

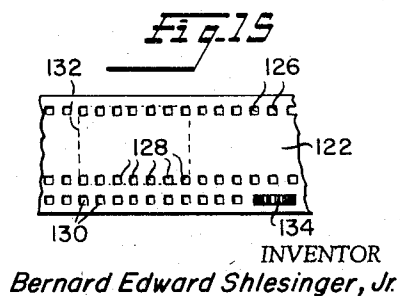
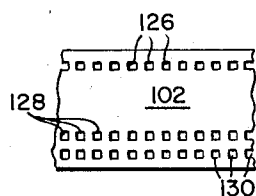
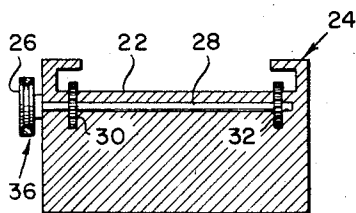
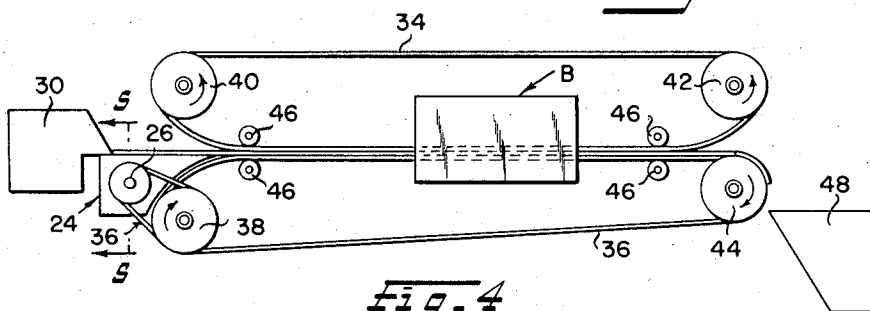
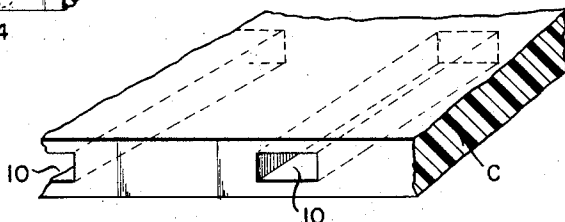
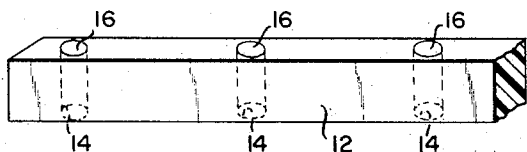
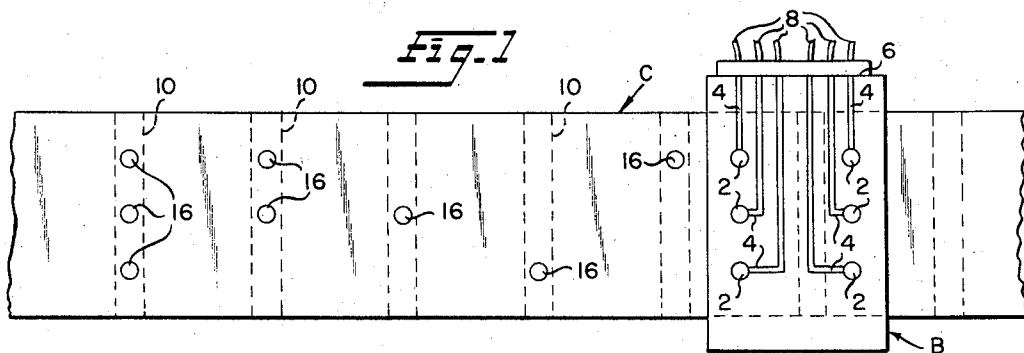
Jan. 28, 1969

B. E. SHLESINGER, JR
PROGRAMMING SYSTEM-TYPE WITH SELECTIVELY CHANGEABLE
INFORMATION CARRYING MEANS

3,424,879

Filed March 9, 1966

Sheet 1 of 3



INVENTOR

Bernard Edward Shlesinger, Jr.

Jan. 28, 1969

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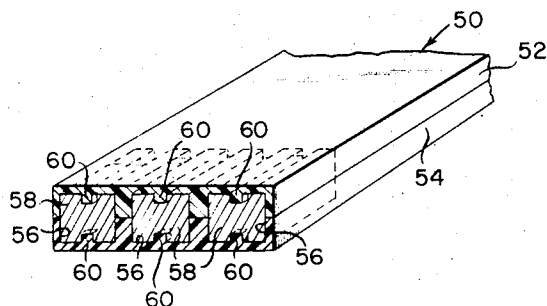


Fig. 6

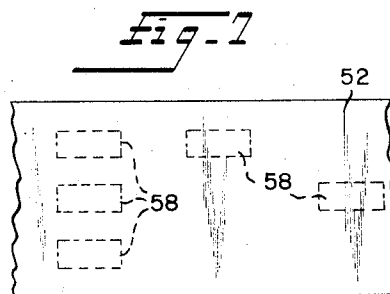


Fig. 7

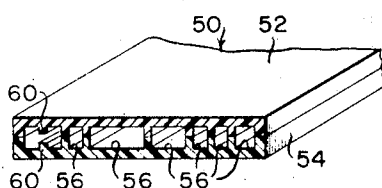


Fig. 8



Fig. 9

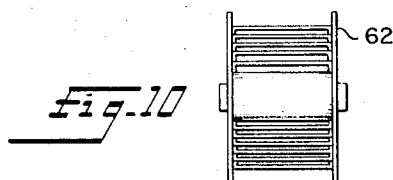


Fig. 10

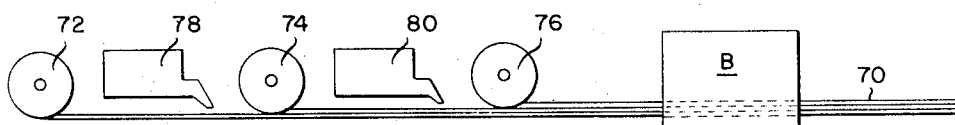


Fig. 11

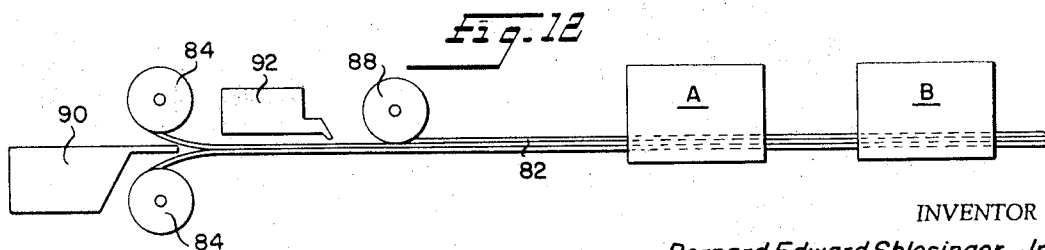


Fig. 12

INVENTOR

Bernard Edward Shlesinger, Jr.

Jan. 28, 1969

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Fig. 13

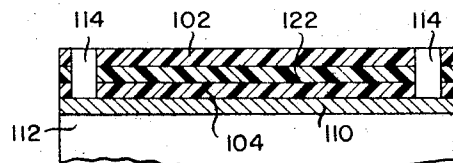
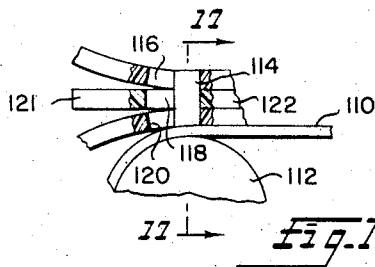
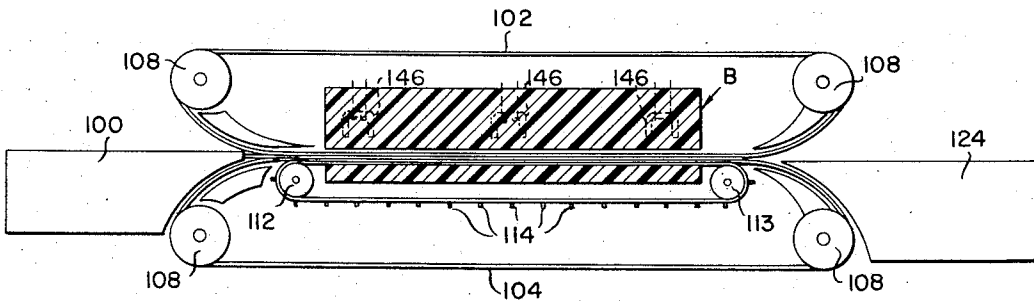


Fig. 17

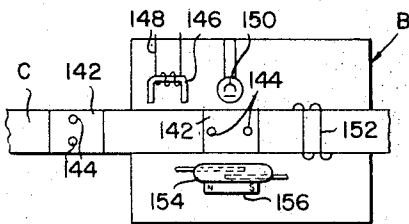


Fig. 18

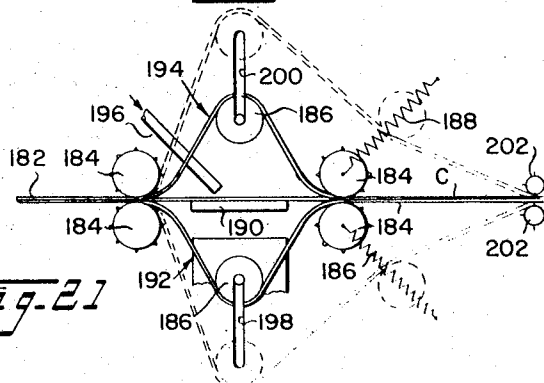


Fig. 21

Fig. 19

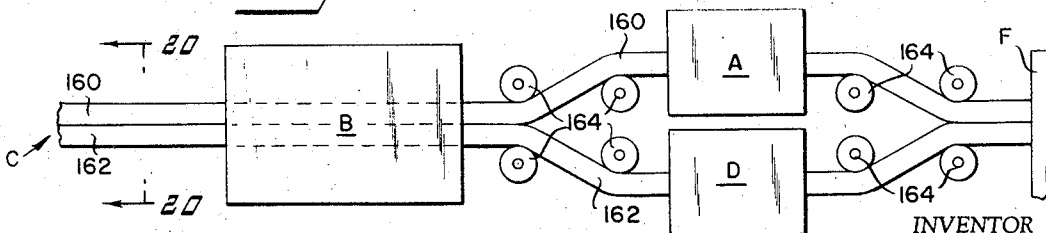


Fig. 20

INVENTOR
Bernard Edward Shlesinger, Jr.

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3,424,879

PROGRAMMING SYSTEM-TYPE WITH SELECTIVELY CHANGEABLE INFORMATION CARRYING MEANS

Bernard Edward Shlesinger, Jr., 3906 Bruce Lane, Annandale, Va. 22003

Filed Mar. 9, 1966, Ser. No. 533,011

U.S. Cl. 200—61.14

24 Claims

Int. Cl. H01h 43/08

ABSTRACT OF THE DISCLOSURE

A programming system comprising a circuit block; a nonconductive length of cable supported by the block and movable with respect to the block; means for moving the cable in the block at a predetermined speed; the block including a circuit having detector means in close proximity to the cable; the cable having a pocket formed therein; the pocket including a plurality of removable spaced detectable members; and means positively positioning said detectable members in said cable, whereby, when the cable is moved in the block at a predetermined speed thereby also moving the detectable members, the circuit will be operated when the detector means in the block detects the passing of the detectable members.

This invention pertains to programming systems and the like and in general falls into the category of programming systems such as set out in my Patent 3,225,149 issued Dec. 21, 1965, for Programming System-Cable Tape Type Switch With Deflecting Spring Contact Means and Ser. No. 322,659, filed Nov. 12, 1963, now Patent No. 3,261,941, for Magnetic Multiple Contact Programming Switch System.

In programming systems of the general type referred to above, one of the problems involved deals with the changeability of the information set up on the cable and the ease in handling of the information. In most systems where information is stored on cards or the like, no means has been provided for carrying this information from one station to another without an interruption in the operation requiring a manual means for taking the information from one area and putting it into another area. These problems are accomplished by this invention.

It is an object of this invention, therefore, to provide a multiple programming system that is simple in construction and inexpensive to manufacture and one which will provide both fast action and reliability.

It is a further object of this invention to provide a multiple contact programming system that may be used in telemetering, telephony, and the like.

Yet another object of this invention is to provide a programming system that will provide a large number of different combinations.

Still another object of this invention is to provide a programming system which will have a minimum number of parts and a maximum efficiency of operation.

A further object of this invention is to provide a programming system which is operable by any type of motor mechanism.

Yet another object of this invention is to provide a programming system which can be selectively changed without major alteration of parts.

Still a further object of this invention is to provide a programming system which can be used in simple contact switching arrangements or in complex switching arrangements such as used in conjunction with metal detectors, radio active materials, phosphorescent or fluorescent materials, or the like.

Still a further object of this invention is to provide a

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programming system which is capable of being repetitive, or discontinuous as desired.

Yet a further object of this invention is to provide a programming system which can utilize a number of read-out mechanisms in series or in parallel operation.

These and other objects of this invention will be apparent from the following description and claims.

GENERAL SUMMARY

In general this invention relates to a programming system in which a length of cable which for the purposes of this application is meant to include belt, webbing, sheet, or similar devices passes through the circuit block having therein a series of detectors which sense the presence in the belt of metal, radioactive, phosphorescent, or fluorescent materials spaced in the belt at various intervals as preselected by the programmer. The information detected is used to operate other type of equipment by means of electrical connection to such equipment from said detectors. The invention further contemplates the tying together of more than one type of readout apparatus in a continuous series or in a parallel relationship so that certain information can be picked up on one machine and readout and further carried to another machine for readout without interruption of the overall feed mechanism.

In the accompanying drawings which illustrate by way of example, the various embodiments of this invention:

FIGURE 1 is a top plan view showing the program switch or circuit block having the cable running there-through and only a portion of the cable shown;

FIGURE 2 is a perspective view of one of the inserts used;

FIGURE 3 is a fragmentary perspective view of a portion of the cable;

FIGURE 4 is a side elevational view schematically showing the programming system.

FIGURE 5 is a cross-sectional view enlarged and taken along lines 5—5 of FIGURE 4 and viewed in the direction of the arrows;

FIGURE 6 is a fragmentary isometric view illustrating yet another embodiment of this invention with inserts therein;

FIGURE 7 is a fragmentary top elevational view of the cable showing various inserts in phantom lines;

FIGURE 8 is a fragmentary isometric view in cross-section showing yet another embodiment of this invention;

FIGURE 9 is a cross-sectional view showing still another embodiment of this invention;

FIGURE 10 illustrates a reel having a portion of the belt wound thereon of the type illustrated in FIGURES 8 through 10.

FIGURES 11, 12 and 13 are side elevation views illustrating schematically further embodiments of this invention;

FIGURE 14 is a fragmentary top elevation view of a further embodiment of the cable as taught by this invention;

FIGURE 15 is a top elevational view showing the cable and a gear drive and includes also an insert shown in phantom lines;

FIGURE 16 is an enlarged fragmentary view of the feeding mechanism utilized in FIGURE 15;

FIGURE 17 is a cross-sectional view taken along the lines 17—17 of FIGURE 16 and viewed in the direction of the arrows;

FIGURE 18 is a sectional view of the block with the cable running therethrough and illustrating various types of sensor mechanisms;

FIGURE 19 is a plan view in schematic showing yet a further embodiment of this invention;

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FIGURE 20 is a cross-sectional view along the lines 20—20 in FIGURE 19 and viewed in the directions of the arrows;

FIGURE 21 is a side elevation in schematic illustrating a cable expanding means as used in FIGURES 12 and 19 for example.

FIGURES 1 through 3

FIGURE 1 shows generally a block B having set therein a series of sensors 2 which are connected to printed circuits 4 which lead to a multiple connector 6 having leads 8. The leads 8 are connected to various types of informational equipment or machines or the like. Passing through the block B is a cable C as heretofore defined as being a belt, web, or rope-like configuration, etc. The cable C has therein a series of transverse recesses or pockets 10 as best illustrated in FIGURE 3. The pockets or receptacles 10 receive an insert or container or receptacle member 12. The cable C and the insert 12 are generally formed of flexible material such as plastic or the like. The container 12 may in some instances be provided with a series of pockets or recesses 14. The pockets or recesses 14 are generally aligned with the detectors 2 for reasons hereinafter described. Within the pockets or recesses 14 are a series of detectable members 16. Where the detectors 2 are radiation types, the members 16 will contain radioactive material. Similarly, where the detectors 2 are metal detectors, the members 16 will be metal inserts. If the detectable substance in the receptacles 16 are fluorescent, and the cable transparent, then irradiation as by example with "black light" such as infra red or ultra violet, as the light source must be present so that the photocell or detector 2 will pick-up the fluorescent object within the chamber or recess 16. Similarly, a photocell could be the detector 2 to pick-up the light transmitted from a phosphorescent source 16 in the recess 14. It will be obvious that transparent cables will be necessary only where light transmission is involved. Where light is required such as infra red, ultra violet, or any other type of exciting rays, the source of this light or wave transmission may be located directly adjacent the detectors 2 so as to excite the detectable substance 16 as it is moved beneath the detector 2 when the belt C travels through the block B.

OPERATION

It will now be obvious that by driving the cable with any suitable motor mechanism, and by proper positioning of the detectable material in the various receptacles or pockets, the detectors 2 will operate certain circuits when the source comes directly beneath the detectors 2. The detecting source 2 may be positioned in the block in much the same manner as the photocells illustrated in my copending application Ser. No. 413,903, filed Nov. 25, 1964, now Patent No. 3,360,657, for Cross Bar Switch-Light Responsive Type. Similarly, selective interrupters may be used to prevent actuation of certain circuits as for example the removable plates positioned between the detector and the detectable material so as to interfere with sensing when desired.

FIGURES 4 through 12

In FIGURE 4 the block B is provided with the usual circuits and detectors (not shown). A dispenser mechanism 20 dispenses a series of information cards, tablets, or the like having imprinted or embedded thereon, metal, phosphorescent, fluorescent, radioactive or the like matter in selected areas. The dispenser 20 has a mechanism of any general dispenser as of sheet material such as available in the art, and selectively dispenses the cards onto a platform 22 of a base support 24. A pulley 26 drives a shaft 28 which in turn drives a pair of friction wheels 30 and 32.

Pulley belts 34 and 36 are interconnected by motor drives (not shown) so that the belts 34 and 36 move gen-

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erally in the direction of the arrows. The belts 34 and 36 are mounted on pulleys 38, 40, 42 and 44. Pressure idler wheels 46 urge the cables 34 and 36 towards one another so as to firmly grasp the information card or the like being fed from the dispenser 20. The detectors in the block B will sense the information on the cards in whatever sequence they are fed and in turn relay this information on to necessary programming circuits or the like.

At the far end of the programming system, the information cards will be fed from the belts 34 and 36 into a receptacle 48 for retrieval purposes and storage. The manner in which the information is fed would be somewhat analogous to the system used in player pianos.

FIGURE 6 shows the tape, cable, or belt 50 formed of two abutting members 52 and 54. The two members 52 and 54 are maintained in mated arrangement by means (not shown) in the block or supporting system including the housing by guides or the like. The mating members 52 and 54 are constructed so that when in mating arrangement, they form a series of channels 56 for the receipt of detectable inserts 58. Lugs 60 maintain the detectable inserts 58 in alignment or in a positive position in the channels. In the case where the cable 50 is formed from the two mating members, the members may be both endless belts abutting in the manner illustrated in FIGURE 4 or may be payed from a reel 62 such as illustrated in FIGURE 10.

FIGURE 8 shows that the channels 56 may be of varying size as desired and may have lugs 60 as illustrated.

FIGURE 9 shows how an insert 64 in the cable 50 may be a single unit such as a card strip or the like having incorporated therein detectable areas of metal, radioactivity, phosphorescence, or fluorescence 66.

FIGURE 11 schematically shows the block B with the cable 70 formed from three separate feed rolls 72, 74 and 76 and carrying information dispensed from two separate dispensers 78 and 80. An arrangement of this type permits the information to come from two dispensers and if need be, to be stacked one on the other for additional flexibility in programming.

FIGURE 12 shows a system in which there are two blocks B and A and a cable 82 formed from three reels of material 84, 86 and 88 and cooperating with dispensers 90 and 92. In FIGURE 12, the blocks A and B may be at a considerable distance one from the other yet programmed so that one will back up the other as desired.

FIGURES 13 through 19

In FIGURE 13, the dispenser 100 feeds the informational cards or detectable members to the belt system which comprises a pair of belts 102 and 104 cooperating with each other to form a sandwich or laminated cable 106. Pulleys 108 are used to guide the cables or belts 102 and 104. An endless belt 110 travels about drive pulley 112 and idler pulley 113. The belt or cable 110 is provided with sprockets 114 which engage recesses 116, 118 and 120 in the cards as well as in the cables 102 and 104. The cards are illustrated best in FIGURES 16 and 17 by the number 122. It will now be obvious that the sprocket belt 110 will engage and drive the cables 102 and 104 simultaneously picking up information cards or the like 121. The sprockets 114 are so designed as to engage the slots 116, 118 and 120. The sprockets 114 maintain the cards in constant position between each other and thereby add to the accuracy of the timing in the programming system. After the information has been fed from the dispenser to the block system, it is ejected from the belts 102 and 104 into the receptacle 124.

FIGURES 14 and 15 illustrates the cable or tape construction 102 in which the tape is provided with a series of upper perforations 126 and lower perforations 128. Drive wheel perforations 130 engage the sprockets or the like to assist in feeding the cables through the block B. It will be noted that the cable shown in FIGURE 15 in-

cludes in phantom lines a detectable member 132. The detectable member 132 may have small raised studs if necessary to fit into the slots on the tape or belt or cable 102. In an instance where the detectable member 122 has means thereon such as lugs for engaging the holes 126 and 130, a sprocket drive may not be necessary and former drive mechanisms as heretofore described may be utilized. In FIGURE 15, the drive wheel 134 is used to drive the belt forward as desired.

In FIGURE 18, we see the block B having the tape or belt or cable C extending therethrough. Inserts 140 and 142, show detectable information 144 which is located in the belt and may be as previously described a card or an insert or the like. In the block B there is a permanent magnet 146 with a coil 148 used to detect the presence of metal or the like. Similarly an electric eye 150 is used to detect light variables such as infra red activity, ultra violet, phosphorescent, or the like. The coil 152 surrounds the cable C and detects a change in flux as metal particles or the like pass through the coil as illustrated in FIGURE 18.

A reed switch 154 including a permanent magnet 156 may be used so that when metal particles pass in close proximity to the permanent magnet 156, the attractive forces of the magnet holding open the switch 154, will be diminished thereby releasing the reed to make a contact against the opposite reed.

FIGURES 19 and 20

In FIGURE 19, the programming system is shown with a forward block B and rearwardly extending blocks A and D. It will be noted that the cable is split as in FIGURE 20 to form two sections 160 and 162. The section 160 passes through the block A and the section 162 passes through the block D both passing through block B. If necessary, an additional block F may be provided subsequent to blocks A and D. Any other arrangement of blocks whether in series or in parallel may be utilized for various programming combinations.

In FIGURE 19, the drive means is not shown but a series of idlers 164 are shown to illustrate the overall operation of the cables. Various switching and circuit techniques can be developed as desired and the split cable C comprising members 160 and 162 may have embedded therein at intervals certain detectable members.

FIGURE 21

Where in some instances as for example in FIGURE 12, it is necessary to remove certain of the cards from the cable while leaving other cards therein, a removal apparatus such as illustrated in FIGURE 21 may be provided. The apparatus provides that the cable 182 for example pass between cogwheels 184 and loop about pulleys 186. The sprockets 184 are spring biased by means of springs 188 so as to maintain a certain tension on the cable while simultaneously maintaining proper distance of all units within the cable programming system. It is noted that a support plate 190 is located between the loops 192 and 194. An air blast nozzle 196 adjacent the plate 190 is provided for blowing a unit of information such as a card or the like from between the upper and lower portions of the cable 192 and 194.

The mechanism illustrated in FIGURE 21 includes a pair of slots 198 and 200 which are built into a bracket or supporting mechanism not shown in the drawings. The pulley members 186 ride up and down in the slots 198 and 200. When the pulleys 186 travel away from the center line, the sprockets 184 are pushed backwards and the loop formed at 192 and 194 increases thereby permitting the card to come out of engagement with the sprockets 184 and to ride on the support 190 to be ejected therefrom by means of air in the nozzle 196. Retaining sprockets 202 maintain a constant relationship at all times in the cable.

It will be obvious from utilizing the construction shown in FIGURE 21, that variables can be worked into the

programming system permitting some cards to pass onto the next block while deleting others.

While the invention has been described, it will be understood that it is capable of further modifications and this application is intended to cover any variations, uses, or adaptations of the invention following in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention what I claim is:

1. A programming system comprising:

- (a) a circuit block,
- (b) a non-conductive length of cable supported by said block and movable with respect to said block,
- (c) means for moving said cable in said block at a predetermined speed,
- (d) said block including a circuit having detector means in close proximity to said cable,
- (e) said cable having a pocket formed therein,
- (f) said pocket including a plurality of removable spaced detectable members, and
- (g) means positively positioning said detectable members in said cable,
- (h) whereby when said cable is moved in said block at a predetermined speed thereby also moving said detectable members, the circuit will be operated when said detector means in said block detects the passing of the detectable members.

2. A programming system as in claim 1 and wherein:

- (a) said blocks are parallelly arranged, blocks arranged in series with said cable moving in each of said blocks.

3. A programming system as in claim 1 and wherein:

- (a) said means positively positioning said detectable members in said cable includes a removable carrier, and
- (b) said carrier is supported within said pocket.

4. A programming system as in claim 3 and wherein:

- (a) said cable includes a plurality of said pockets, and
- (b) a plurality of said removable carriers spaced from each other and each supported within certain of said pockets.

5. A programming system as in claim 3 and including:

- (a) a plurality of said removable carriers supported within said pocket.

6. A programming system as in claim 1 and wherein:

- (a) said cable has upper and lower members, and
- (b) said upper and lower members abut to form said pocket.

7. A programming system as in claim 6 and wherein:

- (a) said upper and lower members include lug positioners.

8. A programming system as in claim 6 and wherein:

- (a) said pocket has its longitudinal axis aligned with the longitudinal axis of said cable.

9. A programming system as in claim 1 and wherein:

- (a) said cable includes a plurality of said pockets, and
- (b) at least one pocket includes a plurality of said removable spaced detectable members.

10. A programming system as in claim 9 and wherein:

- (a) said cable has upper, lower, and intermediate members, and

- (b) said intermediate member forms with said upper and lower members at least two of said pockets,

- (c) one of said at least two pockets being an upper pocket, and

- (d) the other of said at least two pockets being a lower pocket.

11. A programming system as in claim 6 and wherein:

- (a) said upper and lower members are endless.

12. A programming system as in claim 11 and wherein:
 (a) said upper and lower members abut only in the area adjacent said block to form said cable.
13. A programming system as in claim 9 and wherein:
 (a) at least one of said pockets has its longitudinal axis positioned transversely to the longitudinal axis of said cable. 5
14. A programming system as in claim 12 and wherein:
 (a) said means for positively positioning said detectable members includes a dispenser having at least a portion extending between said upper and lower members. 10
15. A programming system as in claim 1 and including:
 (a) means for removing said detectable members from said cable subsequent to their being positioned in said cable. 15
16. A programming system as in claim 15 and wherein:
 (a) said means for removing said detectable members is air.
17. A programming system as in claim 15 and wherein:
 (a) said means for removing said detectable members includes a cable spreader. 20
18. A programming system as in claim 1 and wherein:
 (a) said cable is comprised of at least two separable lengths.
19. A programming system as in claim 18 and including:
 (a) at least two of said circuit blocks, and
 (b) one of said at least two of said circuit blocks supporting at least said two separable lengths, and
 (c) the other of said at least two of said circuit blocks supporting one of said at least two separate lengths.
20. A programming system as in claim 19 and wherein:
 (a) said blocks are serially arranged.
21. A programming system as in claim 19 and wherein:
 (a) said blocks are parallelly arranged. 35

22. A programming system as in claim 1 and wherein:
 (a) said detector means is a photocell, and
 (b) said detectable members are light transmissive.
23. A programming system as in claim 1 and wherein:
 (a) said detector means is a radiometer, and
 (b) said detectable members are electroemissive.
24. A programming system as in claim 1 and wherein:
 (a) said detector means is a metal detector means,
 (b) said detectable members are metallic.

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30 ROBERT S. MACON, *Primary Examiner*.

D. SMITH, JR., *Assistant Examiner*.

U.S. Cl. X.R.

200—46; 235—61.11; 250—219; 178—111 35

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,424,879

January 28, 1969

Bernard Edward Schlesinger, Jr.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, lines 33 to 35, "(a) said blocks are parallelly arranged. blocks arranged in series with said cable moving in each of said block." should read -- (a) said circuit block is one of a plurality of such blocks arranged in series with said cable moving in each of said blocks. --.

Signed and sealed this 24th day of March 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents