United States Patent

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[54] **REED RELAY SYSTEM**
6 Claims, 8 Drawing Figs.

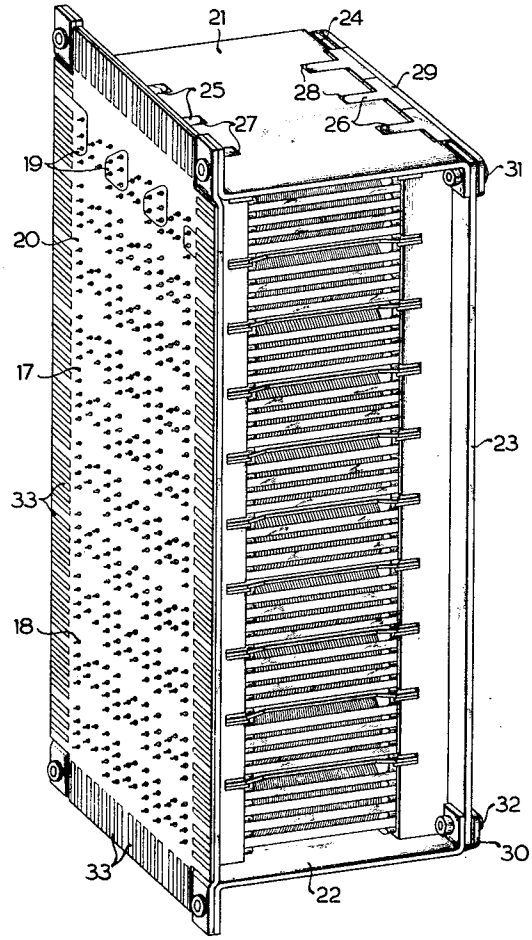
[52] **U.S. Cl.** ..... **335/152,** - 317/101(CB), 335/112
[51] **Int. Cl.** **H01h 67/24,** H01h 67/30
[50] **Field of Search** ..... 335/106, 108, 112, 152; 317/101 (CB), 101 (DH)

[56] **References Cited**
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ABSTRACT: A relay system or relay block consists of stacked reed relays each housed in an envelope. Said relays are supported by pairs of spaced parallel relay supports which, in turn, are received by a frame structure having a front panel including printed circuitry means for properly interconnecting the constituent reed relays of the relay system or block, and for connecting the relay system or block with external equipment.



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SHEET 1 OF 4

FIG.1



FIG.2

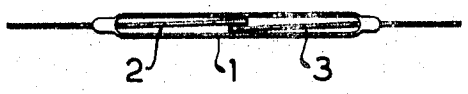


FIG.3

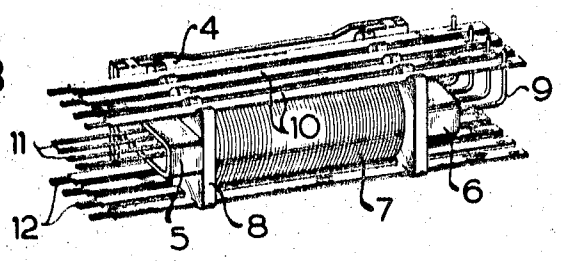


FIG.4

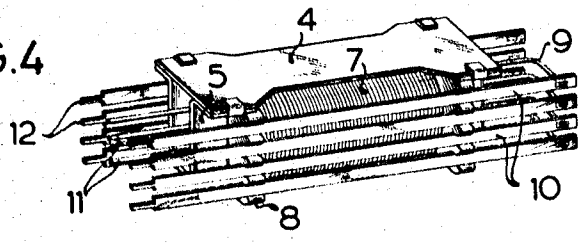
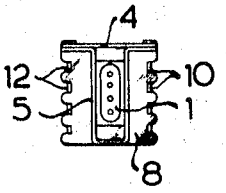


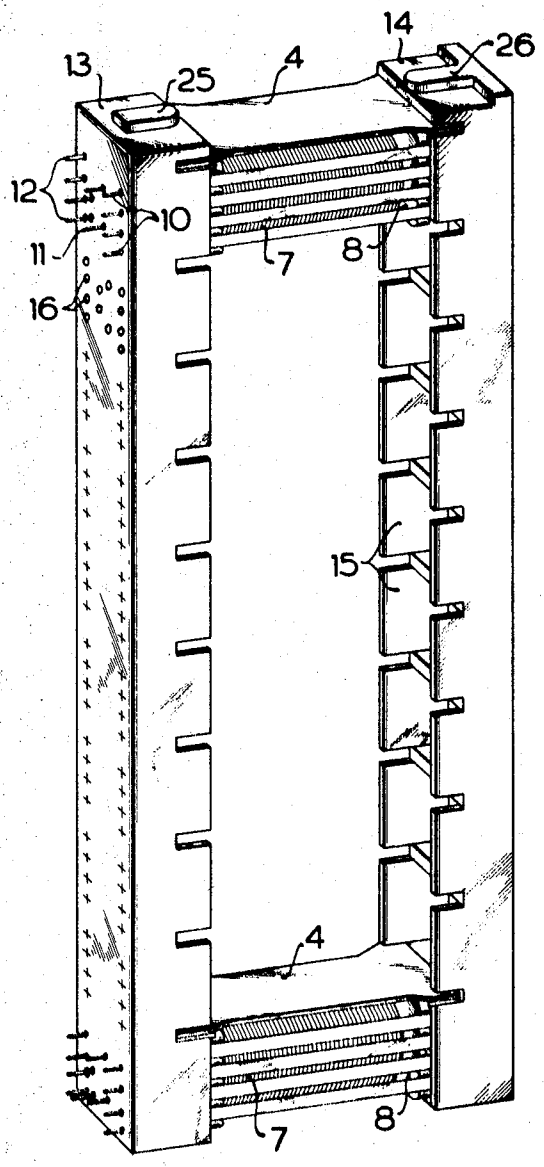
FIG.5



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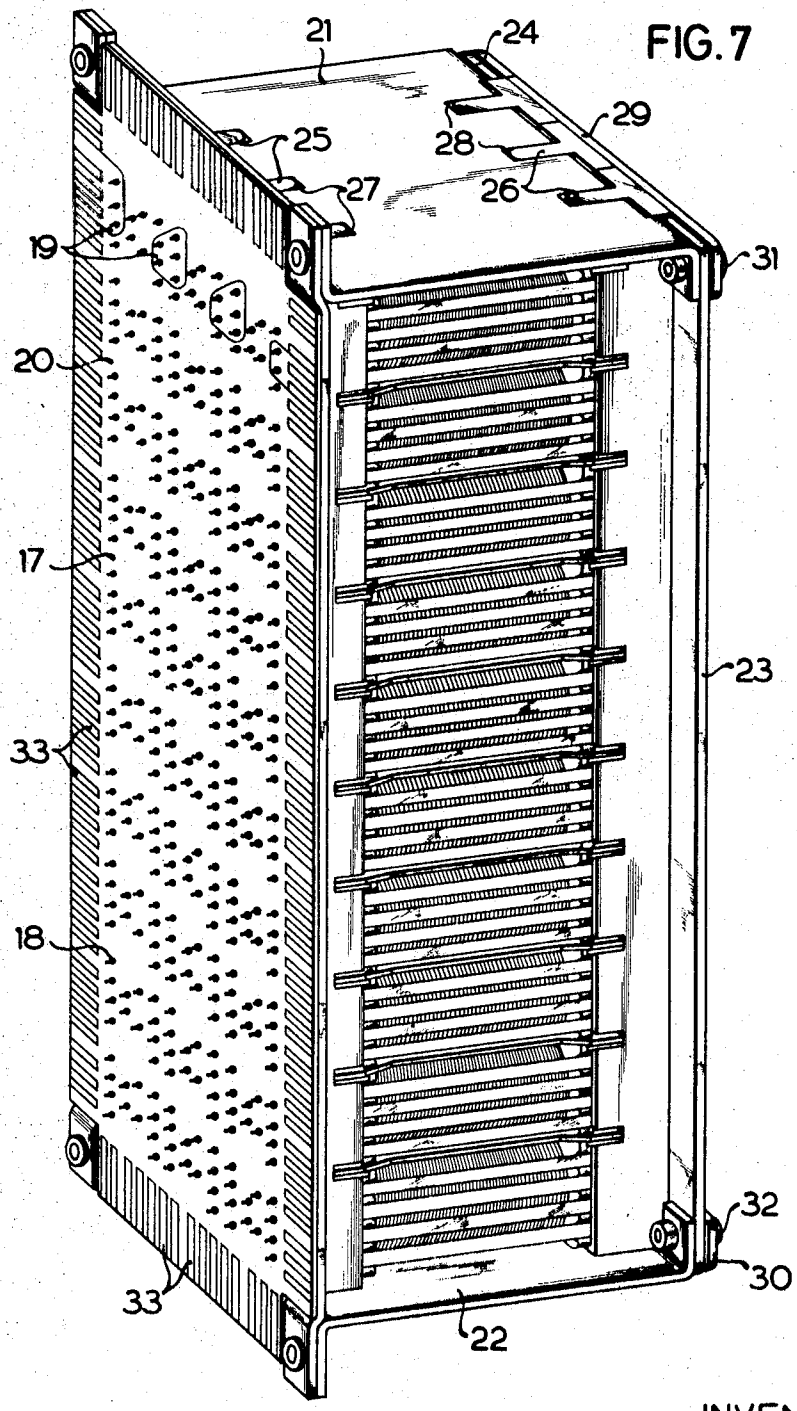
FIG. 6



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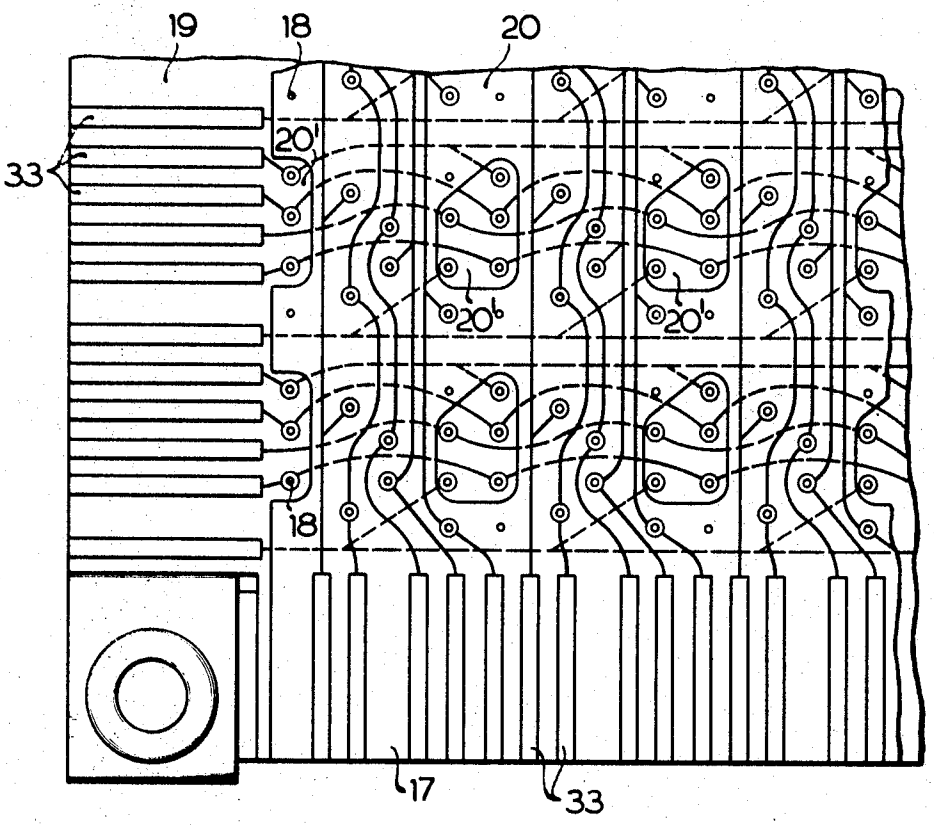
FIG. 7



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FIG. 8



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REED RELAY SYSTEM

BACKGROUND OF INVENTION

This invention relates to relay systems, or relay blocks, including a large number of electromagnetic reed relays.

Such relay systems, or blocks, are widely applied in electric communications engineering and particularly in crossbar telephone offices.

The present invention refers more specifically to units including a plurality of electromagnetic reed relays, a panel with printed circuitry to establish the desired interconnections between the constituent reed relays of the unit, and for connecting the same with other equipment, and a frame structure for supporting all the parts of the unit.

Objects of the invention include to provide units of the aforementioned description whose assembly and wiring are greatly simplified, and whose compactness is increased.

SUMMARY OF INVENTION

A relay system embodying this invention includes a plurality of electromagnetic reed relays superimposed to form stacks of reed relays. The system further includes pairs of spaced parallel relay supports. Each of said pairs of relay supports is arranged on opposite sides of one of said stacks of reed relays and supports the constituent reed relays of one of said stacks of reed relays. Each of said pairs of relay supports is further provided with indexing means. The relay system further includes a frame structure for said paris of relay supports. Said frame structure has a front panel with systems of conductors thereon and said frame structure further has indexing means cooperating with said indexing means on said pair of relay supports for positioning said pairs of relay supports relative to said frame structure.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a top plan view of a single reed switch having four pairs of cooperating contacts;

FIG. 2 is a side elevation of the structure of FIG. 1;

FIG. 3 is an isometric view of an electromagnetic relay including a reed switch as shown in FIGS. 1 and 2;

FIG. 4 is an isometric view of the structure of FIG. 3 shown in another position, or as seen from another angle;

FIG. 5 is an end view of the structure shown in FIGS. 3 and 4;

FIG. 6 is an isometric view of a relay support for supporting relays according to FIGS. 3—5 in stacked form;

FIG. 7 is an isometric view of a relay system, or relay block, including a plurality of relay supports as shown in FIG. 6; and

FIG. 8 is a front view of the front panel of the structure of FIG. 7.

DESCRIPTION OF PREFERRED EMBODIMENTS

The reed switch shown in FIGS. 1 and 2 includes four pairs of cooperating reeds 2,3 sealed-in in an envelope 1. Four terminals 9 project from envelope 1 to the right, and four terminals 11 project from envelope 1 to the left.

The electromagnetic relay shown in FIGS. 3—5, inclusive, includes a reed switch as shown in FIGS. 1 and 2. This relay further includes a magnetic flux-carrying plate 4, and two substantially channel-shaped flux-carrying members 5,6 arranged at opposite ends of plate 4. As best shown in FIG. 5 the flange portions of members 5,6 are bent 90° into the plane defined by plate 4 and abut against plate 4. The aforementioned flux-carrying members 5,6 loop around the ends of the envelope 1 of a reed switch as shown in FIGS. 1 and 2. The center portion of the reed switch is surrounded by tubular coil support 8 on which the energizing coil or energizing winding 7 is mounted.

The flange portions of coil support 8 define groovelike recesses supporting conductor bars 10 and 12. The contact terminals 9 of the reed switch are conductively connected to the right ends of the four conductor bars 10 as clearly shown in FIGS. 3 and 4. Thus conductor bars 10 form extensions of contact terminals 9 located at the left side of the relay rather than at the right side thereof. The conductor bars 12 form winding terminals for coil or winding 7. Thus all terminals of the relay are situated on the left side thereof, i.e. terminals 10,11 and 12 are situated at the left side of the relay.

Referring now to FIG. 6, this FIG. shows a pair of parallel spaced relay supports 13,14 intended to support ten stacked electromagnetic relays according to FIGS. 3—5 FIG. 6 shows a relay arranged at the bottom of supports 13,14 and a relay arranged at the top of supports 13,14. The intervening space intended to accommodate eight additional stacked reed relays has been left empty for reasons of greater clarity.

Relay supports 13,14 are substantially channel-shaped and provide boxlike receptacle means 15 for receiving opposite sides of the stacked reed relays. The flange portions of channel-shaped supports 13,14 define relay-receiving recesses, or slots, engaged by the flux-carrying relay plates 4, as clearly shown in FIG. 6. The web portion of the left channel-shaped relay support 13 is perforated as indicated at 16. The perforations 16 are intended for the passage of terminals 10,11,12 through the web portion of relay support 13. The upper or end surfaces of relay supports 13,14 are provided with indexing means 25,26 for properly positioning relay supports 13,14 in a frame structure intended to receive a plurality of such relay supports with reed relays stacked therein.

Such a frame structure has been shown in FIG. 7. The frame structure of FIG. 7 has a front panel 17 including two spaced layers of printed circuitry. The front panel 17 is further provided with holes or perforations 18 intended for the passage of the terminals 10,11,12 of the above described reed relays.

Plates 21,22 having angular flanges secured to the front panel 17 extend rearwardly from the latter and form the sides of the relay system, or relay block. The rear of the frame structure for receiving parts 13,14 is formed by vertical strips 23,24 spaced in such a fashion that parts 13,14 may be inserted into the gaps of the frame structure formed between contiguous strips 23,24. When parts 23,24 are inserted into their frame structure the indexing means 25 and 26 thereof engage cooperating indexing means 27,28 in plate 21 of the frame structure. In the particular embodiment of the invention shown in FIGS. 6 and 7 indexing means 25,26 are formed by projections on parts 13,14 and indexing means 27,28 by cutouts in the top plate 21 aligned with, and conforming to the shape of, projections 25,26.

Reference numerals 29 and 30 have been applied to indicate horizontal locking bars engaging the upper ends and the lower ends of parts 13,14 and locking parts 13,14 in position inside the frame structure thereof.

The front panel 17 is provided along its four boundary edges with terminal tabs 33 arranged in the general plane of panel 17, thus making it possible to connect the relay system, or relay block, conveniently with other equipment, wherever the latter may be arranged relative to the relay system, or relay block.

Referring now to FIG. 8 showing a portion of front panel 17, the latter is formed by a pair of superimposed plates 19,20 of a synthetic resin which are cemented together at the interface thereof. Plate 19 is provided on its front surface with a system of conductors extending substantially horizontally. Plate 20 is translucent so that the conductors on the front surface of plate 19 may be perceived through plate 20. The front surface of plate 20 is provided with a system of conductors extending substantially vertically. Plate 20 is provided at certain points thereof with cutouts 20′ exposing to view and giving access to the conductors or printed circuitry on the front surface of plate 19. The perforations 18 in plate 19 intended for the passage of terminals 10,11,12 to be soldered to the conductors or printed circuitry on the front of plate 19 are situated within the areas of cutouts 20′.

We claim:

1. A relay system including in combination:

a. a plurality of electromagnetic reed relays superimposed to form stacks of reed relays;

b. pairs of spaced-parallel relay supports, each of said pairs of relay supports being arranged on opposite sides of one of said stacks of reed relays supporting the constituent relays of said one of said stacks of reed relays, and each of said pairs of relay supports being provided with indexing means; and

c. a frame structure for said pairs of relay supports, said frame structure having a front panel provided with systems of conductors and said frame structure further having indexing means cooperating with said indexing means on said pairs of relay supports for positioning said pairs of relay supports relative to said frame structure.

2. A relay system as specified in claim 1 wherein said paris of relay supports are substantially channel-shaped and form boxlike receptacle means receiving opposite sides of stacks of reed relays, wherein the flange portions of said pairs of channel-shaped relay supports define relay receiving recesses and wherein the web portion of one of each said pairs of channel-shaped relay supports is perforated to provide passages for relay terminals.

3. A relay system as specified in claim 2 wherein said frame structure includes vertical bars arranged at the side thereof opposite said front panel and spaced to allow insertion of pairs of relay supports between contiguous vertical bars, and wherein said frame structure further includes horizontal crossbars for locking said pairs of relay supports into said frame structure.

4. A relay system as specified in claim 1 wherein said systems of conductors include a pair of parallel-spaced conductors systems electrically insulated from each other by an insulating layer arranged between said pair of conductors systems.

5. A relay system as specified in claim 1 wherein said front panel is provided with connector tabs arranged in the general plane of said front panel along the periphery and close to the edges thereof.

6. A relay system including in combination

a. a plurality of stacks of electromagnetic reed relays each formed by a plurality of stacked reed relays, the contact terminals and the winding terminals of the constituent reed relays of each of said plurality of stacks being all arranged on one side of each of said plurality of stacks;

b. a plurality of pairs of spaced-parallel relay supports each arranged on opposite sides of one of said plurality of stacks of reed relays, each of said plurality of pairs of relay supports supporting the constituent reed relays of one of said plurality of stacks, one relay support of each of said plurality of pairs of relay supports defining a plurality of perforations and said contact terminals and said winding terminals of the constituent reed relays of each of said plurality of stacks projecting through said plurality of perforations in said one relay support of each of said plurality of pairs of relay supports, and each of said plurality of pairs of relay supports being provided with indexing means; and

c. a frame structure for said plurality of pairs of relay supports, said frame structure having a multiperforated front panel provided with systems of conductors for establishing electrical connections including said contact terminals and said winding terminals of each of said plurality of stacks, and said frame structure further having indexing means cooperating with said indexing means on each of said plurality of pairs of relay supports for positioning each of said plurality of pairs of relay supports relative to said frame structure.