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J. P. DUANE

2,284,808

APPARATUS FOR SORTING CARDS

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Fig. 5

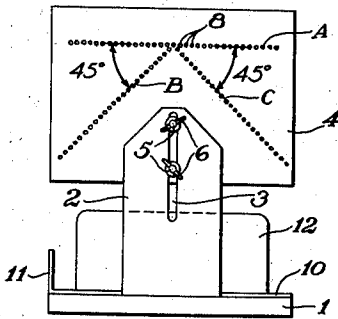
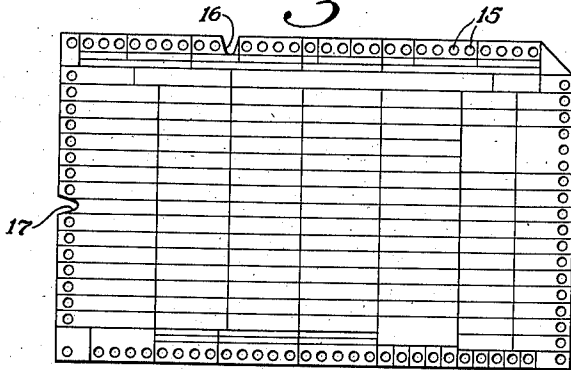


Fig. 2

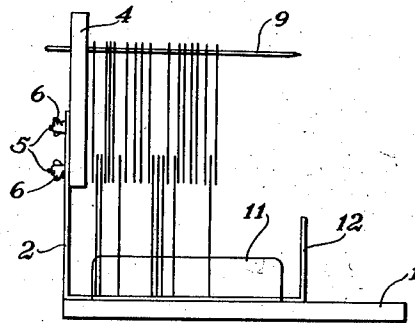


Fig. 3

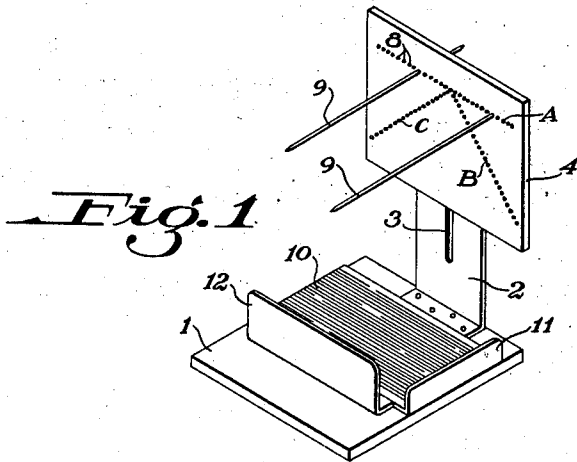


Fig. 1

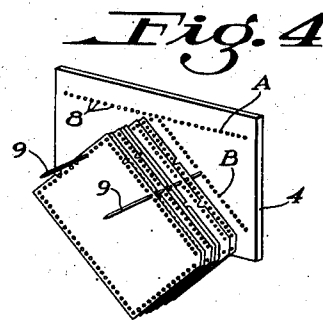


Fig. 4

John P. Duane
INVENTOR

BY *J. M. Case*
ATTORNEY

UNITED STATES PATENT OFFICE

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APPARATUS FOR SORTING CARDS

John P. Duane, Wilmington, Del.

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12 Claims. (Cl. 129—16.1)

This invention relates to an apparatus for sorting cards and, more particularly, to an apparatus adapted for sorting cards of the type having a plurality of perforations adjacent at least one edge thereof, the perforations being adapted to be slotted to the edge of the card for the purpose hereinafter described.

Cards of the general type herein considered are in common use in filing systems today. The fundamental arrangement and design of such cards are disclosed in United States Patent 1,544,172, patented June 30, 1925. As explained in that patent, the cards may be flat sheets, tallies, checks, or the like, made of any material. Ordinary paper filing cards of rectangular shape are most commonly used. An improvement on the design of such cards is disclosed in United States Patent 1,739,087, patented December 10, 1929.

For present purposes it is sufficient to understand that the herein considered cards are usually rectangular in shape and adjacent one or more edges of each card are perforations, each perforation relating to a particular classification. When a card belongs to a certain classification represented by a particular perforation, the card is slotted from that perforation out to the edge of the card. The purpose of this is that all cards belonging in that particular classification may readily be sorted out from a large pack of cards by passing a rod through that particular perforation in the whole pack and lifting the pack by the rod, the cards belonging in that classification falling out due to their being slotted from that particular perforation to the edge of the card.

Although, in theory, there is no reason why a card slotted at a particular perforation would not readily drop out of a pack lifted by a rod passed through that perforation in the whole pack, it has been found in actual practice that there is considerable difficulty in getting the slotted cards to fall out of the pack when using the rod devices heretofore available. Under certain conditions, as where a large pack of cards must be sorted, and this is usually the case, or the cards are relatively large in size, this difficulty is greatly aggravated and constitutes a serious objection to the use of these cards in filing systems.

Heretofore, a single rod provided with a handle or a manually held device adapted to grip two or more rods, has been used for sorting these cards. With the single rod, only a sort of cards falling in a single classification can be made in one operation. With the device holding two or more rods, the sort of cards with a single opera-

tion is restricted to those classifications represented by slotted perforations adjacent one edge of the card. There has been no device heretofore available which permits, with a single operation, a sort of cards falling into both a classification represented by a slotted perforation adjacent one edge of the card and a second classification represented by a slotted perforation adjacent an adjoining edge of the card and this has been a severe handicap in the practical use of these cards which are generally perforated adjacent at least two edges.

An object of the present invention is to provide an efficient and readily constructed apparatus for sorting out cards of the type described above. A further object is to provide such an apparatus that will sort the cards much more readily, quickly, and reliably than the devices heretofore used for this purpose. A further object is to provide such an apparatus particularly adapted for efficiently sorting large packs of cards and cards of relatively large size. A still further object is to provide an apparatus that will permit, in one operation and without disturbing the order of the cards not sorted out, a sort of cards falling in two classifications represented by perforations adjacent adjoining edges of the cards. Other objects will be apparent from the description of the invention given hereinafter.

The above objects are accomplished in accordance with the present invention by the use of an apparatus which, broadly, comprises the combination of a suitable base, an upright member mounted thereon, and a rod carried by said upright member and adapted to pass through the perforations in a pack of the herein considered cards, said rod extending at an angle preferably slightly declined from the horizontal when passed through a perforation in a pack of cards and bearing the weight of said pack, and said upright member being so constructed that its upper end may be vibrated.

The invention further and more specifically resides in the combination of a base, an upright member of springy material mounted thereon with its upper end free to vibrate, a board mounted in vertical position on said upright and vertically adjustable, said board being provided with a plurality of holes in a specific arrangement hereinafter described, and a plurality of rods adapted to be mounted in said holes and extend therefrom at an angle slightly declined from the horizontal.

The invention will be more specifically de-

scribed with reference to the accompanying drawing wherein:

Fig. 1 is a perspective view of an apparatus constructed in accordance with a specific embodiment of the present invention;

Fig. 2 is a rear elevation of the apparatus shown in Fig. 1;

Fig. 3 is a side elevation of the apparatus shown in Fig. 1, a pack of cards being illustrated after having been sorted;

Fig. 4 is a perspective view of part of the apparatus shown in Fig. 1 with a pack of cards in position for a so-called "angle-sort"; and

Fig. 5 illustrates a card of the type adapted to be sorted by the present invention.

Referring particularly to Figs. 1, 2, and 3, reference numeral 1 denotes a base which is preferably made of wood although it may be made of metal or composition. Upon the base 1 is mounted the upright member 2 which must be relatively springy material; spring steel is preferred. A vertical slot 3 is provided in the upright member 2. The board 4 is fastened upon the upright member 2 by means of bolts 5 fixed in the board 4 and passing through the slot 3 and cooperating with the winged nuts 6 (see Figs. 2 and 3).

By the construction so far described, it will be seen that the upper end of the upright member 2 and the board 4 are free to vibrate and may be readily vibrated by manually bending the board 4 and upright member 2 out of their normally vertical position and suddenly releasing them. Also, the board 4 may be readily adjusted vertically.

The board 4 is provided with a plurality of holes designated generally by the reference numeral 8 and in these holes rods 9 may be removably mounted. The diameter of the holes is made only slightly larger than the diameter of the rods 9 in order that the rods may be held securely although readily removable when their position must be changed. As shown in Fig. 3, a rod 9, when mounted in one of the holes, extends out from the board 4 in a generally horizontal direction. However, it is an important preferred feature of this invention that the rod 9, at least when it has been passed through a perforation in a pack of cards to be sorted and is bearing the weight of said pack, shall extend at an angle slightly declined from horizontal. This may be accomplished by boring the holes 8 in the board 4 at an angle slightly declined from the horizontal or by having the diameter of the holes 8 exceed the diameter of the rods 9 just enough so that the weight of the cards will decline the rod slightly. It may also be accomplished by using relatively flexible rods which will be declined from the horizontal slightly by the weight of the cards even though the rods may actually be mounted so that they extend horizontally or slightly inclined upward from the horizontal when free of the weight of the pack of cards.

A plate 10 is mounted on the base 1 and is provided on its surface with scorings running parallel to the board 4 and an upturned end 11 running at right angles to the board 4 and located adjacent one side of the base 1. The scoring in the plate 10 keep cards as they are sorted out, from slipping and the end 11 functions as a buffer plate to keep the cards in position. A buffer plate 12 is also mounted on the base 1 and runs parallel to the board 4. This buffer plate 12 likewise helps to keep the cards in position and to prevent them from coming off the end of the

rods 9. For ease of manipulation, the upturned end 11 should be relatively low while the height of the buffer plate 12 should be approximately equal to half the width of the cards to be sorted.

In Fig. 5 is shown a card of the type herein considered. It is provided with perforations 15 extending around all four sides and each perforation is adapted to be slotted out to the edge of the card as shown at 16 and 17. The cards may be perforated only along one edge but usually will be perforated along at least two adjacent edges running at right angles to each other. Adjacent perforations in the card are usually equally spaced or spaced in whole multiples of the closest spaced perforations. To simplify explanation, it will be assumed the adjacent perforations in the cards are all equally spaced, although those skilled in the art will appreciate that some of the adjacent perforations could be spaced two or three times as far apart as the adjacent perforations most closely spaced without causing any difficulty. In fact, if the holes in the board are arranged to correspond, even cards with irregularly spaced perforations could be sorted by the present apparatus.

The number and spacing of the perforations in the cards to be sorted will dictate the arrangement of the holes in the board 4 if an apparatus of maximum efficiency is desired. The horizontal row of holes designated by the reference character A (see Fig. 2) will correspond in the number of holes and spacing thereof to the number of perforations and spacing thereof in the longer side of the cards to be sorted. The row of holes B, starting from approximately the center of the row of holes A, extends therefrom in a downward direction at an angle of approximately 45° to the horizontal with adjacent holes spaced apart the same distance as adjacent perforations in the card. The row of holes C is arranged similarly to the row of holes B except that it runs at an angle of 90° thereto. The number of holes in rows B and C are preferably equal to the number of perforations in the longer side of the cards to be sorted.

To sort a pack of cards into one or more classifications represented by perforations adjacent only one side of the cards, the row of holes A in board 4 is used. As these holes in row A correspond to the perforations of the card, a rod 9 is mounted in the hole which will correspond with the particular perforation in the card for the classification desired. If a sort of cards falling into two classifications is desired, a second rod 9 is mounted in the hole corresponding with the particular perforation in the card for the second classification desired, and so on if the sort is to include other classifications represented by perforations adjacent a single edge of the card.

With the rod or rods 9 properly mounted in the board 4, the board 4 is adjusted vertically so that the bottom of the pack of cards when the pack is threaded on the rod or rods, will be suspended above the base 1, preferably not quite half the width or the length of the cards, depending upon whether the perforations are along the longer or shorter sides of the cards. The pack of cards is now threaded on the rod or rods 9 by passing each rod through the perforation in the pack corresponding with the hole in which the rod is mounted and the pack pushed back to the board 4. The board 4 is then vibrated simply by bending it out of its normal vertical position and releasing it suddenly, this

being repeated once or twice as a measure of safety. The effect of the vibration of the board 4 is to cause the pack of cards to spread out along the slightly declining rod or rods 9 with the result that every card which is slotted out to its edge from the perforations selected, will immediately drop while the rest of the pack, of course, will remain suspended on the rod or rods 9.

Due to the fact that the pack of cards is positioned above the base 1 at a height not greater than the width or length of the cards, depending upon whether the cards were suspended from their shorter or longer sides, together with the cooperation of the scoring on the plate 10 and the barrier formed by the buffer plate 12, the cards that have fallen out of the pack, will remain more or less vertical and interleaved with the cards still suspended by the rod or rods 9. The position of the cards after the sort is shown in Fig. 3, spacing of the cards being exaggerated and the number of cards reduced for purposes of illustration.

The cards which have dropped down, may now be easily removed by sweeping them out to the left (looking at Fig. 1), the relative heights of the buffer plate 12 and upturned end 11 of plate 10 being such that they will not interfere. The sorted cards are thus obtained, with respect to each other, in the order in which they occurred in the pack. A further sort or sorts can be made from the remainder of the pack by changing the position of the rods and again vibrating the board 4. Also, if the object is to get the whole pack of cards in a new order according to certain classifications, the sorted cards may be threaded on the rod or rods so that they are at the front of the pack, the rod or rods changed for sorting another classification, the board 4 vibrated to sort out the cards falling in this different classification and these cards, in turn, can be threaded on the rods so they are at the front of the pack, and the rods again changed for a third sort. In this manner, any number of sorts may be made in a more or less continuous operation.

It will be understood that, if the sort only involves a single classification at a time and, hence, the use of only one rod during each vibrating step, a second rod will be threaded through the selected perforation in the pack of cards and mounted in the corresponding hole in the board 4 for the second sort after the first sort has been made and before the first rod is removed.

It has been discovered that the combination of the slight cant of the rod 9 from the horizontal and the vibratory motion imparted to the board 4 has the result of slightly separating each card in the pack from its neighbor and allowing the appropriately slotted cards to fall without fail. The infallibility with which this device sorts even the largest packs of cards, is one of its outstanding advantages over the devices heretofore known. If a sorting device cannot be absolutely relied upon except after a careful check, this whole system of sorting cards is of limited practical value.

When a sort of a pack of cards is required with respect to two classifications, one represented by a perforation adjacent one edge of the cards and the other represented by a perforation adjacent an adjoining edge with which the first edge makes a right angle, the two rows of holes designated B and C are used. The ma-

nipulation of the rods 9 is no different basically than previously described except that one rod will be mounted in the appropriate hole in row B and another rod in the appropriate hole in row C. The pack of cards must be threaded on the rods by passing the rods through the perforations in the pack corresponding to the particular holes in board 4 in which the rods are mounted. In this way the pack of cards will be suspended as shown in Fig. 4 with the two upper edges of the cards running at an angle of approximately 45° to the horizontal because the rows B and C run at this angle.

With the cards suspended as shown in Fig. 4, vibration of the board 4 will immediately cause all of the cards slotted out to their edge at the particular perforations through which the rods pass, to drop down. While some slight variation of the 45° angle to the horizontal made by rows B and C, can be tolerated, particularly if the slot in the cards from perforation to edge of the card is appreciably wider than the diameter of the rod, this 45° angle, with a permissible latitude of a few degrees, is critical in that the cards will not drop down if the rows B and C are arranged at any other angle. This is an observation the prior art apparently never made or appreciated and is the reason for the arrangement of the rows of holes B and C in the board 4 whereby a so-called "angle-sort" can be effected.

In making an "angle-sort" the height of the board 4 will be adjusted so that the cards which drop down, will remain interleaved with those still suspended in the rods just as in the case of a sort made with the rods in holes in row A.

It will be understood that the apparatus shown in the drawing is merely illustrative and, although it is a preferred embodiment of applicant's invention, it may be varied widely without departing from the scope of applicant's invention. While it may involve loss of some of the advantages of the apparatus as illustrated, it will be apparent that considerable simplification of the apparatus may be readily effected. For example, the board 4 and the upright 2 may be made as a unitary structure so long as it is free to vibrate at its upper end. Also, for sorting cards falling into a single classification, it is only necessary that a single rod be mounted on the upright member, provided the rod extends substantially horizontally but slightly declined therefrom when supporting a pack of cards.

The arrangement of the holes as shown in the board 4, is the preferred one but the rows B and C may be omitted entirely if the "angle-sort" feature of the device is not desired and it is not necessary that rows B and C bear the particular relation to row A that is illustrated although this arrangement permits the use of a minimum sized board with the rows corresponding to the longer sides of the cards to be sorted.

Instead of employing an upright member 2 of springy material and depending on its resiliency to effect vibration of the board 4, it will be obvious that the upright member 2 could have its upper end hinged to its lower end so that the upper end could be vibrated or oscillated back and forth by hand or a mechanical device; such an arrangement would not necessitate making the upright of springy material.

While the invention has been described up to this point as having the rods extend from the

board at an angle slightly declined from the horizontal, at least when the rods are bearing the weight of the cards to be sorted, and this is a greatly preferred form of the invention, especially in a manually operated device as shown, nevertheless the invention does comprise a device in which the rods extend substantially horizontally even though not actually declined from the horizontal.

If the rods extend from the board definitely at an angle inclined to the horizontal, the present apparatus will not work as the cards will simply tend to pack together against the board and the slotted cards will not be free to drop. However, if the rods are substantially horizontal, the cards do separate out along the rods when the board oscillates in the direction the rods extend, and do not have much tendency to slide back when the board swings back. Hence, particularly when the board will be vibrated vigorously, it is entirely possible to have the rods extending substantially parallel when they bear the weight of the cards being sorted. This would not be preferred in a device to be operated manually but, if the device were combined with some power driven mechanical means for vibrating the board, the convenience in mounting the rods exactly horizontal would in many instances offset the advantage derived from having the rods slightly declined.

An advantage of the present invention is that it provides a sorting device adapted to sort at one time a far larger pack of cards than could be sorted practically in the heretofore known devices. A further advantage is that a sort of cards may be made much more readily and quickly and substantially infallibly by an operator using applicant's device; this device practically eliminates error due to the human element. Another substantial advantage is that the operation of the present device is less tiring to the operator than operation of previously used devices and the sorting of large sized cards is greatly facilitated.

In the preferred embodiment of the invention in the drawing the cards may be sorted with ease into two, three or more classifications represented by perforations along adjoining edges of the cards, at one time; further, the cards which fall down in a sort, are held in upright position, interleaved with the cards which did not fall down, and in their original order. As explained before, this device is particularly adapted for making a continuous type of sort for placing a pack of cards in order according to some classification; this is of real practical utility as large packs of cards frequently have to be put in alphabetical order according to name, subject, or the like, and this has been a long and arduous task when using the devices heretofore available.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments shown except as defined in the appended claims.

The invention claimed is:

1. In an apparatus for sorting cards each of which is provided adjacent an edge with a plurality of perforations adapted to be slotted out to said edge, the combination of a base, an upright member mounted thereon, and a rod carried by said upright member at a height greater than the width of the cards to be sorted, said

rod extending substantially horizontally and said upright member being so constructed that its upper end is free to vibrate.

2. In an apparatus for sorting cards each of which is provided adjacent an edge with a plurality of perforations adapted to be slotted out to said edge, the combination of a base, an upright member mounted thereon, a board carried in vertical position by said upright member, said board being provided with a plurality of holes, and a rod removably mounted in one of said holes at a height greater than the width of the cards to be sorted, said rod extending at an angle slightly declined from the horizontal when passed through a perforation in a pack of said cards and bearing the weight of said pack, and said upright member being so constructed that its upper end is free to vibrate.

3. In an apparatus for sorting cards each of which is provided adjacent an edge with a row of perforations adapted to be slotted out to said edge, the combination of a base, a spring steel upright member mounted thereon with its upper end free to vibrate, a board carried in vertical position by said upright member, said board being provided with a horizontal row of holes corresponding in spacing to the perforations in the cards to be sorted, and a rod removably mounted in one of said holes in said board at a height greater than the width of the cards to be sorted, said rod extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

4. In an apparatus for sorting cards each of which is provided adjacent an edge with a row of perforations adapted to be slotted out to said edge, the combination of a base, a spring steel upright member mounted thereon with its upper end free to vibrate, a vertically adjustable board carried in vertical position by said upright member, said board being provided with a horizontal row of holes corresponding in spacing to the perforations in the cards to be sorted, and a rod removably mounted in one of said holes in said board at a height greater than the width of the cards to be sorted, said rod extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

5. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a support, a vertically positioned board carried by said support, said board being provided with two meeting rows of rod engaging elements corresponding in spacing to the perforations in the cards to be sorted and said rows running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and two rods removably mounted in said board, one in a rod engaging element in one of said rows and the other in a rod engaging element in the other of said rows, and extending substantially horizontally from said board.

6. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a support, a vertically positioned board carried by said support, said

board being provided with a horizontal row of holes corresponding in number and spacing to the perforations adjacent the longer edge of the cards to be sorted, and with two further rows of holes corresponding in number and spacing to the perforations adjacent to the longer edge of the cards to be sorted, said latter two rows meeting at the center of said first row and running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and a rod removably mounted in one of said holes in said board and extending substantially horizontally from said board.

7. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a base, an upright member of springy material mounted thereon with its upper end free to vibrate, a board carried in vertical position by said upright member, said board being provided with two meeting rows of holes corresponding in spacing to the perforations in the cards to be sorted and said rows running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and two rods removably mounted in said board, one in a hole in one of said rows and the other in a hole in the other of said rows, and extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

8. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a base, a spring steel upright member mounted thereon with its upper end free to vibrate, a vertically adjustable board carried in vertical position by said upright member, said board being provided with two meeting rows of holes corresponding in spacing to the perforations in the cards to be sorted and said rows running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and two rods removably mounted in said board, one in a hole in one of said rows and the other in a hole in the other of said rows, and extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

9. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a base, an upright member of springy material mounted thereon with its upper end free to vibrate, a board carried in vertical position by said upright member, said board being provided with a horizontal

row of holes corresponding in number and spacing to the perforations adjacent the longer edge of the cards to be sorted, and with two further rows of holes corresponding in number and spacing to the perforations adjacent to the longer edge of the cards to be sorted, said latter two rows meeting at the center of said first row and running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and a rod removably mounted in one of said holes in said board and extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

10. In an apparatus for sorting cards of the type wherein each card has a row of perforations adjacent each of two adjoining edges forming a right angle and each perforation is adapted to be slotted out to the adjacent edge of the card, the combination of a base, a spring steel upright member mounted thereon with its upper end free to vibrate, a vertically adjustable board carried in vertical position by said upright member, said board being provided with a horizontal row of holes corresponding in number and spacing to the perforations adjacent the longer edge of the cards to be sorted, and with two further rows of holes corresponding in number and spacing to the perforations adjacent to the longer edge of the cards to be sorted, said latter two rows meeting at the center of said first row and running at approximately 90° to each other downwardly from their point of meeting at an angle of approximately 45° to the horizontal, and a rod removably mounted in one of said holes in said board and extending at an angle slightly declined from the horizontal when passed through perforations in a pack of said cards and bearing the weight of said pack.

11. In an apparatus for sorting cards each of which is provided adjacent an edge with a plurality of perforations adapted to be slotted out to said edge, the combination of a base, an upright member mounted thereon, and a rod carried by said upright member at a height greater than the width of the cards to be sorted, said rod extending at an angle slightly declined from the horizontal when passed through a perforation in a pack of said cards and bearing the weight of said pack, and said upright member being so constructed that its upper end is free to vibrate.

12. In an apparatus for sorting cards each of which is provided adjacent an edge with a plurality of perforations adapted to be slotted out to said edge, the combination of a base, an upright member mounted thereon, a board carried in vertical position by said upright member, said board being provided with a plurality of rod engaging elements, and a rod removably mounted in one of said rod engaging elements at a height greater than the width of the cards to be sorted, said rod extending substantially horizontally and said upright member being so constructed that its upper end is free to vibrate.

JOHN P. DUANE.