Dec. 27, 1949 N. S. WELK 2,492,910

CARD SORTING MACHINE

Filed May 14, 1945 2 Sheets-Sheet 1

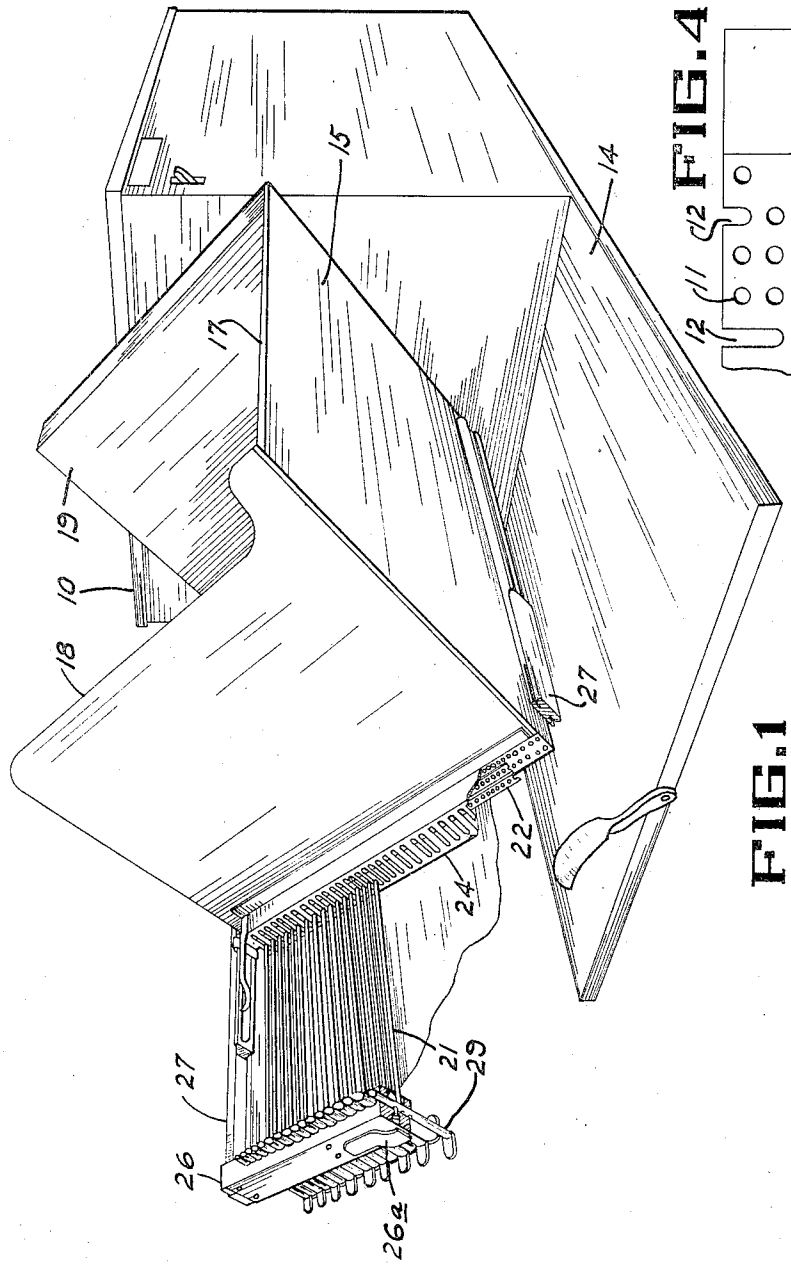



FIG. 1

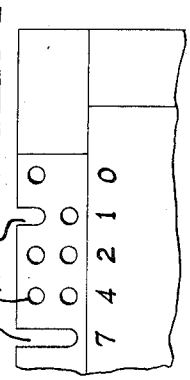



FIG. 4

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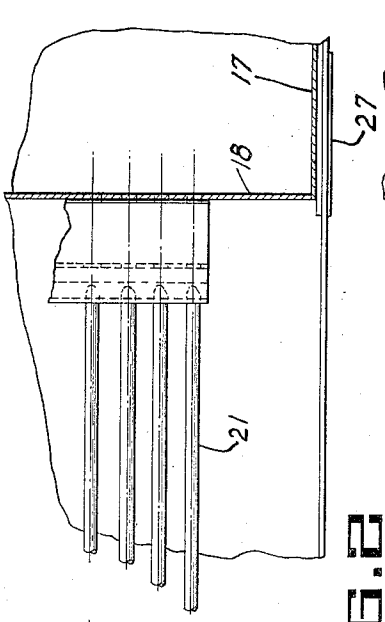



FIG. 2

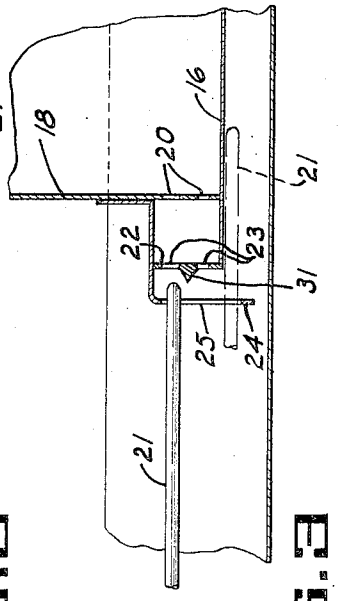
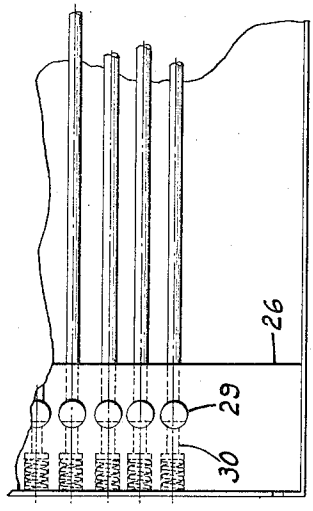
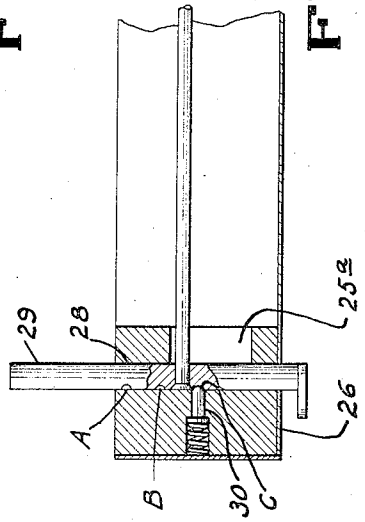



FIG. 3




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2,492,910

## CARD SORTING MACHINE

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6 Claims. (Cl. 129—16.1)

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This invention relates to devices for selectively sorting cards of the type known commercially as "Keysort" cards.

Cards of the type referred to are provided along one or more edges with one or more rows of perforations which are grouped and identified by suitable indicia to represent desired classifications.

In practice, a plurality of these perforations are notched or slotted out to the edge of the card, forming a pattern of notches or slots pertaining to a single classification. The cards when thus notched or slotted may be selectively sorted by passing one or more sorting rods through the selected perforations of a group of cards, which perforations represent the desired classification. By then permitting the cards having notches or slots coinciding with the perforations penetrated by the rod or rods to disengage from the rods, while the remainder of the cards remain suspended from the rod or rods, the cards of one or more selected classifications are sorted from a stack of cards.

It is the principal object of my present invention to provide an improved sorting device for cards of the type referred to, which sorting device will enable the sorting rods to be more accurately and more expeditiously selected and positioned for effecting the sorting operation.

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 perspective view of a card sorting device embodying the preferred form of my invention, and being disclosed in a position to receive a stack of cards for sorting. Parts of the device are shown as broken away and in section to more clearly disclose certain features of construction.

Fig. 2 is a fragmentary view in longitudinal section, showing the construction of the selector rod holder and its operative association with the card receiving tray.

Fig. 3 is a fragmentary view in plan of the selector rod holder, showing the manner of its association with the card receiving tray.

Fig. 4 is a fragmentary view which diagrammatically illustrates one type of punched or perforated card which may be sorted by means of my improved apparatus.

Referring more particularly to the accompanying drawings, 10 indicates a selective sorting apparatus for cards of the character commercially known as "Keysort" cards. These

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cards, as previously set forth, are edge punched cards. The particular type of "Keysort" card with which the present apparatus is particularly concerned is diagrammatically illustrated in Fig. 4. This card has two rows of perforations adjacent and parallel to one edge of the card. The perforations of each row are in alignment perpendicularly with respect to the adjacent edge of the card. As a matter of fact, it may be stated that the card is provided with a plurality of rows of perforations, each row comprising two perforations arranged perpendicularly to the edge of the card. These perforations are indicated by the numeral 11 in Fig. 4.

In practice, certain of the perforations or punchings 11 are notched out to the end of the card, as indicated in Fig. 4 by the numeral 12, in patterns to represent a desired classification or classifications. To effect this result, certain of the punchings extend only to the outermost perforations, while others extend to the innermost perforations so that notches of two depths are provided. It is necessary, therefore, in sorting these cards that needles be run through certain of the perforations of the outer row and needles be run through certain perforations of the inner row.

The card sorting device 10 is what is known as a selective sorting apparatus by means of which punched and notched cards of one or more classifications of the type such as shown in Fig. 4 may be separated from a stack of cards. While in the present instance I have illustrated my apparatus as applying to a particular type of punched card and a particular arrangement of perforations therein, it will be obvious to those skilled in the art that it is applicable to various other types of edge punched cards having various other arrangements of perforations to designate a desired classification or classifications.

The sorting apparatus here disclosed is of the general type disclosed in my copending application entitled "Card sorting machine," filed July 7, 1944, bearing Serial No. 543,813, now Patent No. 2,417,531 dated March 18, 1947.

The machine comprises a frame 14 which has suspended thereon a rotatable card receiving tray 15. I intend that this card receiving tray be rotatable and of the vibrating type such as disclosed in my copending application above identified. However, I am aware that my invention, which is here disclosed, is applicable to any type of card receiving tray which may be employed for selectively sorting cards of the type referred to.

The card receiving tray 15 comprises a flat bottom plate 16, a back plate 17 and end plates 18 and 19. The back plate 17 is, of course, arranged perpendicularly to the bottom plate as are the end plates 18 and 19, the latter, of course, being disposed at ninety degrees to the back plate 17. The end plate 18 of the card receiving tray 15 constitutes a template and is formed with a series of perforations or punched holes 20 corresponding in size and relative position, both with respect to each other and with respect to the bottom and rear edges of the end plate 18, with the punched holes or perforations in the cards or sheets to be sorted in the tray. This is so that when a stack of cards is positioned in the tray with their punched edge bearing on the bottom of the tray and one end abutted against the back plate 17, the perforations or punched holes therein will register with the punched holes or perforations in the end plate 18. This is so that sorting rods 21 may be projected or inserted through the perforations in the end plate 18 and thence through the perforations in the stack of cards disposed therebetween for the purpose of sorting.

It should be stated that the end plate 19 is perforated precisely as is the end plate 18 in order that the needles which are inserted through the cards will enter such perforations and be supported at their extremities by the plate 19. For the purpose of a clear description, it will be stated that the perforations in the end plate 18 are arranged in rows of two perforations, which rows extend perpendicularly to the bottom plate 16 of the tray.

Disposed at a spaced distance outwardly from the end plate 18 is a guide template 22 which is rigidly fixed to the end plate 18, as illustrated, and which is formed with perforations 23 in precise register with the perforations 20 of the end plate 18. Spaced outwardly from the guide template 22 is a guide plate 24 which is likewise rigidly fastened to the end plate 18, as illustrated. This guide plate is formed with a plurality of slots 25 which extend perpendicularly to the plane of the bottom plate 16 of the tray, and one slot is provided for each row of holes 23 in the guide template 22 in longitudinal alignment therewith and in longitudinal alignment with the holes or perforations 20 in the end plate 18. The upper end of each slot 25, however, is disposed above the upper perforation 23 in each row, and the lower end of the slot is disposed at a sufficient distance below the bottom plate 16 that a needle or rod 21 may be projected longitudinally through the slot and beneath the bottom plate 16, as shown in dotted lines in Fig. 3.

To properly manipulate the selector rods 21 and maintain them in a selected pattern for sorting, I provide a selector rod holder 26 which comprises a rigid elongated member which is arranged in parallelism to the end plate 18. The selector rod holder 26 is connected by two telescopic slides 27 to the front and rear bottom edges of the card receiving tray 15, as illustrated. These telescopic slides 27 extend longitudinally of the card receiving tray in parallelism with the back plate 17 to enage the selector rod holder 26 to reciprocate longitudinally of the card receiving tray 15 toward and away from the end plate 18 thereof.

The construction of the dovetail telescopic slides 27 is conventional and for this reason the



construction thereof is not illustrated or described in detail. It will suffice to state that these slides telescopically connect the selector rod holder 26 to the tray so that the same may reciprocate toward and away from the end plate 18, its movement away from the tray 15 being limited by the telescopic slides 27.

The selector rod holder is formed with a plurality of adjuster pin sockets 28, the axes of which are perpendicular to the plane of the bottom of the tray and, consequently, perpendicular to the plane of movement of the selector rod holder 26. One socket is provided for each vertical row of punched holes or perforations 20 and 23 in the end plate 18 and the template 22 in longitudinal alignment therewith. An adjuster pin 29 is reciprocably mounted in each socket 28 and is reciprocable perpendicularly to the plane of the bottom of the tray and to the planes in which the selector rods 21 reciprocate, as will be described.

A selector rod 21 is provided for each vertical row of perforations 20 in the end plate 18 and, of course, for each adjuster pin 29. Each selector rod is arranged in longitudinal alignment with its associated row of perforations and in parallelism with the plane of the bottom of the tray. The outer end of each selector rod 21 is secured to its associated adjuster pin 29, as illustrated in Fig. 3. Thus, it is seen that by changing the position of the adjuster pin axially, the plane of its associated selector rod 21 is changed perpendicularly with respect to the bottom of the tray 15 and, consequently, the lowermost edge of the stack of cards disposed therein.

I provide three positions for each selector rod 21. The first position will be in alignment with the uppermost perforations 20 and 23 (with respect to the bottom of the tray 15) of its associated row of holes. The second position will be in axial alignment with the lowermost perforation of its associated row of holes or perforations, while the third position will be that indicated in dotted lines in Fig. 3, where the needle can pass beneath the bottom plate 16 of the card receiving tray 15.

For this purpose, each adjuster pin is formed with three detent notches A, B and C. These detent notches A, B and C cooperate with a spring-pressed detent 30 in the selector rod holder 26 so that when the detent 30 is engaged with the detent notch C, the rod will be in its first position, and when the detent 30 is engaged with the detent notch B, the selector rod 21 will be in its second position, and when the detent 30 is engaged with the detent notch A, the selector rod 21 will be in its third or inoperative position. The formation of the detent 30 and the notches A, B and C is such that the adjuster pin 29 will be yieldingly held in adjusted position, but may be shifted manually to its next succeeding position.

It will be noticed that the selector rod holder 26 is slotted as at 25a corresponding to the slots 25 in the guide plate 24. These slots 25a are provided to enable the selector rods 21 to move vertically of the selector rod holder 26. The guide plate 24 and its slots 25 are provided, of course, to maintain the selector rods 21 in alignment with the perforations 20 and 23 of the end plate 18 and the guide template 22. At the front face of the guide template 22 a dividing or guiding member 31 is provided to aid in registering the ends of the selector rods 21 with the respective holes with which they are aligned.

It is seen from the foregoing that the selector rods 21 may be individually moved to an ineffective position by depression of the adjuster pins 29 until the detents 30 engage the notches A. When in this position, movement of the selector rod holder 26 toward the tray or toward sorting position will merely project the selector rods 21 beneath the bottom plate 16 of the card receiving tray 15, in which position the selector rods 21 are entirely ineffective.

It should be pointed out that the slides 27 permit the selector rod holder 26 to be moved outwardly only to the position shown in Fig. 3, at which point the selector rods 21 are disengaged from the guide template 22 but not from the guide plate 24, and in this position the selector rods may be adjusted in a direction perpendicularly to the plane of the bottom of the tray 15.

When the selector rod holder 26 is moved to selecting position, the selector rods 21 which are in alignment with the holes 20 and 23 will project through these holes and through corresponding holes in a stack of cards disposed in the tray to effect the sorting. It is usual practice that after the rods are so positioned, the tray is inverted so that those cards which are notched in register with the positioned selector rods 21 will discharge from the tray, while the others will be held within the tray by means of the selector rods 21.

In operation of the device, it is constructed and assembled as illustrated and described herein, and the selector rod holder 26 is withdrawn to non-sorting position, such as shown in Figs. 2 and 3. A stack of cards to be sorted is then positioned in the tray with the cards parallel to the end plates 18 and 19 and with their punched and notched edges bearing on the bottom plate 16 of the tray and with one end abutting against the back plate 17 of the tray. This places the stack of cards in a position where the perforations thereof will register with the perforations 20 of the end plate 18. At this time, assuming that all of the selector rods 21 are in their third position, where they will pass beneath the tray instead of penetrating thereinto, the proper adjuster pins 29 are moved upwardly to condition them for the sorting operation. The selector rods 21 are selected which make up the pattern corresponding with the selected classification or classifications, and in so doing, some of the selector rods 21 will be in the position registering with the uppermost of each row of holes or perforations, while others will be disposed in register with the lowermost thereof.

When the needles have been positioned to effect the proper pattern, the selector rod holder through the medium of its handle 26a may be moved toward the end plate 18 of the tray until the needles have penetrated through the perforations in the stack of cards. The tray may then be inverted and sorting effected, as previously described. When the sort is effected, the tray may be returned to the position shown in Fig. 1, at which time the selector rod holder is withdrawn to non-sorting position, such as shown in Fig. 3, and the stack of cards removed therefrom and a subsequent stack positioned therein. By manipulation of the adjuster pins 29, the pattern may be changed as desired in accordance with the teachings of the foregoing.

It is obvious that by means of my improved apparatus there is no need of separately inserting pins through the selector rod holder 26 and then removing them when it is desired to change



the sorting classification or classifications. It is only necessary to depress the adjuster pins 29 to move the sorting rods 21 to an ineffective position, in which position they will project longitudinally of the tray but beneath the bottom plate 16 thereof, and thus will not have any effect in the sorting operation. Thus, it is manifest that sorting of cards of the type referred to may be expeditiously accomplished by my apparatus.

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 an apparatus of the character described, a card tray having a bottom and an end plate, the end plate being provided with perforations to correspond with perforations in a stack of cards disposed in the tray in parallelism to the end plate, a selector rod holder connected with the tray in parallelism with the end plate for movement toward and away therefrom, selector rods carried by the holder and projecting from the holder toward the end plate in parallelism with the line of movement of the holder, connections between the selector rods and the holder enabling the selector rods to be individually and selectively positioned in a plurality of planes parallel to the plane of the bottom of said tray, one of said positions being exteriorly of the bottom of said tray.

2. In an apparatus of the character described, a card tray having a bottom and an end plate, the end plate being provided with perforations to correspond with perforations in a stack of cards disposed in the tray in parallelism to the end plate, a selector rod holder connected with the tray in parallelism with the end plate for movement toward and away therefrom, selector rods carried by the holder and projecting from the holder toward the end plate in parallelism with the line of movement of the holder, a connection between each selector rod and the holder, said connection comprising an adjuster pin reciprocably mounted in the holder for movement in a plane perpendicular to the plane of the bottom of said tray, and a rigid connection between one end of said selector rod and its associated adjuster pin.

3. In an apparatus of the character described, a card tray having a bottom and an end plate, the end plate being provided with perforations to correspond with perforations in a stack of cards disposed in the tray in parallelism to the end plate, a selector rod holder connected with the tray in parallelism with the end plate for movement toward and away therefrom, selector rods carried by the holder and projecting from the holder toward the end plate in parallelism with the line of movement of the holder, a connection between each selector rod and the holder, said connection comprising an adjuster pin reciprocably mounted in the holder for axial movement to a plurality of positions in a plane perpendicular to the plane of the bottom of said tray, a rigid connection between one end of said selector rod and its associated adjuster pin, and detent means associated with the selector rod holder and with the adjuster pin for yieldably maintaining said adjuster pin in any one of a plurality of axial positions.

4. In an apparatus of the character described,

a card tray having a bottom and an end plate, the end plate being provided with perforations to correspond with perforations in a stack of cards disposed in the tray in parallelism to the end plate, a selector rod holder telescopically connected to the tray for movement in a plane parallel to the plane of the bottom of the tray and movable toward and away from the end plate thereof, selector rods carried by the holder and projecting from the holder toward the end plate in parallelism with the line of movement of the holder, a connection between each selector rod and the holder, said connection comprising an adjuster pin reciprocably mounted in the holder for movement in a plane perpendicular to the plane of the bottom of said tray, and a rigid connection between one end of said selector rod and its associated adjuster pin.

5. In an apparatus of the character described, a card tray having a bottom and an end plate, the end plate being provided with perforations to correspond with perforations in a stack of cards disposed in the tray in parallelism to the end plate, a selector rod holder telescopically connected to the tray for movement in a plane parallel to the plane of the bottom of the tray and movable toward and away from the end plate thereof, selector rods carried by the holder and projecting from the holder toward the end plate in parallelism with the line of movement of the holder, a connection between each selector rod and the holder, said connection comprising an adjuster pin reciprocably mounted in the holder for axial movement to a plurality of positions in a plane perpendicular to the plane of the bottom of said tray, a rigid connection between one end of said selector rod and its associated adjuster pin, and detent means associated with the selector rod holder and with the adjuster pin for yieldably maintaining said adjuster pin in any one of a plurality of axial positions.



6. Apparatus of the character described adapted to sort cards having an inner row of perforations and an outer row of perforations, said apparatus comprising a card tray having a bottom plate and an end plate, the end plate having an inner row of perforations and an outer row of perforations adapted to register with the inner and outer rows of perforations, respectively, of said cards, a selector rod holder connected with the tray in parallelism with said end plate for movement toward and away therefrom, selector rods carried by the holder projecting from the holder toward the end plate in parallelism with the line of movement of the holder, and means connecting the selector rods and the holder, said means supporting each rod in any of three selected positions, including a first position in registry with an outer perforation in the cards, a second position in registry with an inner perforation in the cards, and a third position wherein the selector rod is spaced from and does not support the cards.

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