

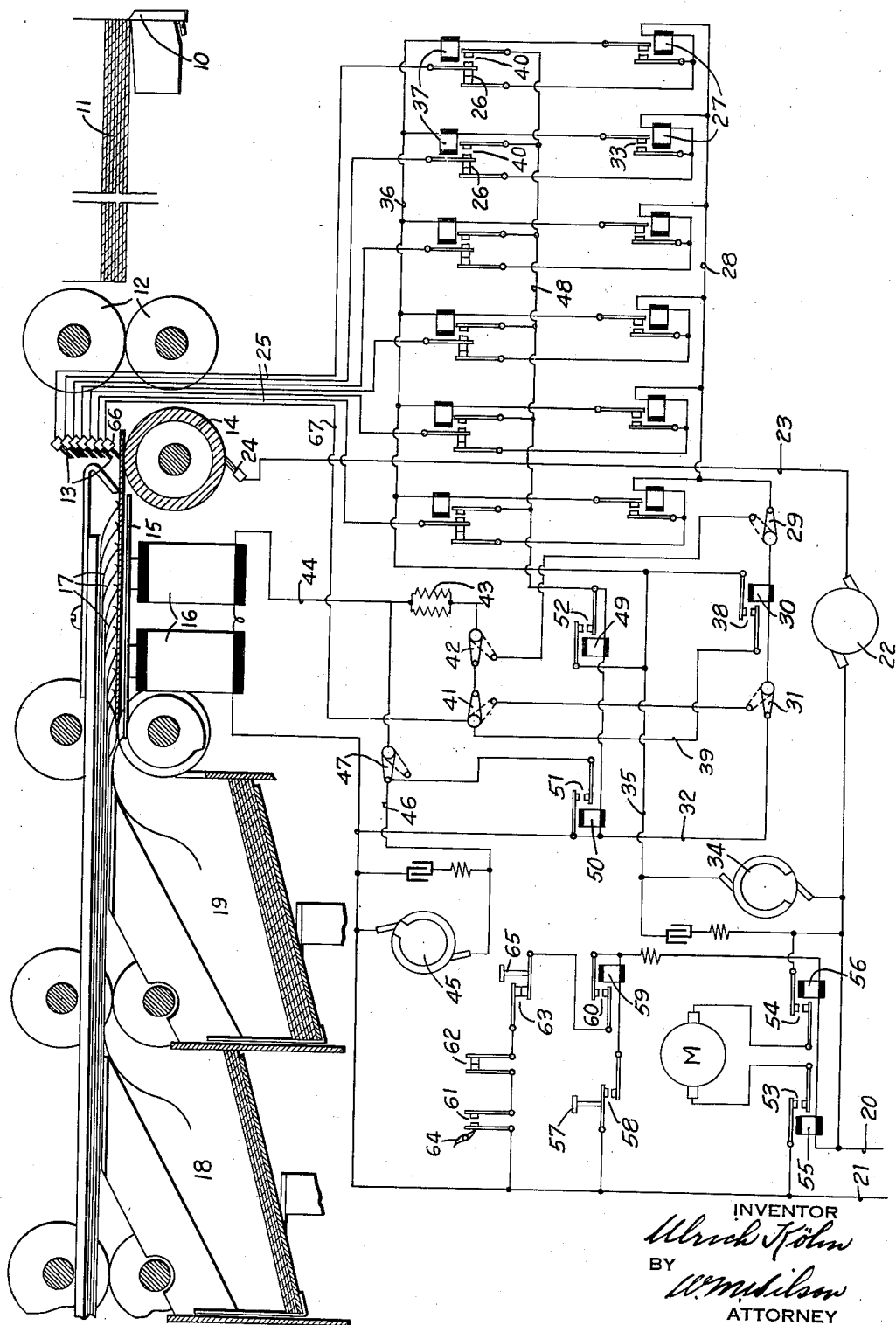
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SORTING MACHINE

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SORTING MACHINE

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This invention relates to card controlled machines in general and more particularly to machines adapted to sort record cards such as are used to control the operation of the well known Hollerith type of tabulating machine.

In punching cards to be analyzed in tabulating machines it sometimes happens that more than one hole is punched in a given column which, if run through the tabulating machine, would cause erroneous operation thereof. For instance, in payroll control, data may be punched in a control field indicating the group to which the particular card, or employee belongs. The cards may be punched with the aid of master or pattern cards in a well known duplicating punch, said pattern card bearing data-indicating perforations appertaining to a particular group of employees. It may occur that an individual card may be perforated under control of a master card of another group thus rendering the card useless by punching two holes in a group control column on the card.

It is one object of the present invention to provide novel means to sort all cards having a single perforation in any of a plurality of columns into one pocket and to sort the cards having plural perforations in one or more of said columns into another pocket.

For illustrative purposes the invention is shown applied to a sorting machine of the type disclosed in U. S. Patent No. 1,741,985, issued Dec. 31, 1929 to E. A. Ford. Such a sorter, in operation, feeds cards one-by-one by means of a picker knife 10, from the bottom of a card stack 11 to rollers 12 which, in turn, feed the cards between a series of brushes 13 and a contact roller 14 in a well known manner.

The index or value perforations in the well known Hollerith card are differentially located from the leading edge of the card. After this edge of the card passes the brushes 13 it passes between a table 15, forming an armature for a pair of sorting magnets 16, and a series of guide tongues 17 pressed lightly into contact with said table by the inherent spring tension of the tongues.

When a brush 13 encounters a hole, during the passage of the card thereby, the leading edge of the card is between two of the tongues 17, depending upon the differential location of the hole. At this time the brush 13 makes contact with the roller 14 closing an electrical circuit to energize the sorting magnets 16, whereupon the table is lowered, the tongues 17 to the left of the card moving downwardly therewith, and the remaining tongues 17 being supported by the card, thus

determining the particular pocket to which the card subsequently will be guided.

However, it is the purpose of the instant invention to sort the cards into two pockets, those cards having a single hole in a column being sorted into the "12" pocket 18 and those cards having more than one hole in a column being sorted into the "reject" pocket 19. This is accomplished by delaying energization of the sorting magnets 16 until the 12th index position on the card reaches the brushes 13 thus directing the single hole cards into the 12th pocket, and by preventing energization of the sorting magnets 16 when two holes occur in a column, thus passing the card under all of the tongues and into the "reject" pocket 19.

Current is supplied to the machine by lines 20 and 21. When a brush 13 encounters a hole in the card for example in the "5" position, a circuit is established as follows: Line 20, an impulse device 22 synchronized with the passage of the card past the brushes 13, wire 23, a brush 24 to contact roller 14, brush 13, wire 25, contacts 26, magnet 27, wire 28, change over switch 29, magnet 30, switch 31, wire 32 to the other side of the line 21. This energizes magnet 27 closing its contacts 33 and establishing a holding circuit through a commutator 34, wires 35 and 36, magnet 37, contacts 33, magnet 27, wire 28, change over switches 29 and 31, magnet 30, wire 32 to line 21.

Energization of magnet 30 closes its contacts 38 and sets up a circuit from the commutator 34, contacts 38, wire 39, switches 41 and 42, resistance 43 and line 44 to the sorter magnets 16. This circuit is not effective at this time to energize the sorter magnets since it is shunted across these magnets by a commutator 45, wire 46 and a switch 47. The commutator 45 is timed to open the shunt circuit as the "12th" position on the card passes the brushes 13, consequently, if another hole has not been encountered, the sorter magnets will be energized at the "12th" position, thus directing the advancing card into the "12" pocket 18. However, if, in addition to the "5" hole, another hole, for instance in the "1" position, is encountered a circuit is established over the contacts 40, a wire 48, a magnet 49, a magnet 50 to the line 21. This energizes the magnet 50 closing its contacts 51 and reestablishing the shunt across the sorter magnets 16. This prevents energization of the sorter magnets at the "12th" position under control of the commutator 45 which results in the card being directed into the "reject" pocket 19.

Energization of magnet 49 closes its contacts 52 thus setting up a holding circuit from the com-

mutator 34, wire 35, contacts 52, magnets 49 and 50 to the line 21. This circuit maintains the shunt across the sorter magnets 16 until the end of the cycle when the sorting circuits are opened by the commutator 34.

The machine may be driven by the usual electric motor M which is energized from the main lines 20—21 through two sets of contacts 53 and 54 adapted to be closed upon energization of their respective relay magnets 55 and 56. These magnets are energized by depression of a start key 57 closing contacts 58 and setting up the following circuit. From line 21, contacts 58, relay 59, magnets 56 and 55 to the line 20. This energizes the relay 59 closing its contacts 60 setting up a holding circuit from the line 21, card lever contacts 61 (closed when the first card is fed into the machine) full-pocket contacts 62, stop key contacts 63, contacts 60, motor relay magnets 56 and 55 to line 20.

The machine will stop automatically when the last card has passed the card lever 64 opening the card lever contacts 61, or when one of the card pockets is full which automatically opens the full pocket contacts 62. The machine may also be stopped at will by operation of the stop key 65 opening the contacts 63 to deenergize the motor relay magnets 56 and 55.

Obviously, by throwing the change-over switches 29, 31, 41 and 42 to the positions indicated by dotted lines, and by opening the switch 47 to cut out the shunt commutator 45 and the shunt contacts 51, the machine may be made to function in a normal manner, sorting into all twelve pockets and the reject pocket under control of a brush 66 analyzing a single card column.

When the machine is set to analyze from a single column, and the brush 66 encounters a hole in said column a circuit is established from the line 20, impulse emitter 22, wire 23 brush 24, contact roll 14, brush 66, a conductor 67, switch 41 (now in dotted position) to switch 31, magnet 30, switch 29, switch 42 resistance 43, line 44 to the shorter magnets 16 and to the line 21. This energizes the sorter magnets to selectively guide the card into the appropriate pocket. This circuit also energizes the magnet 30 which closes its contacts 38 thus setting up a holding circuit from the commutator 34, line 35, contacts 38, line 39, switch 41. Switch 31, magnet 30, switches 29 and 42, resistance 43, line 44, sorter magnets 16 to the line 21. This holding circuit is maintained until the end of the card cycle when it is opened by the commutator in readiness for the next succeeding card.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a sorting machine having a plurality of pockets, sensing means to sense record cards in motion, means controlled by perforate index points of a certain column on a record card to sort the cards into the several pockets according to the location of the index points in the card column, electrical circuits controlled by a perforate index point in any index position in any one of a plurality of columns to control the sorting

means to sort all cards having a single perforate index point in any one of said plurality of columns into a certain pocket, and other electrical circuits conditioned by the first mentioned circuits and controlled by a second perforate index point in any one of the columns to control the sorting means to sort all cards having plural perforate index points in any one column into a certain other pocket.

2. In a sorting machine having a plurality of pockets, the combination of a plurality of sensing means to sense perforations in one or a plurality of columns on a record card in motion, card sorting means, electrical circuits conditioned by the sensing means when sensing a single column to control the sorting means to sort the cards into all of the pockets according to the differential location of the perforation in the column, an electrical switch to change the control of the sorting means from the single sensing means to the plural sensing means, a shunt circuit to control the sorting means to sort all cards having a single perforate index point in any one of a plurality of columns into a certain pocket, and a second shunt circuit conditioned by the first perforate index point to control the sorting means to sort the cards having plural perforate points in any one column into another pocket.

3. In a sorting machine having a plurality of pockets, the combination of means to sense perforate control points in a plurality of columns on a record card, means to feed cards past the sensing means, means to select the pockets to receive the cards, a magnet to operate the selecting means, circuits controlled by the sensing means when said sensing means encounters a perforate point to energize the magnet, means operated by the machine to prevent energization of the magnet until a predetermined time during the operation of the machine, other circuits controlled by the sensing means when said sensing means encounters a second perforate point in the same column, and means operated by said other circuits to prevent energization of the magnet at the predetermined time.

4. In a sorting machine having a plurality of pockets, the combination of a plurality of sensing means to sense a plurality of columns on a record card, sorting magnets, electrical circuits to energize the sorting magnets, a circuit controlled by the first perforation in a column to delay energization of the sorting magnets until a predetermined time after the sensing means encounters said first perforation, and a circuit controlled by a second perforation to prevent energization of said magnets at said predetermined time.

5. In a sorting machine having a plurality of pockets, the combination of sensing means to sense a plurality of columns on a record card, sorting magnets to select the pockets, a circuit controlled by a perforation to effect energization of the sorting magnets, a commutator, a circuit controlled by said commutator to delay energization of the magnets until a predetermined time, and a circuit controlled by a second perforation to prevent energization of the sorting magnets at said predetermined time.

6. In a sorting machine having a plurality of pockets, the combination of a plurality of sensing means to sense a plurality of columns in perforated record cards, a sorting magnet to select the pockets to receive the cards, a circuit to energize the magnet when the sensing means encounters a perforation, a commutator, a shunt

circuit controlled by the commutator to prevent energization of the sorting magnet until a predetermined time, and another shunt circuit controlled by a second perforation in any column to
5 prevent energization of the sorting magnet at said predetermined time.

7. In a sorting machine having a plurality of pockets, the combination of a plurality of sensing means to sense a plurality of columns in a
10 perforated card, a sorting magnet to select the

pockets, electrical circuits to energize the sorting magnet, a shunt circuit across the sorting magnet to delay energization of the sorting magnet until a predetermined time thereby selecting
5 one of two pockets, and a second shunt circuit across the sorting magnet to prevent energization of said magnet at said predetermined time to select the other of the two pockets.

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