March 24, 1970 J. D. SHAW 3,502,209

CARD SORTING DEVICE AND SYSTEM

Filed Jan. 24, 1968 2 Sheets-Sheet 1

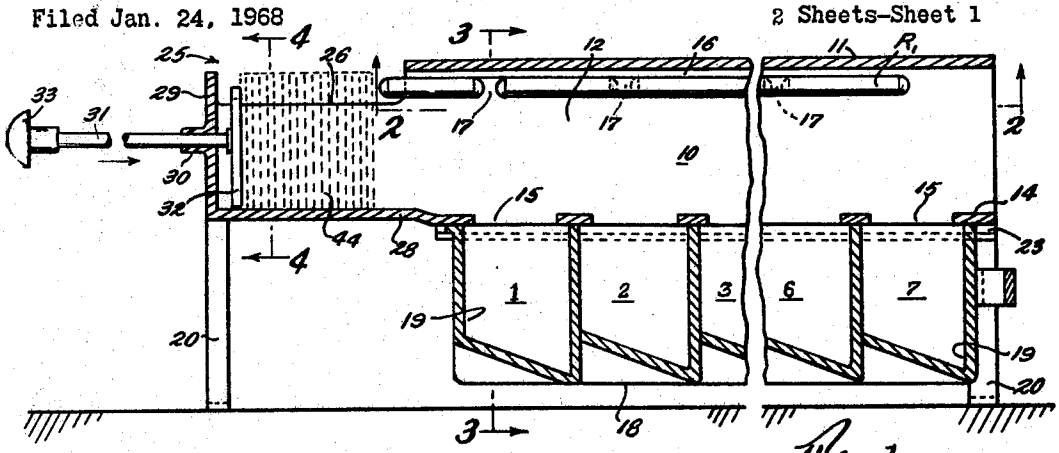


Fig. 1

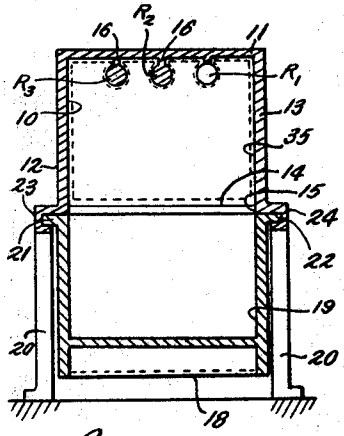


Fig. 3

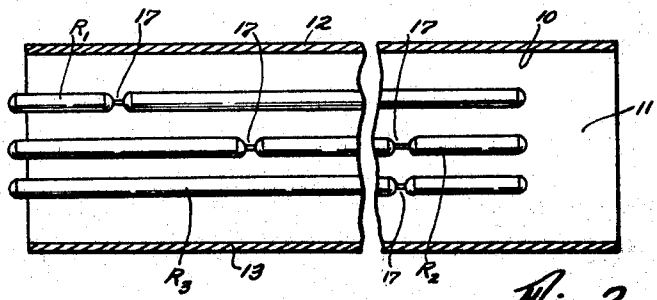


Fig. 2

TRAY	R_1	R_2	R_3
1		○	○
2	○		○
3	○	○	
4			○
5		○	
6	○		
7			

Fig. 8

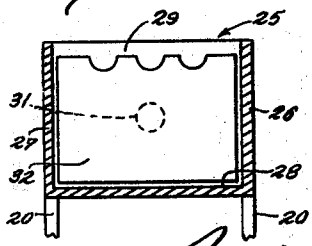


Fig. 4

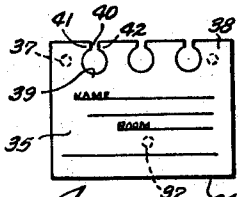


Fig. 5

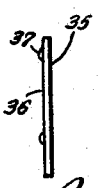


Fig. 6

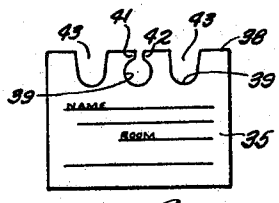


Fig. 7

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CARD SORTING DEVICE AND SYSTEM

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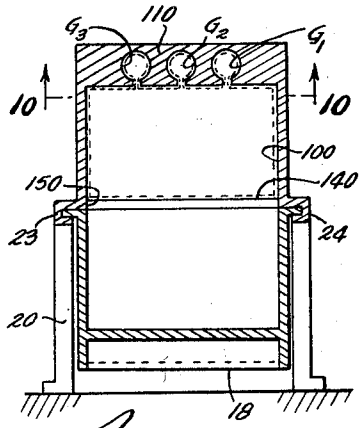


Fig. 9

Fig. 10

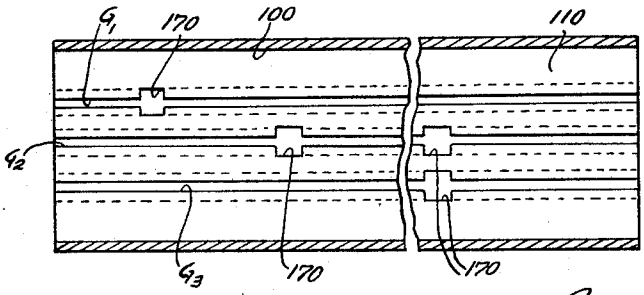
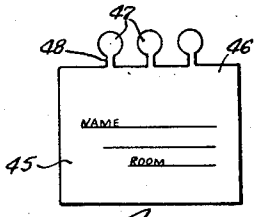


Fig. 12



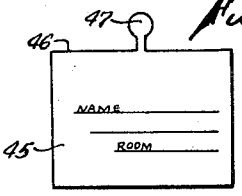


Fig. 11

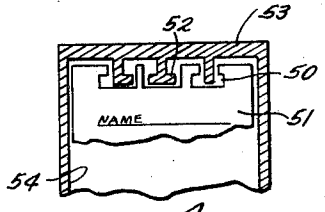


Fig. 16

TRAY	G_1	G_2	G_3
1		Ω	Ω
2	Ω		Ω
3	Ω	Ω	
4			Ω
5		Ω	
6	Ω		
7			

Fig. 13

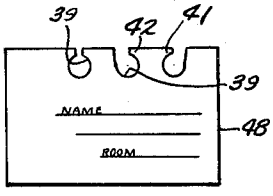


Fig. 14

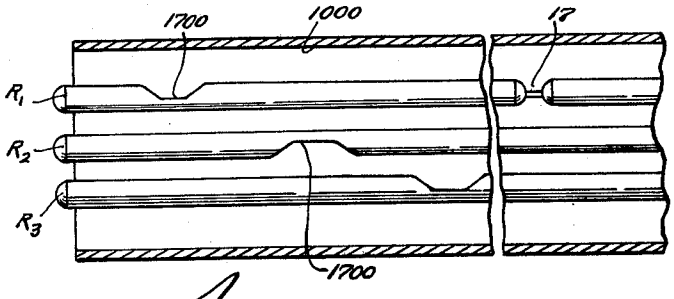


Fig. 15

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3,502,209

CARD SORTING DEVICE AND SYSTEM

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Int. Cl. B07c 5/34
U.S. Cl. 209—110.5 8 Claims

ABSTRACT OF THE DISCLOSURE

A card sorting device and system wherein the cards have supporting tabs along one edge thereof, the cards being coded by predetermined deletion of certain of said tabs, and the coded cards, indiscriminately mingled in a pack, being sorted by face-wise movement of the pack through a gravity chamber having tab supporting ways located in the top of the chamber, the ways being restricted at certain points along their longitudinal extents to provide non support for certain of the cards.

This invention relates to improvements in sorting devices and systems for cards having tabs and selected tab severed portions along a common edge thereof.

More specifically this invention is directed to a gravity actuated card sorter and separating system that employs uniform cards each having a row of individual supporting tabs along one edge portion thereof, each card being coded by detaching selected card tabs from said edge portion.

It is an object of the invention to provide a relatively simplified and reliable card sorting system which may be effected by a positively operated device adapted to separate a pack of edge perforated and punched cards indiscriminately mingled in the pack by face-wise movement of the pack through a sorting chamber and affording gravity actuated delivery of selected cards into card trays at particular card receiving trays located along the chamber.

Another object of the invention is to provide a novel edge-tabbed card structure especialy adapted to effectively cooperate with the sorting device of this invention to carry out the sorting functions of my system.

Further objects will be apparent from the following specification taken in conjunction with the accompanying drawings depicting preferred embodiments of the invention.

In the drawings:

FIG. 1 is a sectional view taken through the longitudinal center of a card sorting device of this invention.

FIG. 2 is a section taken on line 2—2 of FIG. 1.

FIG. 3 is a section taken on line 3—3 of FIG. 1.

FIG. 4 is a section taken on line 4—4 of FIG. 1.

FIG. 5 is a plan view of an exemplary perforated card to be used with my sorting device and system.

FIG. 6 is an edge view of the card shown in FIG. 5.

FIG. 7 is a plan view of the card shown in FIG. 5 with selected tabs detached from the edge portion for coding purposes.

FIG. 8 is a chart illustrating the number and kinds of codes of my system as applied to a three (3) rod sorting device shown in FIGS. 1–7 of the drawings.

FIG. 9 is a sectional view similar to FIG. 3 showing a modified form of my card sorting device.

FIG. 10 is a section taken on line 10—10 of FIG. 8.

FIG. 11 is a plan view of an exemplary card to be used with the sorting device depicted in FIGS. 9 and 10 of the drawings.

FIG. 12 is a plan view of the card shown in FIG. 11 with selected edge located tabs detached for coding purposes.

FIG. 13 is a chart illustrative of the codes available for the system shown in FIGS. 9–12 of the drawings.

FIG. 14 is a plan view of a card with a modified form of edge located coding arrangement.

FIG. 15 is a view similar to FIGS. 2 and 10 showing a modified form of device for sorting cards coded as shown in FIG. 14.

FIG. 16 is a fragmental sectional view, like FIG. 9 showing a further modification of my card sorting system.

In the drawings, the numeral 10 indicates an elongated, card sorting chamber having a top wall 11, side walls 12 and 13, and a bottom wall 14 that is provided with a longitudinal series of card discharge openings 15 therein. Suspended from the top wall into the chamber by means of narrow ribs 16 are a number of laterally spaced apart, longitudinally extending parallel ways which take the form of rods R_1, R_2 and R_3, each of said rods being laterally restricted or discontinued at pre-determined places 17 along their lengths to render each individual place, so restricted, ineffectual to support a card; said places overhanging certain of the openings 15 in the bottom wall 14 of the chamber.

A card receiving drawer 18 is detachably mounted beneath the bottom wall 14 of the sorting chamber 10 and is divided into a longitudinal series of individual trays 19, each tray being in vertical alignment with a card discharge opening 15 in said bottom wall. As best shown in FIG. 3 the device is supported upon corner located legs 20 and the drawer 18 has opposed, outwardly extending flanges 21 and 22 that are slidably received in confronting channels 23 and 24 formed on the lower parts of the side walls 12 and 13, respectively.

An open-topped card pack assembly box 25 (FIGS. 1 and 4) is positioned at the forward end of the chamber and is in open communication with the chamber, said box being formed by side walls 26 and 27 that are rearward extensions of the corresponding side walls of the chamber 10 and by a bottom wall 28 that is slightly raised or stepped up from the plane of the bottom wall 14 of the chamber. The box also has a forward end wall 29 that is joined to the said side walls 26 and 27, said end wall having a bearing 30 formed centrally therethrough that mounts a push rod 31 for axially sliding movement therein, the rod having a rectangular pusher plate 32 located within the box and fixed on its leading or rear end and a knob 33 on its opposed forward end.

In FIG. 5 of the drawing there is depicted a card 34 in the form in which it would be initially furnished for use with the card sorting device shown in FIGS. 1–4 of the drawings, said card having an obverse, indicia bearing face 35 and a reverse face 36 having one or more projections 37 thereon. In lieu of the projections 37 the reverse face could be stippled or roughened or have other means that will provide anti-friction contact and suitable air spaces between adjacent cards when the cards are assembled in a pack for sorting. The top edge portion 38 of the card 35 is provided with a series of pre-formed perforations 39 having a laterally restricted slot 40 that permits open communication of each perforation with the said card edge. It will be noted that each perforation 39 and restricted slot 40 forms two opposing, laterally extending tabs 41 and 42 in the card edge that cooperate to suspend the card in sliding engagement on the rods R_1, R_2 and R_3. The card is coded with respect to the indicia and data carried on its obverse face by detaching certain of the cooperating tabs 41 and 42 to form wide, outwardly flaring openings 43 (FIG. 7) in the edge portion of the particular card around selected perforations and slots.

In operation a pack 44 (FIG. 1) of cards 34 with certain cooperating tabs detached are indiscriminately mingled in the pack and assembled on edge within the box 25 with the common coded edges uppermost and the indicia carrying faces of the cards in the pack facing forwardly. The bottom and sides of the box maintain the

cards in alignment in the pack and by manually operating the pusher plate **32** the card pack is pushed toward the sorting chamber with the coded and perforated holes therein registering for slidable reception on the rods R_1, R_2 and R_3, it being noted that as the cards move into the sorting chamber the cards leave the stepped up bottom portion **28** and are suspended in the chamber only by a rod or rods. Said rods have substantially the same diameter as the diameter of the perforations **39** in the cards, the slots **40** forming clearance areas for the cards to pass by the rod support ribs **16** connecting the rods to the top wall **11** of the sorting chamber. The perforated, restricted holes in the cards are adapted to suspend their respective cards in sliding engagement on the rods while the detached tab openings with enlarged mouths **43** are adapted to furnish non-support for the particular cards.

As each individual card slides along and is supported by one or more of the rods R_1, R_2 and R_3 it will come to a discharge station in which a certain combination of discontinued rod portions **17** and detached tab openings **43** furnish no support for it and the card will leave the pack and fall through the opening into a particular tray **19** located beneath the discharge station. By way of a specific example, a card **35** havng the coded pattern illustrated in FIG. 7 of the drawing when moving through the sorting chamber **10** will come to the statio nfor tray No. **2** and with reference to FIG. 2 of the drawing it will be noted that at said station rods R_1 and R_3 are solid but rod R_2 has a discontnued portion **17**. As the card tabs were detached at **43—43** and thus coded to be at all times unsupported by rods R_1 and R_3 and to be supported only by rod R_2 by its perforation **39**, discontinuing rod R_2 at **17** will leave the card unsupported by all the rods and it will fall into the compartment marked No. **2**.

In the chart depicted in FIG. 8 discontinued portions of each rod at a particular tray station is indicated by a blank, while solid rod portions are indicated by circles. Cards whose coded perforations and detached tab portions correspond to blanks and solid rod portions, respectively, read horizontally on the chart, will be discharged into the numbered trays at the left of each horizontal line.

A modified form of my card sorter is depicted in FIGS. 9–13 of the drawings wherein the elongated card sorting chamber **100** has a top wall **110** provided with a number of laterally spaced apart, longitudinally extending parallel ways which take the form of key-shaped grooves, G_1, G_2 and G_3, each of said grooves being discontinued or opened at predetermined places **170** along their lengths; said places overhanging certain of the card discharge openings **150** in the bottom wall **140** of the chamber **100**. In FIG. 11 there is shown a card **45** in the form in which it would be furnished for use with the modified sorter depicted in FIGS. 9 and 10 of the drawing, said card having a top edge portion **46** provided with a series of preformed tabs **47** connected to the edge portion by laterally restricted portions **48**. Each tab **47** and restricted portion **48** cooperate with a particular key-shaped groove to suspend the card in the sorting chamber, the card being coded by detaching certain of the tabs to leave the card edge portion at the detached tab position incapable of suspending the card.

The sorting device and cooperating card shown in FIGS. 9–13 of the drawing operate and function similar to the sorter and card illustrated in FIGS. 1–8 of the drawing, it being understood that a pack of the cards **45** are pushed into the sorting chamber **100** with their tabs slidably engaged in the grooves G_1, G_2 and G_3, the grooves and tabs cooperating to suspend the cards in the chamber. As each card slides through the chamber predetermined combinations of detached tabs and discontinued or opened groove places will furnish no support for that card and it will fall through the discharge opening into a card receiving tray. The chart shown in FIG. 13 contains key hole symbols which indicate solid

grooved portions for a particular tray whereas the blank spaces indicate groove openings. Cards whose tabs corresponded with the openings and whose coded detached tabs correspond to the solid groove symbols for a particularly numbered tray will be discharged into that tray.

In FIGS. 14 and 15 of the drawings there is shown a further modification of my card sorting device and with reference to FIG. 14 a card **48** like card **35** has only one tab **41** detached from its central pre-formed perforation **39** and a single tab **42** detached from its right hand preformed perforation. Cards coded with left and/or right tabs detached along with both tabs removed from the preformed perforations are sorted in a chamber **1000** (FIG. 15) wherein the rods R_1, R_2 and R_3 are restricted laterally as at **1700** and discontinued or broken as at **17** thus adding two additional coding means to the system depicted in FIGS. 1–8 of the drawings. It will further be noted that the series of perforations **39** in card **48** are offset with respect to the width dimension of the card. A set of these cards are adapted to cooperate with a sorter whose rods are offset laterally with respect to the pack receiving box thereby assuring that all the cards in the pack must face in the same direction in order to be threaded on the sorter rods.

With reference to FIG. 16 of the drawing it will be noted that the pre-formed perforations **50** in the card **51** could have inverted T-shaped forms which correspond to similarly shaped inverted T-shaped ways **52** depending from the top wall **53** of a sorting chamber **54**. By detaching tabs from the card edge and omitting one or both of the arms on the T-shaped ways a great number of card coding combinations may be attained by this modified card sorting system.

Although only three perforations and their cooperating rods have been illustrated throughout the drawings both perforations, tabs and their cooperating ways may be increased in number; the coding possibilities of any given number being exemplified by the Formula 2 raised to the *n*th power=total number of code possibilities; where *n* equals the number of rods or their respective cooperating perforations in each card. In the example illustrated in FIGS. 1–8 of the drawings, the coded possibilities will therefore be $2\times2\times2=8$, while in cards having eight (8) perforations there would be 256 possibilities according to said formula. Cards coded with left and right hand tabs will have the Formula 2 raised to the $2n$th power where n=the number of rods or their respective cooperative perforations in each card.

It will be understood that the foregoing system and construction of parts is illustrative of the invention and modifications may be made.

What is claimed is:

1. In a card sorting device,

a longitudinal card sorting chamber,

a plurality of parallel, laterally spaced apart card supporting ways extending longitudinally in the upper part of the chamber,

a card pack assembly box at the forward end of the chamber for receiving and holding cards in edgewise condition with their coded edge portions uppermost and in longitudinal alignment with the ways,

means for advancing the pack face-wise onto the ways and through the chamber with the coded card edge portion slidable in the ways,

means breaking the continuity of the ways at predetermined positions along their longitudinal extents and in selected lateral combinations,

and a longitudinal series of card receiving means located beneath the chamber in alignment with said predetermined positions.

2. In a card sorting device as set forth in claim **1** wherein the card receiving means are trays.

3. In a card sorting device as set forth in claim **1** wherein the ways are card supporting rods, the means breaking the continuity of the ways are restrictions in the

rods, and the edge portions of the cards are coded by perforations and restricted slots connecting each perforation to the card edge and forming card supporting tabs on said edge portion.

4. In a card sorting device as set forth in claim 1 wherein the ways are card supporting grooves, the means breaking the continuity of the ways being openings, and the cards are coded by tabs extending from a card edge portion, said tabs being connected to the edge by restricted portions.

5. In a card sorting device as set forth in claim 1 wherein the ways are card supporting rods, the means breaking the continuity of the ways are side restrictions in the rods, and the edge portions of the cards are coded by perforations and a single card supporting tab adjacent each perforation.

6. In a punched card sorting device as set forth in claim 3 wherein the perforations in the cards have a diameter to slidably receive the rods and each perforation communicates with the upper card edge by a narrow slot.

7. In a punched card sorting device as set forth in

claim 6 wherein the code punches are U-shaped and outwardly flared from the bottoms thereof to clear the rods in non-engaging conditions.

8. In a system for sorting cards,

a number of parallel, spaced apart card supporting ways,

means changing the lateral extent of the ways at predetermined places along their extents,

means forming detachable coded way engaging tabs along a top edge portion of each card,

and means for advancing a pack of said cards facewise along the card supporting ways, whereby coded cards in the pack wholly unsupported by said ways will fall by gravity from the pack.

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