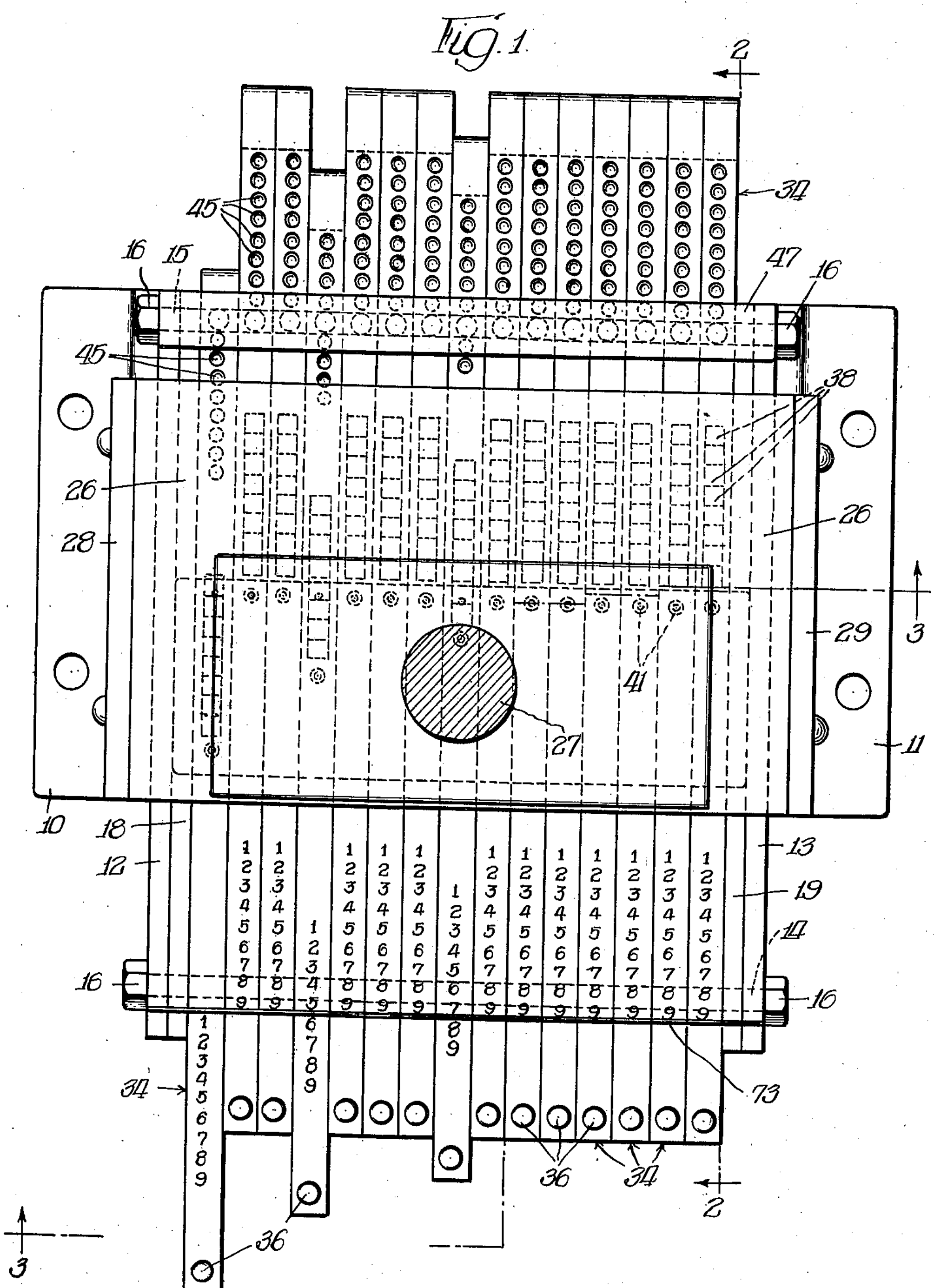
Oct. 29, 1940. J. F. RYAN 2,219,908
PERFORATOR
Filed Dec. 7, 1938 3 Sheets-Sheet 1

Fig. 1



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PERFORATOR

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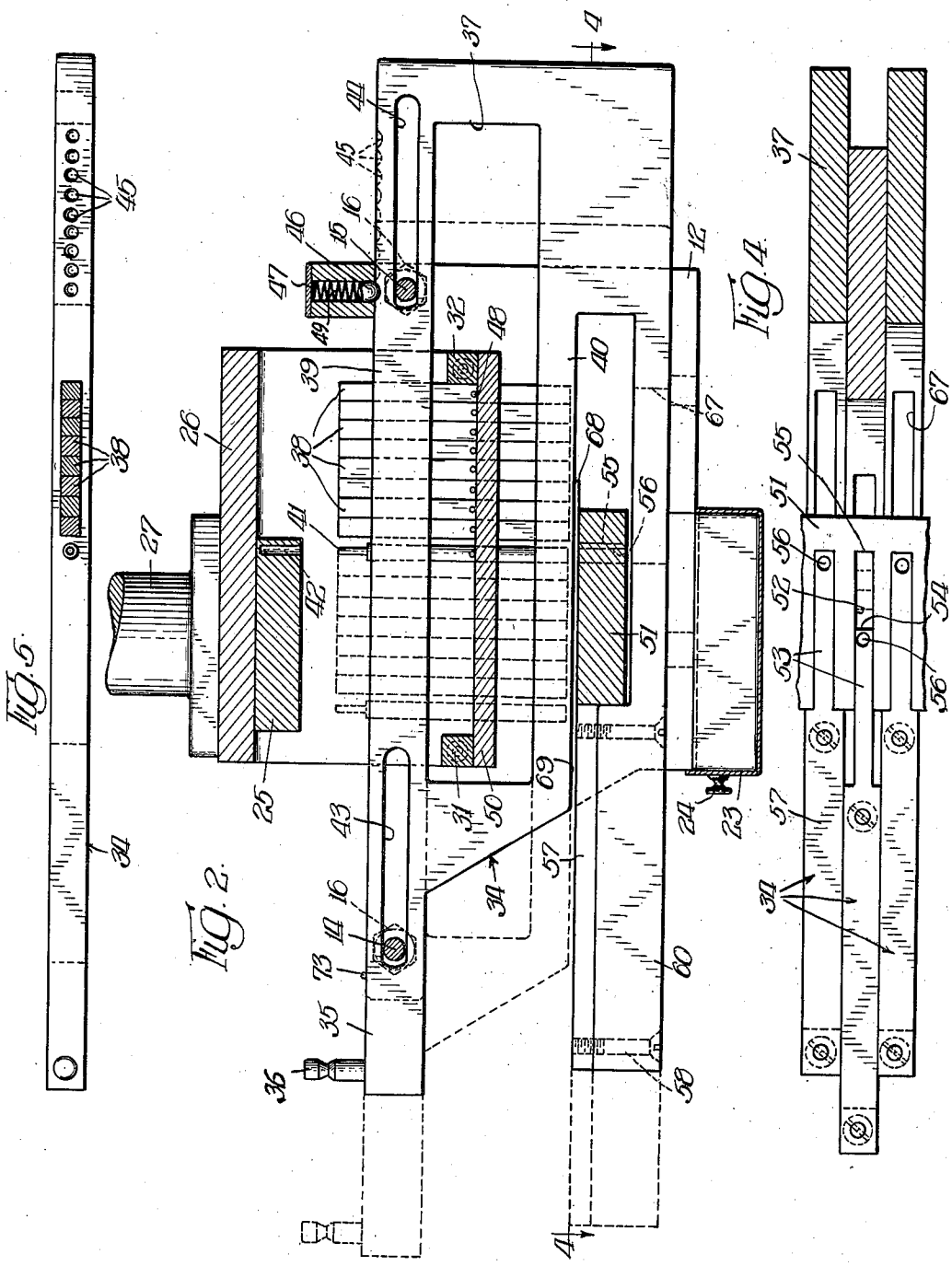

Fig. 2.

Fig. 5.

Fig. 4.

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Fig. 3.

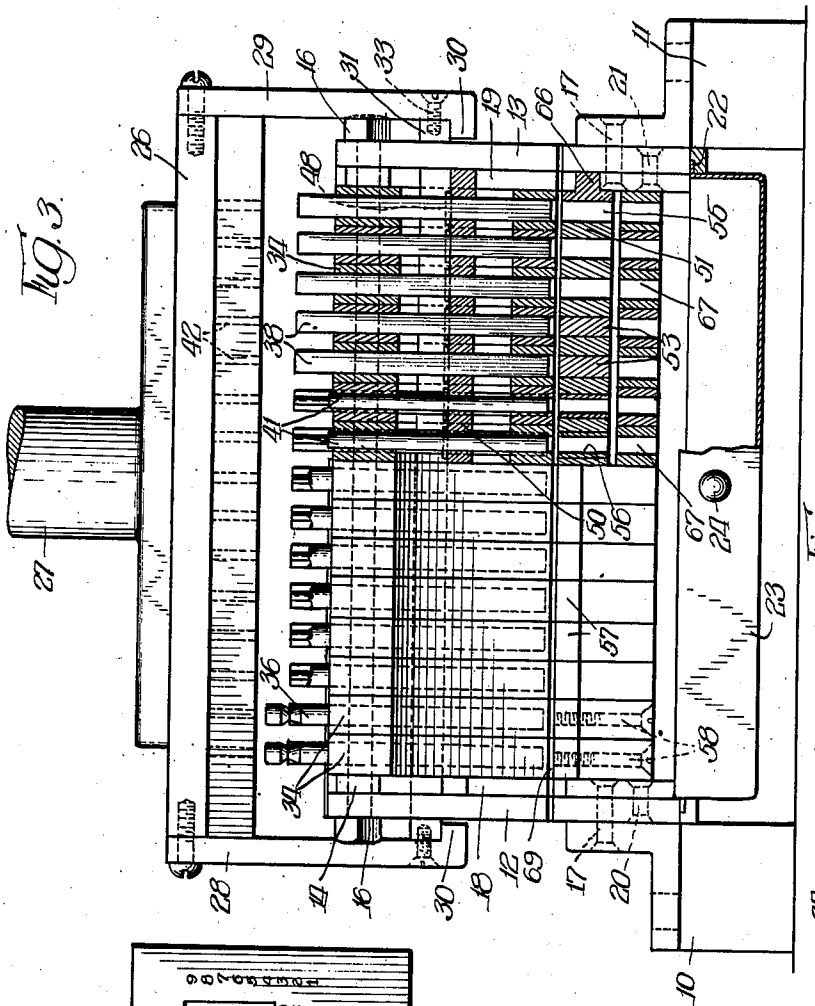


Fig. 6.

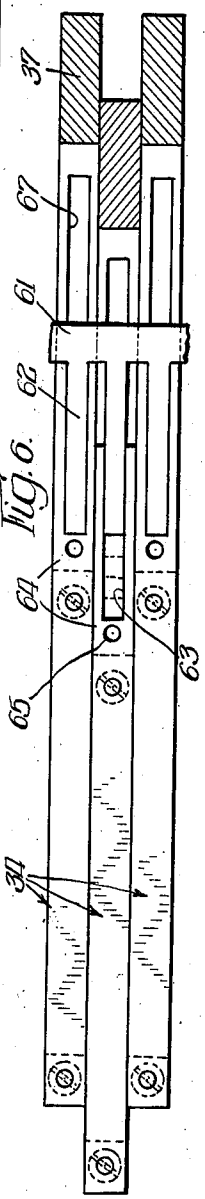
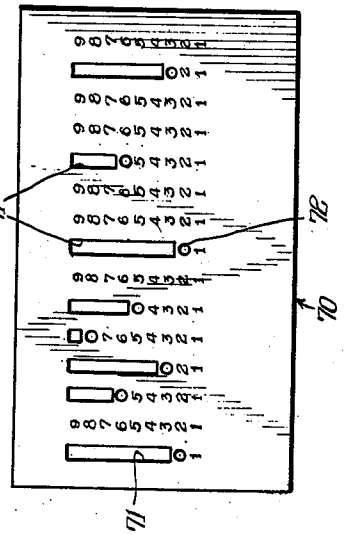


Fig. 7.



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UNITED STATES PATENT OFFICE

2,219,908

PERFORATOR

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Application December 7, 1938, Serial No. 244,324

11 Claims. (Cl. 164—111)

The invention relates to perforators and has more particular reference to a machine of this class for perforating cards and the like with a plurality of parallel slots which may vary in length within the capacity of the machine and wherein a round opening will be simultaneously punched in advance of each slot.

Perforating machines as heretofore constructed have used a plurality of punches which, when actuated, would perforate a sheet such as a bill, label or the like, with round openings. These punches in the conventional type of perforator are actuated by an oscillatable head comprising control members which can be set so as to cause actuation of selected punches for perforating the date or other information in the bill or label. It is possible in the machine of the present invention to select desired punches for actuation but the selection is made by moving adjustable slides, each of which carries a group of punches. One or more punches of the group, depending on the extent to which the slide is pulled, combine to punch a slot in the card or the like, and which will be parallel with the slots produced by the other slides.

Accordingly, an object of the present invention is to provide a perforating machine for punching a card or the like with a number of parallel slots which will be uniform in width but which may be varied as to length within the capacity of the machine.

A more specific object of the invention is to provide a perforating machine for punching a card or the like which will punch a number of parallel slots in said card of uniform width but which may be varied as to length, depending on the position of the slides corresponding to said slots and wherein a round hole will also be punched in said card in advance of each slot.

Another object of the invention is to provide a perforating machine having a plurality of adjustable slides each carrying a group of punches for perforating a slot in a card or the like and which can be operatively positioned or inoperatively positioned as desired.

A more specific object resides in the provision of a perforating machine having independently adjustable slides for rendering operative one or more punches of a group, depending on the extent to which the slide is pulled out and which will also incorporate novel die structure for association with said punches wherein the die opening for each slide will automatically increase in size as the slide is pulled out and decrease in size as the slide is returned.

A more specific object is to provide a perforating machine for the purposes described which will embody novel die structure comprising a movable die for each adjustable slide, having coaction with a stationary die and wherein three edges of a slot will be cut by the stationary die and the fourth edge by the movable die.

With these and various other objects in view, the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto.

In the drawings which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

Figure 1 is a plan view of a perforating machine constructed in accordance with the invention for punching a number of parallel slots in a card or the like;

Figure 2 is a vertical longitudinal sectional view taken substantially along line 2—2 of Figure 1;

Figure 3 is a vertical longitudinal sectional view taken substantially along line 3—3 of Figure 1 showing the machine partly in front elevation and partly in transverse section;

Figure 4 is a horizontal sectional view taken substantially along line 4—4 of Figure 2, showing the preferred arrangement of dies wherein three sides of the slot are cut by a stationary die and the fourth side by a movable die;

Figure 5 is a top plan view of an individual slide showing the manner of mounting the round and square dies therein;

Figure 6 is a horizontal sectional view through a group of three individual slides showing a modified arrangement of dies for co-acting with the punches of the slides; and

Figure 7 is a plan view of a card perforated with a number of parallel slots by the machine of the present invention.

Referring to the drawings, which illustrate one embodiment of the invention, the frame of the present machine consists of base members 10 and 11 positioned on the respective sides of the machine and extending the length of the body portion thereof as shown in Figure 1. These base members have suitably secured thereto the side frames 12 and 13 which are joined at their upper end adjacent the front by the rod 14 and adjacent the rear by rod 15. Said rods are threaded at their respective ends and these ends receive the nuts 16 securely holding said rods in place. The sides frames 12 and 13, which are secured to the base member by rivets 17, have a shape which is best illustrated in Figure 1 and which is substantially the same in outline as that of the individual slides confined between said side frames and which will be presently described. It will be apparent from Figure 1 that the frames 12 and 13 extend beyond the rear of the base members 10 and 11. Positioned to the inside of each side frame is a member 18 and 19, respectively, which may be described as a suport

member and which has direct contact with an end slide. The shape of said bearing members is substantially that of a side frame although in certain particulars they differ in general outline. The rivets 20 secure the support member 18 to its side frame 12 and rivets 21 in like manner securely join member 19 to its side frame 13. It is also noted that the upper ends of said members terminate substantially flush with that of the frame and are apertured for receiving the rods 14 and 15. The side frames at their lower ends are grooved, as clearly shown in Figure 3, for receiving the outwardly bent flange 22 formed on the sides of a metal container identified by numeral 23 having a knob 24. In this manner the container is supported for movement so that the same can be withdrawn and replaced and it will be understood that space is provided by the base members 10 and 11 within which the container is located.

The punches of the present perforating machine are actuated by a force plate 25 which is suitably secured as by welding to the top member 26 of a movable frame which is reciprocated in a vertical direction by the plunger 27. The movable frame is completed by the depending side members 28 and 29 and which are provided at their lower ends with an inwardly directed flange portion 30. The depending side members 29 are positioned to the outside of the side frames 12 and 13 and the flanges 30 are also spaced in the side frames so that the movable frame will be free of any obstructions or interference to its movement. It will be understood, as best illustrated in Figure 2, that the inwardly directed flanges 30 of the movable frame provide a support for the transverse bars 31 and 32 which are suitably secured to the depending side members 28 and 29 by the screws 33 and which are positioned forwardly and rearwardly of said movable frame, respectively.

In the present perforator the carriers for the punches consist of a plurality of individual slides identified by numeral 34. The general shape of the slides, as will be clear by reference to Figure 2, is rectangular, each slide having extending from its upper forward end a portion 35 to which is fixed the actuating knob or handle 36. Each slide substantially centrally thereof is provided with an opening 37 and when the slides are in assembled relation in the machine the bars 31 and 32 are located within this opening and the same extend transversely of the machine, passing through the openings of all the slides.

Each slide carries a plurality of punches which are vertically mounted for reciprocating movement. The square punches 38 of each slide are located in slots formed in the upper portion 39 and the lower portion 40, respectively, of the slide and these punches are in line so that each has contact with an adjacent punch. Each slide also carries a round punch 41, which is located forwardly of the square punches a very short distance and aligned therewith. The round punch is peculiar to the present embodiment and this element may be omitted without materially departing from the invention, since the square punches operate the same in both cases. All the punches are inoperatively positioned when the slide is "in", that is, located inwardly as far as the slide will go, and it will be observed that to render the round punch inoperative the force plate 25 is provided with a plurality of round bored openings 42, each being in alignment with an end of small diameter formed on the round punches.

Elongated openings 43 are provided in the forward end of each slide and through these openings the rod 14 extends. Similarly, rod 15 extends through aligned openings 44 formed in the rear end of each slide. This allows the slide to be drawn out and returned, or, in other words, to be reciprocated within the limits permitted by the openings. On the top surface above the openings 44 each slide has formed therein depressions 45 which equal in number the punches in the slide and as a result of the spring pressed ball 46 the slide is releasably positioned. The cover 47 backs the spring 49 and said cover is supported by the side frames 12 and 13. The slides may be pulled out one, two or more notches and this will render operative the round punch and one square punch or said round punch and two square punches, etc., depending on the number of notches to which the slide is moved. Downward movement of the force plate will produce similar movements of these operatively positioned punches. To perform a perforating operation it will be observed that movement forwardly of the slide will locate the round punch out of alignment with opening 42 and therefore this punch and the square punch, which may be located under said opening will be actuated.

For lifting the punches that have been depressed the invention provides pins 48 projecting from the sides of each punch. These pins overlie and normally contact lifting bars 50 which extend between the punches of adjacent slides and of course below the pins. Said bars 50 are fixed at their ends to the transverse bars 31 and 32, respectively. As the force plate and the movable frame move downwardly for a perforating operation the bars 50 have similar movement and therefore no interference is presented to the actuation of the punches for perforating a card or the like. However, as the movable frame moves upwardly the bars 50 are brought into contact with the pins 48 and the punches are lifted from the die openings and returned to initial position. In this position they may be operated again if it is desired to punch another card or the position of the slides can be changed before the force plate is again actuated.

Dies are provided in the present perforator for association with the punches to punch the round openings and the parallel slots. As the slides 34 are pulled out a larger number of square punches are rendered operative and accordingly the die opening must increase in size to accommodate this larger number of square punches. The preferred modification shown in Figures 2 and 4 includes a stationary die 51 having die openings 52 extending inwardly from its forward edge. The openings each receive a movable die 53 carried by the slide and which has a width and length to completely fill the die opening when the slide is inoperatively positioned. In this position the forward cutting edge 54 of the movable die is in contact with the rear cutting edge 55 provided by the stationary die. However, when the slide is pulled out the two surfaces separate, forming a slot to accommodate the square punches. For the round punch each movable die has a round die opening 56 which at all times is in alignment with the round punch. Each movable die is integral with a supporting portion 57 secured by screws 58 to the base section 60 of its slide. In the form of the die structure shown in Figure 4 the stationary die will cut three edges of a slot and the fourth edge will be cut by the movable die.

Figure 6 shows a modified form of die structure wherein the parts are reversed from that of Figure 4. The stationary die 61 provides the male

members 62 which fit within a die opening 63 formed in each movable die 64. Round die openings 65 are also located in the movable die so that these maintain their position with respect to the round punches. In this modification three sides of each slot in the card are cut by the movable part of the die structure and the fourth or rear edge is cut by the stationary die.

In both forms the stationary die is suitably supported from the supporting members 18 and 19 by means of projections 66 which have interfitting engagement with the members. The punchings will of course drop through their respective die openings and in order that they may be collected in the receptacle 23 the part 60 of each slide is apertured at 67, as shown in both Figures 4 and 6. This opening is about the width of the square punches and the same extends so as to accommodate all the punches of a slide. The receptacle may be removed from the perforator and emptied.

In the perforator of the invention the individually adjustable slides are normally maintained in inoperative position such as shown in full lines in Figure 2. Although the round punch is located under the force plate 25 when the slide is "in" the opening 42 receives the reduced end of the punch and the same is not actuated. However, when the slide is pulled out the round punch and one or more of the square punches are operatively located under the force plate 25 and downward movement of the movable frame will actuate the same to perforate a round opening in a card or the like and to also perforate a slot. The card to be punched is inserted in the perforator and properly positioned therein by the rear edge 68 of the perforator opening 69. This opening is provided for the full width of the perforator, being formed in the slides and also in the supporting members 18 and 19 and the side frames 12 and 13. With the card thus properly positioned the desired slides may be pulled out to perforate parallel slots in the card and wherein each slot has associated therewith a round opening. This will be evident from Figure 7 in which the card 70 is perforated with parallel slots 71 of variable length and wherein each slot has a round opening 72 immediately below the same. The cards may be used for keeping inventory and the like, in which case the cards are printed with numbers arranged in columns, each column beginning with the numeral 9 at the top and ending with numeral 1 at the bottom. In order that the operator will know to what extent the various slides must be pulled out for punching a slot of desired length the side frames 12 and 13 support a wire marker 73, Figure 2, extending transversely of the frame, and each slide is marked on its upper surface with a column of numbers such as appear on the card although in reverse order. When the slide is pulled all the way out the entire column will be perforated. When the slide is moved part way as, for example, when the numeral 6 appears beyond the wire marker 73, this will indicate that said slide will punch a column of numbers down to and including numeral 6. This numeral will be punched with a round opening and the slot will be punched by three square punches.

When the various individual slides are operatively positioned it will be understood that the particular die structure for each slide automatically provides a die opening of a size to accommodate the operatively positioned punches. In both forms of structure shown in Figures 4 and 6 a round die opening is formed in the movable member and therefore these openings maintain alignment with the round punches 41. Each elongated die opening for the square punches of a slide progressively increases in length as the slide are pulled out to accommodate the increasing number of square punches which are rendered operative by movement of the slide in this direction.

What is claimed is:

1. In a perforator of the class described, the combination with actuating means, of a slide adjustable in a longitudinal direction to vary its position with respect to said actuating means, a plurality of punches carried by said slide in aligned relation longitudinally of the slide, whereby adjustment of said slide will vary the number of punches operatively positioned under said actuating means, and die structure including a movable part having movement with the slide to vary the length of the die opening so as to accommodate the punches operatively positioned for any adjustment of the slide.

2. In a perforator of the class described, the combination with actuating means, of a slide adjustable in a longitudinal direction to vary its position with respect to said actuating means, a plurality of punches carried by said slide, said punches being arranged in aligned relation longitudinally of the slide whereby adjustment of said slide will vary the number of punches operatively positioned under said actuating means for actuation thereby, and die structure comprising a stationary part and a movable part, said movable part having movement with the slide to vary the length of the die opening so as to accommodate the punches operatively positioned for any adjustment of the slide.

3. In a perforator of the class described, the combination with actuating means, of a slide adjustable in a longitudinal direction to vary its position with respect to said actuating means, a plurality of punches carried by said slide in aligned relation longitudinally of the slide, whereby adjustment of the slide will vary the number of punches operatively positioned under said actuating means, die structure including a movable part having movement with the slide to vary the length of the die opening so as to accommodate the punches operatively positioned for any adjustment of the slide, and means yieldingly holding said slide in its adjusted positions.

4. In a perforator of the class described, the combination with actuating means, of a frame mounting said actuating means for substantially vertical movement, a slide also mounted by said frame below the actuating means for longitudinal movement in a horizontal plane, a plurality of punches carried by said slide in aligned relation longitudinally of the slide, whereby movement of the slide will vary the number of punches operatively positioned under said actuating means, and die structure comprising a stationary part and a movable part, said movable part having movement with the slide to vary the length of the die opening to accommodate the punches operatively positioned for any adjustment of the slide.

5. In a perforator of the class described, in combination, a plurality of slides, a plurality of punches carried by each slide in aligned relation longitudinally thereof, actuating means for the punches, means mounting the slides for individual movement in a longitudinal direction whereby the punches operatively positioned under the ac-

tuating means progressively increase in number as each slide is moved in a certain direction, and die structure comprising a stationary part and a movable part for each slide, the movable part of the die structure having movement with its slide and forming a die opening of varying length to accommodate the punches operatively positioned for any longitudinal adjustment of the slide.

6. In a perforator of the class described, the combination with actuating means adapted to have vertical movement, of a plurality of slides each having longitudinal adjustment in a horizontal plane with respect to said actuating means, a plurality of punches carried by each slide in aligned relation longitudinally thereof, means to impart vertical movement to said actuating means to depress the punches operatively positioned under the same by longitudinal adjustment of a slide, and die structure comprising a stationary part and a movable part for each slide, the movable part having movement with its slide to vary the length of the die opening to accommodate the punches operatively positioned for any adjustment of the slide.

7. In a perforator for punching elongated openings in cards and the like, in combination, a frame, a plurality of slides mounted in the frame for individual longitudinal movement in a substantially horizontal plane, a plurality of punches carried by each slide in aligned relation longitudinally thereof, vertically movable operating means for depressing said punches for a perforating operation, the number of punches actuated by said operating means depending on the adjustment of the various slides to position the punches thereof under said operating means, and die structure comprising a stationary part and a movable part for each slide, the movable part of the die structure having movement with its slide to vary the length of the die opening to accommodate the punches operatively positioned for any adjustment of the slide.

8. In a perforator for punching elongated openings in cards and the like, in combination, a frame, a plurality of slides mounted in the frame for individual longitudinal movement in a substantially horizontal plane, vertically disposed punches carried by each slide, said punches being positioned in alignment with each other and which coincides with the longitudinal axis of the slide, a vertically movable frame having association with the first mentioned frame, a force plate on said movable frame for depressing the punches positioned under the same when the frame is moved downwardly, the longitudinal movement of the slides in a certain direction progressively increasing the number of punches operatively positioned under said force plate, and die structure comprising a stationary part supported by the first mentioned frame and a movable part fixed to each slide, said movable part having movement with its slide and forming a die opening of progressively increasing length as the slide is moved in said direction to accommodate the increasing number of punches operatively positioned and thereby moved in a downward direction by said force plate.

9. In a perforator for punching elongated openings in cards and the like, in combination, a frame mounting a plurality of slides for individual movement in the direction of their longitudinal axis, a plurality of punches carried by each slide for movement in a vertical direction to perform a perforating operation, vertically movable means associated with the frame, said vertically movable means having operation to depress the punches operatively positioned under the same as said means moves in a downward direction and to retract the punches upon movement in an upward direction, the number of punches operatively positioned under said movable means varying in accordance with the longitudinal adjustment of each slide, and die structure for each slide including a part having movement with its slide whereby the die opening formed by said die structure has variable length depending on the longitudinal adjustment of each slide to accommodate the punches operatively positioned.

10. In a perforator for punching elongated openings in cards and the like, the combination with actuating means adapted to have vertical movement, of a plurality of slides each having longitudinal adjustment in a horizontal plane with respect to said actuating means, a plurality of punches carried by each slide in aligned relation longitudinally thereof and for movement in a vertical direction to perform a perforating operation, said vertically movable actuating means having operation upon downward movement to depress the punches operatively positioned under the same and to retract the punches upon movement in an upward direction, the number of punches operatively positioned under said actuating means varying in accordance with the longitudinal adjustment of each slide, and die structure for each slide comprising a stationary part and a movable part, said movable part having movement with its slide to vary the length of the die opening to accommodate the punches operatively positioned for any adjustment of the slide.

11. In a perforator for punching elongated openings in cards and the like, in combination, a frame, a plurality of slides mounted in the frame for individual longitudinal movement in a substantially horizontal plane, a plurality of square punches carried by each slide, said punches being positioned in alignment with each other and which coincides with the longitudinal axis of the slide, a vertically movable frame for depressing those punches operatively positioned under the same by longitudinal movement of a slide, a circular punch also carried by each slide and located in advance of said square punches, said movable frame having openings therein for alignment with each circular punch when the slides are rearwardly positioned, whereby the movable frame is ineffective to actuate said circular punches with the slides in said rearward position, die structure comprising a stationary part supported by the first mentioned frame and a movable part fixed to each slide, said movable part having movement with its slide and forming a die opening of progressively increasing length as the slide is moved forwardly to accommodate the increasing number of square punches operatively positioned under said movable frame, and said movable part having a die opening therein for said circular die.

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