

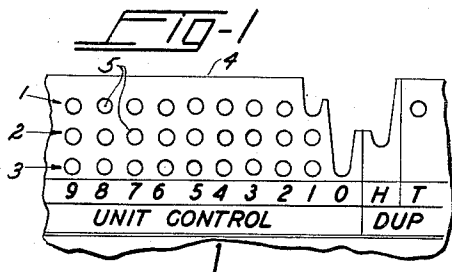
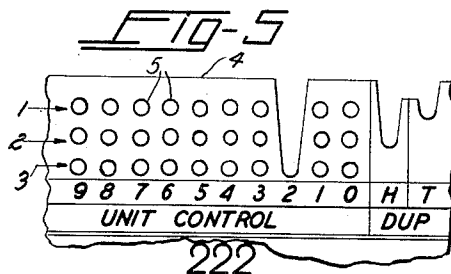
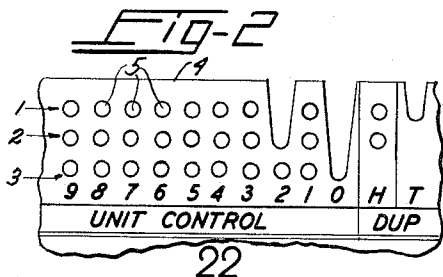
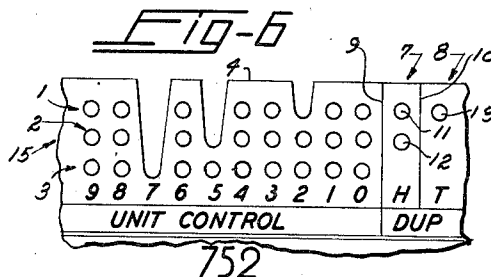
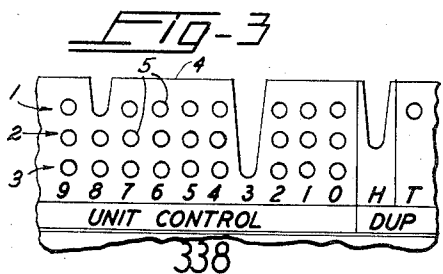
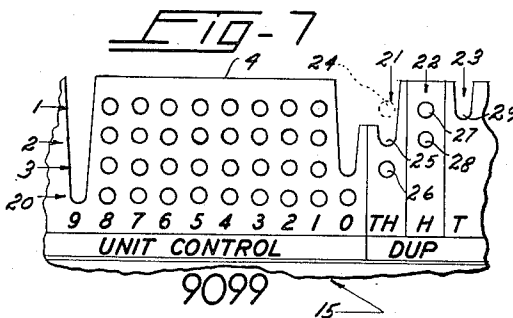
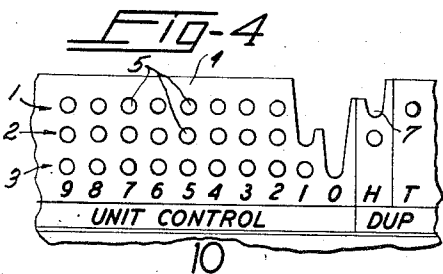
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MARGINALLY PUNCHED AND NOTCHED SORTING CARDS

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MARGINALLY PUNCHED AND NOTCHED SORTING CARDS

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2 Claims. (Cl. 129—16.1)

This invention relates to sorting cards, sheets, etc., such as are used for keeping records, and one of the objects of said invention is the provision of a card structure and arrangement of openings and notches or the like, that permits a simplified direct sorting of cards by the use of only a few sorting devices, and which card has relatively few openings compactly arranged and differently coded from the systems heretofore used to enable the accomplishment of the desired results.

Heretofore, cards constructed and coded for sorting have usually employed one or two rows of openings along one or more edges, and certain of the openings in one or the other or both of said rows are notched out or slotted to the edge to provide the necessary different patterns that enable selectively sorting the cards by use of pins, needles or similar sorting devices.

In some instances, three or more rows of openings are formed in a card, but when this is the case, the notching out of openings beyond, say the first row, is usually not done, and instead, slots are cut between openings in the different rows, and usually an inconveniently large number of sorting devices must be used.

By the present invention, in a relatively short length along an edge of each card, sufficient openings are provided to enable quick direct sorting of the cards by only several sorting devices; and the number of cards differently identified by the pattern of notches formed in said length by slotting from the edge to different openings, is large.

For example, heretofore, it has been customary to divide a pair of rows of openings in a marginal portion into divisions of say eight openings or four pairs of numerically coded openings, with each such division representing a decimally different group from others. By "decimally" different I mean that one group may be for "units" from one to nine or ten (by combinations of differently valued openings) while the other groups may be for "tens," "hundreds," "thousands," "ten thousands," etc.

By the present invention, the decimally different groups may be the rows themselves rather than divisions of rows. Thus, there may be ten openings in the first row nearest the edge of the card each opening being from "1" to "9" in succession, and "0," and this represents the "units," while the second row of similar openings may represent the "tens," and the next the "hundreds" and the next the "thousands" etc. with several small fields of openings to provide for the control of duplicate figures and zeros.

Thus along a length of the card having twelve openings, there will be 999 different classifications if there are three rows, and 9,999 different combinations with four rows, yet in the latter instance the length along the edge of the card in which the openings are formed will remain practically the same.

Other advantages and objects will appear in the description and drawings.

In the drawings,

Fig. 1 is a plan view of a card showing the invention where three rows of openings are formed, and in which the card is notched or slotted out to illustrate the pattern along the marginally punched edge for a card bearing the identification of the unit "1."

Fig. 2 is a similar view to that of Fig. 1 in which certain openings are slotted out in the marginally punched portion for a card bearing the identification of the numeral "22."

Fig. 3 is a view similar to that of Fig. 1 for a card identified by the numeral "338."

Fig. 4 is a view similar to that of Fig. 1 for a card identified by the numeral "10."

Fig. 5 is a view similar to that of Fig. 1 for a card identified by the numeral "222."

Fig. 6 is a card similar to that of Fig. 1 for a card identified by the numeral "752."

Fig. 7 shows a card similar to that of Fig. 1 in which the pattern along the marginally punched portion is for a card identified by the numeral "9099."

In detail, each of the cards shown in Figs. 1 to 6 inclusive is formed along one edge 4 with rows 1, 2, 3 of openings 5 which rows are parallel with said edge and in the marginal portion of the card along the latter. The openings in adjacent rows are in alignment perpendicular to said edge thus forming separate files of these openings.

The openings 5 are in a group that is formed by the ten openings in each of the rows 1, 2, 3 and these openings are preferably identified by the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 in succession, which may be printed on each card as seen in the drawings. The rows themselves may represent digits in the successive decimal groups of units, tens, and hundreds, with the row nearest said edge representing the units. The term "decimal groups" is used to distinguish unit class, such as numerals in the "1," "2," etc. from the numerals in the tens group, such as "10," "20" etc., and to distinguish the latter from the hundreds group such as "100," "200" etc. Thus a numeral having three figures, such as "220" or "838" would include numbers in all three classes, units, tens and hundreds, the "0" in the instance of "220" being in the unit group.

At one end of the above described main group of openings are two divisions 7, 8 (Fig. 6) that may be separated from the main group by lines 9, 10. Division 7 adjoins the main group of openings 5 and is formed with two openings 11, 12, that are in alignment perpendicular to the edge 4 of the card adjacent thereto and along which edge the rows of openings 5 extend.

The opening 11 is also in alignment with the row 1 of openings 5 and opening 12 is in alignment with the row 2 of openings 5.

In division 8 there is only one opening 13 which is in alignment with the row 1 of openings 5.

These openings 11, 12, 13 are the operative openings in these fields or divisions 7, 8 by which is meant that any additional openings in said fields would not be of any utility insofar as the present invention is concerned although additional openings would not render the present invention inoperative. Such additional openings would merely be superfluous. This explanation will clarify certain claims in which the term "operative openings" is used.

The openings in these fields or divisions 7, 8 constitute "control" openings for controlling duplicate digits that are to be identified by slotting out certain openings to edge 4. The openings in the field 7 provide for a control with respect to openings previously slotted out in row 3 where the coded item requires a slotting out of an opening in row 1 or 2. The letter "H" indicates "hun-

dreds" and when the opening 12 is slotted out it indicates that there is a duplication in row 2 of a number already punched out in the same file in the hundreds row. When the opening 11 in field 7 is slotted out, this indicates that there is a duplication in row 1 of a number already slotted out in the hundreds row in the same file.

Thus if the card is coded for the numeral "121," the file of openings designated "1" will be slotted out to row 3 since the first digit in the number "121" is in the hundreds row. The portion of the card from the second opening (tens rows) in the file having the openings identified by the numeral "2" will be slotted out to the edge of the card. The remaining "1" is a duplication in the unit row of the opening "1" already slotted out in the hundreds row, hence the opening 11 in the field 7 will be slotted out. Had the code number been "221" then the opening 12 would have been slotted out since the second "2" in the number "221" occurred in the second row of openings which is the "tens" row.

The opening 13 in field 8 is punched out when an opening in the second rows (tens) is slotted out and the coded number includes a duplication in the unit field (row 1) in the same file. Fig. 2 illustrates this circumstance in which the coded number is "22," and Fig. 5 also illustrates this circumstance, where the coded number is "222" since it is obvious that one of the numerals "2" has already been slotted out in the "2" file in row 2.

It is to be understood that the cards, designated by the numeral 15 may be much longer than the rows of openings 1, 2, 3 including the fields or divisions 7, 8, and such cards may bear any desired number of other marginally punched openings for coding purposes. Also the cards may be, and normally are, many times wider (vertically) than is required for the rows 1, 2, 3. The illustrations do not show the complete cards inasmuch as the latter may be of any desired size. However, in a stack of cards using the present invention, the cards must be such that the openings herein described for each card will be in registration with corresponding openings in the remaining cards in the stack.

This is because conventional sorting pins used in selectively sorting the cards are thrust through the desired openings in the cards in the stack to enable the desired cards to drop from the pins or sorting devices. These latter cards are, of course, the ones in which the pin receiving openings are slotted to the edge 4 so the cards will not be held on the pins when the remaining cards in the stack are suspended from such pins.

The method of sorting by the use of sorting devices is old, but by the present arrangement, coded cards properly notched along rows 1, 2, 3 and in certain instances in fields 7, 8, require only three pins to effect any and all sorting operations. This number of pins is equal to the number of rows of openings 5.

In explanation of the present invention, where the pattern along the marginally punched portion of the card is such as to identify and to enable separation of a card bearing the numeral "1," the opening 5 in the file designated "1" and in row 1, or the "units" row, will be slotted out to edge 4 as seen in Fig. 1, and in order to employ the three pins required and to eliminate the zeros, the opening in row 3 (hundreds rows) and in the file identified by the "0" numeral will be slotted out to the edge 4 and the opening 12 will also be slotted out to edge 4.

The elimination of the zeros is required since, where three rows of openings are used and three pins are required to extract the card of any given code number, three symbols are required, hence the card "1" would be "001," and card "10" would be "010," as examples. Therefore, one zero precedes any two digit number less than "100" and two zeros precedes any digit less than "10." This, together with the explanation of the control fields 7, 8 will make it clear why, in the card of Fig. 1,

the zero file of openings is slotted to the hundreds field and why the opening 12 in field 7 is slotted out.

In each card one slot, and one only, will extend to the "hundreds" row or row 3, and one will extend to the tens row or row 2, and one will extend to the unit row or row 1, and where there is any duplication of digits or zeros, at least one of such slots will be in the field 7 or 8. If four rows of openings are used then a slot will extend to an opening in each of the four rows, and this will include openings in fields 7, 8 where there are duplications of digits or zeros, but under no circumstance will two or more slots in any card extend to the same row of openings in the present invention.

If the pattern of notches along edge 4 is to identify the figure 22 (Fig. 2), it will be seen that the opening in row 2 (tens row) and in the file the openings of which are identified by numeral "2" will be slotted out to edge 4. Inasmuch as this number "2" in the tens field is duplicated, the opening 13 will be slotted out, and to take care of the hundreds zeros the opening in the hundreds row and zero file is slotted out.

Where there are three numbers such as "338" (Fig. 3), it will be seen that the numeral "3" in the hundreds field is duplicated, hence not only will be opening in row 3 and in the file bearing the identity of "3" be slotted out, but opening 12 will also be slotted out (because of duplication) and the opening in row 1 (units row) and in file identified by numeral "8" will be slotted out.

Assuming the card is No. 10 (Fig. 4), three needles will be required, as already mentioned. The opening in row 2 (tens row) and in file 1 will be slotted out to the edge and the opening in row 3 (hundreds rows) file "0" will be slotted out, and the opening 11 will be slotted out. This slotting out of the opening in row 3 of the "0" file to account for the hundreds zero is repeated in the unit field which accounts for the opening 11 being slotted out.

In Fig. 5 the number is "222." Thus the "2" in the hundreds row is duplicated twice, and here again the control is to be found in fields 7, 8 by slotting out openings 12 and 13, the slotting out of opening 12 indicating a duplication of the "2" in the hundreds field in the tens position of the figure and the slotting out of opening 13 indicating duplication of the "2" also in the unit position.

When there is no duplication, as in Fig. 6, in which the number is "752" the control fields or divisions are not required. It is merely necessary to slot out the opening on row 3, file "7," and the opening in row 2, file "5" and the opening in row 1, file "2."

In order to extend the classification, it is only necessary to add another row of openings 20 (Fig. 7) below row 3 and to add an opening in field or division 7 and an opening in field 8 and to add a third field or division with a single opening therein.

In order to distinguish the card in Fig. 7 from the others, the rows 1, 2, 3 of openings 4 will bear the same numbers, and row 20 will be the fourth row.

The fields or divisions will be designated 21, 22, 23 in succession at the right hand end of rows 1 to 4, and the openings in division 21 will be designated 24, 25, 26 in succession away from edge 4 while the openings in division 22 in succession away from edge 4 will be indicated by the numerals 27, 28. The single opening in division 23 is designated 29.

The field 21 may be identified on the card as the thousands field, and field 22 as the hundreds, and field 23 as the unit, or by any other suitable symbols.

Assuming the number coded on the card is "9099," it will be seen that the opening in row 20, file "9" will be slotted out since this is the "9" in the thousands row. Then the opening in row 3 and file "0" will be slotted out since this is the zero in the hundreds row. Inasmuch as the thousands "9" is duplicated in the ten posi-

tion, opening 25 in the ten position in the thousands division 21 (Fig. 7) will be slotted out and as this number "9" is repeated in the unit position, the opening 29 is slotted out. By this method and structure, a full control is provided by the divisions 21, 22, 23 and the openings therein. However, four pins or sorting devices are required where four rows of openings are used, and if five or six rows were used, the number of sorting devices used would correspondingly increase.

Insofar as the structure is concerned, the following features are apparent, irrespective of the number of rows of openings. The number of marginal slots or notches is equal to the number of rows of openings 5, and the number of control fields or divisions is one less than the number of rows of openings 5, and the number of operative openings in the control field having the maximum number of such openings, is one less than the number of rows of openings 5, while the other control fields have, in succession one less opening than the field adjacent thereto with a minimum of one opening in the last of said fields.

Any number of rows of openings may be used, and as many pins will be required as there are rows. This is one of the principal advantages, namely; that only one pin is required for each digit value, therefore, only one pin is required for each row of holes, thus if there are four rows, four pins will be required, five pins for five rows, etc.

I claim:

1. Selective sorting cards for direct sorting of combinations of different numbers representing different titles for said cards, each card having at least three rows of perforations formed in a marginal portion along one edge thereof with said rows parallel with said edge, the openings in adjacent of said rows being in alignment perpendicular to said edge thus defining files of said openings each having the same number of openings as there are rows thereof, openings formed in said margin in divisions separate from each other and from said rows with the openings in said divisions being in line with the openings in said rows and in lines parallel with said openings in each of said files, the openings in each of said files being identified by a different digit from "1" to "9" inclusive and "0," the said title on certain of said cards including at least three of said digits and the title on other of said cards having at least three digits that include a duplication of one of said digits, the openings in the card having the title with three different digits being slotted to said edge from the first, second and third row from said edge in each file identified by said one of said digits in the order in which said digits appear in said title with the opening in the first row being slotted to said edge from the file identified by the unit digit and with the opening in the second row being slotted from the file identified by the tens digit, and with the opening in the third row being slotted from the file identified by the hundreds digit, the opening in one of said divisions being slotted out from the opening nearest said edge and to the latter in the card having a duplication of digits in the title and in which such duplication is the unit digit in the file identified by a digit in the title that is in the tens row only, and the opening in another of said divisions being slotted out from the opening nearest said edge and to the latter in the card having a duplication of digits in the title and in which said duplication is in the units digit in the file identified by a digit in the title that is in the hundreds row only, and the second opening from the edge in said last mentioned division being slotted out to the edge of the card in a card having a duplication of digits in the title and in which such duplication is in the tens digit in

the file identified by a digit in the title that is in the hundreds row, and the said openings in both of the above mentioned divisions being slotted out to said edge in a card having a title in which the same digit is in triplicate.

2. Selective sorting cards for direct sorting of combinations of different symbols representing different titles, each card having at least three rows of openings formed therein along and parallel with one edge of said cards disposed in an undivided field, the openings in said rows being in alignment perpendicular to said edge thus defining files each having the same number of openings as there are rows thereof, a series of different symbols on each card identifying said files in a predetermined order from one of the corresponding ends of said rows to the other with one symbol for each file, each card having a title thereon formed from a group of symbols occurring in said series arranged in a predetermined order, the opening nearest said edge in the file identified by a first predetermined symbol in the title on each card being slotted out to said edge, the second opening from said edge in the file identified by a second predetermined symbol in the title on each card being slotted out to said edge and the third opening from said edge in the file identified by a third predetermined symbol in the title on each card being slotted out to said edge, said first, second and third predetermined symbols being in a predetermined order in each title and being independent of each other in each title, the cards in which said first predetermined symbol is duplicated and the remaining predetermined symbol is different being slotted out to said edge to openings in only two of said files in said field, and the cards in which said first, second, and third predetermined symbols in the title are the same having only one slot in said field and which slot extends to the opening in the third row from said edge in the file identified by said first, second and third predetermined symbols, a second field and a third field on each card, said second field and said third having openings formed therein in alignment with the row in said undivided field that is nearest to said edge and said second field having an opening formed therein in alignment with the second row from said edge in said undivided field, aligned perpendicular to said edge with respect to the other opening in said second field, said cards in which the duplication of said predetermined symbols occurs in said first and second predetermined symbols only, being slotted out to said edge from the opening in said third field, and the cards in which said duplication is in said first and third predetermined symbols only, being slotted out to said edge from the opening in said second field that is nearest to said edge, and the cards in which said duplication of symbols is in said second and third predetermined symbols only, being slotted out to said edge from the opening in said second field that is aligned with the second row of openings from said edge, and the cards in which said first, second and third predetermined symbols are the same being slotted out to said edge from the opening in said third field and from the opening in said second field that is aligned with the openings in said second row.

References Cited in the file of this patent

UNITED STATES PATENTS

2,310,445	Lang	Feb. 9, 1943
FOREIGN PATENTS		
294,724	Great Britain	Aug. 2, 1928
713,179	Germany	Nov. 3, 1941