Apparatus for coding a record card with paraindex punches wherein the card is punched with paraindex punches and such punches are used to control the punching of the index punches. The sensing of the paraindex punch functions to verify the accuracy of the punching of the index punch. During the index punch cycle an index punch key is depressed to activate an index punch impulse. If the index punch cycle does not correspond to the paraindex punch the apparatus locks prior to encoding the card with an index punch. If an erroneous paraindex punch was made in the card during the paraindex punch cycle, the operator switches to an override system and punches the correct index punch key.

9 Claims, 6 Drawing Figures
OFFSET KEY PUNCH KEY AND VERIFIER MACHINE FOR ENCODING PUNCH CARDS

DISCUSSION OF THE PRIOR ART

The records used in business machines are of standard form having vertical columns of digits arranged in horizontal rows numbered 1 through 9, and upper rows are numbered from bottom up 10, 11, and 12.

In present practice a source text normally is punched on the card and this punch card is inserted into a key verifier machine and the same operation of punching the card is performed.

If an error is detected in the punched card during the key verifying operation the punch card cannot be utilized because of the erroneous data encoded on it. The card is forwarded back to the key punching operation to correct the erroneous punch and is then discarded. However this is no assurance that the same or other errors will not be made or repeated on the second or third re-entry.

Thus costly man hours are wasted and voluminous punch cards containing erroneous data have to be discarded.

SUMMARY OF INVENTION

In contrast to the present practice the offset key punch key verifier machine utilizes the paraindex punch to verify the punch card prior to encoding it with an index punch.

Utilizing the paraindex punch concept the punch card would always be error free in the index punch area. It is the encoding in the index punch area that is recognized and utilized for processing on various data processing equipment.

A general object of the invention is to devise a novel method of inscribing first the verifying information and indexia on a punch card wherein the verifying information controls the punching of the code indicia.

A further object is to devise a novel apparatus for punching and verifying the punching on a card.

These and other objectives and advantages inherent by the invention will become more readily apparent from the specification and drawings, wherein:

FIG. 1 shows a fragmentary record card showing a first stage punching with paraindex apertures in accordance with the present invention.

FIG. 2 shows the second stage of punching the same portion of the card of FIG. 1 with the punches of the index apertures.

FIG. 3 is a diagramatic illustration of the components of the novel apparatus for verifying and coding of a punch card.

FIG. 4 illustrates the mechanism for punching the paraindex apertures during the first stage of card punching.

FIG. 5 shows in fragmentary perspective the mechanism for punching of the index apertures.

FIG. 6 is a schematic wiring diagram of the apparatus.

DESCRIPTION OF THE INVENTION

Describing the invention in detail and having particular reference to the drawings, there is shown a keyboard 2 generally designated FIG. 3.

The keyboard 2 is of conventional design such as used on current International Business Company machines and other makes of key punch and key verifying machines well known to those skilled in the art.

As best seen in FIGS. 1 and 2, a standard record or data card 3 is used which is subdivided into 12 horizontal rows A through L and intervening spaces A' through L'. A card is comprised of 80 12 horizontal rows. Each row and its position on the card is arranged in what is well known and used as the Hollerith coding system and these are hereinafter identified as index points and are the only areas used on the card for coding information thereon.

The areas directly beneath each code number or index point will be considered a paraindex point.

The feature of the present invention is to utilize those blank areas between the rows to first encode paraindex points by punches 5, FIGS. 4 and 5, which may be round, and which are activated by the operator pressing the respective keys 8 for the respective letters or numbers of the text which the operator is encoding upon a card.

As best seen in FIGS. 3 and 4, the card is supported for movement by a movable carriage 10 which advances the card from right to left as seen by the arrow through guide slot 9 between the upper and lower die blocks 13 and 14 which are mounted with the carriage on the frame 15 of the machine. As the card is advanced incremently step by step by the conventional escapement mechanism, each vertical row of symbols or index points are brought into vertical registry with the row of round and rectangular punches 5 and 17.

The rectangular punches 17 are vertically aligned with the indicia bits in rows A through L and the round punches 5 are aligned with the spaces A' through L'.

In recording a card, a blank or unimperforated card is inserted into the carriage 10 which has been pulled to the right end of travel. The machine is set to encode the card with the paraindex points. The operator then depresses the keys 8 on the combination keyboard 2 corresponding to the characters on the source material which is to be inscribed onto a blank card.

Each key is initially connected to a respective verifying punch 5 which is in its respective aperture 21 in lower block 14. As the operator continues to encode the card through the die blocks 13 and 14 the card is appropriately encoded in the blank spaces by the cutting out punching of the paraindex points which are the round apertures X—X shown in FIGS. 1, 2 and 3.

The circuitry for setting the apparatus to encode the paraindex and index points is shown in FIG. 6, wherein the punches 17 are identified as key punch, and the punches 5 are designated as verify punch.

Each key 8 may be suitably mounted in the machine between vertically spaced frame numbers 26 and 27. The key may have a large intermediate body portion 28 abutting against the bearing boss 30 to limit upper movement of the key which is biased upwardly by a compression spring 31 which is sleeved over the lower stem end 32 of the key. The compression spring seats at its upper end against a shoulder 33 on the lower end of the body and at its lower end upon the lower frame 27 which is provided with guide aperture 35 for the stem 32, which has a dielectric contact 321.

The body 28 is provided with a latch bolt pocket or catch 36 into which there normally projects a bolt end 37 of a latch generally designated 38.

The bolt 39 having end 37 is urged into a latching position of its respective key by a compression spring 40 which is compressed between an abutment 41 fixed to the bolt and the yoke portion 42 of a solenoid 43.
The first or verifying encoding of the card is performed by the verifier punches and in such condition the bolts 39 are retracted mechanically by the linkage 44 and all the keys are unlocked. Beneath each key there is a positioned switch generally designated 45 and each switch comprises a pair of contacts 46 and 47.

The contact 46 is connected to a conductor 48 which is connected to a connection 49 at one end of a solenoid coil 50 which activates an appropriate punch 5. The other end of the coil 50 is connected through a conductor 51 selector switch 52 and a source of potential 53 to the other contact 47. These contacts 46 and 47 are carried from the machine frame in a dielectric bar 55.

It will be seen that upon a selected key 8 being depressed during the verifying operation the respective verify punch will perforate the card in the appropriate space.

During the key punching operation, the card with its paraindex points punched serves as a control and a means for verifying the key punch operation. Under these circumstances the 12 read out brushes 57 scan or ride on the card over the spaces A1 through L1. The bolts 39 are all in a locked position with the respective keys as shown in FIG. 6 in solid lines.

The card is advanced incrementally under the brushes where the punch outs X, X are made, the respective brush will make contact through the aperture X with the contact 59 which is connected through the conductor 60, a potential source 61, switch 62 to one end of coil 63 of the solenoid 43. The other end of the coil 63 is connected through conductor 65 to the respective brush. When the circuit is completed the solenoid 43 will retract the respective bolt and the key which is normally locked may be depressed. At such time the contacts 46 and 47 of the respective switch 45 are closed and the current is routed through the source potential 53 through conductor 66 selector switch 52 conductor 67 to one end of the solenoid coil 68 which activates the respective key punch 17 to punch the card at the appropriate index point Y. The coil 68 is connected through the conductor 48 to switch element 46.

In the event that the key punch operator during the key punch operation should not depress the key which is open and which has been activated during the punching of the paraindex points such key will not depress! Immediately the operator realizes that she has either depressed the wrong key or that the paraindex point is in error.

If the former then the operator depresses the correct key which corresponds to the respective paraindex point. If the latter the operator manually closes the normally overriding switch 70 which with connectors 71 and 72 bridges the brushes 57 and contacts 59 and activates the solenoid coil 68 releasing the appropriate and the correct key punch to be depressed.

It will be understood that the circuits are such that each key is properly connected to the appropriate punch as will be readily understood by those skilled in the art.

I claim as my invention the following:

1. Apparatus for key punching and key verifying a program on a coded card having vertical and horizontal rows of index points and between said rows defining horizontal spaces, means for inscribing from a source text paraindex indicia points on said card in said horizontal spaces to provide a guide program thereon, means including operator activated key, means for inscribing from said source text a duplicate permanent program on said index points of said card, means restricting operation of said key means to a duplication of said guide paraindex indicia point program, and operator controlled means for overriding said restricting means to correct errors in the impression of the paraindex points.

2. Apparatus according to claim 1 and said means restricting operation of said key means comprising means having a signal source activated by said paraindex indicia points for releasing the keys corresponding to said guide program.

3. Apparatus according to claim 1 and said paraindex indicia points comprising punches in the card.

4. The invention to claim 1 and said means restricting operation of said key means comprising read out paraindex indicia points and switching means for releasing the key means corresponding to the read out of respective paraindex indicia points whereby said paraindex indicia points serve to control said key means to punch the code corresponding to the respective paraindex indicia points.

5. The invention according to claim 1 and said means restricting operation of said key means comprising plurality of a read out brush is one for each of said spaces traversing the same and providing a signal source for switching on the key means corresponding to the paraindex indicia points to permit activation thereof.

6. The invention according to claim 1 and means for signaling non-duplication of the guide program points.

7. The invention according to claim 1 and said means restricting operation of the key means comprising means for releasing only a key corresponding to the respective paraindex point.

8. A key punch apparatus comprising a series of verifying and recording punches for punching a code card having horizontal rows of code indicia with intervening blank spaces, card advancing means for moving such card to punching positions, means for selectively conditioning said apparatus for verifying and recording operations and activating said verifying and recording punches respectively, keys for alternatively actuating the verifying punches during the verification operation and locking the keys during the recording operation, said verifying punches disposed to encode said card in the blank spaces during a first operation, said advancing means adapted to received a card with the verifying punches encoded thereon, and means responsive to said verifying punches for releasing corresponding keys during a second operation for actuation thereby of the respective recording punches for punching the card in the rows of code indicia.

9. The invention according to claim 8 and means for overriding said locking means in the event of an error in the verifying punch to permit actuation of a key corresponding to the correct symbol to be punched.