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Sebille et al.

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[54] **MODULE FOR USE WITH SYSTEMS HANDLING MULTIPLE AUTOMATIC FUNCTIONS**

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[51] **Int. Cl.** **H01h 47/22**

[58] **Field of Search** ..... 317/137, 139, 155, 157, 317/101 LE; 340/166 R, 166 S, 147 P, 147 T; 307/115; 200/46; 179/18 GE, 18 GF

[56] **References Cited**

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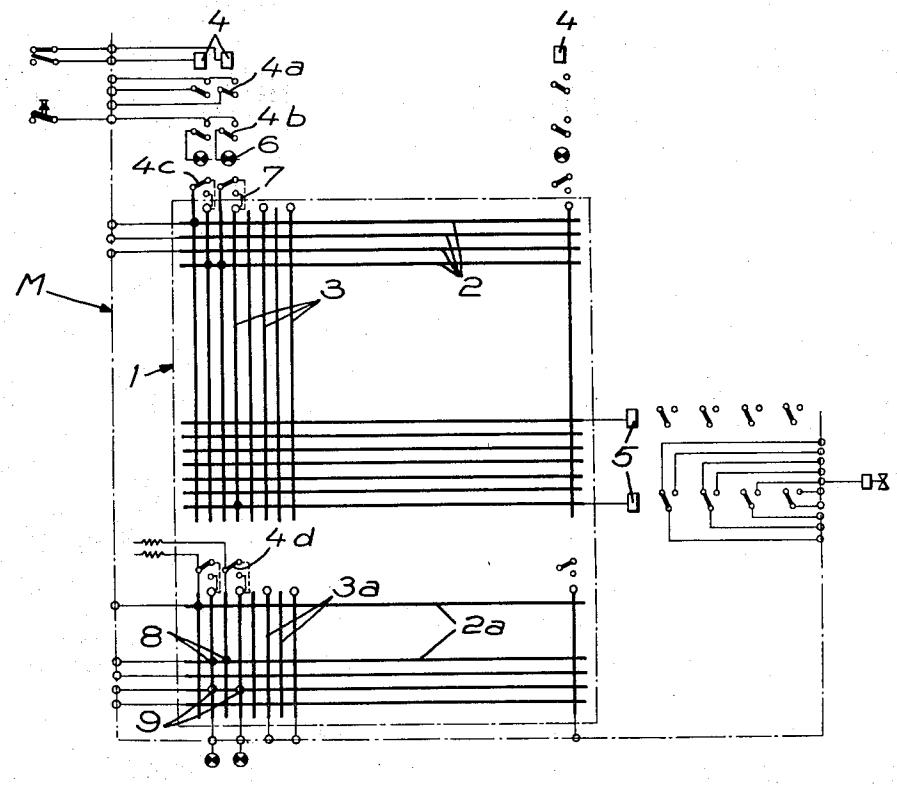
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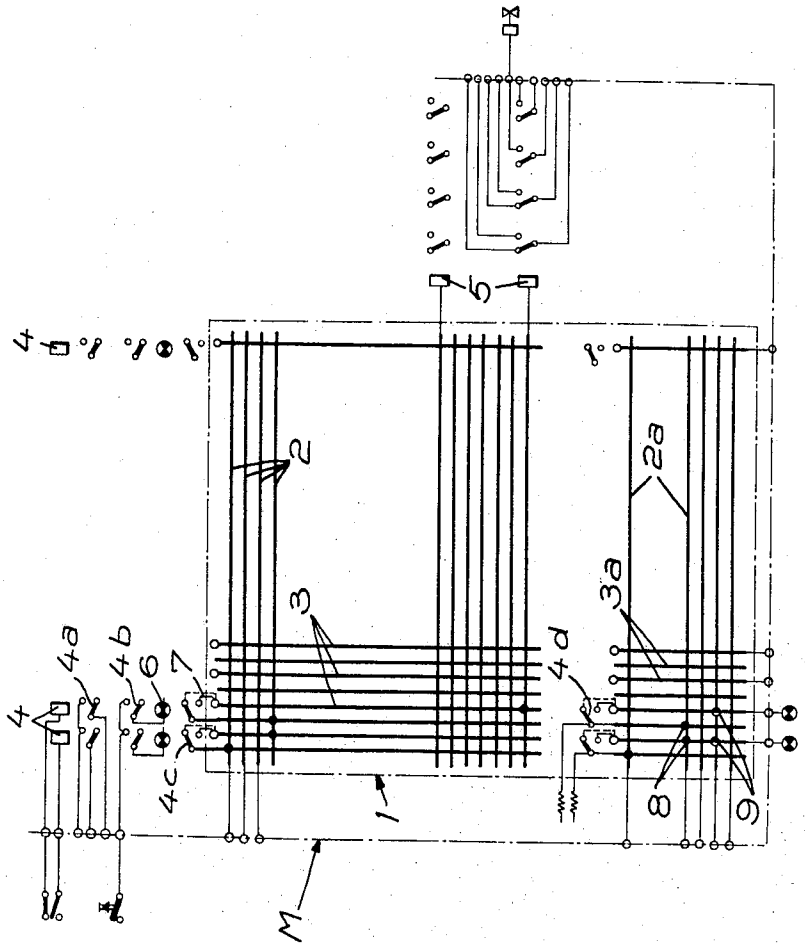
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[57] **ABSTRACT**

A module for use with systems handling multiple automatic functions incorporates a matrix of rows and columns of signal lines which can be interconnected by means of short circuit tags and by the operation of relays responsive to input instructions to produce a required overall circuit configuration for processing the input instructions into appropriate outputs.

7 Claims, 1 Drawing Figure




4
5
2
2a
3
3a
4a
4b
6
7
4c
4d
1
8
9
M

MODULE FOR USE WITH SYSTEMS HANDLING MULTIPLE AUTOMATIC FUNCTIONS

The invention is concerned with controlling and automating equipment having magnetic or static relays.

Automatic and controlling devices are executed in a general way by grouping into cabinets all the relays needed for the functioning of the automating and controlling devices.

The relays are connected rigidly to each other.

In certain cases in which programmes are often required to be modified, a matrix made up of vertical and horizontal bars insulated from one another and which can be connected at their intersections by short-circuit or diode plugs is utilized and wired as a function of the various programmes envisaged.

In both cases a change in the automation sequences involves a modification of the wiring between the relays or appliances.

The object of the invention is to embody standard multifunctional automation modules which simplify the organization of relay boxes and allow them to respond to all the combination and sequential schemes which are presented in industry, and this without having to alter the wiring between the various relays but by moving short-circuit or diode plugs on a matrix used in a special manner.

Thus the invention has as its object a multifunctional automation module comprising input and output relays interconnected by a matrix, this matrix comprising horizontal bars or lines and vertical bars or columns and being characterized in that the columns or lines are used by the input relays, in a group of at least two columns or lines for one relay, while the lines or columns are connected to the coils of the output relays. In each group of at least two columns or lines, the first column or line is connected by means of a staple to the normally open or normally closed contact of the same relay.

Other characteristics and advantages of the invention will appear more clearly during the following description and through the attached drawings.

The single FIGURE is a schematic illustration of a module according to the invention.

According to the invention the assembly appears in the form of a module M comprising the matrix **1**, itself composed of lines **2** and columns **3**, and the input relays **4** and the output relays **5**.

The input relays **4** have four reversing contacts, a contact **4***a*, e.g., for external repetition, a contact **4***b* for feeding an indicator **6** showing the state of the relay **4**, a contact **4***c* the fixed terminal or pivot of which is connected to a column **3** while one of the two movable contacts is connected to the neighbouring column by a staple **7**.

The fourth contact **4***d* is connected in the same way as the contact **4***c* to a second assembly of lines **2***a* and columns **3***a* which are provided for indicating and warning action and offering the possibility by means of the short-circuit plugs **8** of predetermining a first fault and of grouping several warning signals towards a common alarm by means of the diode plugs **9**.

In the above example, the module is formed from a matrix comprising an assembly of 40 lines and 40 columns which can receive 20 items of information and give out ten commands and a second assembly of 40 columns and 10 lines which can receive 20 items of information and command at least 20 alarms. The contact **4***c* is connected to two columns but it is very evident that in certain cases it may be of interest to connect each movable contact to a single column and to appropriate to the contact **4***c* a set of three columns.

Each item of information arrives at a relay **4** which is in fact a repeating relay, and each order is given by the output relays **5** connected to the lines **2**; these relays (**5**) can be either instantaneous or delayed. The relays **5** also have four reversing contacts which actuate the external organs of command. Each item of output information from the relays **5** can also be fed in again on to the relays **4** for memory or delaying functions.

The arrangement according to the invention, which is offered in the form of a complete interchangeable module with matrix and relays pre-wired, includes in front of the matrix an indicating plate which facilitates the setting up of the programme by means of the short-circuit plugs.

The arrangement according to the invention offers numerous advantages, among which can be mentioned:

1. Possibility of careful wiring-up in the workshop, the matrices being able to arrive on the factory site just before testing.
2. A module can be assigned to different functions due to its standard wiring.
3. The boxes being standard: possibility of ordering them before plans are complete, and of despatching them to the site before it is opened.
4. Rapid programming with the aid of the indicating plates mounted in front of the matrices, impossibility of errors in all modifications, the plate must be remade previously before the embodiment of the particular modification.
5. Progressive application of voltage by means of disconnectible terminals.
6. Versatility of the tests: the input items of information visualized allow rapid checking of the collector **9** for sound connections, reversal of contacts, functioning of the collector.
7. Possibility of by-passing of the safety devices by means of plugs:
   - for tests
   - to eliminate a defective collector during running (changing of the collector made possible without shutdown of the installation).

   The by-pass plugs are located on a single line, less risk of leaving the by-passes in place after operating with them.
8. Signalling of the first fault, common alarm.
9. Instant replacement of a complete module.
10. Simplified exposure of the electrical circuits.
11. Reduced capital cost.

The invention is not limited to the mode of embodiment which has just been described and it is obvious that an expert will be able to make divers modifications to it without thereby going outside the scope of this invention. In particular, the lines may be appropriated to the input relays while the columns are connected to the coils of the output relays.

What is claimed is:

1. Module of multifunctional automating devices composed of input and output relays interconnected by a matrix which includes a set of rows of signal lines and a set of columns of signal lines, these rows and columns

being connectible among themselves by short-circuit plugs located at the intersections of the rows and columns, characterized in that one of said sets is assigned to the input relays, said assigned sets being divided into groups of at least two signal lines, each group being connected to an input relay contact, a first in said group being connected to a pivot contact of said input relay contact, and the succeeding ones in said group being connected to associated ones of the movable contacts of said input relay contact.

2. Module as claim **1,** characterized in that the relay contact is a reversing contact and the group consists of two, the second in said group being connected to one of two movable contacts by a movable staple.

3. Module as claim **1,** characterized in that the relay contact is a reversing contact having two movable contacts that are connected respectively to second and third ones in said group.

4. Module as claim **1,** characterized in that it comprises two assemblies each assembly including a set of rows of signal lines and a set of columns of signal ines,

wherein one of said set in each of said assemblies being connected to a set of contacts of relays, each relay having at least two contacts, an assembly of rows and columns serving for signalization.

5. Module as claim **4,** characterized in that it is coupled to a set of repeating input relays with each relay in said set having four contacts, two sets of contacts of the set of relays being connected to respective sets of signal lines in said respective assemblies, the third set of contacts of the set of relays being connected to an indicator and the fourth set of contacts of the set of relays being connected to an external appliance.

6. Module as claim **5,** characterized in that it is an interchangeable module with the input relays wired and connected.

7. Module as claim **6,** characterized in that it includes output relays the excitation coils of which are connected to selected ones of those signal lines not assigned to the input relays.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,824,435 Dated July 16, 1974

Inventor(s) Claude J. P. Prugnaud and Christian A. Sebille

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

In the heading, insert:

Foreign Application Priority Data

January 28, 1972 French-------72 02971

Signed and sealed this 24th day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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