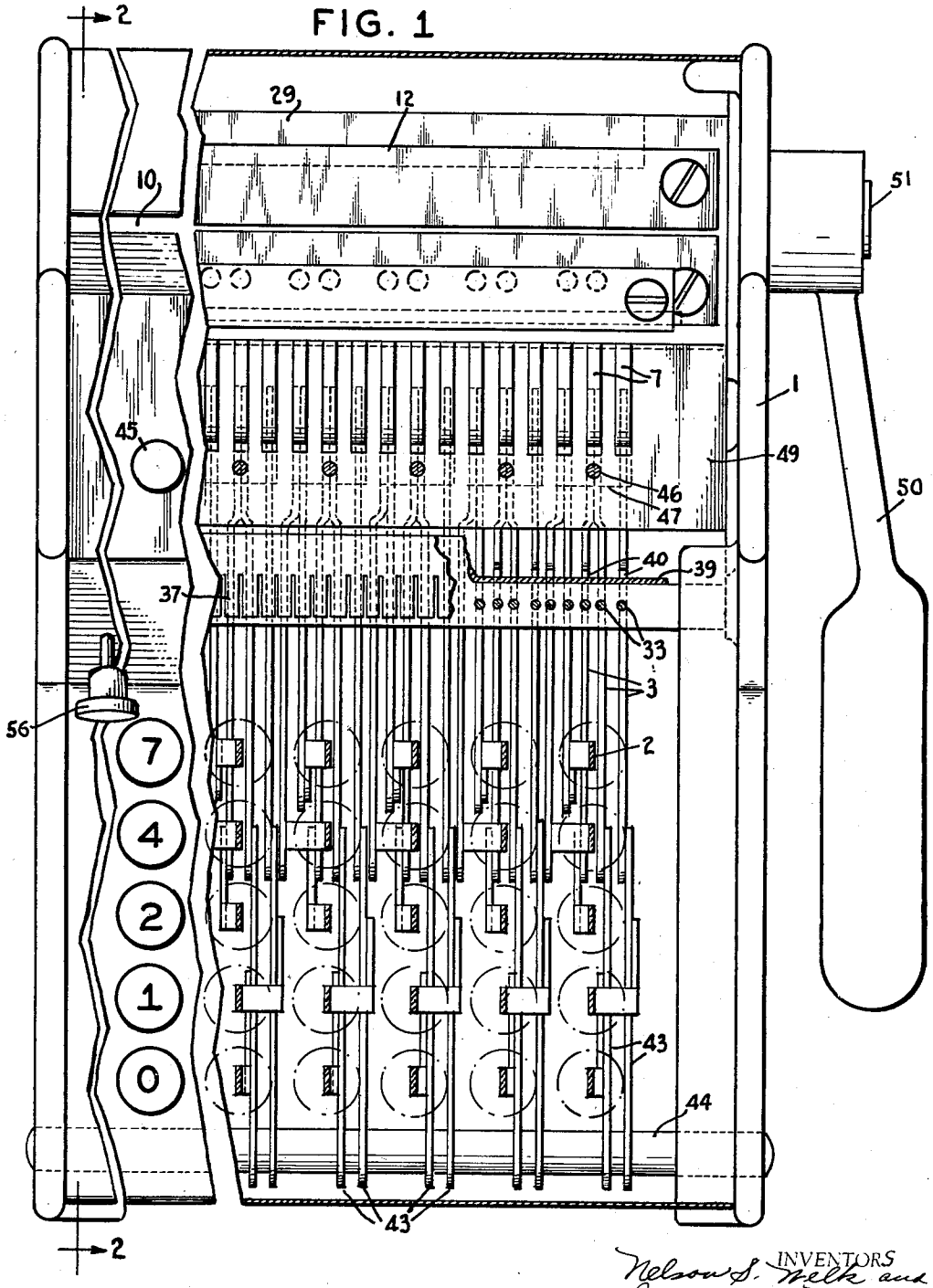
Nov. 24, 1936. N. S. WELK ET AL 2,062,155

DOUBLE ROW KEY PUNCH

Filed Oct. 2, 1935 5 Sheets-Sheet 1

FIG. 1



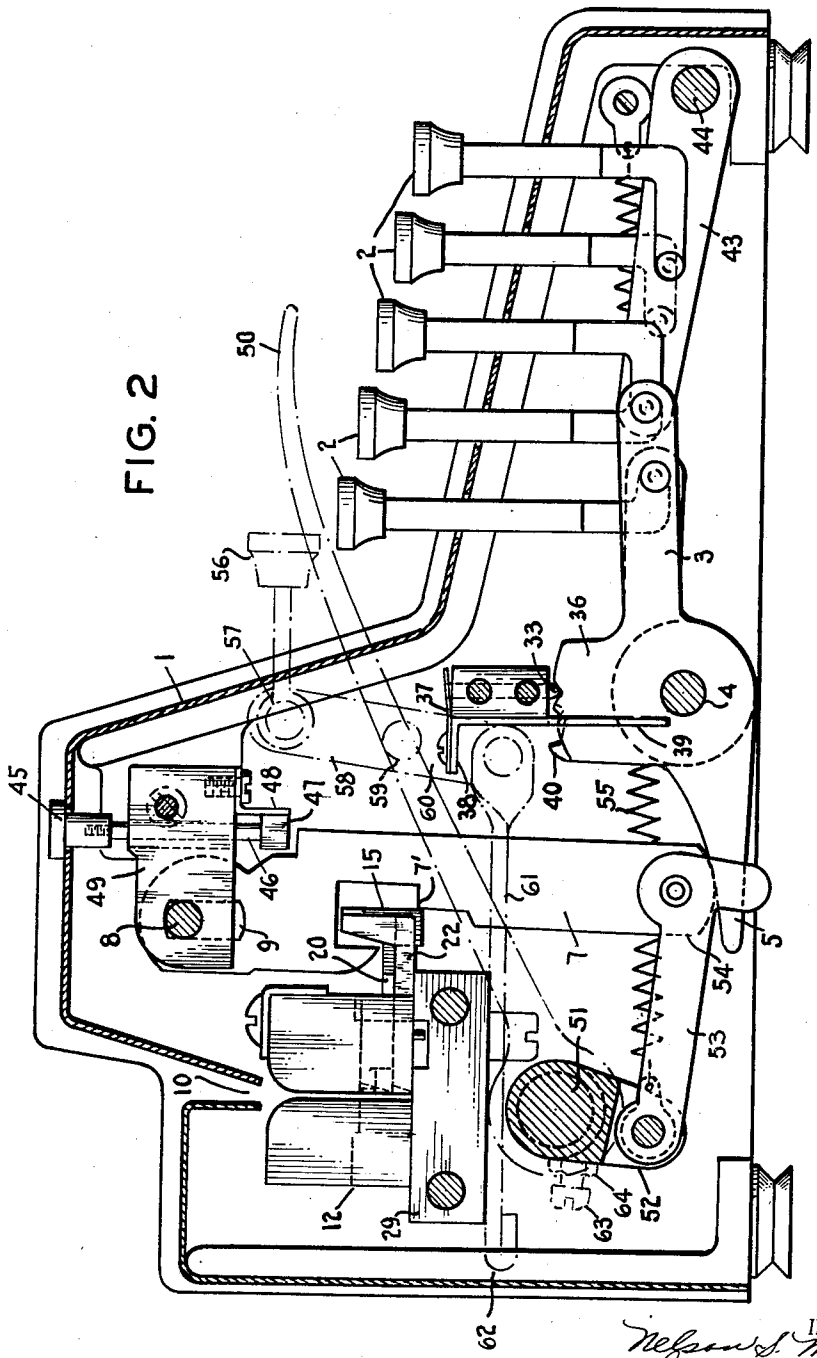
INVENTORS
Nelson S. Welk and
Donald A. Nevin
BY Harvey Lea Dodson
ATTORNEY.

Nov. 24, 1936. N. S. WELK ET AL 2,062,155

DOUBLE ROW KEY PUNCH

Filed Oct. 2, 1935 5 Sheets-Sheet 2

FIG. 2



INVENTORS
Nelson S. Welk and
Donald A. Nevin
BY Harvey Lee Dodson
ATTORNEY.

Nov. 24, 1936. N. S. WELK ET AL 2,062,155

DOUBLE ROW KEY PUNCH

Filed Oct. 2, 1935 5 Sheets-Sheet 3

FIG. 3

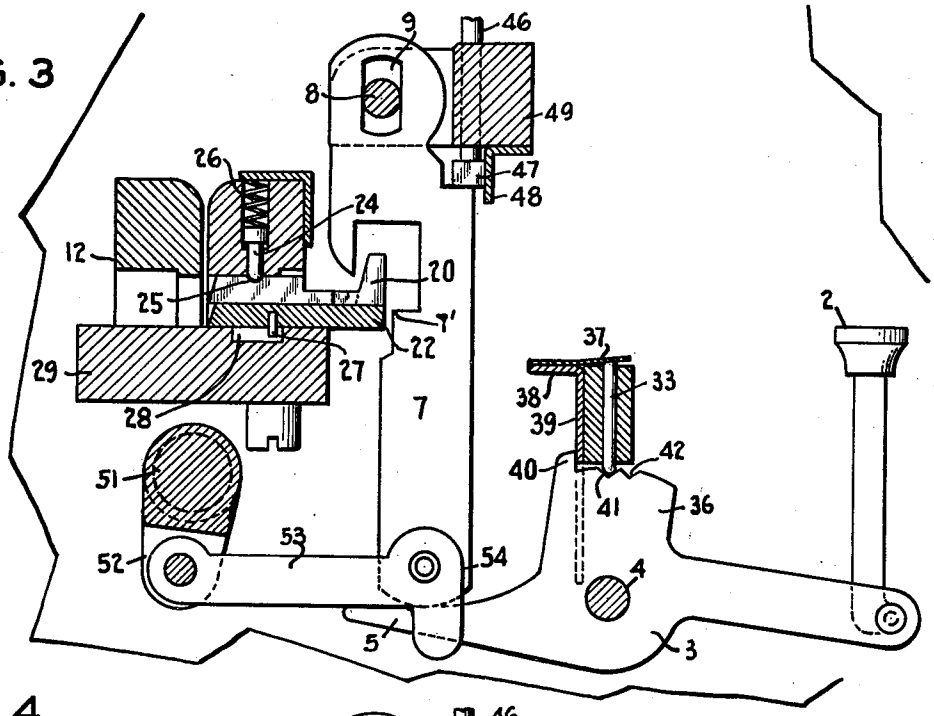
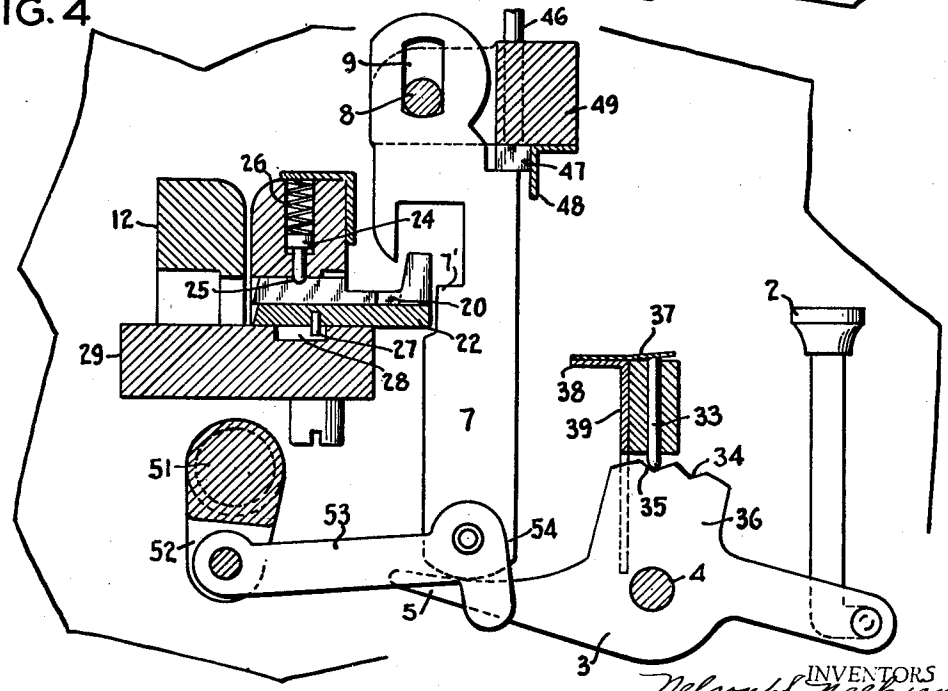


FIG. 4



INVENTORS
Nelson S. Welk and
Donald C. Nevin
BY Harvey Lea Dodson.
ATTORNEY.

Nov. 24, 1936. N. S. WELK ET AL 2,062,155

DOUBLE ROW KEY PUNCH

Filed Oct. 2, 1935 5 Sheets-Sheet 4

FIG. 5

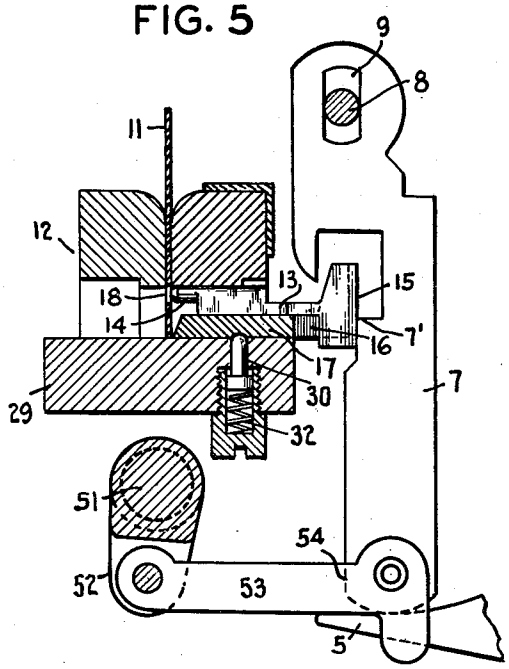


FIG. 6

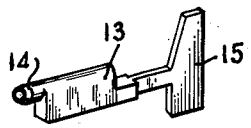


FIG. 7

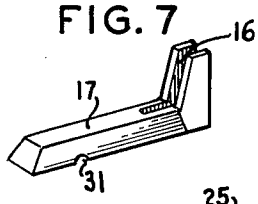


FIG. 8

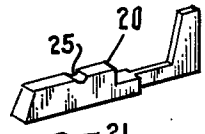


FIG. 9

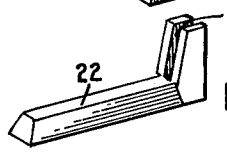
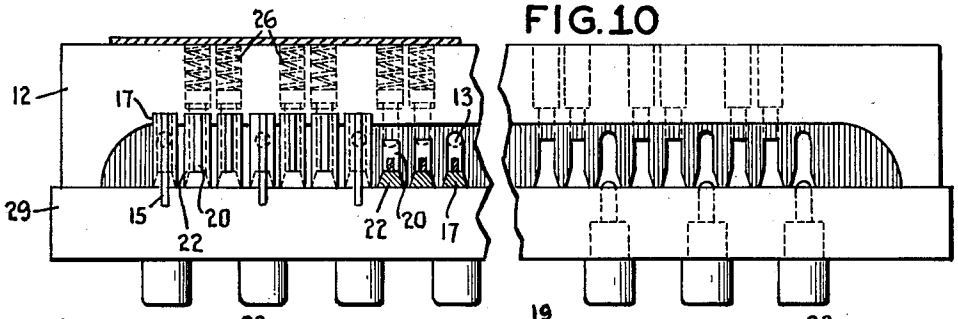


FIG. 10



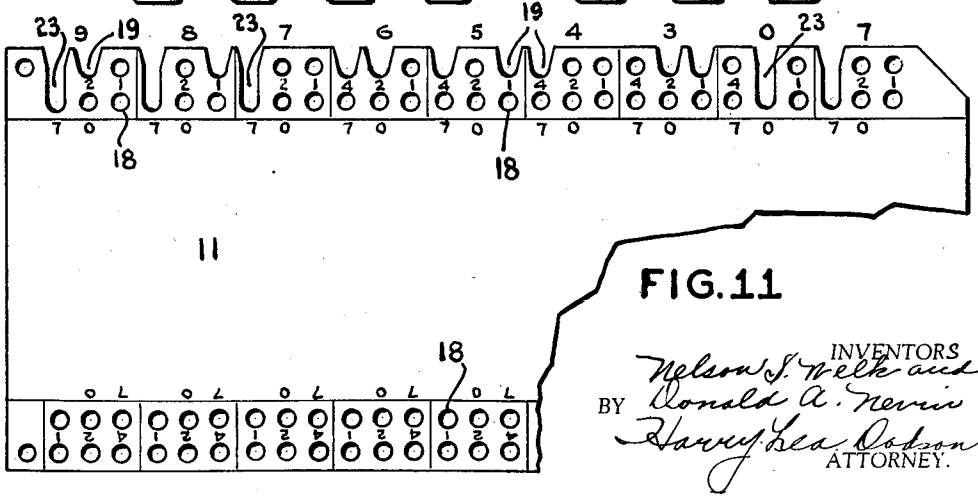


FIG. 11

INVENTORS
Nelson S. Welk and
Donald A. Nevin
BY Harvey Lea Dodson
ATTORNEY.

Nov. 24, 1936. N. S. WELK ET AL 2,062,155

DOUBLE ROW KEY PUNCH

Filed Oct. 2, 1935 5 Sheets-Sheet 5

FIG. 12

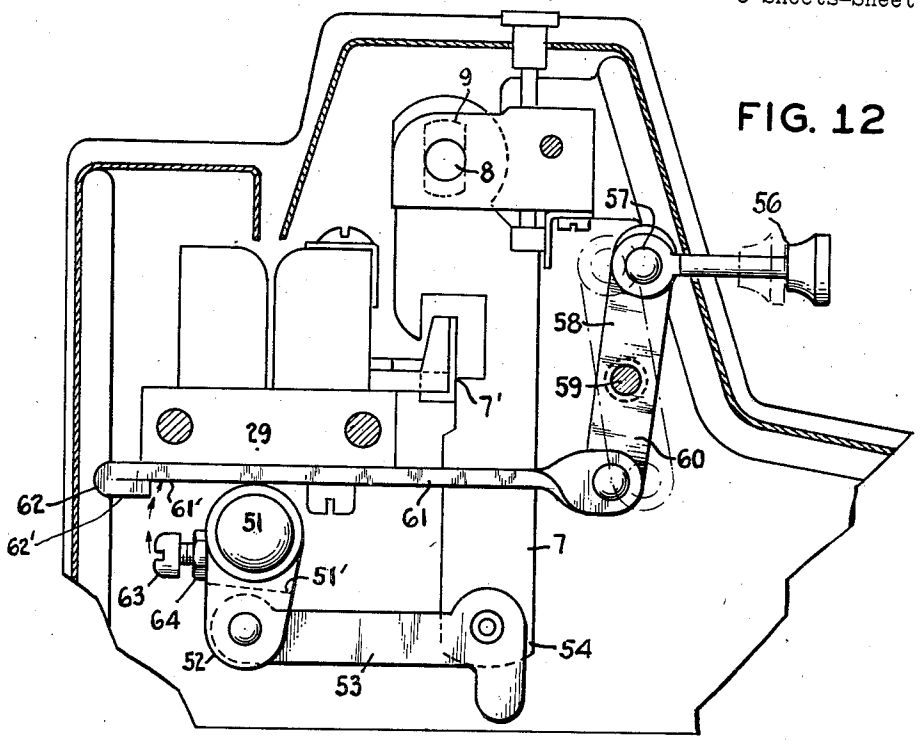
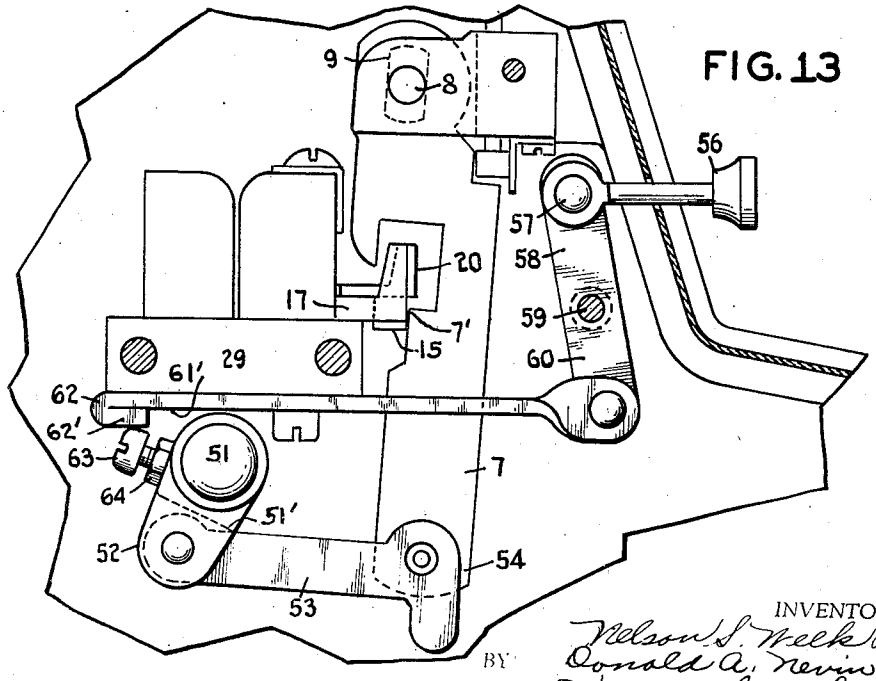


FIG. 13



INVENTORS
Nelson S. Welk and
Donald A. Nevin
BY Harvey Lea Dodson
ATTORNEY.

Patented Nov. 24, 1936 2,062,155

UNITED STATES PATENT OFFICE

2,062,155

DOUBLE ROW KEY PUNCH

Nelson S. Welk and Donald A. Nevin, Athens, Ohio, assignors to The McBee Company, Athens, Ohio, a corporation of Ohio

Application October 2, 1935, Serial No. 43,194

20 Claims. (Cl. 164—112)

Our invention relates more particularly to that type of card punches in which the punch actuators are placed in position by a board of selective keys such as is described in the patent issued to Welk, No. 1,981,932, which relates to a punch to notch the cards described in the patent to Perkins, No. 1,544,172.

As described in the Welk patent, a card is illustrated having a single row of holes punched adjacent the margins of the card. These holes are divided into series of groups of four holes representing either singly or in combination the numerals 1 to 10.

As shown in the Perkins patent, referred to, the card is illustrated with a double row of holes. These holes are also sub-divided into groups and a fourth hole is added to each group which represents the numerals 1 to 10, the fourth hole being located under and in offset relation to the other three holes. This arrangement permits a more extended codification on a card of given size as it permits the arrangement of more groups of holes which practice has shown is very desirable.

As described in the Welk patent, the punch is used to notch certain holes from the hole to the edge of the card to facilitate the sorting of the cards with a needle, while in the Perkins patent the card is shown to be notched from either row of holes to the edge or margin of the card, but in both of these cards there is no provision for the numeral 0 other than by omitting to notch the card. Due to this arrangement it becomes necessary, in order to segregate the 0 cards to sort out all the other numerals first. Where a double row of holes is employed as shown in the Perkins patent, it becomes necessary under certain conditions for the notch to extend from the edge or margin of the card down to the hole on the inner row. To obtain this result would require either two machines like the Welk patent—one for the outer row and one for the inner row—or else a complete change of punches, the expense of which would be excessive.

Our invention has for its principal object to provide mechanism for punching cards having a double row of holes adjacent their edges. The holes in the inner row being in line with the holes in the outer row instead of being staggered as shown in the Perkins patent.

A further object is to provide for positioning the card by means of the holes rather than by the edge of the card as is customary, thus ensuring a greater degree of accuracy for the sorting mechanism. For this purpose we provide an additional or sixth hole in each group. One or all of these six holes are to be used for the entrance of a card positioning plunger which is arranged to enter the positioning hole just prior to the portion of the punch for notching the card.

A further object of the invention is to arrange the key buttons in straight rows, instead of staggered as shown in the Welk patent, so as to conform to adding machine practice and operation, since as operators become familiar with such key board it facilitates the operation of the key punch.

A further object is to provide for a sectional punch for notching either the outer or inner row of holes—one or both of the sections being actuated as desired by the same punch actuating mechanism.

Our means of accomplishing the foregoing objects may be more readily comprehended by having reference to the accompanying drawings which are hereunto annexed and are a part of this specification, in which—

Fig. 1 is a plan view of our improved punch, part of the casing being broken away so as to disclose the interior construction;

Fig. 2 is a side elevation of the device shown in Fig. 1 taken on the line 2—2 in Fig. 1;

Fig. 3 is an enlarged fragmentary detail view showing the punch actuating mechanism shifted to a position for actuating the lower section of the sectional punch for notching the card;

Fig. 4 is a similar view where the punch actuating mechanism has been lifted sufficiently so that it will engage both sections of the punch;

Fig. 5 is a fragmentary detail view partially in section showing the punch actuating mechanism in position to actuate the card positioning plunger just prior to the actuating of the key notching section of the punch;

Fig. 6 is a perspective detail view of the card positioning plunger;

Fig. 7 is a perspective detail view of the other section of this punch;

Fig. 8 is a perspective detail view of the upper or outer section of the card notching punch;

Fig. 9 is an enlarged perspective detail view of the lower section of this punch;

Fig. 10 is a front elevation of the die block showing part of the punches in full; part in section; and part left out for clarity;

Fig. 11 is a fragmentary front elevation of our improved card;

Fig. 12 is a fragmentary side elevation, partly in section, showing the repeat mechanism in its normal position; and

Fig. 13 is a similar view of Fig. 12 but with the repeat mechanism shown in its operating position.

Similar reference numerals refer to similar parts throughout the entire description.

As shown in the drawings, the mechanism is contained in a casing 1 and comprises a plurality of keys 2 which are arranged to actuate a lever

such as is described in the Welk patent referred to. Each of the keys 2 is secured in suitable manner to a key stem lever 3. These levers are arranged in pairs and mounted to rock upon a shaft 4 which extends from one end wall of the casing to the other end wall (not shown). The inner ends 5 of each pair of key stem levers are in the same plane as a rocker arm or punch actuator 7 which serves to reciprocate the sectional punches which will be more specifically described hereinafter.

The rocker arms 7 swing on a rocker arm shaft 8, a slot 9 being provided adjacent the upper end of the rocker arm 7 through which the shaft passes. This slot permits the vertical reciprocation of the rocker arm 7, in order to bring the shoulder 7' in position to abut a punch to press it inwardly and cause it to notch the card.

Inasmuch as these rocker arms 7 and their actuating mechanism are fully described in the Welk patent above referred to, a specific description is not deemed necessary.

A slot 10 is provided in the top portion of the casing for the reception of the cards 11, one of which is clearly shown in Fig. 11. A suitable die 12 is mounted below the slot 10. The sectional punches are slidably mounted in the die 12.

These punches, as more clearly seen in the detail views in Figs. 6, 7, 8, and 9, are made in sections. Figs. 6 and 7 show one pair of sections, the upper section 13 forms a card positioning plunger 14. This section 13 is provided with a head 15 which is fitted to a slot 16 formed in one end of the lower section 17. It will be clearly seen from the drawings, particularly Fig. 2, that since the head 15 projects below the lower surface of the section 17, a sufficient distance to engage the shoulder 7' on the rocker arm 7, that the upper section 13 will be moved before the rocker arm 7 abuts the notching section or moves it at all.

The result of this construction is that the swinging of the rocker arms 7 as shown in Fig. 5, will contact the head 15 of each of the sections 13, causing the card positioning plungers 14 to enter the holes 18 formed in the card 11 as clearly seen in Fig. 5. This operation will be in advance of any movement of the lower section 17 which is to notch the card by the further movement of the rocker arm 7 on the shaft 8. This further movement of the rocker arm 7 will move both the lower and upper sections and the punch will be pressed through the card forming a notch as indicated at 19 in Fig. 11.

It will be clear from the foregoing that any swinging movement of the rocker arms 7 will always cause the positioning plungers 14 to enter the holes 18 formed for that purpose and thus the card will not only be positioned by these plungers before the notching can take place but will be held in exact location during such operation.

When it is desired to notch the card so as to cut out the portion between the edge and a hole in the inner row, a sectional punch such as shown in Figs. 8 and 9 is employed. As shown in Figs. 8 and 9 this punch consists of an upper section 20 adapted to notch the cards as indicated at 19 in Fig. 11. This section 20 is mounted and slides in a slot 21 formed in the lower section 22 of this punch. This lower section being used to notch the card in combination with the section 20 as shown at 23 in Fig. 11.

It will be apparent that, as in the case of the sectional punch shown in Figs. 6 and 7, the same rocker arm or actuating mechanism is employed to operate either the section 20 alone or the sections 20 and 22 at the same time. In order to prevent the sections moving with each other due to the frictional engagement of their surfaces we provide, as clearly seen in Figs. 3 and 4, a spring pressed detent 24, the inner end of which engages a notch 25 formed in the section 20. A coil spring 26 serves to hold the detent normally projected into the notch 25. This spring should be sufficiently flexible to permit it to yield easily so that the section 20 can be reciprocated without undue frictional resistance.

The lower section 22 of this punch is preferably provided with a pin 27 which slides in a slot 28, formed in the support 29 for the die block 12. This pin serves to limit the longitudinal movement of section 22.

A somewhat similar construction is provided for the lower section 17 of the other sectional punch. A detent 30 engaging a slot 31 formed in the bottom of the section 17. A coil spring 32 is provided to hold the detent normally projected as clearly shown in Fig. 5.

Having selected the desired punch and depressed its key thus elevating the rocker arm into position to abut the desired punch, the operator presses upon the hand lever 50 (if it is manually and not electrically operated) this swings a crank shaft 51 and moves the crank arm 52. The arm 52 is pivotally connected to a link 53 which is pivoted adjacent the lower end 54 of the rocker arm 7. The rotation of shaft 51 operates to swing the rocker arm 7 on the shaft 8. A coil spring 55 is provided to return the parts to their normal position.

The means employed to hold the key stem levers 3 in elevated position is somewhat similar to the one employed in our copending application, Serial No. 40,580, in which a vertically movable plunger 33 engages notches 34 and 35 formed in the upwardly projecting portion 36 of the key stem lever 3. In the copending application these plungers are held down by coil springs. Practice has shown that in arranging these detent plungers close together it was impractical to secure a coil spring which would provide sufficient resistance, as their close spacing necessitated a spring of extremely small diameter. In the present instance they are held down by the means of fingers of a flat spring 37 which may be secured to the upper portion 38 of the guide 39 for the key stem levers. The spring is shaped so that each finger will press upon a plunger.

Each one of the pair of key stem levers 3, as shown in Fig. 3 which is to actuate the lower section of the punches is provided with a stop 40 which engages the wall of the guide 39, this prevents the key stem lever from raising the rocker arm 7 more than the distance which will be required to bring it in position to operate the lower section of the punch. The other key stem levers 3', as shown in Fig. 4 which are designed to be employed where both sections of the punch are to be actuated are not provided with the stops 40, consequently when operated the rocker arm 7 will be lifted sufficiently to engage the end face of both sections of the punch or until the bottom of the slot 9 engages the shaft 8.

The notches 34 and 35 on the key stem levers, employed for this purpose, are more widely separated than are the notches 41 and 42 on the levers having the stop 40 formed on them, in order to provide for this additional movement.

The forward portions of the key stem levers are secured to the key stems in the usual manner with the exception of those bearing numerals 0 or 1. These are pivoted to a compensating lever 43 to which is pivoted the key stems. This lever swings on shaft 44. In this manner we avoid the excess movement which would otherwise result from the depression of the keys bearing numerals 0 or 1.

We have provided an improved arrangement for the restoring key 45. Practice has shown that it is better if possible to avoid the hinged parts shown in our copending application above referred to and greater efficiency is attained by having the key stems 46 of the restoring keys 45 secured to a cross head 47 which extends across three of the rocker arms. This cross head is prevented from turning by an angle piece 48 which is attached to a rocker arm supporting bar 49.

We have provided a simplified repeat mechanism which comprises a repeat key 56 and its connecting parts. The key 56 projects through the front wall of the casing 1. Its inner end is connected to one end 27 of a rocker lever 58 which is mounted on a stud 59. The lower end 60 of the lever 58 is connected to a link 61 which slides on the crank shaft 51 being guided by the bottom of the die support 29. This link terminates in a head 62. In the crank shaft 51 near one end is mounted a cap screw 63 which is screwed into the crank shaft 51. A locknut 64 is provided to hold it in place. As shown in Fig. 12 the repeat mechanism is in normal position and the crank shaft can be freely rotated when however the key 56 is pushed in, as seen in Fig. 13, the head 62 will be moved into the position where the end of the cap screw 63 will contact the head 62 and further movement of the crank shaft is prevented. In this manner the punching operation may be repeated as often as desired.

From the foregoing it will be seen that in normal operation the repeat button 56 is pulled out to the position shown in Fig. 12. This imparts motion to the rocker lever 58 causing it to move link 61 rearwardly sufficiently for the surface 62', on the head 62 of link 61. When the arm 52 has moved a sufficient amount for the punches to cut through a card as shown in Fig. 13 the upper edge of link 61 will contact with the bottom of a slot in 51 at a fulcrum point 51' and further movement of the operating lever 50 imparts a rapid downward movement to link 53, also rocker arm 7.

When the repeat button 56 is depressed as shown in Fig. 13 this downward motion is prevented by contact of screw 63 with surface 62' of head 62 thus providing for notching the cards without restoring the punching mechanism or any of the depressed keys.

Having described our invention, what we regard as new and desire to secure by Letters Patent is—

1. In a device of the character described, a plurality of sectional punches, a plurality of punch actuators, a pair of key actuator levers for each punch actuator, one for each section of said punches, whereby said punch actuators can be moved into position to actuate one or both sections of said sectional punches.

2. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of keys arranged in straight rows, a plurality of sectional punches to notch said cards, punch actuating mechanism, means to move said punch actuating means, means whereby the keys can selectively designate the punch to be actuated, and means to permit the same punch actuating means to actuate one or both sections of said punches.

3. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of keys arranged in straight rows, a plurality of sectional punches to notch said cards, a plurality of punch actuators, a pair of key actuated levers for each punch actuator, one for each section of said punches.

4. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of keys arranged in straight rows, a plurality of sectional punches to notch said cards, a plurality of punch actuators, a pair of key actuated levers for each punch actuator, one for each section of said punches, key selective means, said keys operating to shift said punch actuating mechanism whereby one actuator can actuate one or both sections of said punches.

5. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of keys arranged in straight rows, a plurality of sectional punches to notch said cards, a plurality of punch actuators, positioned by said keys, card positioning means formed on certain sections of certain of said punches, said card positioning means always being moved into position by said punch actuators before the cards are notched.

6. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of positioning holes, one in each group, a plurality of sectional punches, a plurality of keys, card positioning means formed on certain sections, of certain of said punches, adapted to enter said holes, a plurality of punch actuators, a pair of key actuated levers for each punch actuator, one for each section of said punches whereby they will engage one or both sections of said punches.

7. A key punch to notch cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, certain of said holes being for the reception of a card positioning plunger, a plurality of sectional punches, a plurality of keys, card positioning means formed on certain sections of certain of said punches adapted to enter the perforations provided therefor, the other sectional punches being adapted to notch the edge of the card to a hole in either the first or second row, means to actuate said punches either in single sections or as a unit.

8. A key punch, to notch cards having a double row of holes adjacent their edges, sectional

means to notch said cards from the perforations in either row to the edge, and means to actuate one or both sections with the same means.

9. A key punch for notching cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of keys arranged in straight rows, a plurality of sectional punches to notch said cards, a plurality of punch actuators, positioned by said keys, card positioning means formed on certain sections of certain of said punches, means to limit the movement of said actuators, whereby they can only actuate certain sections of said punches.

10. A key punch to notch cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, certain of said holes being for the reception of a card positioning plunger, a plurality of sectional punches, a plurality of keys, card positioning means formed on certain sections of certain of said punches adapted to enter the perforations provided therefor, a plurality of punch actuators, a pair of key actuated levers for each punch actuator, one for each section of said punches, selective means to shift said punch actuators whereby they will actuate one or both sections of said punches.

11. A key punch to notch cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, certain of said holes being for the reception of a card positioning plunger, a plurality of sectional punches, a plurality of keys, card positioning means formed on certain sections of certain of said punches adapted to enter the perforations provided therefor, before the punches can be operated, a plurality of punch actuators, a pair of key actuated levers for each punch actuator, one for each section of said punches, selective means to shift said punch actuators whereby they will actuate one or both sections of said punches, and means to limit the movement of said selective means.

12. A key punch, to notch cards, having a double row of holes adjacent their edges, sectional means to notch said cards from the perforations in either row to the edge, means to actuate one or both sections with the same means, and means which engage certain of said holes to position said cards before the punches can be operated.

13. A key punch, cards having a double row of holes adjacent their edges, the holes of the inner row being in line with the holes in the outer row, a plurality of sectional punches, means to actuate one or both sections of said punches, key selective means to predetermine which of said sections shall be actuated, a repeat mechanism comprising a repeat key, a rocker lever connected thereto, a link pivoted to one end of said lever, a head on said link, means on said punch actuating means engaged by said head whereby the punches may be actuated without restoring the keys to normal position.

14. A key punch, cards having a double row of holes adjacent their edges, the holes of the inner row being in line with the holes in the outer row, a plurality of sectional punches, means to actuate one or both sections of said punches, key selective means to predetermine which of said sections shall be actuated, a repeat mechanism comprising a repeat key, a rocker lever connected thereto, a link pivoted to one end of said lever, a head on said link, a cap screw mounted on the mechanism which swings said punch actuating means, the head of said screw contacting the head of said link, whereby the punches may be actuated without restoring the keys to normal position.

15. In a device of the character described, a plurality of sectional punches, to notch cards having a double row of holes, one section sliding in a slot formed in the other, a head on said sliding section which enters said slot, punch actuating means, keys arranged to selectively designate which section of said punches will be actuated by said punch actuating means.

16. In a device of the character described, a plurality of punches formed of sections slidable on each other to notch cards having a double row of holes, frictional means to hold one section while the other is free to slide, and formed on certain sections of certain of said punches.

17. A key punch, to notch cards having a double row of holes adjacent their edges, the holes of the inner row being in line with the holes in the outer row, a plurality of sectional punches, means to actuate one of said sections, means to actuate both sections of said punches simultaneously, and key selective means to predetermine whether said sections shall be actuated independently or simultaneously.

18. A key punch to notch cards having a double row of holes adjacent their edges, the holes of the inner row being in line with the holes in the outer row, a plurality of sectional punches, selective keys arranged in straight rows to designate which of said sections shall be actuated, and means to actuate the sectional punches to notch the said cards from the predetermined holes to the edge of the card.

19. A key punch to notch cards having a double row of holes adjacent their edges, the inner row of holes being in line with the holes in the outer row, said holes being arranged in groups, each hole having a designating numeral, a plurality of notching punches formed in sections slidable on one another, a slotted head on one section, a head on the other fitted to said slot, means on one section to limit its movement, and a plurality of keys.

20. A key punch for notching cards having a double row of holes adjacent their edges, means to notch said cards from the perforations in either row to the edge of the card, means to actuate said notching means, key selective means to position said notching means to notch either for the outer row or the inner row, said notching means comprising compound notching punches formed of sections slidable one on another, spring actuated means to hold one section while the other slides, and means to limit the movement of one section.

NELSON S. WELK.
DONALD A. NEVIN.