

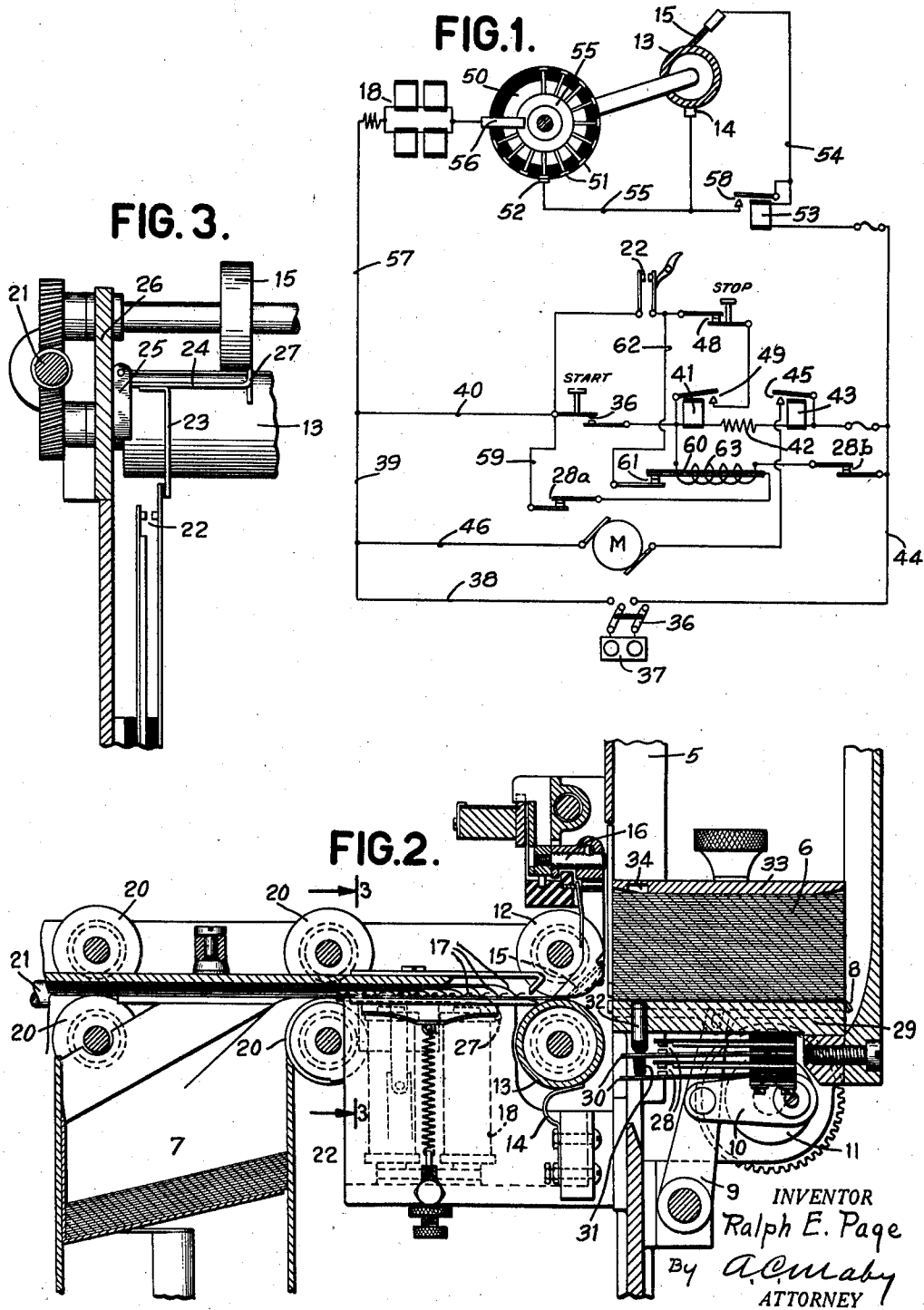
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SORTING MACHINE

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SORTING MACHINE

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This invention relates to sorting machines and more particularly to sorting machines for handling perforated cards such as are used in tabulating and accounting machines in connection with the well-known Hollerith system.

It is customary to place a stack of cards in a hopper of such a machine and feed them through chute blades to sorting pockets or stations. Automatic means have generally been provided for stopping the machine when the last card is fed from the hopper which caused several cards still in transit to be left in the chute blade making it necessary for the operator to come and clear the machine before gathering the cards from the pockets.

It is an object of this invention to provide automatic means for clearing all cards from the chute blades before stopping the machine after the hopper has become empty.

It is another object of this invention to provide a time controlled circuit breaker for holding the machine in operation for a predetermined time after the hopper has become empty.

Another object of the invention is to provide a thermostatic controlled device for continuing the sorting machine in operation for a predetermined time after the hopper has become empty.

Various other objects and advantages of my invention will be obvious from the following particular description of one form of mechanism embodying the invention or from an inspection of the accompanying drawing, and the invention also constitutes certain new and novel features of the construction and combination of parts hereinafter set forth and claimed.

In the drawing:

Fig. 1 is a wiring diagram showing the circuit of the machine.

Fig. 2 is a section through hopper showing details of the part of the invention.

Fig. 3 is a detailed view of card lever contacts in the machine taken on line 3—3 of Fig. 2.

The present invention may be used in connection with various types of sorting machines but for the purpose of illustration and explanation the preferred embodiment has been chosen as the machine shown and described in Patent No. 1,684,389 dated September 18, 1928. A full and detailed description having been given in that patent it will suffice to give a very general explanation of the sorting machine for a clear understanding of the operation.

Referring to Fig. 2 which shows a section of one end of a sorting machine such as described in

Patent No. 1,684,389 in which a hopper 5 is provided for receiving a stack of cards 6 which are to be sorted into various pockets in the machine, one of which is shown at 7. The cards used may be of the well-known Hollerith type in which index point positions are perforated in the card. The cards are fed, one at a time, from the bottom of a stack by a picker 8 which is oscillated back and forth by means of an arm 9 connected to a crank 10 which is fastened to an eccentric 11 which is rotated by means of gearing from the drive shaft 21 of the machine (Fig. 3).

The cards are fed to feed rollers 12 which bear on a contact roll 13 which is permanently connected into a circuit by a spring contact 14 bearing against it. A brush 15 bears against the upper surface of the cards as they pass by and when said brush encounters a perforation it makes a contact through said perforation with the contact roll 13. The brush is mounted in a brush holder 16 which is movable transversely of the machine for selecting any column of the card for sorting. As the card is fed forward the leading edge of the card passes under successive ends 17 of chute blades passing these ends in synchronism with the passage of the index point positions on the card by the brush 15, so that the edge of the card is at the entrance of the chute leading to the pocket 7 corresponding to the index point position on the card that is at the time under the brush, thus if a perforation is encountered the brush 15 makes contact with roll 13 which energizes a magnet 18 which allows the chute in front of the leading edge of the card to open and receive it in a manner fully described in Patent No. 1,684,389. The card is then carried along the chute by a series of feed rollers 20 until it has reached its selected pocket. The feed rollers are all operated from the drive shaft 21 of the machine through suitable gearing. A card lever contact is provided for keeping the machine in operation when once it has been started as long as cards are being fed. This contact is shown in detail in Fig. 3 in which a spring blade contact 22 is held in a normally open position.

An arm 23 having an insulated end rests against one spring blade of the contact 22. The arm 23 is fixed to a lever 24 which is pivotally mounted to a bracket 25 fixed to the side frame member 26 of the machine. The opposite end 27 is formed into a cam-like extension extending a little above the plane of movement of the card as it is fed between feed roller 15 and contact roll 13. The arm 24 has a tendency to rock clockwise due to gravity but is held up by the spring blade of con-

tact 22. As a card is fed through the machine, however, it strikes the upper surface of the cam-shaped end 27 rocking the arm 24 clockwise and closing contact 22 until the last card has passed the cam 27 at which time contact 22 opens. In the machine described in Patent No. 1,684,389 the opening of this contact stopped the machine immediately, leaving the chute blades full of cards in transit that had not yet reached their destination and requiring an operator to come to the machine and clear it by pressing the start key of the machine. In order to overcome this there has been provided a double set of spring blade contacts which are mounted underneath the hopper base 29 and insulated therefrom (Fig. 2). The lower spring blades 30 are provided with an insulated space member 31. A plunger 32 made of suitable insulating material is slidably mounted in an aperture of the base 29 and rests on the upper spring blade 30. A weighted plate 33 is placed on top of the stack of cards 6 and this plate is provided with a counter sink 34 which registers opposite the top of the plunger 32 so that when there are no cards in the hopper the plunger 32 extends into the counter sink 34 by virtue of the spring blades 30 pressing said plunger upward and at such times the contacts 28 are closed. When cards are in the hopper however the plunger is pressed down as shown in Fig. 2 and the contacts 28 are held open.

Referring now to Fig. 1, it will be remembered that when cards are in the hopper and the machine started contacts 28 are opened. Assuming cards are now placed in the machine and a sorting operation is to be initiated. The start key is depressed closing contacts 36 and thereby completing a circuit from a source of power 37, switch 36, which has been closed, wires 38, 39, 40, start contacts 36, relay magnet 41, resistance 42, relay magnet 43, wire 44 to the other side of the supply line. Relay magnet 43 is energized closing its contacts 45 and establishing a circuit through the driving motor M as follows: Supply line 37, wires 38 and 46, motor M, relay contacts 45, wire 44 to the supply line. The motor having been started the cards are fed as previously described causing card lever contacts 22 to be closed, thus establishing a stick circuit and permitting the start key to be released. The relay magnet 41 having been energized, a circuit is established as follows: From supply line 37, wires 38, 39, 40, 47, card lever contact 22 (now closed), stop contacts 48, contacts 49 (now closed), relay magnet 41, resistance 42, relay magnet 43, wire 44 and back to the supply line. Thus relay magnets 41 and 43 are both held energized as long as cards are passing by the card lever and holding card lever contacts 22 closed. The sorting operation is the same as described in Patent No. 1,684,389 in which the cards pass under brush 15 and in which a commutator 50 is provided having conducting spots 51 which are wiped by a contact 52 and which are synchronized with the passing of the index point positions on the card past the brush 15 so that as each index point position passes the brush 15 one of the spots 51 makes contact with the brush 52.

The purpose of this is to take the arcing due to the break in the current away from the brush. When the brush encounters a perforation in a card a circuit is completed as follows: From supply line 37 to wires 44, relay magnet 53, wire 54, brush 15, contact roll 13, contact brush 14, wire 55, commutator brush 52, conducting spot 51, commutator ring 55, brush contact 56, sorting

magnets 18, wires 57, 39 and 38, to supply line 37. Relay contact 58 closes and shunts out the brush 15 so that the circuit is broken finally at the commutator.

When the cards are completely fed out of the hopper and the last card passes the card lever, card lever contact 22 opens but the hopper having been emptied contacts 28 close as previously described. A new circuit is now set up around the card lever contacts 22 to keep the machine in operation and feed all cards remaining in the chute blades to their destination. This circuit is as follows: From supply line 37, through wires 38, 39, 40, 59, contact 28a (now closed), bimetallic element 60, contact 61, wire 62, contact 48, relay contact 49, relay magnet 41, resistance 42, relay magnet 43, wire 44, and back to the supply line. The bimetallic element 60 is surrounded by a heating coil 63 and this combination constitutes a thermal unit which is designed to open contacts 61 at a predetermined time after the heating coil 63 becomes energized. Thus when contacts 28 (Fig. 2), which are the same as 28a and 28b (Fig. 1) and which always open and close together, close, a circuit is established through the coil 63 as follows: Supply line 37, through wires 38, 39, 40 and 59, contacts 28a, bimetallic element 60, contacts 61, wire 62, contacts 48, relay contacts 49, heating coil 63, contacts 28b, wire 44 and back to the supply line 37.

The heating coil now heats the bimetallic element 60 at a predetermined rate so that after a period of a few seconds the bimetallic element bends due to the difference in the co-efficient expansion of the two elements and causes contact 61 to open, thus breaking the circuit through relay magnets 41 and 43 and stopping the machine. The delayed time in the opening of contact 61 after contact 22 has opened and contacts 28a and 28b have closed is sufficient to keep the machine running long enough to clear the chute blades and conduct all cards to their respective pockets. The bimetallic element and its associated heating coil may be of any suitable type of thermostatic relay which are old and well known in the art. Such devices can be adjusted to act for any set predetermined period of time.

While the fundamental novel features of the invention as applied to a single modification have been shown and described and pointed out, 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. I intend to be limited therefore only as indicated by the scope of the following claims.

What is claimed is as follows:

1. In a machine of the character described, in combination, a card magazine for holding a stack of cards, means for feeding cards of the stack successively out of said magazine, operating mechanism for said feeding means, a control device operable upon failure of the feeding means to feed cards from the stack to immediately interrupt the operation of said operating mechanism and a second control device operable only upon the depletion of cards from the magazine to interrupt the operation of said operating mechanism after a predetermined time interval.

2. In a machine of the character described, in combination, a card magazine for holding a stack of cards, means for feeding cards of the stack successively out of said magazine, operating mechanism for said feeding means and a plurality

of interrupting devices for interrupting the operation of said operating mechanism comprising an interrupting device effective only upon failure of the feeding means to feed cards from the stack only while cards are in said stack to immediately interrupt the operation of said operating mechanism and a second interrupting device operable only after feeding the last card from said stack to interrupt operation of the operating mechanism only after a predetermined time has elapsed after the feeding of the last card.

3. In a machine of the character described, in combination, a card magazine for holding a stack of cards, means for feeding cards of the stack successively out of said magazine, operating mechanism for said feeding means, and a plurality of interrupting devices for interrupting the operation of said operating mechanism comprising a device for immediately interrupting the operation of said operating mechanism upon failure of the feeding means to feed cards from the stack and a device for rendering said first named device ineffective after feeding the last

card from said stack, said last named means effecting interruption of the operating mechanism after a predetermined time interval following the feeding of said last card from the stack.

4. In a machine of the character described, in combination, a card magazine for holding a stack of cards, means for feeding cards of the stack successively out of said magazine, operating mechanism for said feeding means, and a plurality of card controlled devices for interrupting the operation of the operating mechanism comprising a contact member operable upon failure of the feeding means to feed cards from the stack to effect immediate interruption of the operating mechanism and a second contact member operable after the last card has been fed from the stack to effect operation of a time delayed relay, the operation of said time delay relay rendering the operation of said first mentioned contact device ineffective and to cause interruption of said operating mechanism only after a predetermined time delay.

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