Sept. 29, 1959 D. C. NEWCOMB 2,906,400

RECORD CONTROLLED MACHINE

Filed Dec. 21, 1951 2 Sheets-Sheet 1

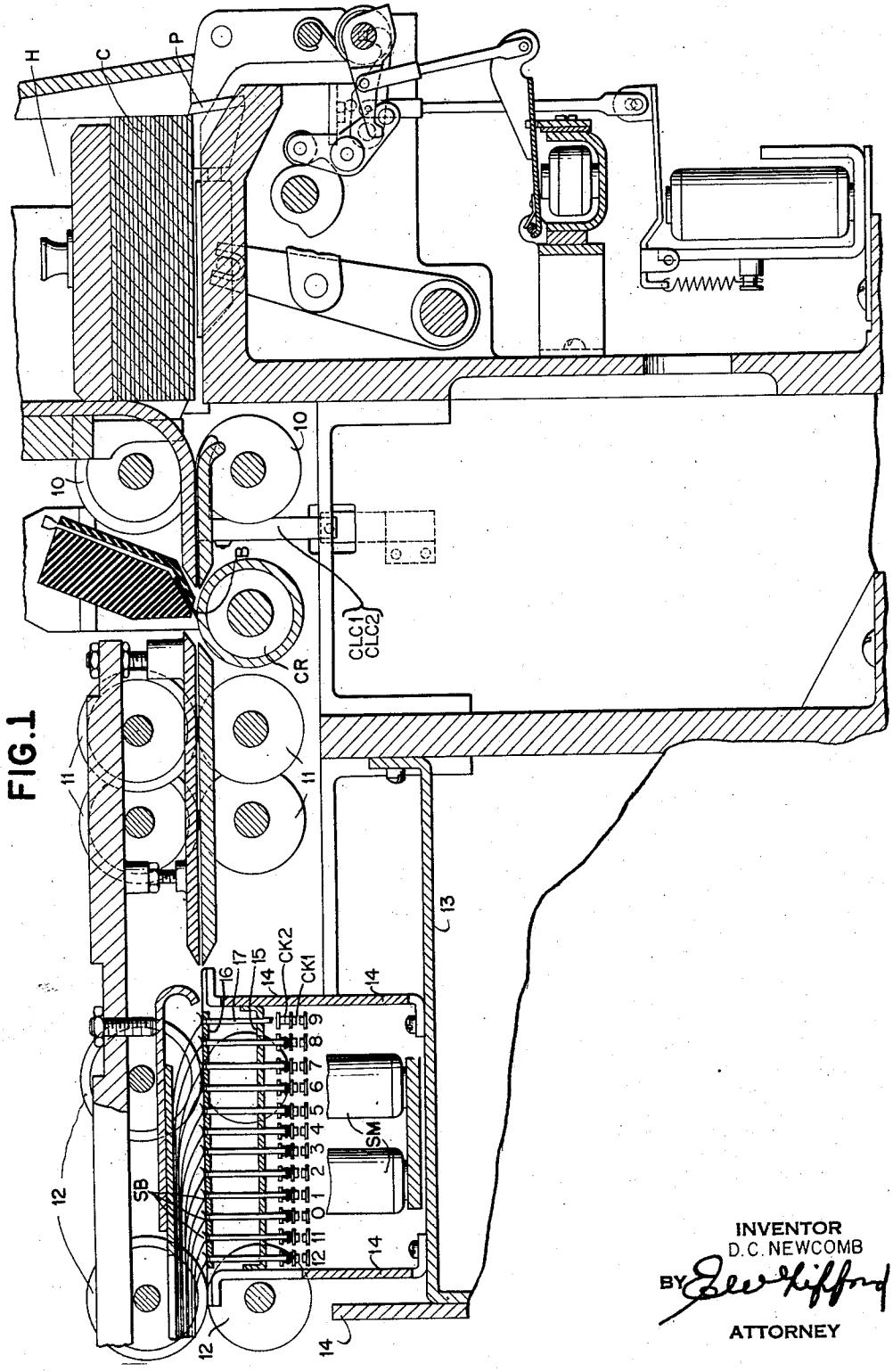


FIG. 1

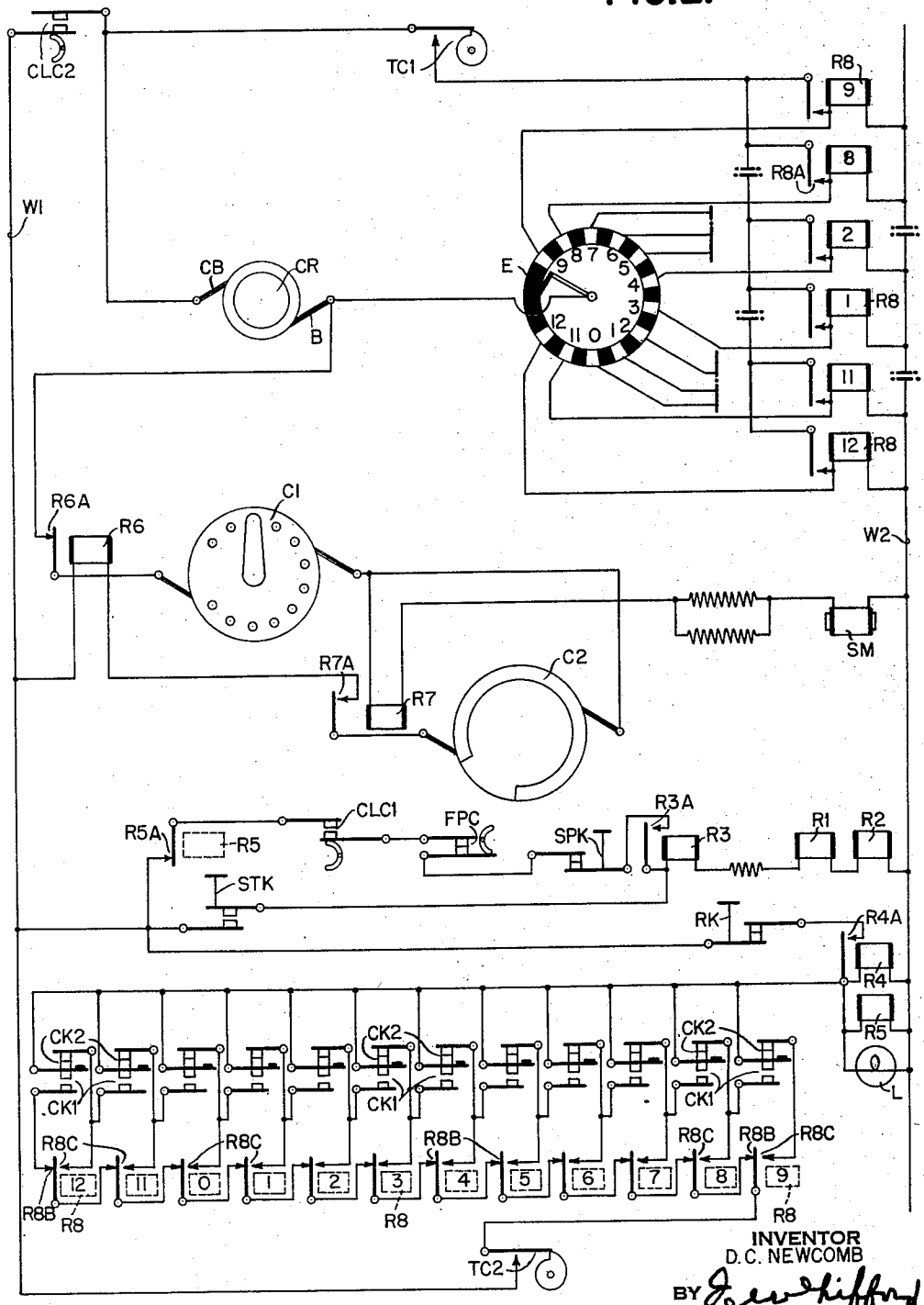
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FIG.2.



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RECORD CONTROLLED MACHINE

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3 Claims. (Cl. 209—110)

This invention relates to record controlled machines.

The primary object of the present invention is to improve record controlled sorting machines.

An object is to provide a means of comparing the true destination of a record as determined by the sorting mechanism with storage means for the selected destination as a check upon the accuracy of the operation of both the sorting mechanism and the specific means for selecting a destination for a record.

An object is to provide a means for stopping the machine and indicating to the operator the fact that a record will not be sorted to the selected destination.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of examples the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a vertical section through a sorting machine modified in accordance with the present invention.

Fig. 2 is a wiring diagram.

In the operation of a conventional record card sorting mechanism of the general type shown in Patent 1,741,985 it sometimes happens that the record card slips or for some reason fails to feed at the rate which will cause the card to be correctly sorted to the pocket corresponding to the value of the selecting impulse to the sorting magnet. It is also possible in machines of this general type, where sorting is effected on an arbitrary basis determined by combinations of data designations in the record card, that more than one sorting impulse may be transmitted to the sorting magnet or the controlling circuits may be erroneously set up and cause a different destination to be selected from the one initially chosen. As the erroneously sorted record card may be rather difficult to find, particularly where the initial selection is based on an arbitrary combination of data designations, it is desirable that a means be provided to check the initial sorting impulses against the actual destinations of the record cards and, if the actual destination disagrees with the selected destination, to stop the machine and otherwise warn the operator in time to remove the erroneously sorted card.

The card feeding and sensing mechanism and the mechanism associated with the card hopper is similar to the mechanism disclosed in Patent 1,741,985 and consequently will not be described in detail. The cards C are advanced from the hopper H by means of a picker mechanism generally designated P in Fig. 1 which is operated in a well known way to push the bottom card from the hopper H to the left where it is gripped by a first set of feed rollers **10** and advanced to the left past the usual sensing brushes B which cooperate with the usual contact roller CR. The cards are then transported to the left by a series of feed rollers **11** and **12** past the sorting station at which terminate the usual sorting blades SB which form passages leading to the thirteen sorting pockets into which the cards are ultimately selectively deposited, the cards being conveyed to these pockets by other rollers generally similar to the feed rollers **12**.

In the present case, the blades SB control a separate contact mechanism according to how the blades are selectively held up and allowed to drop by the card in a well known way. This separate contact mechanism may be located beneath the ends of the blades SB and is supported by a framework which includes a bottom plate **13**, side plates **14**, and a cross member **15** carried by plates **14**. The bottom plate **13** also supports the sorting magnet SM and the armature **16** of the sorting magnet is urged upwardly by a suitable restoring spring (not shown).

When the invention is applied in its simplest form to a sorting machine of the type disclosed in Patent 1,741,985, a single set of storage relays may be used which are designated R8 in Fig. 2. In such a case the brushes B will be located to the left a distance equal to the width of one of the cards C so that when a "9" perforation is sensed the left-hand or leading edge of the card will be about to pass under the upturned end of the extreme right-hand or "9" sorting blade SB (Fig. 1).

For the purpose of electrically detecting and storing the actual destination of a card after the sorting mechanism has been operated to select such destination there are provided destination designating devices including the checking and destination storage contacts CK1, CK2, there being such a device and a pair of associated contacts CK1, CK2 for each sorting blade SB. The armature **16** of the usual sorting magnet SM is provided with a series of holes disposed opposite the upturned ends of the sorting blades SB which holes serve as guides for switch or contact operating members such as the pins **17** the lower ends of which are guided in cross member **15**. The contacts CK1, CK2 are mounted underneath the cross member **15** with the common member of such contacts positioned engaging insulating buttons carried by the pins **17**. Under normal conditions the upper ends of the pins **17** will lie slightly below the top surface of the armature **16** with the contacts CK1 open and contacts CK2 closed.

When the sorting magnet SM is energized, its armature **16** will be drawn downwardly in the usual way and one or more of the pins **14** will be pushed downwardly by the sorting blades SB. When the card passes underneath the ends of the blades SB and the sorting magnet is energized, certain of the blades will be held up by the card with the result that the contacts CK1, CK2 corresponding thereto will not be affected. For example, if a card is to be sorted into the "6" pocket, the left-hand edge of the record card will pass under the upturned ends of the "7," "8," and "9" blades which are the first three blades SB from the right (Fig. 1) and such blades will be held up by the card while the remainder will be allowed to drop by the movement of the armature **16** of the sorting magnet SB thus forming a passage for the card leading to the "6" pocket. Thus the contacts CK2 associated with the first three pins **17** from the right (Fig. 1) will remain closed while the other nine pins to the left will be pushed downwardly by the sorting blades and close the associated contacts CK1 and open the associated contacts CK2. The leading edge of the record card will pass into the space a passage between the third or "7" blade and the fourth or "6" blade and ultimately will be deposited in the "6" pocket. Thus the status of the storing and checking contacts CK1, CK2 at the end of each card cycle designates or represents the actual destination which will be selected for a record card.

The wiring diagram illustrates the simplest form which the invention may take when applied to a machine such as disclosed in Patent 1,741,985 which requires the use

of only one set of storage relays and destination storage contacts. In this machine the impulses which are emitted by the record sensing brush B and timed by the differential position of a perforation in the sensed column are used to preselect destinations for records by setting up a single destination selecting storage relay which later in the cycle additionally controls part of the checking circuit to compare the actual destination, as stored by the checking contacts, with the destination selected by said relays. There are twelve storage relays designated R8 which are controlled by the emitter E the brush of which is timed to traverse the emitter segments in synchronism with the sensing of the index-point positions of a record column by the brush B. The selection or storage relays R8, in the simplest case, directly control the storage contacts R8B, R8C which are in series-parallel circuits with the contacts CK1, CK2 corresponding to the respective blades SB as indicated by the small numbers 0 to 12. For example, the "9" relay R8 has its contacts R8B, R8C in a series-parallel circuit with the checking and destination storage contacts CK1, CK2 corresponding to the "9" blade SB which is the one on the extreme right in Fig. 1. The "12" relay R8 on the other hand is associated with the contacts CK1, CK2 corresponding to the "12" blade SB which is the one at the extreme left in Fig. 1.

The machine is equipped with the usual starting circuit comprising the motor relays R1, R2, the control relay R3, the stop key SPK, full pocket contacts FPC and card lever contacts CLC1. The usual start key STK is located in shunt with the part of the starting circuit including the relay contacts R3A of relay R3, stop key contacts SPK, full pocket contacts FPC, card lever contacts CLC1 and the contacts R5A of a stop relay the purpose of which will be made clear hereinafter.

The machine is started in operation in the usual way by depressing the start key STK which causes the energization of the motor relays R1, R2 and the control relay R3. Closure of contacts R3A permits a holding circuit to be established around the start key STK for the relays R1, R2, R3 when the card lever contacts CLC1 close in the usual way and the machine will continue in operation as long as cards continue to feed past the card lever contacts CLC1.

Let it be assumed that a card is perforated "8" in the column sensed by the brush B. This causes a circuit to be set up as follows: line wire W1, the common brush CB, contact roll CR, sensing brush B, the brush of emitter E, the "8" segment of emitter E, and the "8" relay R8, to line wire W2. The "8" relay R8 closes its contacts R8A to establish a holding circuit for itself through the timing contacts TC1 which are closed throughout the part of the cycle in which the index-point positions of the record are being sensed. At the same time a parallel circuit is closed by the brush B through the contacts R6A and the individual segments of the usual sorting selection commutator C1, C2, the coil of relay R7 and the sorting magnet SM, to line wire W2. The relay R7 closes contacts R7A and establishes a holding circuit for the relay R7 and sorting magnet SM through the common contact segment C2 of the selection commutator which circuit includes the relay R6. In this manner relays R8 select destinations for records.

Contacts R6A are opened and prevent a back circuit to the brush B which would otherwise cause all the remaining relays R8 to be energized by the emitter E after the card perforation has been sensed. The opening of the contacts R6A does not, however, prevent energization of a second relay R8 in the event that the record is double punched. The energization of the sorting magnet to open a passage for the card occurs just before the leading edge of the card reaches the upturned end of the "8" blade but after the end of the "9" blades has been passed and all of the blades except the "9" blade will be permitted to drop thereby operating all of the contacts CK1, CK2 except the set associated with the "9" blade at the extreme right in Figs. 1 and 2. The "8" relay R8 closes its contacts R8C and tries to close a circuit through the contacts CK2 associated with the "8" blade. However, these contacts are now open so that if the record is sorted correctly in accordance with the sorting impulse, the opening of the correspondingly valued contacts CK2 cancels the effect of the associated contacts R8C.

After the record has passed the ends of all of the blades the timing contacts TC2 close momentarily and test the condition of all of the contacts R8B, R8C and CK1, CK2. Since none of the other relays R8 were energized and since the "8" relay and the associated contacts CK1, CK2 cancel the effect of each other, the closure of the contacts TC2 does not have any result. Provided the card continues to feed in correct timed relation to the sensing of the index-point positions and the occurrence of perforations in the column sensed, the relays R8 and contacts CK1, CK2 will cancel the effect of each other and the machine will continue to run.

Now let it be supposed that in the illustrated case of the card perforated "8" the card slipped in the feed rollers 11 so that its leading edge lags in machine time after the perforation is sensed so that the "9" blade also will be drawn downwardly when the sorting magnet SM is energized. This causes the record to pass over the "9" blade instead of underneath it with the result that such card will enter the wrong passage and become deposited in the "9" pocket instead of the "8" pocket and all of the contacts CK1, CK2 will be operated. At the time in the cycle when the contacts TC2 close, the "9" contact CK1 will be closed and both the contacts R8C for the "8" relay and the contacts R8B for the "9" relay will be closed. This permits a circuit to be established from line wire W1, through the contacts TC2, R8B, R8C and the contacts CK1 corresponding to the "9" blade SB, and the relays R4, R5 and lamp L in parallel, to line wire W2. Relay R4 closes its contacts R4A and establishes a holding circuit for relays R4, R5 and lamp L through the restoring key RK and relay R5 opens contacts R5A and has the same effect as operation of the stop key SPK of stopping the machine. The lamp L warns the operator that either the card was missorted or the sorting selection impulse was erroneous.

The operator may now search for the erroneous card which will be the top card in one of the pockets or still be in course of feed to a pocket depending on how far the card has to travel before it reaches a pocket. After the card has been removed, the operator may depress the restoring key RK which will deenergize relays R4, R5 and lamp L and permit the machine to be started in the usual way by means of the start key STK. If it is desired, the key RK may be mechanically connected to the start key STK so that this result may take place automatically. It is preferred, however, that a separate key be provided as it is desirable that the operator be compelled to perform an extra act which will impress upon him the necessity for removing the erroneous card.

It will be understood that the invention in the present case consists primarily in the arrangement whereby the actual destination of a card may be checked against a sorting selection impulse whether that sorting impulse be derived directly from a record or from a system of storage relays of which a number are well-known in the art. For that reason the drawings illustrate only so much of the machine and circuit connections as are essential to the checking function and it will be understood that there are a great many different types of sorting machines and machines having sorting functions in which the present invention may be used without substantially altering the fundamental connections disclosed in Fig. 2 of the drawings.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, 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 machine of the class described, a series of movable sorting blades, means for selectively moving said blades to open a passage for a record to a selected destination; and switch mechanism selectively controlled by said blades for storing the status of said blades after they have been operated, comprising a series of switch operating members, one for each blade and operated thereby, and separate contact means directly actuated by said members to represent, by the open and closed condition of said contact means, the actual passage selected for a record.

2. In a record sorting machine, a series of movable sorting blades; means for operating said blades to open a passage for a record to a selected destination comprising a member coacting with said blades and between which blades and said member the record passes and a magnet for enabling said member to be actuated at differential times to cause some of the blades to move to one side of the line of travel of the record and the remainder to be blocked by the record to thereby open

said passage; a series of electrical switches corresponding to said series of blades, and switch operating members responsive to the movement of said blades by the operating means for causing said switches to be actuated to correspond with the actuation of said blades to thereby represent the actual destination of each record.

3. In a record sorting machine, a series of movable sorting blades; means for operating said blades to open a passage for a record to a selected destination comprising a member coacting with said blades and between which blades and said member the record passes and a magnet for actuating said member at differential times to enable some of the blades to move to one side of the line of travel of the record and the remainder to be blocked by the record to thereby open said passage; a series of electrical contact devices, each representing one of said blades; and a series of switch actuating members, one for each device and blade and actuated by said blades, for operating said contact devices to store a representation of the actual passage selected for a record.

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