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(54) **User friendly central control display for a multi-station document inserter.**

(57) A method, and associated apparatus, for providing a user friendly central control display for a multi-station document inserter, comprising the steps of interconnecting a central control display to the inserter, displaying inserter operating functions on the central control display, activating the inserter through the central display to perform programmed inserter operating functions, and displaying fault locations and descriptions on the central control display in human readable form. Advantageously, the inserter operator can also reconfigure the inserter through switches in the central control display.

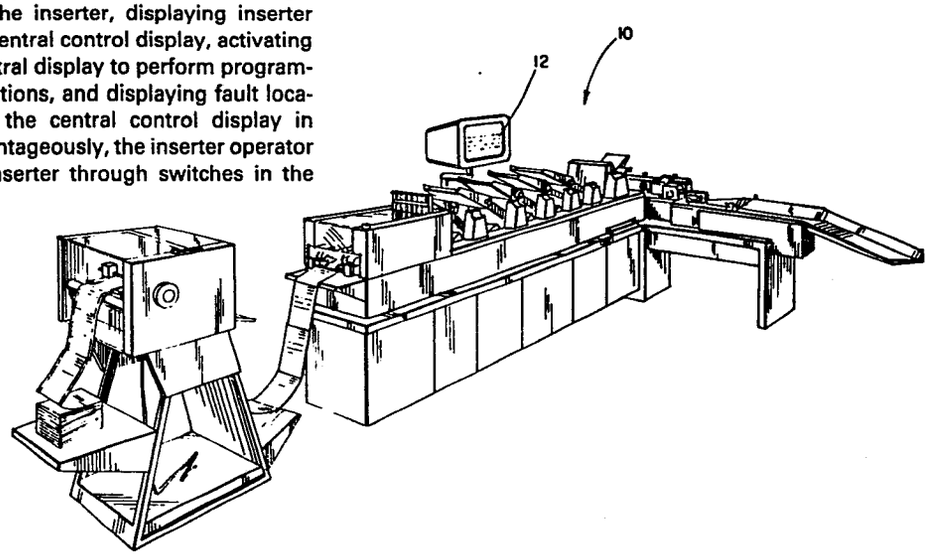

FIG. 1

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USER FRIENDLY CENTRAL CONTROL DISPLAY FOR A MULTI-STATION DOCUMENT INSERTER

The present invention relates to document inserters, and more particularly to multi-station document inserters.

Known multi-station document inserters employ discrete elements with individual module display lights to indicate a malfunction. When such lights are lighted, the operater must check the appropriate module in an attempt to determine the cause of the malfunction Further, once the inserter configuration is fixed, the inserter must be rewired to change its operation.

It would be desirable to provide a user friendly central control display for a multi-station document inserter.

According to the invention, there is provided apparatus for providing a user friendly central control display in a multi-station document inserter, comprising:

central control display means for providing a display of inserter operating functions;

means for operatively coupling said central control display to the document inserter;

switch means for activating the document inserter through said central control display to perform programmed inserter operating functions; and

fault display means for displaying fault locations and descriptions on said central control display means in human readable form.

A method and associated apparatus is disclosed herein for providing a user friendly central control display for a multi-station document inserter, comprising the steps of interconnecting a central control display to the inserter, displaying inserter operating functions on the central control display, activating the inserter through the central control display to perform programmed inserter operating functions, and displaying fault locations and descriptions on the central control display in human readable form. The inserter operator can also reconfigure the inserter through switches in the central control display.

The present invention will be better understood from the following detailed description in conjunction with the illustrative drawings, in which:-

Figure 1 is a perspective view of a preferred embodiment of multi-station document inserter with a central control display;

Figure 2 is a schematic drawing of the display present on the central control display upon power up;

Figure 3 is a schematic drawing of the display on the central control display during continuous run operation;

Figure 4 is a schematic drawing of the display on the central control display when a fault condition is detected;

Figure 5A is a schematic drawing of the display on the central control display when the inserter configuration is displayed;

Figure 5B is a schematic drawing of the display on the central control display when a selected individual feed station is displayed with the associated switches for modifying its operation; and

Figure 6 is a schematic drawing of the display on the central control display in the diagnostic mode.

Referring to Figure 1, a multi-station document inserter is illustrated as 10. A central control display 12 is electrically connected to the inserter 10.

Advantageously, the central control display 12 is a finger touch display, such as Fluke Model 1780A InfoTouch Display. Both the multi-station document inserter 10 and central control display 12 are of the type disclosed in copending U.S. patent application Serial No. 394 388 filed on 1st July 1982 in the names of Peter N. Piotroski

and John M. Gomes, European Patent Application Number (E59/13), entitled UNIVERSAL MULTI-STATION DOCUMENT INSERTER, the disclosure of which is incorporated herein by reference. As disclosed in the aforementioned patent application, the central control display 12 is electrically connected to the supervisory control circuit of the multi-station document inserter 10 through a RS232C standard communication line. The central control display 12 provides an operator or user with certain switches which when activated cause the inserter 10 to undergo certain routines and provide displays in human readable form.

Referring to Fig. 2, the central control display 12 is shown with certain information displayed upon Power Up. Specifically, the following switches are displayed:

Start Machine - Shall start machine operation.

One Cycle - Shall activate system operation for one cycle.

Continuous Run - Shall activate system for continuous-run operation.

Sequence Start - Shall sequentially activate one feeder module per cycle. Shall activate envelope module feeder in time to insert first collation.

Stop - Shall allow inserter operation to be stopped. Actual cessation of operation occurs at only one point in inserter cycle.

Clear Deck (Sequence Stop) - Shall sequentially deactivate one feeder module per cycle. Shall deactivate envelope feeder after last collation is inserted. Shall process last inserted collation through postage meter (if applicable) to stacker.

Change Set-Up - Shall provide a display of the inserter configuration for change in inserter operation.

Further, the display shall display information enabling the operator to determine:

Operating Mode

Fault Condition (if any)

Piece Count

A maintenance reminder message is displayed upon the first power-up after one million cycles. Thereafter, the reminder message is displayed after each subsequent power-up until cancelled by the service technician.

Referring to Fig. 3, during continous run operation, the following information is displayed on the central control display 12:

Operating Mode

Piece Count

Action To Be Taken To Halt Operation

Referring to Fig. 4, upon detection of a fault by the supervisory control circuit of the document inserter 10, the following information is displayed on the central control display 12:

Fault Display - Upon detection of a fault by any of the document or inserter sensors, inserter operation shall be halted (dependent upon specific application requirements) and the following type of information displayed on the central control display 12:

Fault location, e.g. station 5

Fault description, e.g.:

Jam

Failure to Feed

Double

Mismatch

Late Feed

Open Cover

Referring to Fig. 5A, when the operator actuates the inserter Change Set Up switch of Fig. 2, the following information regarding the configuration of the inserter is displayed on the central control display 12:

Station Numbers

Type of Feeder per Station Number

Feeder Select Status

Feeder On/Off Status

Assigned Station Number

Line Spacing (scan marks at multiple document feeders)

Feed Stop

Feed Count

Mismatch Count

Postage Break

Low Break

High Break

Additionally, Reset, Modify, Reassign, Diagnosis and Reset Piece Count switches are displayed. Further, as seen in Fig. 5B, upon display of the foregoing information regarding the configuration of the inserter 10 the user-operator may reprogram the supervisory control circuit to reconfigure the inserter 10 by actuating the Modify switch and a particular station number for re-display of the foregoing information as well as the following switches:

Status (On/Off) - Shall enable the operator to deactivate a designated feeder module.

Feed Count - Shall enable the operator to set a maximum document count or a specified number of documents.

Feed Stop - Shall enable the operator to set the document count or the control document to set the count.

Postage Break Low and Postage Break High - Shall enable the operator to set two limits associated with a predetermined count from a designated multiple document feeder.

Mismatch Count - Shall enable the operator to specify the maximum consecutive number of mismatches allowed.

Line Spacing - Shall enable the operator to specify the line spacing for dash mark scanning.

Reset Values - Shall enable the operator to reset to the original configuration of the inserter.

Exit - Shall enable the operator to leave a particular document feeder display and display the entire inserter configuration as in Fig. 5A.

Referring to Fig. 6, upon selection of the proper access code the following information shall be displayed on the central control display 12 during the diagnostic mode to enable the service technician to individually activate input or output devices and/or mechanisms for testing, as follows:

Fault Lights

Brakes

Clutches

Solenoids

Motors

Photocells

Interlocks

Sensors

Switches

The supervisory control circuit of the inserter 10 under control of the program in the Microfiche Appendix provides the aforementioned displays of operating functions and switches on the central control display 12 for interaction with the inserter user-operator.

It should be apparent to those skilled in the art that various modifications may be made in present invention without departing from scope thereof as described in specification and defined in the appended claims.

It will be seen that there has been particularly disclosed and illustrated herein:

a central control display capable of displaying fault locations and describing the type of faults encountered in a multi-station document inserter;

a user-interactive central control display for a multi-station inserter for displaying information in human readable form;

a central control which displays the operating conditions of a multi- station document inserter; and which includes a maintenance reminder.

CLAIMS

1. Apparatus for providing a user friendly central control display in a multi-station document inserter, comprising:

central control display means for providing a display of inserter operating functions;

means for operatively coupling said central control display to the document inserter;

switch means for activating the document inserter through said central control display to perform programmed inserter operating functions; and

fault display means for displaying fault locations and descriptions on said central control display means in human readable form.

2. Apparatus according to Claim 1 wherein:
said switch means includes finger touch switches in said central control display means.

3. The apparatus recited in Claim 1 or 2 including:
maintenance display means for displaying a maintenance reminder message after the inserter has undergone a predetermined number of cycles of operation;

said maintenance display means continuing to display the maintenance reminder message during each cycle of the inserter subsequent to the predetermined number of cycles until cancelled.

4. The apparatus recited in Claim 1 or 2 wherein:
said central control display means displays information upon power up which enables the inserter user to determine the operating mode, the presence of any fault condition and the document count.

5. The apparatus recited in Claim 1 or 2, wherein:
said central control display means displays information during continuous-run operation of the inserter regarding the operating mode,the document count, and the action to be taken to halt operation of the inserter.

6. The apparatus recited in Claim 1 or 2, wherein:
said central control display means displays information regarding the configuration of the inserter which enables the inserter user to change the configuration of the inserter.

7. The apparatus recited in Claim 6, wherein the information displayed regarding the configuration of the inserter includes:

the application mode, the feeder station number, type of feeder at a station, on and off status of the feeder stations, select status of the feeder stations, line spacing of the scan marks at multiple document feeder stations, mismatch count, postage break, and document count.

8. The apparatus recited in Claim 1, including:

diagnostic display means for displaying information on said central control display means during a diagnostic mode regarding the status of the brakes, clutches, fault lights, solenoids, motors, photocells, interlocks, sensors, and switches of the document inserter.

9. The apparatus recited in Claim 1, including:

reprogram switch means in said central control display means for reprogramming the inserter to change its configuration and operation.

10. The apparatus recited in Claim 9, wherein said reprogram switch means includes:

means for deactivating designated document feeders;

means for specifying the number of documents to be fed from a feeder station;

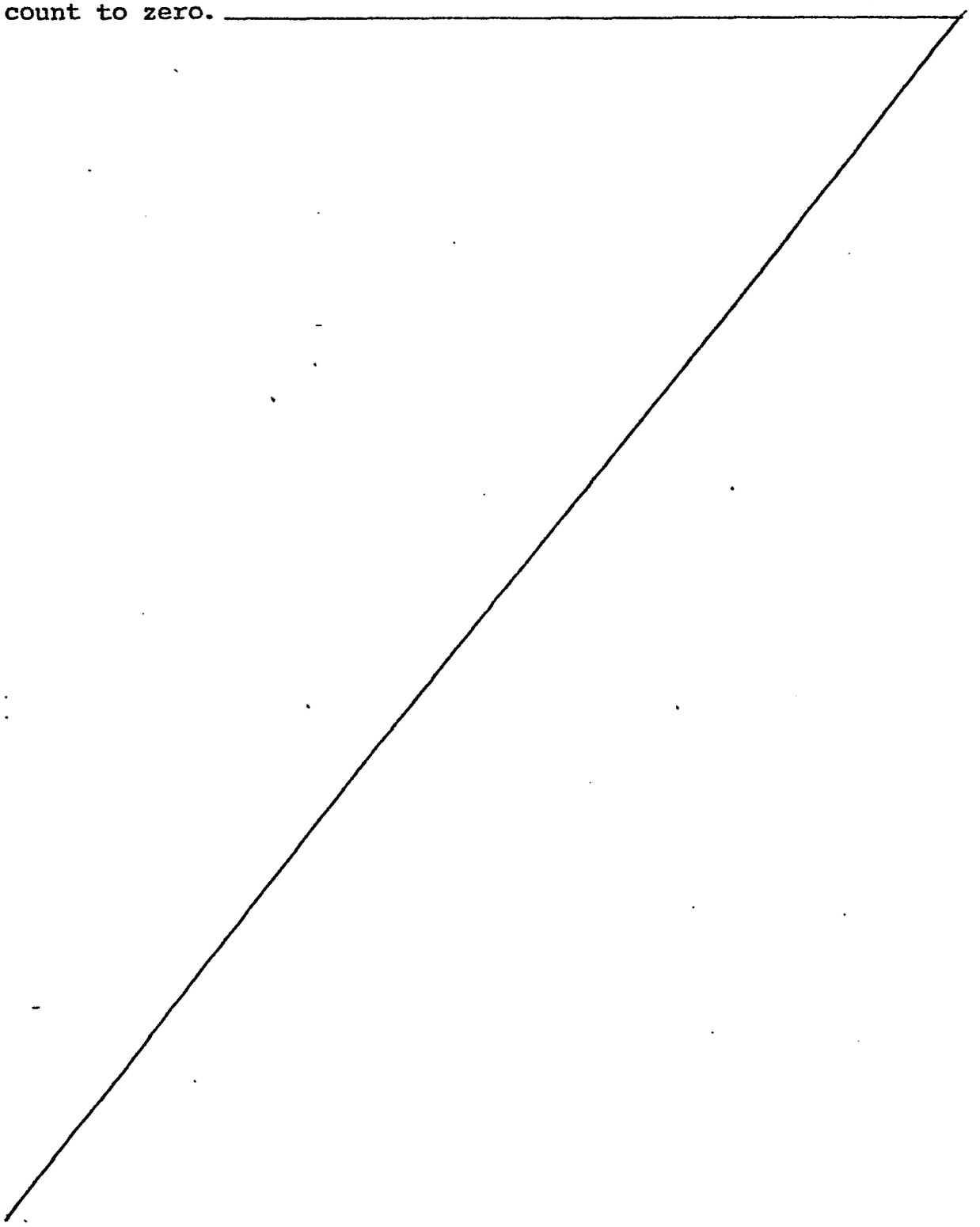
means for specifying the maximum number of documents to be fed from a feeder station;

means for enabling the inserter user to set limits associated with a predetermined count from a designated feeder station for a postage break;

means for specifying the maximum consecutive number of document mismatches allowed;

means for specifying the line spacing for scanning of dash mark codes on documents; and

means for enabling the inserter user to reset the document count to zero.



11. Method for providing a user friendly central control display for a multi-station document inserter, comprising the steps of:

interconnecting a central control display to the inserter;

displaying inserter operating functions on the central control display;

activating the inserter through the central control display to perform programmed inserter operating functions; and

displaying fault locations and descriptions on the central control display in human readable form.

12. The method recited in Claim 11, including the step of:

reprogramming the inserter operation through the central control display to change the inserter configuration and operation.

13. The method recited in Claim 11, including the step of:

displaying a maintenance reminder message on the central control display after the inserter has undergone a predetermined number of cycles of operation;

continuing to display the maintenance reminder message during each subsequent cycle until cancelled by a service technician.

14. The method recited in Claim 11, including the steps of:

displaying information on the central control display upon power up which enables the inserter user to determine the operating mode, the presence of any fault condition and the document count.

15. The method recited in Claim 11, including the step of:

displaying information during continuous-run operation of the inserter regarding the operating mode, the document count, and action to be taken to halt operation of the inserter.

16. The method recited in Claim 11, including the step of:

displaying information regarding the configuration of the inserter including the application mode, the feeder station number, type of feeder at a station, on and off status of the feeder stations, select status of the feeder stations, line spacing of the scan marks at multiple document feeder stations, mismatch count, postage break, and document count.

17. The method recited in Claim 11, including the step of:

displaying on the central control display during a diagnostic mode the status of the brakes, clutches, fault lights, solenoids, motors, photocells, interlocks, sensors and switches of the document inserter.

18. The method recited in Claims 11 or 12, including the step of:

deactivating designated module feeders through switches in the central control display;

specifying the maximum number of documents to be fed from a feeder module through switches in the central control display;

enabling the user to set limits associated with a predetermined count from a designated feeder module for a postage break through switches in the central control display;

specifying the maximum consecutive number of document mismatches allowed;

specifying the line spacing for scanning of dash mark codes on the documents; and

enabling the user to reset the document count to zero.

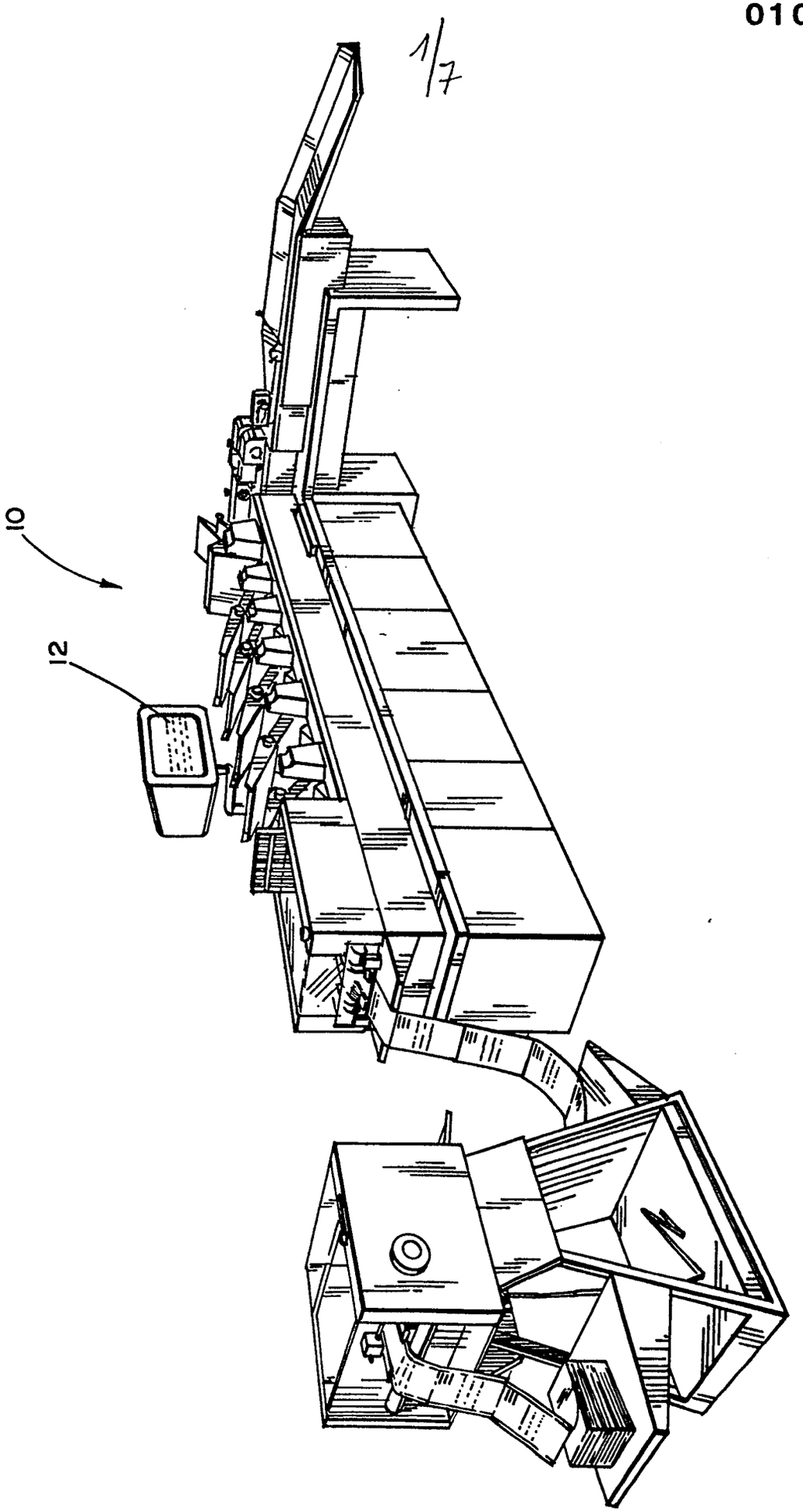


FIG. 1

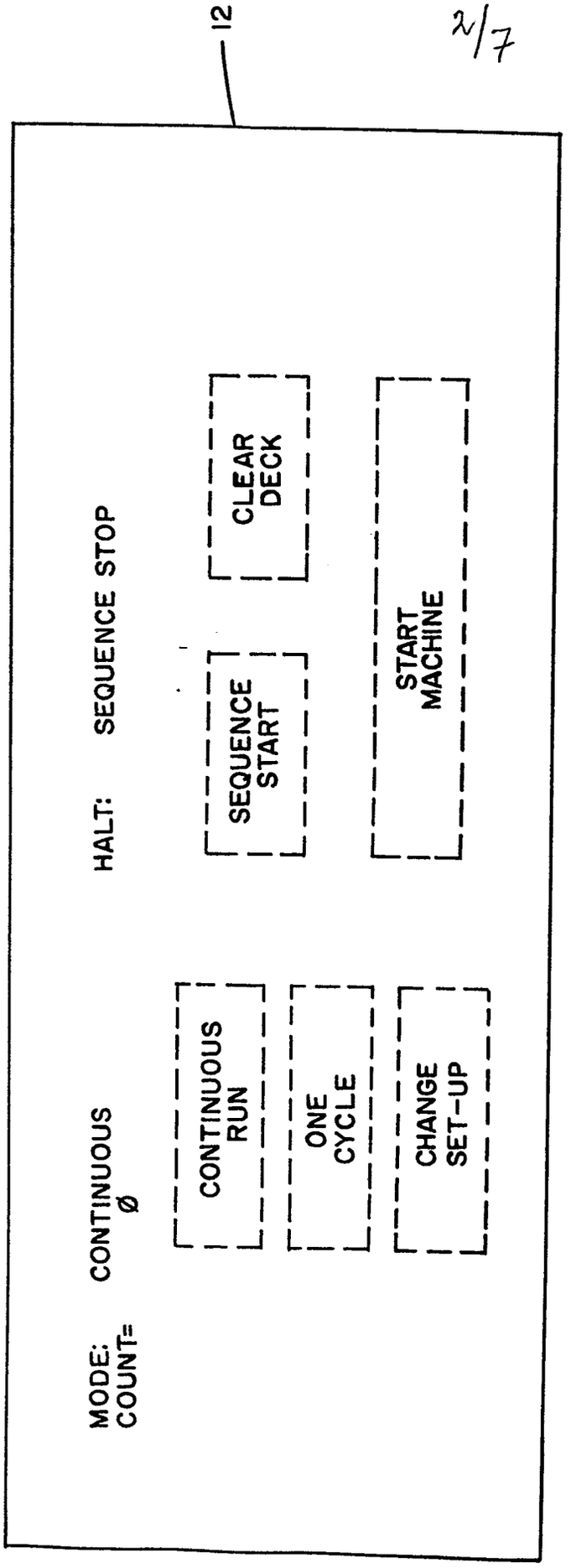

12
MODE:
CONTINUOUS
COUNT=
Ø
HALT:
SEQUENCE STOP
CONTINUOUS RUN
ONE CYCLE
CHANGE SET-UP
SEQUENCE START
CLEAR DECK
START MACHINE

FIG. 2

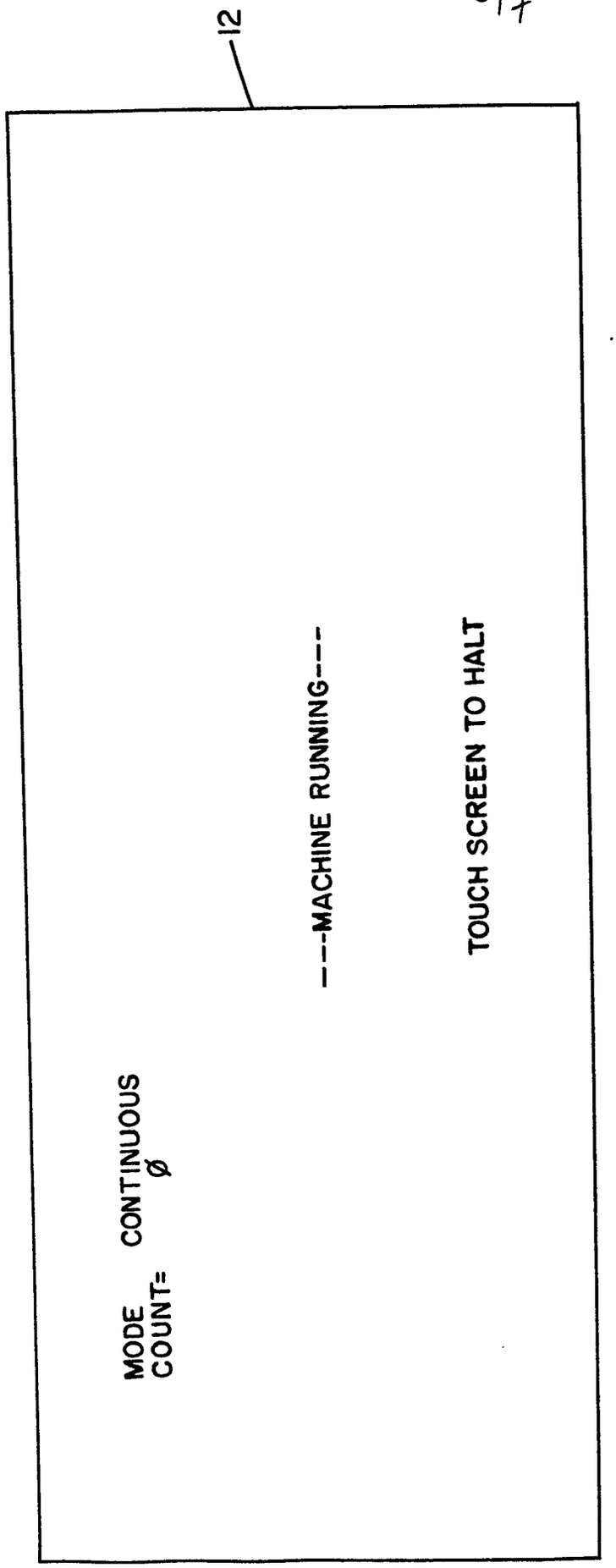

12
MODE CONTINUOUS
COUNT= Ø
---MACHINE RUNNING---
TOUCH SCREEN TO HALT

FIG. 3

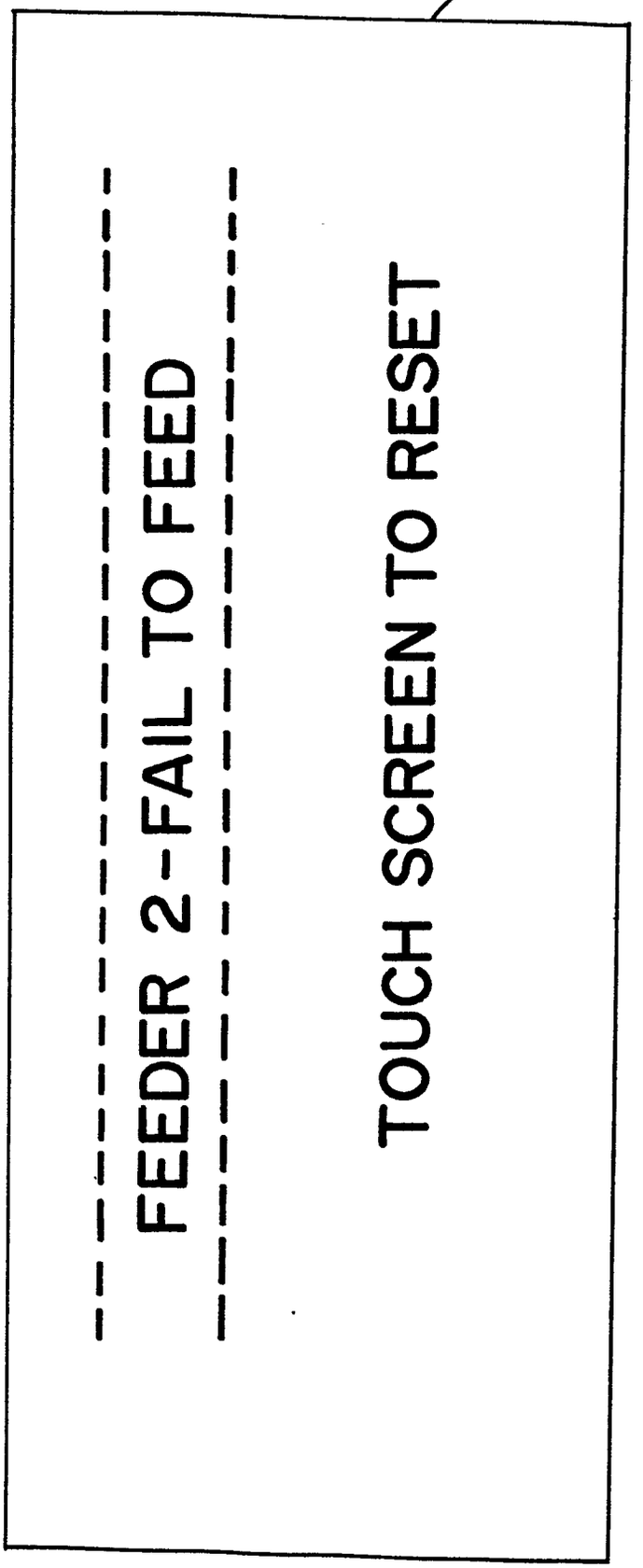


FIG. 4

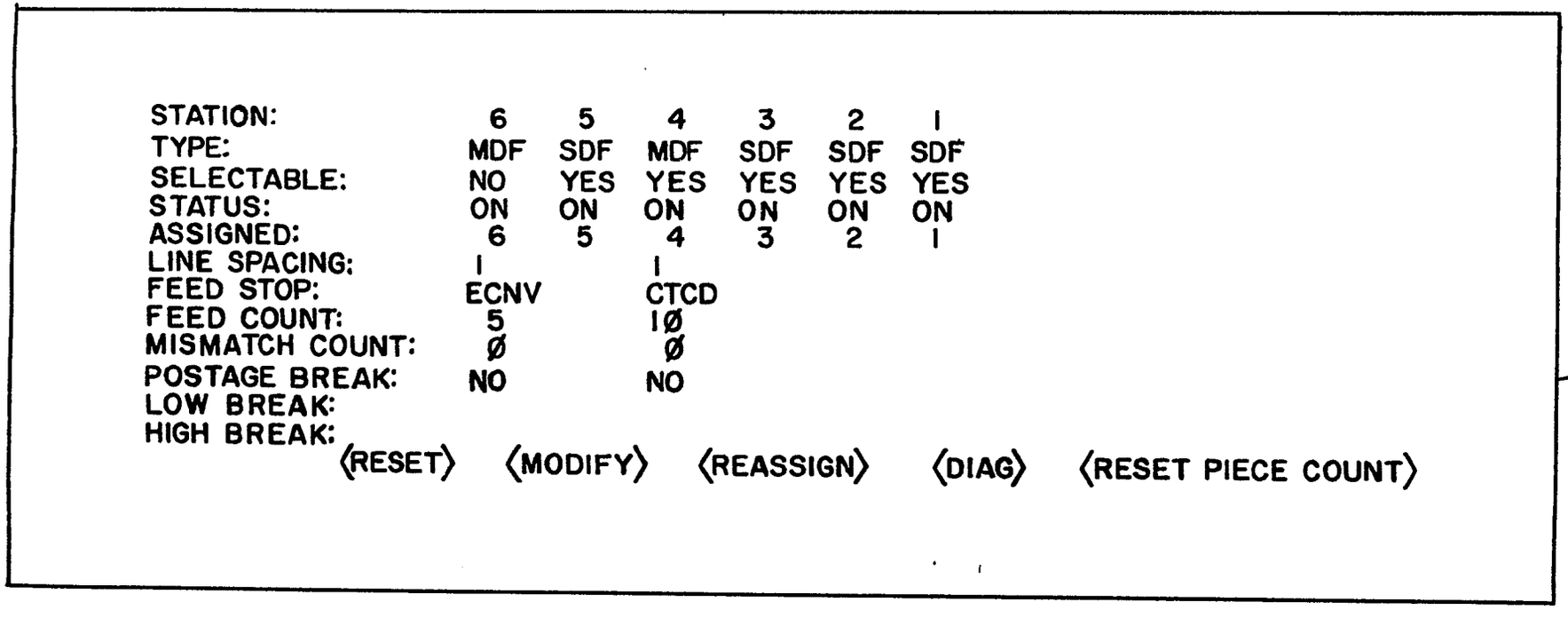


FIG. 5a

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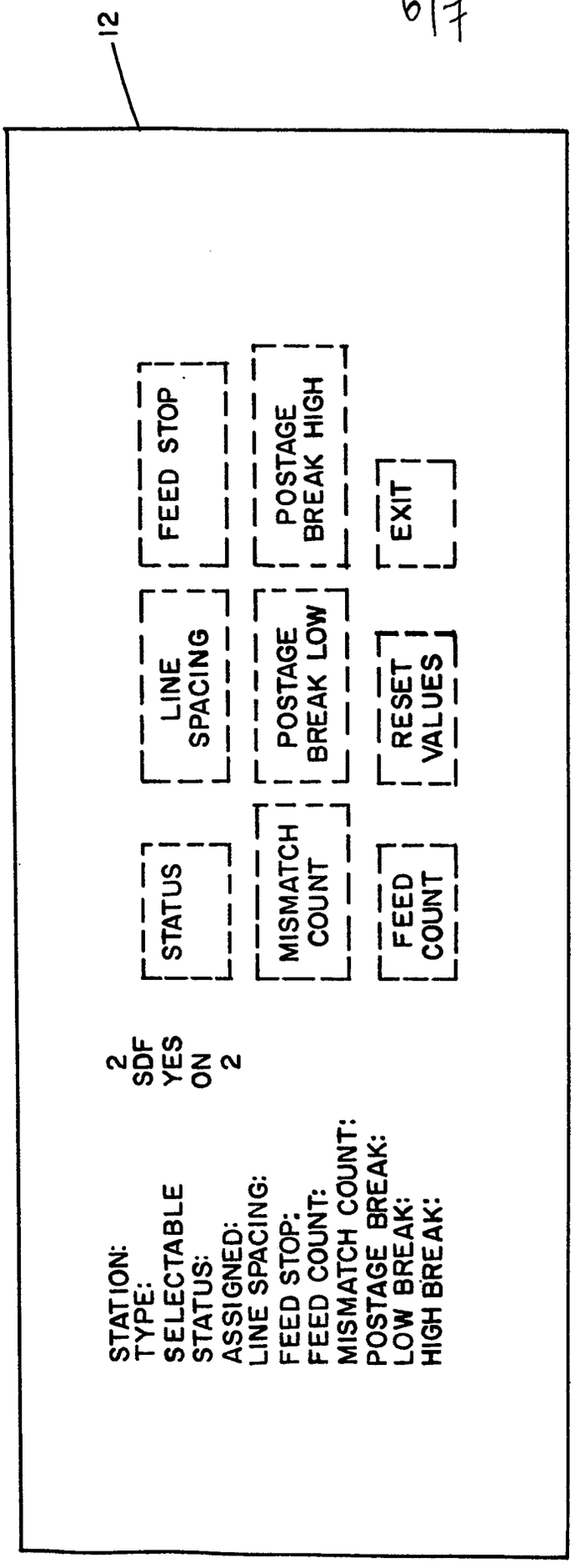
12
STATION:
TYPE:
SELECTABLE
STATUS:
ASSIGNED:
LINE SPACING:
FEED STOP:
FEED COUNT:
MISMATCH COUNT:
POSTAGE BREAK:
LOW BREAK:
HIGH BREAK:
2
SDF
YES
ON
2
STATUS
LINE SPACING
FEED STOP
MISMATCH COUNT
POSTAGE BREAK LOW
POSTAGE BREAK HIGH
FEED COUNT
RESET VALUES
EXIT

FIG. 5b

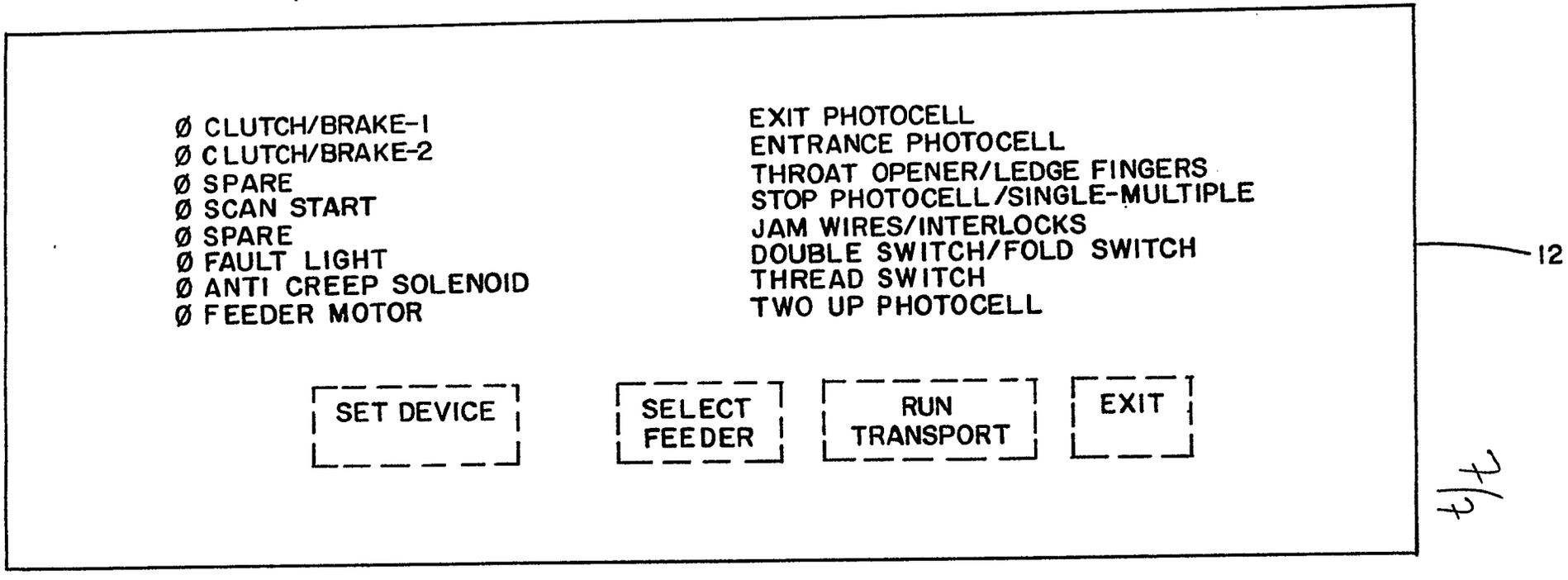

FIG. 6