

July 10, 1934.

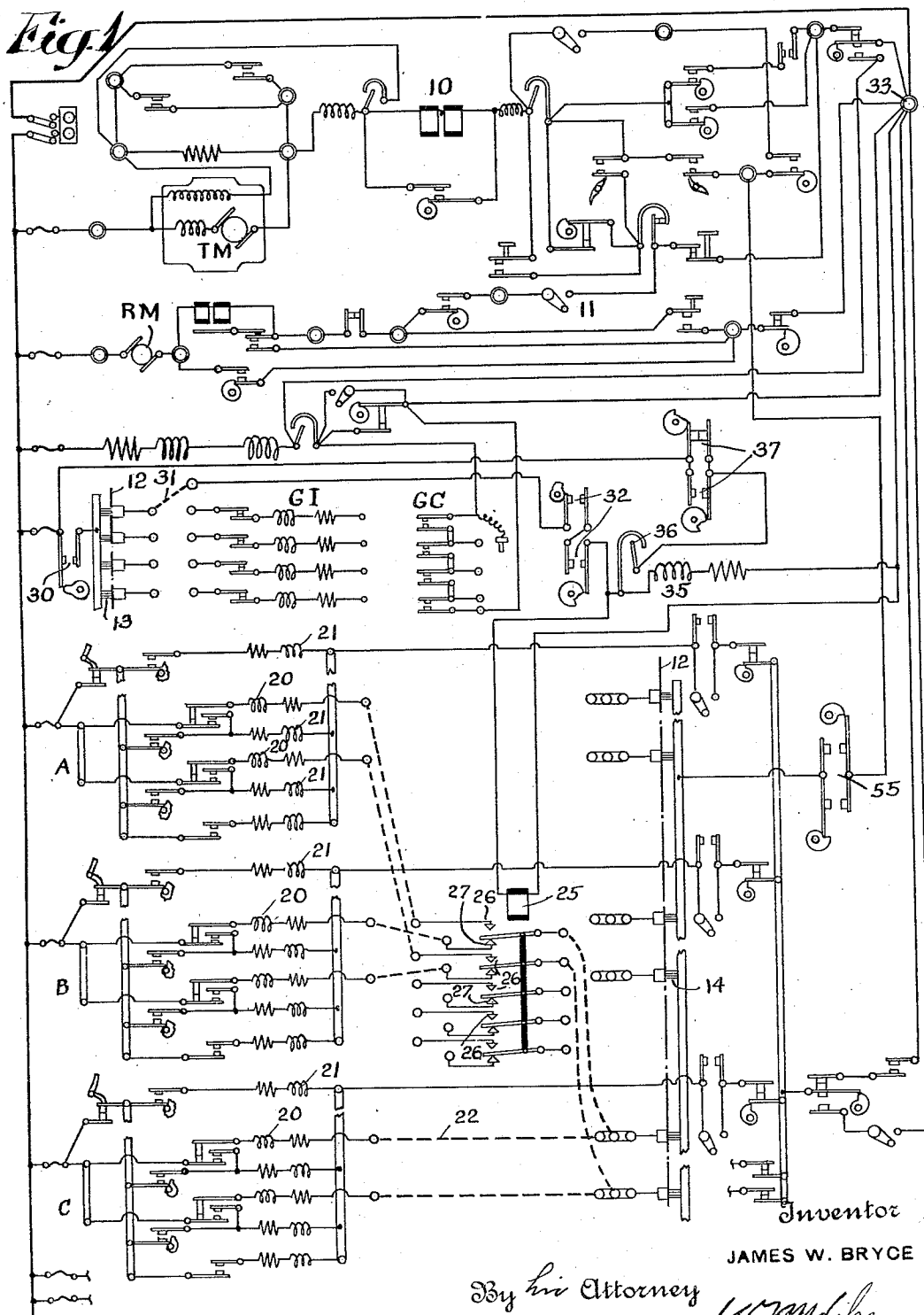
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COUNTER CONTROL

Filed Nov. 18, 1926

2 Sheets-Sheet 1



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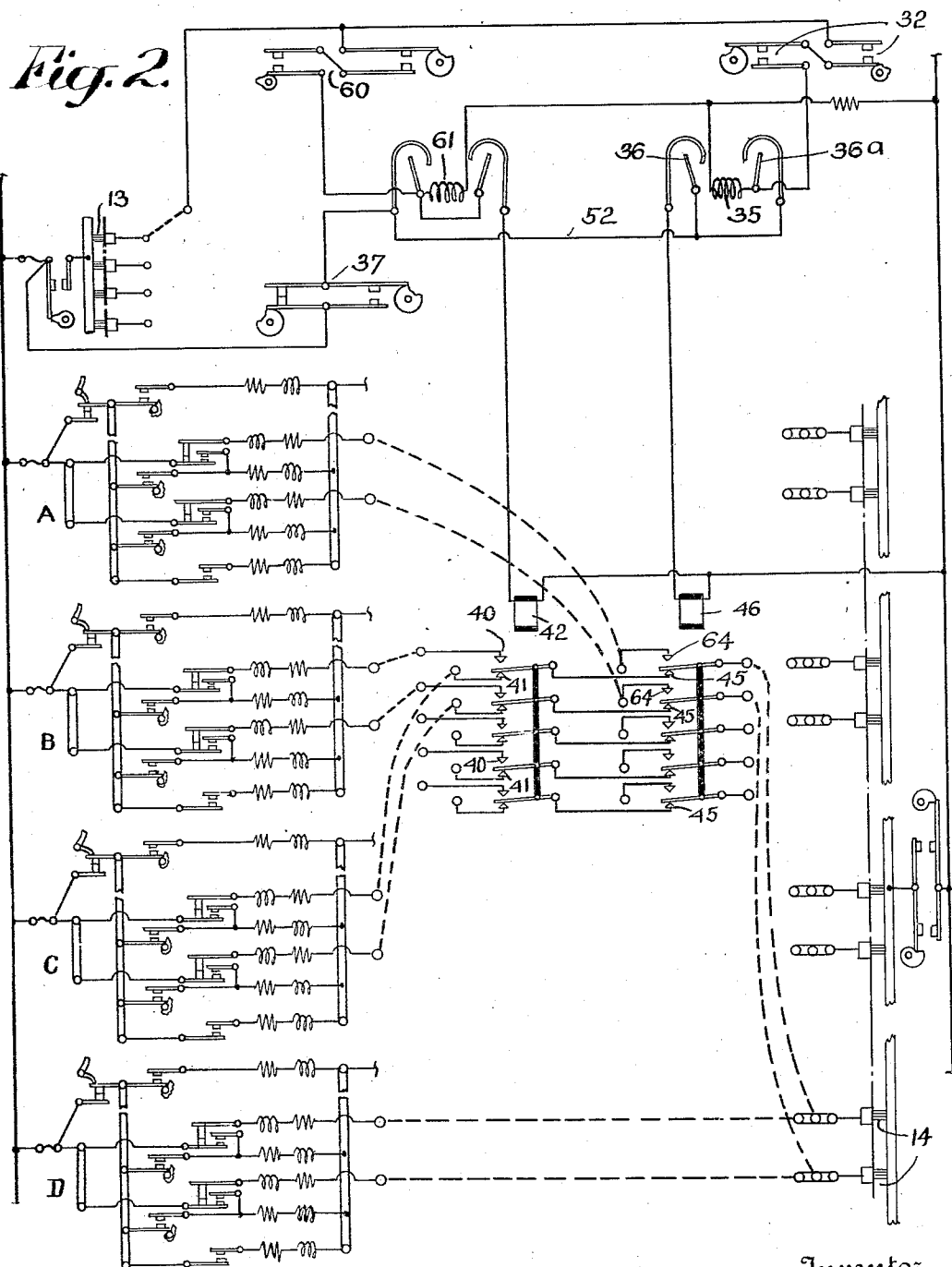
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2 Sheets-Sheet 2



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COUNTER CONTROL

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2 Claims. (Cl. 235—92)

This invention relates to tabulating machines and more particularly to counter control mechanism therefor.

In tabulating machines of the type normally controlled by records having index point designations in columns it is customary to employ a plurality of entry receiving devices such as accumulators or printing elements and operate each entry receiving device in accordance with designations in a particular index column of the record which normally is in the form of a perforated card. It is frequently desirable to make certain types of entries such as cash sales and credit sales, which never occur simultaneously on the same record card, into separate entry receiving devices. If a given field of the record is set aside for operating each device, one field must then remain idle in each case while the other field is utilized to make the required entry. Furthermore it is sometimes desirable to obtain a total of the two types of entries necessitating the use of a separate bank of accumulators and an additional record field for each item. In such cases it is desirable to conserve record card space by utilizing a single field on the record card for all of the above types of entries and selectively entering the data therefrom into the selected device in accordance with control designations on the record card and also making the entry from the same field into an accumulator for the purpose of obtaining a grand total.

It is therefore an object of this invention to provide a system whereby entries from a given field of an index point record may be made selectively into one of a plurality of data controlled devices.

Another object is to provide a system of the above character in which simultaneous entries may be made into a third bank of entry receiving devices for the purpose of obtaining a total of all entries represented by the field.

A further object is to provide a system whereby a single field of an index point record may selectively control a plurality of entry receiving devices.

A still further object is to provide a tabulating device of simplified and improved construction for the purposes to be hereinafter set forth.

These objects and others which will be apparent as the nature of the invention is disclosed are accomplished in accordance with the present invention by providing an index point record having designations divided into columns and controlling thereby a plurality of banks of entry receiving devices. Data represented in a

particular column is entered into one of a plurality of such devices in accordance with the presence or absence of control designations on the record. In addition to selectively entering data as above mentioned a third bank of data receiving devices is employed into which the entry is made at all times whereby a total of all the entries may be obtained.

Although the novel features which are believed to be characteristic of this invention will be pointed out with particularity in the claims appended hereto, the invention itself as to its objects, advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof in which:

Fig. 1 is a circuit diagram of a complete tabulating machine constructed in accordance with this invention and;

Fig. 2 is a circuit diagram of a modification thereof wherein an entry may be made selectively into one of three or more accumulators.

Referring more particularly to Fig. 1 a tabulating motor TM, controlled by associated contacts and relays 10, is employed for driving the tabulating machine during listing and tabulating operations and reset motor RM controlled by its associated relays 11 is utilized for driving the machine during reset and totaling cycles. The above mentioned relays and control circuits are well known in the art and for further description thereof reference may be made to the copending application of C. D. Lake, Serial No. 639,153 filed May 15, 1923 now Patent #1,822,594 dated September 8, 1931. The machine is controlled in response to perforated record cards 12 by means of a set of upper brushes 13 and a set of lower brushes 14. Group indicating contacts GI and group control contacts GC may be inserted in the circuit between upper brushes 13 and lower brushes 14 if desired, the connections therefor being set forth in detail in the U. S. patent to Lake No. 1,600,413, September 21, 1926.

A plurality of banks of accumulating elements A, B and C each comprising counter magnets 20 and printer magnets 21 connected in the usual manner are adapted to be connected by plug connections to lower brushes 14. Bank C is directly connected by plug and cord connections 22 to brushes 14 in such a manner that all entries sensed by these brushes are entered into that bank. Banks A and B are connected to brushes 14 through relay 25 and its associated contacts

26 and 27. With the relay in the position shown contacts 27 are closed and entries may be received in banks B and C, whereas when relay 25 is energized contacts 27 will be opened and contacts 26 closed whereby entries will be made into banks A and C.

Relay 25 is controlled by an index point designation in the record controlling the machine as will now be described. In the usual type of Hollerith card 10 index point positions are provided into which data for controlling the tabulating machine is entered. Two extra positions are also provided at the top of the card commonly called the 11 and 12 positions or the X and Y positions. Since data is not ordinarily entered into these last two positions they may conveniently be selected for controlling the operation of relay 25. Assuming the X position to be selected, cam contacts 32 are designed to be closed only at the time the X index point position of the record card is under brushes 13. If a perforation is then encountered in this position by a brush 13 a circuit will be completed through relay 25 traced through contact 30, brush 13, plug connection 31, contacts 32, relay 25 and binding post 33. Two cam contacts are shown inasmuch as the time of make and break may be more accurately determined than would be the case were a single cam member used and adjustment is thereby facilitated. Contact 30 is designed to open before the record card has passed brushes 13 in order to avoid back circuits and also to avoid the circuit being completed by the brushes making contact with their cooperating contact blocks when no card is present in the machine.

It will be understood that during card feed successive cards are spaced so that as each index point position of a card is passing under the upper brushes 13, the corresponding index point position of the preceding card is passing under the lower brushes 14; in other words during continuous card feed each card feeds beneath the lower brushes exactly one machine cycle later than it feeds beneath the upper brushes. The relay 25 is controlled from the upper brushes 13 to select the A or B bank of accumulator elements and the X index point position from which the selection is controlled reaches brushes 13 just before the card leaves these brushes. The actual entry of the data designated on the card field into the selected bank occurs during the following machine cycle while the card is passing under brushes 14. The energizing circuit of the relay 25 then, when once closed, must be maintained during that portion of this following cycle in which the data designating portion of the card field is passing beneath the brushes 14 and the circuit must be opened before the X index point of the following card reaches brushes 13. A holding circuit is provided for relay 25 which includes cam contacts 37 and the contacts 36 of a relay 35 and when these two sets of contacts are closed they establish a shunt around contacts 30, upper brushes 13 and cam contacts 32. The cam contacts 37 are designed to be automatically closed by the machine operation just prior to the closure of contacts 32 and to be opened during the following machine cycle after the entire data designating portion of the card field has passed the lower brushes 14, but before the X or selecting index point has reached the brushes. The relay coil 35 controlling contacts 36 is in parallel with the relay 25, the circuit branching at a point between contacts 32 and relay 25 so that energization of relay 35 is dependent solely on

energization of relay 25. When the relay 25 is energized momentarily in response to a perforation in the X position of a card under the brushes 13 the relay 35 is likewise energized and establishes the holding circuit referred to above which may be traced from one side of the line through contacts 37, relay contacts 36 and relay coils 25 and 35 to the other side of the line. This holding circuit excludes contacts 30, which open before each card entirely clears the brushes 13, and also contacts 32, which close only at such times as the X index point positions of the record cards are under the brushes. As a result, whenever relay 25 is energized by the presence of a selecting perforation under the upper brushes 13, it remains energized for the remainder of the machine cycle during which the selecting is done and during the major portion of the following cycle while the data designating section of the card field is passing the lower brushes 14. Just prior to the analyzing of the X index point position, as explained above, the holding circuit is broken by the cam contacts 37, so that the following record card may likewise energize the relay 25 or not depending on the presence or absence of a selecting perforation in its X index point position.

The apparatus just described operates as follows: If a record card contains no control perforation in its X index point position, the relay 25 remains unenergized, contacts 27 remain closed and the data designated on the card will be entered into the accumulator banks B and C; the entering circuit for the B bank extending from the brushes 14 through suitable jumpers to armature contacts of relay 25 and thence through contacts 27 to accumulator magnets 20 of this bank. However, if a control perforation is present in the X position on the card, relay 25 is energized, contacts 27 opened and contacts 26 closed, whereupon the data on the card will be entered in the A and C banks. In this case the entering circuit for the A bank extends from brushes 14 to armature contacts of relay 25 and contacts 26 to the accumulator magnets 20 of this bank. All data will be entered in the C bank as the magnets 20 of this bank are plugged directly to the brushes 14. If accumulator bank A is used for cash sales and accumulator bank B for credit sales the totals for each type of sales will be obtained directly from these accumulators and the total of all sales will be obtained from accumulator bank C.

The system illustrated in Fig. 2 is similar to that shown in Fig. 1 and operates in a similar manner except that four banks of accumulators A, B, C and D are shown. In this case two controlling relays are necessary and are indicated at 42 and 46, the relay 42 governing selecting contacts 40 and 41 and the relay 46 governing selecting contacts 45 and 64. Suitable sockets are provided in connection with the accumulator magnets, the analyzing brushes 14 and the selecting contacts so that any accumulator magnet may be properly connected to any selecting contact and any analyzing brush may be connected to any selecting set of contacts of the relay 46. In the figure the dotted lines designate cord connections connecting the accumulator bank D directly to the analyzing brushes 14 and connecting the accumulators A, B and C to the contacts of the relays 42 and 46 to select these banks for entry of different classes of data. Banks B and C are connected to contacts 40 and 41 respectively of relay 42 and bank A

is connected to contacts 64 of relay 46. With both relays 42 and 46 deenergized the relay contacts will be in the position shown and data sensed by the brushes 14 will be entered in bank

The connections employed, however, will be similar to those shown in Fig. 2 and the remaining relays and contacts will be duplicates of those disclosed therein.

Although this invention has been shown as applied to the above system it is not to be limited thereto but only in accordance with the scope of the invention as defined by the following claims:

What is claimed is:

1. In a tabulating machine normally controlled in response to records having index point designations in columns representing data to be entered, a plurality of data controlled devices, each comprising a plurality of denominational orders, a plurality of reading stations, sensing means at each station for successively reading a record, a series of contact blades, one for each denominational order, a single relay energized for simultaneously operating said series of contact blades, means whereby said blades disconnect one of said sensing means to which one of the data controlled devices is normally connected and connects only the other of said data controlled devices to the same sensing means, means whereby said single relay is energized under control of the other of said sensing means, and means whereby the energization of said single relay is held until the data is entered into the selected data controlled device.

2. In a tabulating machine normally controlled in response to records having index point designations in columns representing data to be entered, a plurality of data controlled devices each comprising a plurality of denominational orders, a plurality of reading stations, sensing means at each of said stations for successively reading a record, a series of contact blades, one for each denominational order, means whereby said series of blades normally connect one of said data controlled devices with one of said sensing means but upon operation of said blades breaks such normal connection and connects the other of said data controlled devices with the same sensing means, a single relay energized for operating said contact blades, means whereby the energization of said relay is controlled in accordance with a particular index point position of a record sensed by the other of said sensing means and means whereby the energization of said single relay is held until the data is entered in the selected data controlled device.

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5 C, the entering circuit extending through contacts 45 and 41. Should relay 42 be energized its armature contacts will be shifted to open contacts 41 and close contacts 40 thereby selecting bank B for entry of the data, the circuit in this case extending through contacts 45 and 40. Should relay 46 be energized its armature contacts will shift from contacts 45 to contacts 64 thereby disconnecting the B and C banks from the brushes 14 and connecting the A bank to the brushes through the contacts 64. Consequently by selectively energizing relays 42 and 46 in response to controlling index point designations on the record card an entry may be made into accumulators A, B or C and a total of the various entries obtained in accumulator D.

Relay 46 may be controlled by brushes 13 in response to a designation in the X index point position as previously described through contacts 32 and holding relay 35. When relay 35 is energized its armature is attracted completing the circuit from brush 13 through contact 32, contacts 36a, contact 36, and relay 46. The holding circuit includes contact 36a, line 52 and contacts 37 which are closed before contacts 32 close and remain closed for the remainder of the card cycle and for the major portion of the succeeding card cycle as previously described. Relay 42 is operated by means of contacts 60 and holding relay 61 which are connected in the same manner as contact 32 and holding relay 35. Contacts 60 are timed to operate in response to a designation in the Y index point position of the record card.

In the system shown in Fig. 2, a record card having no designation in either the X or Y position would actuate accumulators C and D. If a designation is present in the X position, accumulators A and D will be actuated whereas if a designation is present in the Y position accumulators B and D will be actuated. Consequently data represented by a particular field sensed by brushes 14 may be used to control selectively accumulators A, B and C and also will be entered into accumulator D for the purpose of deriving the grand total. Obviously this system may be extended to include any number of accumulator banks into which it is desired to selectively enter data from a given card field.