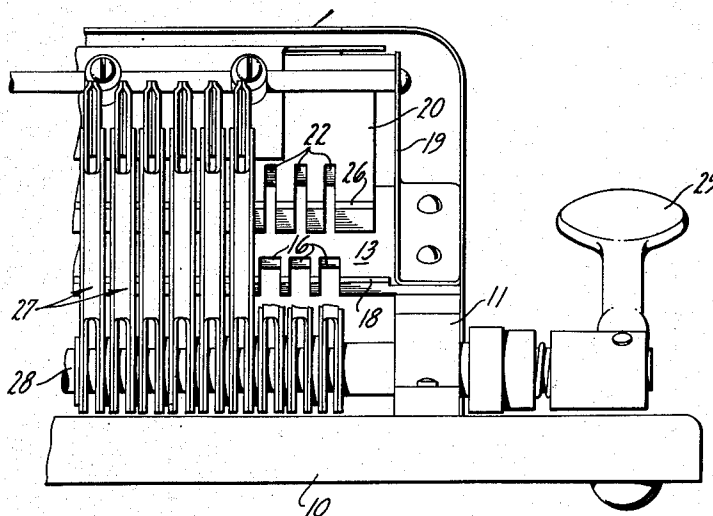


Fig. 1

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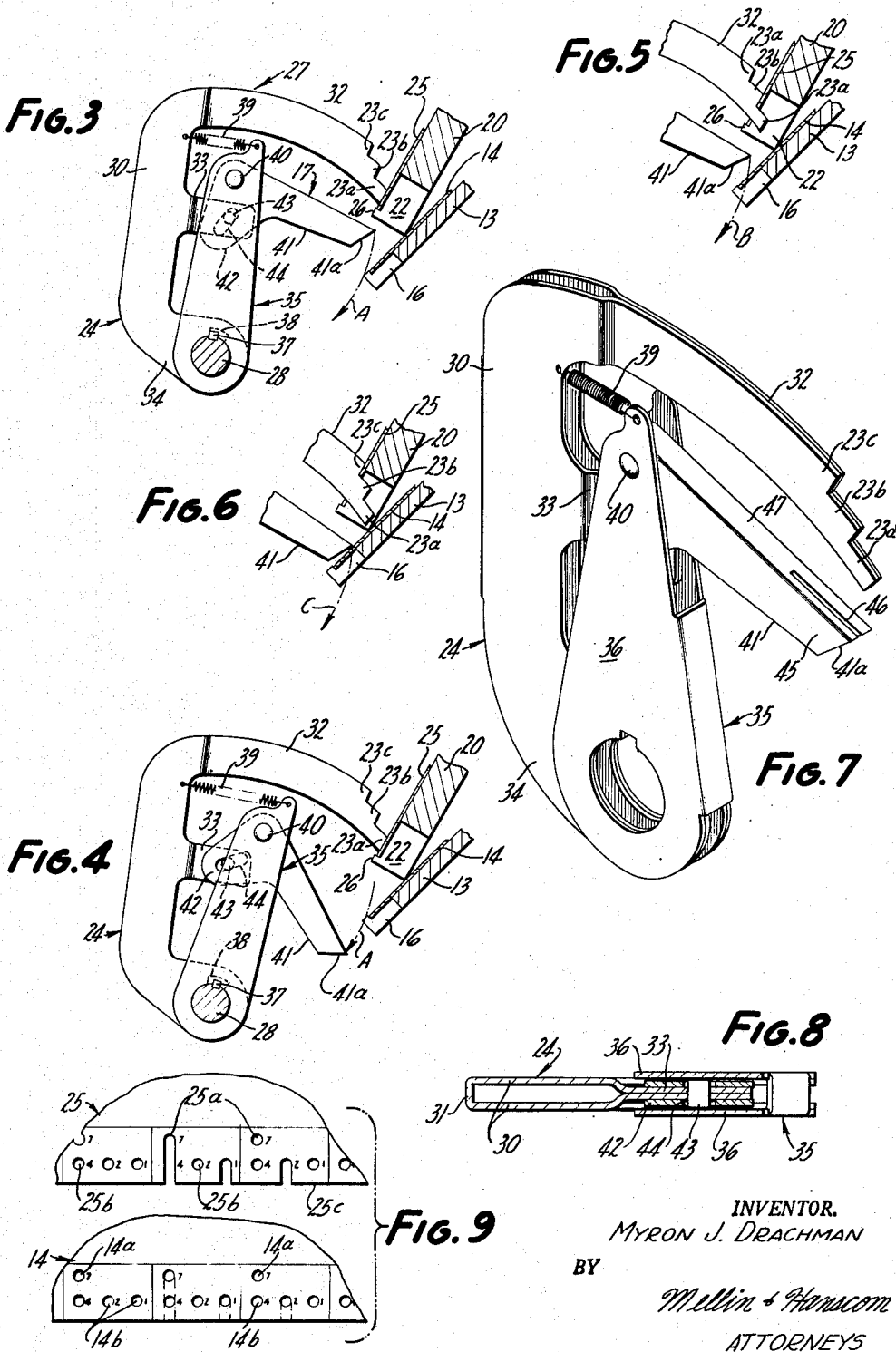
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APPARATUS FOR DUPLICATING SLOTTED CARDS

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15 Claims. (Cl. 164-114)

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The present invention relates to devices for slotting marginally perforated cards, and is more particularly directed to mechanisms for selectively slotting cards in accordance with the slotted areas on master cards.

In United States Patent No. 2,233,662, issued to Sanford D. Buster, Jr. et al., a duplicating machine is illustrated for slotting the marginal area of a perforated card in accordance with a pattern on a key or master card. The present invention has for an object the provision of improved selector and cutter devices, especially adapted for use in the type of duplicating machine above mentioned, which insure the complete notching or cutting of a duplicate marginally perforated card to the particular perforations selected by the master card.

Another object of the invention resides in an improved mechanism for actuating the cutters of a machine for notching a duplicate card in accordance with the pattern on a master card.

Certain types of cards have a plurality of rows of perforations along their marginal areas parallel to the card edges. For example, a card may have parallel rows of inner and outer perforations, and slotting or notching may be performed inwardly of the card edge to selected outer perforations, or more deeply to selected inner perforations. In one form of card a plurality of fields may be provided along its edge, each field having three outer perforations parallel to the card edge and representing numbers "1," "2" and "4," and an inner perforation representing number "7," spaced inwardly of the "4" perforation and lying on a line perpendicular to the card edge passing through the number "4" perforation. By slotting inwardly to any selected perforation in the outer row, the number "1," "2" or "4" may be indicated. Slotting inwardly through the number "4" perforation to the number "7" perforation indicates the latter number. By slotting any two of the four numbers specifically mentioned, they will add together to indicate the numbers "3," "5," "6," "8" or "9."

A further object of the invention is to provide a duplicating cutter mechanism capable of selectively notching a card in accordance with corresponding notches on a master card extending to its outer or inner rows of perforations, or to both of such rows of perforations.

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:

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Fig. 1 is a front elevation of part of a duplicating machine embodying the invention.

Fig. 2 is a transverse view through the machine showing the duplicating mechanism in side elevation.

Fig. 3 is a side elevation of the cutter mechanism in one selected position with respect to master and duplicate cards on the machine card supports.

Fig. 4 is a view similar to Fig. 3 disclosing the cutter of the mechanism at the end of its shearing stroke.

Figs. 5 and 6 are partial views similar to Fig. 3, disclosing the selector and cutter in different selective positions with respect to the master card and duplicate card.

Fig. 7 is an isometric view of the cutter, selector and driving mechanism.

Fig. 8 is a transverse section taken along the line 8-8 on Fig. 2.

Fig. 9 is a plane view of a master card and duplicate card capable of use in the machine.

Referring more particularly to Figs. 1 and 2, a notched or perforated card duplicating machine is disclosed which has a base 10 from which project longitudinally spaced vertical arms 11. A bar 12 extends lengthwise of the machine between the arms and carries an inclined supporting platen or bed 13 for a duplicate card 14, to be notched to conform with the perforations, notches or slots on a master card 25. The lower portion of the platen 13 is slotted inwardly to form a plurality of uniformly spaced die recesses or cavities 16 into which cutters 17 of the machine may extend, in order to perform the notching or slotting functions on the lower marginal area of the duplicate card 14. The lower end of the platen 13 has an upwardly projecting rib 18 against which the lower end of the card 14 may rest. The die cavities 16 extend inwardly a sufficient extent to enable cards 14 to be notched to an inner row of perforations 14a, as well as to an outer row of perforations 14b.

A pair of spaced supporting brackets 19 extend upwardly from the arms 11 and have a master card supporting platen 20 pivotally mounted on a rod 21 secured to the brackets and extending lengthwise of the machine. This master card supporting platen or plate 20 is inclined downwardly toward the front of the machine and is also provided with a plurality of spaced recesses or cavities 22 aligned with the recesses 16 in the lower platen and extending inwardly a sufficient extent to permit the fingers 23 of feeler or selector devices 24 (described in detail below) to

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enter slotted portions of a master card 25 to its innermost row of perforations 25a. This platen 20 is also provided with an upwardly projecting rib 26 at its forward edge against which the lower edge of the master card 25 may rest.

A cutter and feeler mechanism 27 is designed to cooperate with a master card 25 placed on the upper supporting plate 20 and to notch a pattern corresponding to the master card pattern on the duplicate card 14 placed upon the lower plate or platen 13. A feeler and cutter mechanism 27 is provided for each of the aligned slots 16, 22 in the plates, and they are all mounted in juxtaposition to one side of the plates 13, 20 upon a common operating shaft 28 suitably supported for rotation in the side arms 11 of the apparatus, the shaft projecting outwardly from one arm 11 where a suitable operating handle or lever 29 is secured thereto, in order to rock or rotate the shaft 28 through a predetermined angular extent.

Further details of the general machine organization is unnecessary to an understanding of the present invention and may be found in the Buster, Jr., et al. patent, above referred to. The present invention is particularly concerned with the feeler and cutter mechanism 27 for selectively notching the cards.

Each apparatus or device 27 for slotting the duplicate card 14 in accordance with a corresponding slot on the master card 25 includes a feeler 24 which may be made of sheet metal bent into generally U-form and consisting of central spaced body portions 30 interconnected by a web 31. Upper feeler arms 32, intermediate cutter pivoting arms 33 and lower arms 34 project forwardly from the body portions, the lower arms 34 being rotatably mounted on the shaft 28 of the machine.

An operating arm or lever 35, which may also be made of sheet metal, is bent into generally U-form and has the lower end of its sides 36 secured to the shaft 28 by means of a key 37 positioned in opposed grooves or recesses in both the shaft 28 and sides 36 of the operating arm. This key cannot transmit motion in a card slotting direction to the feeler 24, since the lower arms 34 of the latter are provided with arcuate recesses 38 allowing the key 37 to move freely within the feeler without effecting a driving connection therewith. The upper end of the driving arm 35 has a tension spring 39 attached to it, whose other end is secured to the feeler body 30. The upper end of the operating or driving arm 35 also carries a pivot pin 40 on which a cutter or shearing blade 41 is oscillatably or pivotally mounted. This cutting or shearing blade may be made of sheet metal, being bent into generally U-form, and having a cutter head 41 extending forwardly toward the lower bed or platen 13 and also spaced depending lower lever arms 42 extending along the exterior of the intermediate cutter pivoting arms 33, to which they are drivably connected by means of a pin 43 projecting in opposite directions from the intermediate feeler arms into inclined slots 44 in the cutter arms 41.

The sides 45 of the cutter head are adapted to effect a notching action on the marginal areas of a card positioned on the duplicating bed 13 from one of the perforations outwardly toward the card edge. The proper shearing action is facilitated by inclining the forward end 41a of the cutter head and by providing an inwardly extending central slot 46 through the web 47 of the head, which causes the latter to possess spring-like characteristics and thus improves its

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cutting action. Thus the slot 46 imparts a resiliency to the forward or cutting end of the cutter so that a closer and tighter fit thereof with the slot 16 is possible than would be possible with a solid cutter.

Each feeler 24 has a plurality of fingers 23 extending forwardly of the upper arms 32 toward the master card supporting plate 20. In the specific embodiment disclosed in the drawings, there are three fingers or steps disclosed; a forward finger 23a adapted to engage the master card stock between an outer perforation 25b and its edge 25c; an intermediate finger 23b stepped backwards from the first-mentioned finger and adapted to engage the card stock between an inner perforation 25a and an outer perforation 25b, and a rearward finger 23c adapted to engage the card stock inwardly of the inner perforation 25a. The particular finger engageable with the card stock determines the movement of the cutter 17 with respect to the duplicate card 14.

Upon depression of the operating handle or lever 29, the shaft 28 is rocked in its supporting arms 11 and the cutter and feeler mechanisms 27 are all moved toward the master and duplicate card supporting platens 20, 13, the motion of the operating or cutter driving arms 35 being transmitted to the feelers 24 through the springs 39. The operating arm 35, feeler 24 and cutter parts 17 of the device all move substantially in unison until one of the fingers 23 on each feeler engages the master card stock, which prevents further movement of the feeler 24 in a direction inwardly of the machine. Continued movement of the operating shaft 28 and each driving lever 35 then moves the cutter 17 toward the duplicate card platen 13 and swings the cutting head 41 in an arcuate path downwardly in a plane aligned with the die recess or cavity 16, since the pin 40, on each intermediate feeler arm 33 acts as a fixed pivot point and causes the cutter 17 to swing downwardly about the driving arm pin 40. It is during this downward swinging movement that the cutter head 41 can effect slotting of a duplicate card 14, or no slotting, as the case may be, depending upon the extent to which the feeler 24 has moved, as permitted by the master card 20.

Figs. 3 to 6, inclusive, illustrate different operating conditions of the mechanism, depending upon the extent to which a master card has been notched inwardly of its edge. In Figs. 3 and 4, the master card 25 has not been notched at all. Accordingly, during forward motion of the shaft, the foremost finger 23a engages the card stock between the card edge 25c and its outer perforation 25b, which positions the feeler pin 43 at a definite forward point, as disclosed in Fig. 3. Continued forward movement of the driving arm 35 then causes the foremost edge 41a of the cutter head 41 to swing downwardly along an arcuate path, designated by the dotted line A, which completely misses the duplicate card 14, and, consequently, effects no notching therein. The lowermost position of the cutter 17 and the innermost position of the operating arm 35 are illustrated in Fig. 4, wherein it is seen that the cutter has been incapable of notching the card 14. Moreover, the key 37 in the shaft 28 has been unable to transmit any further forward driving motion to the feeler 24 because of its free movement in the arcuate feeler slot 38. Return of the operating handle 29 and shaft 28 to initial starting position returns all of the feeler and cutter parts 27 to their original positions, as shown in Fig. 2.

In the event that the master card has been notched inwardly to an outer perforation 25b, then forward driving motion of the cutter driving arm 35 causes the foremost finger 23a of the feeler to enter the notch and pass into the slot 22 of the master card supporting bed 20. However, the intermediate finger 23b comes to rest upon the card stock between the inner and outer perforations 25a, 25b, which positions the feeler pin 43 closer to the lower shear plate 13 and causes continued forward movement of the driving arm 35 to swing the foremost cutter edge 41a along the arcuate path designated by dotted line B in Fig. 5, in which position the duplicate card 14 is notched inwardly from its edge 14c to an outer perforation 14b.

Similarly, if a deep notch is present in the master card to an inner perforation 25a, the first two fingers 23a, 23b can enter this notch freely, passing into the plate cavity 22 until the rear finger 23c comes to rest against card stock inwardly of the inner perforation 25a, which positions the feeler pin 43 still closer to the shear plate 13 supporting the duplicate card 14, and causes the foremost edge 41a of the cutter head to follow an arcuate path, designated by dotted line C in Fig. 6, under the continued driving influence of the cutter driving arm 35, to notch the duplicate card deeply to an inner perforation 14a and make it conform exactly with the corresponding notch in the master card 25.

It is apparent that, although only the operation of one set of feelers 24, cutters 17 and driving arms 35 has been described in effecting notching of a card 14, the same operation takes place on all of the other sets mounted on the driving shaft 28, with the fingers 23 of each feeler selecting the inward position of the pin 43 on the intermediate feeler arms 33, which position determines the arcuate path to be followed by the foremost portion 41a of each cutter head. It is, accordingly, possible to effect either no notching inwardly from the edge 14c of the card, a shallow notch to an outer perforation 14b, or a deep notch to an inner perforation 14a, in accordance with the notched or slotted pattern along the margin of the master card 25. In each instance, the inclined forward shearing blade 41a on the cutter head 41 removes the card stock from the perforation 14a or 14b outwardly toward the card's edge 14c, insuring full removal of the card stock material, despite the fact that there might be some slight misalignment between the perforations in the duplicate card and the platen die cavities 16 therebelow.

By way of exemplification of the invention, let it be assumed that the master card 25 has been notched in one field to the number "1" and number "7" perforations, to represent the number "8," and in the next adjacent field to the number "2" perforation, and that it is desired to duplicate this pattern on the duplicate card 14 (see Fig. 9). The master card is placed on the upper platen 23 and the duplicate card on the lower platen 13. The operating handle 29 is depressed to move all of the driving arms 35 toward the cards, as well as the feelers 24 and cutters 17, motion being imparted to the feelers through the springs 39. The foremost fingers 23a on all of the feeler arms 32, with the exception of those aligned with number "1" and number "7" perforations 25b, 25a in the first field and the number "2" perforation 25b in the next adjacent field will engage card stock between its edge 25c and outer perforations 25b, which will cause their

cutter heads 41 to swing along the arcuate paths A and be incapable of notching the duplicate card 14. The intermediate fingers 23b on the feelers aligned with a number "1" notch in the first field and the number "2" notch in the second field will engage master card stock between the inner and outer perforations 25a, 25b, since the foremost fingers 23a could enter the associated card notches and platen slots 22, while the rear finger 23c on the feeler aligned with the deep number "7" notch would engage card stock inwardly of the "7" perforation 25a, the foremost and intermediate fingers 23a, 23b entering the deep notch or slot. Accordingly, the number "1" and number "2" cutter heads 41 would be caused to swing along the dotted lines, represented by the paths B, to cut a shallow notch in the duplicate card to the number "1" and number "2" perforations in the adjacent fields, while the cutter head 41 aligned with the number "7" deep notch would swing along the dotted line path C to cut a deep notch in the duplicate card 14 representative of the number "7" in the first field on the master card. It is thus apparent that with a single stroke of the operating handle 29, the exact notched pattern, whether embodying notches to only a single row of perforations or to multiple rows of perforations, is accurately reproduced in the duplicate card.

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. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising selector means cooperable with said master card, cutter means for slotting said duplicate card and movable with respect to said selector means, and driving means for moving said selector means and cutter means, said driving means first moving said cutter means to a position determined by stopping of said selector means with respect to said master card and then moving said cutter means across the plane of said duplicate card after said selector means has come to rest.

2. Apparatus of the character described comprising a support for a master card, a support for a duplicate card, selector means cooperable with a card adapted to be placed on said master card support, cutter means for slotting a card adapted to be placed upon said duplicate card support, and driving means for moving said selector means and cutter means toward said supports, said driving means first moving said cutter means to a position determined by stopping of said selector means with respect to a card on said master card support and then moving said cutter means across the plane of said duplicate card support after said selector means has come to rest.

3. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising selector means cooperable with said master card, cutter means for slotting said duplicate card, and driving means for elastically moving said selector means toward said master card and for positively moving said cutter means across the plane of said duplicate card.

4. Apparatus for slotting a duplicate card in conformity with the slotted pattern in a master

card comprising a selector cooperable with said master card, driving means for moving said selector toward said master card, a cutter mounted on said driving means for movement toward said duplicate card, and coengaging means on said cutter and selector for effecting movement of said cutter across the plane of said duplicate card under the influence of said driving means after said selector has come to rest.

5. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a selector cooperable with said master card, a driving arm, elastic means for transmitting the motion of said driving arm to said selector, a cutter mounted on said driving arm for movement toward said duplicate card, and coengaging means on said cutter and selector for effecting oscillation of said cutter on said driving arm and across the plane of said duplicate card.

6. Apparatus for slotting a duplicate card in accordance with the slotted pattern of a master card comprising selector means cooperable with said master card, cutter means for slotting said duplicate card, and driving means for moving said selector means toward said master card and for moving said cutter means across the plane of said duplicate card and in a direction outwardly of an edge of said duplicate card adjacent said cutter means.

7. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a selector cooperable with said master card, a driving arm, elastic means for transmitting the motion of said driving arm to said selector, a cutter pivotally mounted on said driving arm for movement toward said duplicate card, and coengaging means on said cutter and selector for effecting swinging of said cutter on said driving arm across the plane of said duplicate card and in a direction outwardly of an edge of said duplicate card adjacent said cutter.

8. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a selector, a driving arm, a spring connected to said driving arm and selector, a cutter pivotally mounted on said driving arm, and a pin and slot connection between said cutter and selector.

9. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a selector having a plurality of stepped fingers, a driving arm, a spring connected to said driving arm and selector, a cutter pivotally mounted on said driving arm, and a pin and slot connection between said cutter and selector.

10. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a drive shaft, a selector rotatably mounted on said drive shaft, an arm secured to said drive shaft, a spring connected to said arm and selector, a cutter pivotally mounted on said arm, and a pin and slot connection between said cutter and selector.

11. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a drive shaft, a selector mounted on said drive shaft and cooperable with said master card, means for transmitting the motion of said drive shaft to said selector, and a cutter movable by said means and selector about an axis

removed from the axis of said drive shaft across the plane of said duplicate card.

12. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card having a plurality of rows of perforations parallel and adjacent to its edge comprising cutter means for slotting said duplicate card in accordance with said master card; selector means engageable with the stock of said master card between its edge and a perforation in an outer row, between a perforation in an outer row and a perforation in an inner row, and with the master card stock inwardly of an inner row perforation; and driving means for moving said selector means into engagement with said master card and said cutter across the plane of said duplicate card in accordance with the portion of said master card stock engaged by said selector.

13. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card comprising a cutter for slotting said duplicate card in accordance with said master card; a selector having fingers selectively engageable with said master card, and driving means for moving said selector fingers toward said master card and said cutter across the plane of said duplicate card in accordance with the engagement of said master card by a selector finger.

14. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card having a plurality of rows of perforations parallel and adjacent to its edge comprising a cutter for slotting said duplicate card in accordance with said master card, a selector having a first finger engageable with the stock of said master card between its edge and a perforation in an outer row, a second finger engageable with said master card stock between a perforation in an outer row and a perforation in an inner row, and a third finger engageable with the master card stock inwardly of an inner row perforation, and driving means for moving said selector fingers toward said master card and said cutter across the plane of said duplicate card in accordance with engagement of said master card by a selected one of said three fingers.

15. Apparatus for slotting a duplicate card in conformity with the slotted pattern of a master card having a plurality of rows of perforations parallel and adjacent to its edge comprising a drive shaft; a selector rotatable on said drive shaft and having first, second, and third fingers engageable, respectively, with the stock of said master card between its edge and a perforation in an outer row, between a perforation in an outer row and a perforation in an inner row, and inwardly of an inner row perforation; a driving arm secured to said shaft, a cutter pivotally mounted on said driving arm, elastic means connecting said driving arm to said selector, and coengaging means on said cutter and selector for moving said cutter across the plane of said duplicate card in accordance with the engagement of said master card by one of said fingers.

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The following references are of record in the file of this patent:

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Number	Name	Date
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