

Sept. 3, 1935.

C. CAMPBELL
 VERIFYING MACHINE
 Filed Oct. 5, 1931

2,013,534

3 Sheets-Sheet 1

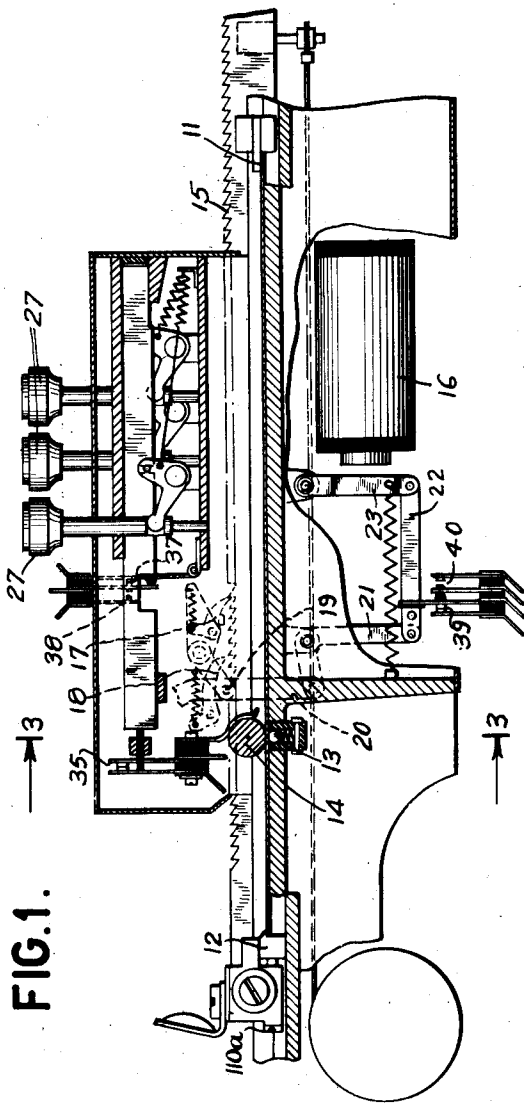


FIG. 1.

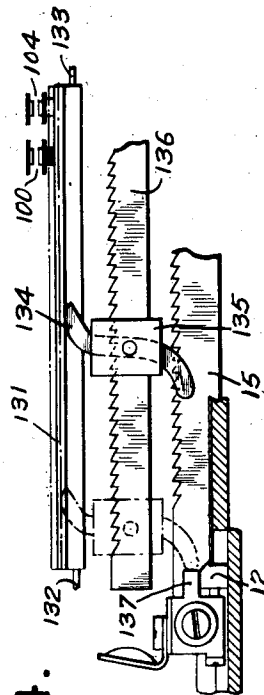


FIG. 4.

INVENTOR-
Charles Campbell
 BY
A. Crosby
 ATTORNEY-

Sept. 3, 1935.

C. CAMPBELL

2,013,534

VERIFYING MACHINE

Filed Oct. 5, 1931

3 Sheets-Sheet 2

FIG. 2.

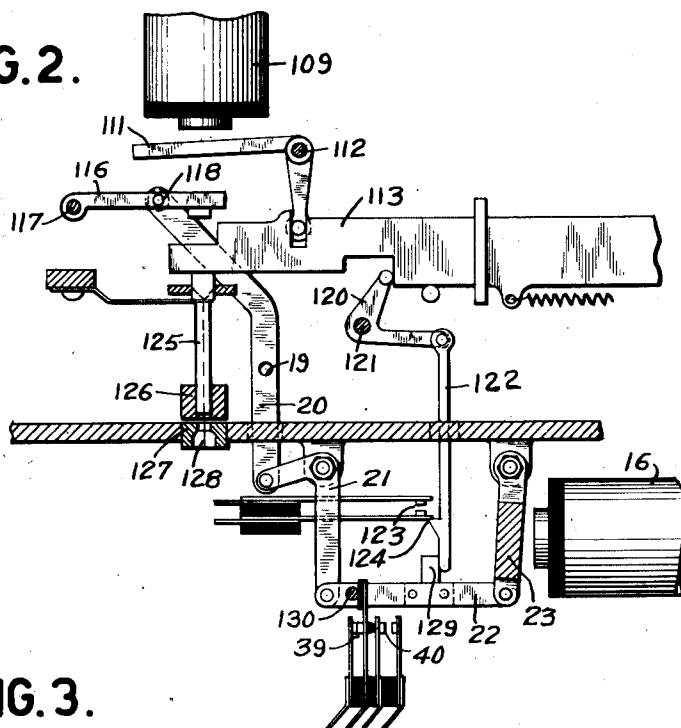
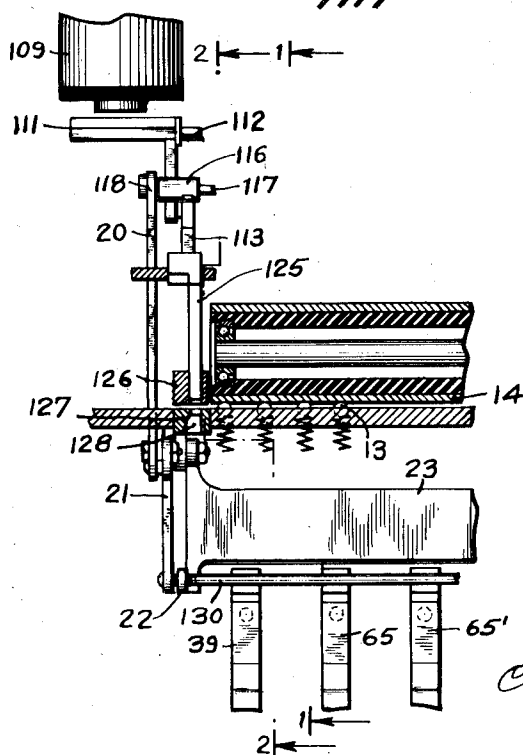


FIG. 3.



INVENTOR-

Charles Campbell

BY

Attorney

ATTORNEY-

Sept. 3, 1935.

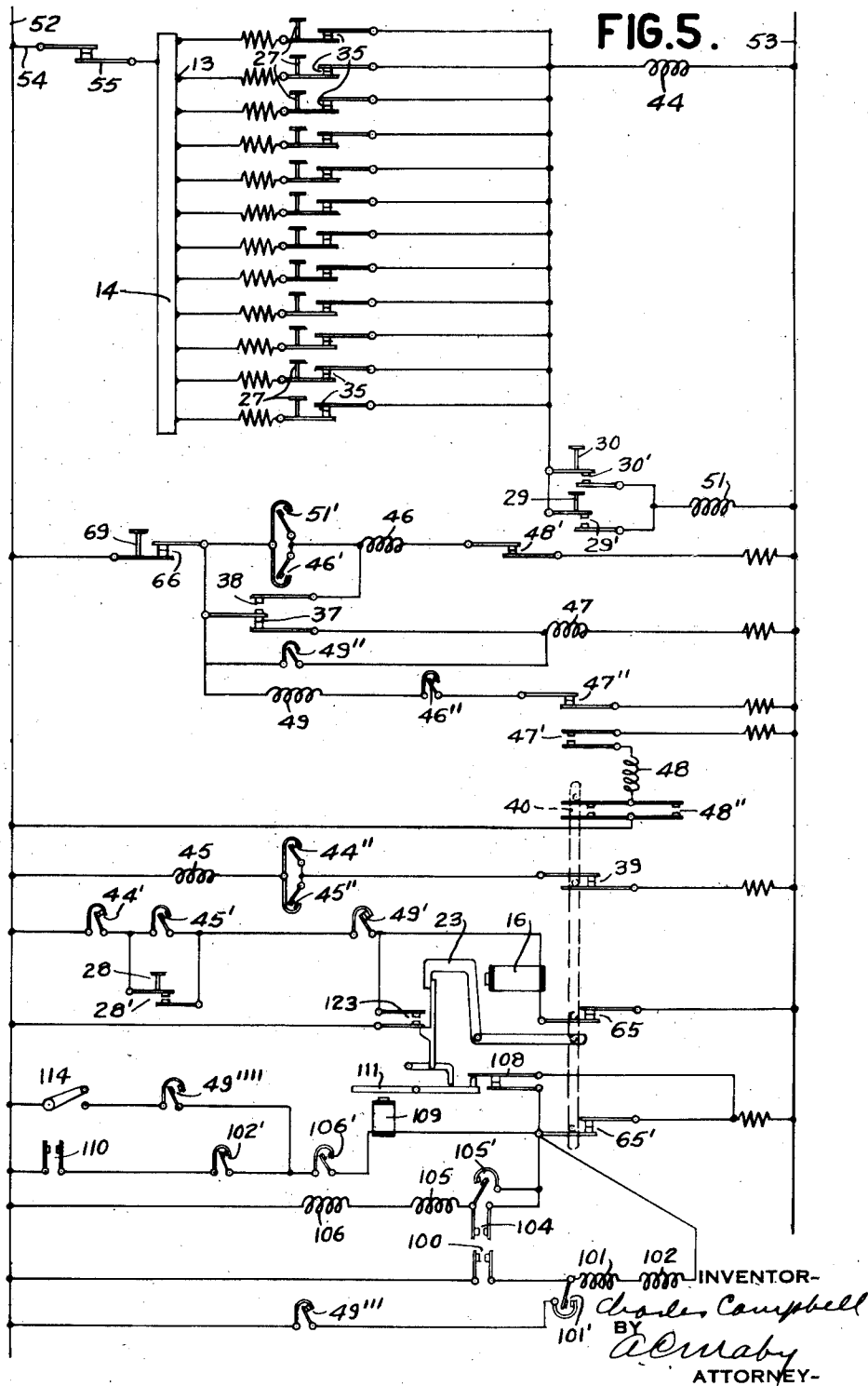
C. CAMPBELL

2,013,534

VERIFYING MACHINE

Filed Oct. 5, 1931

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,013,534

VERIFYING MACHINE

Charles Campbell, London, England, assignor, by
mesne assignments, to International Business
Machines Corporation, New York, N. Y., a cor-
poration of New York

Application October 5, 1931, Serial No. 567,065
In Great Britain October 24, 1930

12 Claims. (Cl. 73—51)

This invention relates to apparatus for verifying perforated record cards such as are used for controlling statistical machines, and is concerned with apparatus of the kind in which the verification is performed in stages, normally a column at a time, with the aid of a keyboard, which has escapement mechanism for causing a card carriage or a carriage carrying verifying mechanism to escape one step after each stage of the verifying operation, and means operable, when a key or keys depressed at any stage does not, or do not, correspond to the holes in the column on the card being verified at that stage, to give an indication (e. g. to lock the machine by rendering the escapement mechanism inoperative) of such failure, and in which the cards are delivered to a discharge station when they have passed completely through the machine.

With such apparatus, the operator removes each verified card from the machine and adds it to a stack of verified cards. When the machine becomes locked, the card that caused the stoppage is removed and added to a stack of incorrectly punched cards. It is, however, possible for the operator to add incorrectly punched cards and incorrectly verified cards to the stack of verified cards, and there is no means of checking the cards in this stack to see whether they have been verified properly or at all.

Already it is known to mark either the verified cards or the incorrect cards with a distinguishing imprint, but, here again, every card requires inspection before being passed for machining, i. e. including such operations as balancing, sorting and posting accounts.

With apparatus in which the machine is locked when the verifying operation fails to correspond with the hole configuration of the card, an error key is provided for releasing this lock and permitting the verifying operation to continue if the error has been made by the operator of the verifying apparatus.

With this construction, however, it is possible for operators, when the machine locks, to try separate keys alternately with the error key until the key corresponding to the hole in the card is depressed and the carriage allowed to escape. Consequently, the machine may allow carriage movement with the presence of an incorrect hole and so pass an incorrect card as being fully verified. One object of the present invention is to remove this possibility by making a permanent record on a wrongly verified card.

Another object of the invention is to effect a physical change in such cards as have success-

fully passed the verifying test by specially perforating the card in a definite place so that a bulk check by needling can be made and incorrect cards sorted out from the correct cards before they are used to control other machines.

Another object of the invention is to ensure that the whole field of the card is operated on to prevent the verifying operator from checking the last few columns in the final field and passing a partially verified card as being fully verified.

According to the present invention there is provided verifying apparatus of the kind above described which includes a device arranged automatically to punch a hole or notch in the card in a predetermined position on the completion of a verification operation when the keys operated during the said operation correspond to the hole configuration on the card.

According to another feature of the invention the said punching device may be arranged automatically to operate when the key or keys operated at any stage of the verifying operation fail to correspond to the hole configuration in the column on the card being verified to indicate that the column has not been correctly verified.

Conveniently, initiating means are provided, automatically operable to operate the punching device on completion of the verification of the last column in the card in addition to error indicating means for automatically suppressing the operation of the punching device when the key or keys depressed during any stage of the operation fail to correspond to the hole configuration on the column of the card being verified. Conveniently, the error indicating means is so operatively connected to the punching device as to bring it into action when the key or keys depressed do not correspond to the hole configuration in a column to make a record on the card of such failure in verification.

Since, however, it may be undesirable or inconvenient to punch a hole or notch in a card when it fails to be verified, there is preferably provided, according to another feature of the invention, manually operable means (e. g. a switch) to interrupt the said operative connection between the error indicating means and the punching device at will.

It is desirable to ensure that the whole field of the card will be tested during a verifying operation and, according to another feature of the invention therefore, verifying apparatus as above described includes means whereby the punching device cannot be actuated if the card has not been correctly positioned prior to verification.

Conveniently, such means comprises a pair of contacts and means associated with the carriage for closing the said contacts when the said carriage is in the correct position for starting a verifying operation. The last mentioned means are preferably adjustable with respect to the carriage to enable a verifying operation to be commenced at any stage on the card when the information prior to that stage is not required to be verified.

According to a further feature of the invention the verifying apparatus has means adjustable by the punching device when operated to render the latter inoperable and also adjustable by the carriage on its movement to the correct position for starting a verifying operation to render the punching device again operable.

Other features of the invention will appear hereinafter and will be pointed out in the appended claims.

An embodiment of the invention will now be described with reference to the accompanying drawings which illustrate, by way of example, a verifying apparatus for punching a hole in a predetermined position in correctly verified cards and arranged so that the said hole is not punched in the predetermined position when the card has not been correctly verified.

On the drawings:

Fig. 1 is a sectional elevation on the line 1—1 of Fig. 3 showing the card carriage and the keyboard situated thereabove for testing the correctness of the card;

Fig. 2 is a section on the line 2—2 of Fig. 3 and illustrates, in a diagrammatic form, the apparatus used for punching the special hole in the card under conditions hereinafter described;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary view which illustrates diagrammatically the construction used to ensure that the device for punching the special hole in the card indicating correct verification will be inoperable unless the card has been correctly positioned prior to verification;

Fig. 5 is a wiring diagram of the circuits used in the apparatus.

Referring to Figs. 1, 3 and 5 the record card to be verified is inserted between the card pusher 11 and a forward guide 12 with the first column of the card coinciding with a column of spring pressed ball contacts 13 which are adapted to make contact through holes in the card with an insulated roller 14. The pusher 11 and the guides 12 are attached to a rack bar 15 which is suitably guided for horizontal movement. The circuits established by the balls 13 and the roller 14 through holes in the card, in a manner described later, cause the energization of a magnet 16 which effects the movement of the card rack 15. The movement of the rack is controlled by an escapement mechanism, as described in the copending application of Weinlich and Kolm, Serial No. 459,401, filed June 5, 1930. The two escapement pawls 17 and 18 are provided of which the pawl 17 is pivotally mounted at 19 on a member 20 which is connected by a bell crank 21 and a link 22 with the armature 23 of the magnet 16. The operation of the escapement device and the rack bar 15 is controlled by the electrical condition of the magnet 16.

Verifying keys 27, a skip key 28, a tabulating key 29 and a release key 30 (see Fig. 5) are included in the apparatus.

Figs. 2 and 3 show a suitable device for punching the special hole or notch at a predetermined

position on the card. It is preferred that the punching device should make a hole of special shape, such as triangular, since such a hole is harder to counterfeit. By packing the cards together and passing a needle through the holes it can be ascertained whether all the cards that are supposed to have been verified have, in fact, been verified since unverified or incorrectly verified cards will not have a hole in the predetermined position. The punching device illustrated in the drawings is so located that it is in position to punch a hole in the column of the card that has just been verified and in the normal case this punching operation takes place after the last column in the card has been verified. In this way, the predetermined hole is punched in one of the four corners of the card which facilitates the needling operation above described.

This punching operation is controlled by the successive energization of the electrical magnets 109 and 16 respectively. The controlling circuits for these magnets will be described later. When the magnet 109 is energized it attracts its armature 111 which is in the form of a bell crank pivoted at 112. The angular movement of the armature 111 moves a punch interposer 113 longitudinally under the hammer member 116 which has a fixed pivot 117 and is pivotally connected at 118 to the member 20. As the punch interposer 113 moves under the hammer 116 it rotates the bell crank 120 about its fixed pivot 121 to lift the link 122 connected to the bell crank 120 and close the contacts 123. For this purpose the link 122 is provided with a nose 124. Closure of the contacts 123 completes, as hereinafter described, a momentary circuit through the escapement magnet 16 which thereupon attracts its armature 23, through the link 22, bell crank 21 and member 20, pulls the hammer 116 down upon the punch interposer 113 and also drives the punch 125 vertically downward through the guide 126 into the die 127 which has a triangular aperture 128 corresponding to the shape of the punch 125. The card, during this movement, is stationary between the guide 126 and the die 127 and a hole is consequently punched. The link 22, during its longitudinal movement when the armature 23 is attracted, pushes, by means of the stop 129, the nose 124 of the link 122 out of engagement with the spring pressed contacts 123 which immediately open to deenergize the magnet 16. The armature 23 is returned to its normal position by suitable springs, not shown, and in this return movement operates the stop 130 on the link 22 to close contacts 39 and open contacts 40 for the purpose hereinafter described. It will be seen that when the armature 23 is attracted, the contacts 39 open and the contacts 40 are closed by the same stop 130 and further that unless the punch interposer magnet is energized before the magnet 16, no punching will take place when 16 is energized. In this way carriage movement which is controlled by the escapement magnet 16, can be initiated without punching a hole.

Movement of the link 22 and the stop 130 also controls the opening or closing of the contacts 65, 65' (see Fig. 3). The purpose of these contacts will be described later.

In Fig. 4 is illustrated a convenient construction for ensuring that the card carriage has travelled over a prescribed field of the card during the verifying operation to permit the verification hole to be punched. In the drawings the contacts 100 and 104 are adapted to be momentarily

closed as the card is positioned to present its commencing data to the roller 14 and spring pressed balls 13. For this purpose the contacts 100 and 104 are made when the flap 131 pivots on the bearing 132 and 133. The flap is stationary with respect to the card carriage and is moved angularly by the member 134 which is pivoted on the block 135 adjustable on the stationary rack 136. The block 135 and the member 134 constitute a tabulator stop and the block is held in any adjusted position by internal teeth registering with teeth on the rack 136. To close the contacts 100 and 104 the card carriage is moved until the abutment 137 acts on one end of the pivot member 134 as shown in chain dotted lines in Fig. 4. When this happens, the member 134 moves angularly and raises the pivoted flap 131 to close the contacts. When, however, the card carriage moves under the control of the escapement magnet 16, the end of the member 134 which was acted upon by the abutment 137 is released, due to movement of the carriage and abutment 137 toward the left, and allows the flap 131 to fall and open the contacts 100 and 104. The circuits controlled by the last mentioned contacts will be described with reference to the wiring diagram. It will be appreciated that by adjusting the block 135 along the stationary rack 136 it is possible to pass over a predetermined field of the card which does not require to be verified but control of the machine is initiated immediately such predetermined field has been passed.

The wiring diagram

A number of relays 44, 45, 46, 47, 48, and 49 are shown and a pair of contacts 35 for each key 27 is provided. A further relay 51 is associated with the tabulating key 29 and the release key 30. The contacts associated with the various relays will, for convenience, be given the same number as the relay followed by a dash, double dash, triple dash or quadruple dash as the case may be. The various relays are of conventional construction, being provided with the usual springs (not shown) to return their associated contacts to normal position upon deenergization of the relays.

The operating current of the apparatus is derived from the mains 52, 53. The main 52 is connected to the roller 14 through a wire 54 and normally closed contacts 55. The circuit is continued through the ball contacts 13, contacts 35 to the relay coil 44 and thence to the other main 53. If there is a hole in the card column in line with the balls 13 and the roller 14, the circuit is completed through the contacts 35, corresponding to the hole position in which the hole occurs. The magnet 44 is thus energized and opens its contacts 44' and then closes its contacts 44'', the closure of which energizes the relay coil 45 through the normally closed contacts 39. The coil 45 then closes the contacts 45' and 45'' and the latter forms a holding circuit for the relay coil 45. This holding circuit becomes effective as soon as the contacts 44'' are opened and this occurs on the depression of the key 27 corresponding to the hole position in which the hole occurs in the card because depression of the key opens the corresponding contacts 35 and breaks the circuit through the relay coil 44 which is deenergized. The contacts 44' closed upon deenergization of coil 44 and the contacts 45' being both now closed, a circuit is established through the magnet 16 by way of the normally closed contacts 49' and 65 to permit the card carriage to

be advanced one step. The armature 23 of the magnet 16 is attracted and opens the contacts 39 (see Fig. 2) to deenergize the relay 45 and allow the contacts 45' and 45'' to open. This is the normal operation of the machine during each verifying stage when the hole configuration in the column being verified corresponds with the keys depressed.

If the key which is depressed does not correspond to the position of the hole in the card column being verified, or if it does correspond but there is an additional or incorrect hole in the card, the opening of the contacts 35 does not deenergize the relay coil 44. Consequently, the contacts 44' are held open so that the magnet 16 cannot be energized and the card carriage is not released. If there is no hole in the column the relay coil is not energized so that the coil 45 remains deenergized and the contacts 45' remain open. Once again, the magnet 16 is not energized and the card carriage fails to escape.

When a card column should properly be blank the skip key 28 is depressed and its contacts 28' are closed. If there is no hole in the column, the relay coil 44 will not be energized and consequently a circuit will be made from the main 52 through the closed contacts 44', contacts 28', normally closed contacts 49' and the coil of the escapement magnet 16 and the normally closed contacts 65 to the line 53. The card carriage is thus permitted to escape one step. If, however, there is a hole in the skipped column, relay coil 44 will be energized and the contacts 44' opened so that no circuit can be completed through the escapement magnet. Depression of the key 28 would therefore have no effect.

The circuits of the machine are arranged so that, if any key is depressed and released without the magnet 16 being energized, the relay contacts 49' are opened to interrupt the circuit for the escapement magnet 16 and are held open until the error key 69 is depressed. In this connection it is to be noted that, as shown on Fig. 1 of the drawings, the contacts 37 and 38 are operated when any of the keys 27 is depressed or when the skip key 28 is depressed.

The contacts 49' are controlled by the relay coil 49 which in turn is controlled by the contacts 66, 46'' and 47''. The circuit for this coil extends from the line 52, through the normally closed contacts 66, a relay coil 49, contacts 46'' and contacts 47'' to the line 53. The coil 47 is normally energized over a circuit extending from the line 52, through the contacts 66, contacts 37, coil 47 to the line 53 and holds its contacts 47' closed and its contacts 47' open as shown in Fig. 5. The coil 46 is normally deenergized and its contacts 46'' are open so that the circuit for the coil 49 is normally broken. The coil 48 is normally deenergized so that its contacts 48' and 48'' are in the positions shown in Fig. 5. As previously pointed out the contacts 37, 38 are shifted from the position shown in the drawings when any key 27 or when the skip key 28 is depressed. The contacts 37 then open the circuit through the relay coil 47 which is deenergized so that its contacts 47' close and contacts 47'' open. Concurrently, a circuit is established between the mains through the contacts 66, the contacts 38 now closed, the relay coil 46, and the contacts 48' normally closed. The relay coil 46 is thus energized and closes its contacts 46' and 46''. The contacts 46' complete a holding circuit for the coil 46 round the contacts 38 and through the contacts 48'.

If the column being verified at any stage is correct the magnet 16 is energized and attracts its armature 23 as shown in Fig. 2 of the drawings and closes the contacts 40. In such a case the relay coil 48 is energized through a circuit extending from the line 52, contacts 40, relay coil 48 and contacts 47' to the line 53. The contacts 48'' then close to establish a holding circuit for the coil 48 while the contacts 48' open and break the circuit for the relay coil 46.

The contacts 46' and 46'' thus both open so that when the key 27 is released and the contacts 38 open and the contacts 37 close, the coil 47 is reenergized and closes its contacts 47'' and opens its contacts 47'. Since the coil 46 has been deenergized its contacts 46'' are open and therefore closure of the contacts 47'' does not energize the relay 49. The opening of the contacts 47' deenergizes the relay 48 and the relays are restored to their normal condition.

If, on the other hand, the column being verified is incorrect, the magnet 16 will not be energized and the contacts 40 will not be closed. Thus, when the depressed key 27 is released, the contacts 48' will still be closed and the relay coil 46 will be held energized through the contacts 46' and 48' after the contacts 38 open. Thus, the contacts 46'' will be closed, when the relay coil 47 is reenergized by the closure of the contacts 37 and, in turn, closes the contacts 47''. The relay coil 49 is then energized over the circuit previously traced through the contacts 46'' and 47'', both of which are now closed. The coil 49 opens its contacts 49' in the circuit for the magnet 16 so that the latter cannot be energized and closes its contacts 49'' to provide a holding circuit for the coil 47 extending from the line 52, the contacts 66, the contacts 49'', and the coil 47 to the line 53. The depression of any key 27 will now have no effect since the magnet 16 cannot be energized and since the relay coils 46 and 47 are held energized independently of the contacts 37 and 38. These circuits are more fully described in the application referred to above.

The tabulator and release keys 29, 30 also operate as described in such application. The relays 46, 47 and 49 may be restored to their normal condition by depressing the error key 69 and opening the contacts 66 which are in the holding circuits for these relay coils. The card may then be removed or, if the operator has depressed the wrong key 27, the correct key may be depressed.

The above described arrangement is substantially that disclosed in the prior application No. 459,401. However, it will be seen that one disadvantage of the construction so far described is that it permits the verifying operator, when a wrong key has been depressed or when a wrong hole occurs in the card, to depress the error key 69 and the keys 27 alternately until the escapement magnet is energized as described above.

An arrangement will now be described for ensuring that when a wrong key is depressed or, alternatively, when a wrong hole occurs in the card, the verifying distinctive notch or hole will not appear on the card being verified when the error occurred.

First of all, however, it is necessary to provide means for ensuring that a prescribed or predetermined number of verification stages will be carried out on the card. For this purpose a convenient construction is previously described with reference to Fig. 4. The closure of the contacts 100 when the card is correctly positioned energizes the relay coils 101 and 102 which are main-

tained through the relay contacts 101' and the normally closed contacts 49''' which are controlled by the error detecting relay 49 above described. The contact 104 energizes the coils 105 and 106 which are maintained through the relay contacts 105' and the normally closed contacts 108 and 65'. Contacts 101' and 105' are closed upon energization of their respective relay coils 101 and 105 and remain closed until their controlling coils are deenergized. It is necessary to provide holding circuits for the relays 101, 102, 105 and 106 since the contacts 100 and 104 are only momentarily closed when the card is in correct position and immediately on the movement of the card carriage are opened. The relay coils 102 and 106 hold the contacts 102' and 106' respectively closed. When the card carriage or its equivalent has passed the complete band of punched data over the verifying sensing devices 13, 14 the contacts 110 are closed by the energization of the escapement magnet to allow the last column to pass the devices 13 and 14.

Conveniently, this could be effected by an abutment 110a (Fig. 1), on the card carriage closing the contacts 110 during this final movement. In other words, after the last card column has been verified the carriage will be in its extreme left hand position and contacts 110 will be closed thereby. On the closure of the contacts 110 a circuit is established through the punch interposer magnet 109 from the line 52 to contacts 110, contacts 102', contacts 106', coil 109 normally closed contacts 65' and 108 to the line 53. As described above with reference to Fig. 2 of the drawings, energization of 109 permits a hole to be punched in the card when the magnet 16 is energized in succession to the coil 109. As previously described, the coil 109 attracting its armature 111 closes the contacts 123 and thus completes a circuit through the escapement magnet 16 to permit the armature 23 of the escapement magnet first of all to punch a hole and then open the contacts 123 to deenergize itself. When the coil 109 attracts its armature 111 it opens the contacts 108 and it is held energized through the contacts 65' until the escapement magnet has itself been energized to punch the hole. As the armature 23 is attracted it opens the contacts 65 and 65' to deenergize the escapement magnet 16 and the group of relays 101, 102, 105 and 106 respectively. Deenergization of coils 102 and 106 opens the contacts 102' and 106' permanently. The circuits of the machine are now restored to a normal position for another verifying operation. In this way, all correctly verified cards have a hole automatically punched in them in a predetermined position.

When the error indicating relay 49 becomes energized under any of the conditions above described, it opens the contacts 49''' and breaks the circuit through the relays 101 and 102. Deenergization of these relays opens contacts 101' and 102' respectively. Thus, even although the error key 69 is depressed to deenergize the error indicating relay 49 and permit the card carriage to escape, it is not possible for relays 101 and 102 to become reenergized during this continued movement, because the contacts 101' cannot be closed. The effect of this is that it is not possible normally to establish a circuit through the punch interposing magnet 109 and the card will be discharged from the machine without the verifying hole in the predetermined position.

The alternative to carrying on the operation 75

by depression of the error key is for the operator to return the card to the correct initial position and so close the contact 100 which permits 101 and 102 to be reenergized. It is, of course, necessary to press the error key when the second verification is being performed on the same card. The necessity for repeating the verifying operation should act as a deterrent on the carelessness of the operators.

10 It may be desirable, however, to provide for punching a hole at any stage of the verification to indicate the column on the card at which the error occurs. For this purpose it is necessary to bridge the contacts 110 and 102' by a parallel
15 circuit through the manually operable switch 114 and the normally open contacts 49'''. When the switch 114 is closed and an error occurs in the card, the contacts 49'''' are closed by the energization of the error detecting relay 49. As above described, relays 101, 102 are deenergized but
20 relays 106 and 105 are not deenergized so that a circuit is established through the punch interposing magnet 109 from the line 52, through the switch 114, contacts 49''', contacts 106', relay coil 109 and normally closed contacts 65'. Ener-
25 gization of the relay coil 109 initiates a punching operation at the column at which the error has occurred as has been described above. This punching operation deenergizes the relays 106 and
30 105 by opening the contacts 65' and since 106 is deenergized the contacts 106' are opened so that although depression of the error key followed by correct key operations of keys 27 allows the card carriage to continue to move the card past
35 the verification devices 13 and 14, no further circuit can be established through the punch interposing magnet 109. The result is that the card will be removed from the machine without the verification hole and with a hole punched
40 at the column of the card in which the error occurred. This will permit the offending card to be examined and the blame for the error attached either to the person who punched the initial information on the card or to the records
45 from which the information was punched on to the cards or to the operator of the verifying apparatus.

The "error" punching scheme just described is made optional since in some cases it would not
50 be desirable to have the card disfigured by holes punched in other than the predetermined position.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification,
55 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.

I claim:

1. In a verifying machine, analyzing means
65 adapted to sense the perforations in a record card, column by column; key operated means cooperating with said analyzing means to verify the correctness of the perforated entries in said card columns column by column, a marking device and
70 means controlled by said analyzing means and said keys for automatically effecting an operation of said marking device as an incident to the non-verification of a card column whereby a mark
75 will be made in the non-verified column.

2. In a verifying machine, having record card

analyzing and verifying mechanism, a card carrier movable to present a card, column by column to said analyzing mechanism for verification, a marking device and a controlling circuit therefor, means controlled by said carrier, when in position
5 to present the first column of the card to be verified to the analyzing mechanism, for partially closing the controlling circuit of said marking device, further means controlled by said carrier for completing the controlling circuit of the marking
10 device after the last column of the card has been presented to said analyzing mechanism, and means controlled by said analyzing and verifying mechanism for preventing the completion of the operation of said marking device upon the non-
15 verification of one or more of the card columns analyzed.

3. In a verifying machine, a plurality of card analyzing devices adapted to cooperate with the columns of a perforated record card, a marking
20 device located adjacent to said analyzing devices and adapted to enter a mark upon a record-card, verifying key contacts, a circuit running through said analyzing devices and said contacts and means adapted to be made effective under control
25 of said circuit for causing said marking device to create a mark adjacent to an analyzed column when the perforations therein do not correspond to the key contacts operated.

4. In a machine of the class described, record
30 card analyzing devices and verifying key contacts cooperating therewith, a verifying circuit adapted to be broken under control of said devices and key contacts upon the non-verification of a column of a record card, a marking device and a
35 controlling circuit therefor and means operated conjointly with the breaking of said verifying circuit to operate said marking device whereby an indication will be made upon the record card of a non-verification of a column thereof.
40

5. In a machine of the class described, record card analyzing devices and verifying key contacts cooperating therewith, a card carrier, a verifying circuit adapted to be broken under control of
45 said devices and key contacts upon the non-verification of a column of a record card, a marking device and a controlling circuit therefor; means controlled by the movement of said carrier to complete said controlling circuit, and means operated
50 conjointly with the breaking of said verifying circuit to prevent the completion of said marking device controlling circuit.

6. In a verifying machine, analyzing means adapted to sense the perforations in a record card, column by column, key operated means cooperating
55 with said analyzing means to verify the correctness of the perforated entries in said card columns column by column, a marking device; means controlled by said analyzing means and said keys for automatically effecting an operation
60 of said marking device as an incident to the non-verification of a card column, said mark being made in said non-verified column and manually operable means to interrupt said operation at will.
65

7. In a device of the character described, having sensing elements, a punch and an operating magnet therefor, a circuit for said magnet including normally open contacts, a relay for operating
70 said contacts, a circuit for said relay including contacts, a card carrier adapted to close said last named contacts when in position to present the first card column to be verified to the sensing elements, whereby said relay will be energized
75 to close the contacts in said punch magnet cir-

cuit; a holding circuit for said relay including a pair of normally closed contacts, and means controlled by the operation of said punch for opening said contacts to interrupt the circuits
 5 for said controlling magnet and said holding circuit.

8. A perforated record verifying machine comprising analyzing mechanism for analyzing perforations in a record card, key operated means
 10 cooperating with said analyzing means for verifying the perforations column by column, a marking device and means controlled by said verifying means for causing said marking device to automatically effect a mark in a column of the card
 15 as an incident to the non-verification of said column.

9. A verifying machine comprising in combination, a circuit, analyzing means adapted to initially close said circuit through perforations in a
 20 record card, key operated means for opening said circuit, a marking device and further means operated conjointly with said key operated means for automatically effecting an operation of said
 25 marking device if said circuit fails to open upon operation of said key operated means.

10. In a verifying machine the combination with means for advancing a perforated record card and means for verifying the perforation in
 30 said card column by column, of a punching device and means controlled by said verifying means for causing said punching device to automatically

effect a perforation in non-verified columns of the record card.

11. In a machine of the class described having means for analyzing perforations in the columns
 5 of a record card, a carriage for the card, means for advancing said carriage step by step to successively present a predetermined number of card columns to said analyzing means, a punch and
 10 means rendered effective by said carriage after the pre-determined number of columns has traversed said analyzing means for causing an operation of said punch, key operated means associated
 15 with said analyzing means adapted to verify the perforations analyzed in the columns of the card column by column and means controlled by said
 15 verifying means for rendering said punch operating means ineffective.

12. In a machine of the class described, in combination, means for analyzing the representations
 20 in the columns of a record card, associated key operated means for verifying the analyzed representations column by column, a punch and controlling means rendered effective by said verifying
 25 means for actuating said punch to make a perforation in a non-verified column and further controlling means for actuating said punch to make
 30 a perforation in a fixed location on the card upon verification of all the columns analyzed, said last named controlling means being rendered
 30 ineffective as an incident to the operation of said punch in a non-verified column.

CHARLES CAMPBELL.