Feb. 21, 1956 T. J. OBSZARNY 2,735,994

TERMINAL BLOCK FOR HERMETICALLY SEALED RELAY

Filed April 9, 1951

FIG. 1.

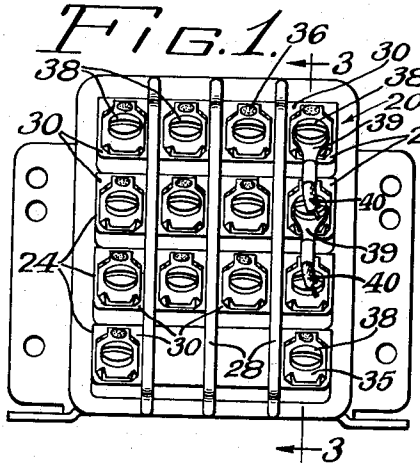


FIG. 2.

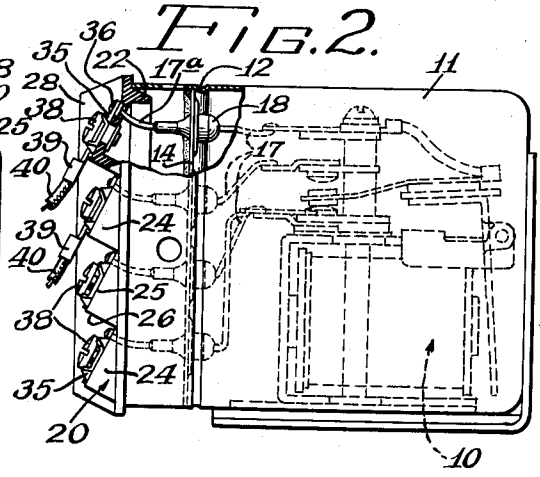


FIG. 4.

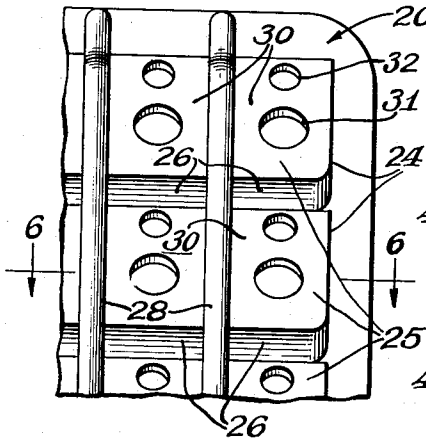


FIG. 3.

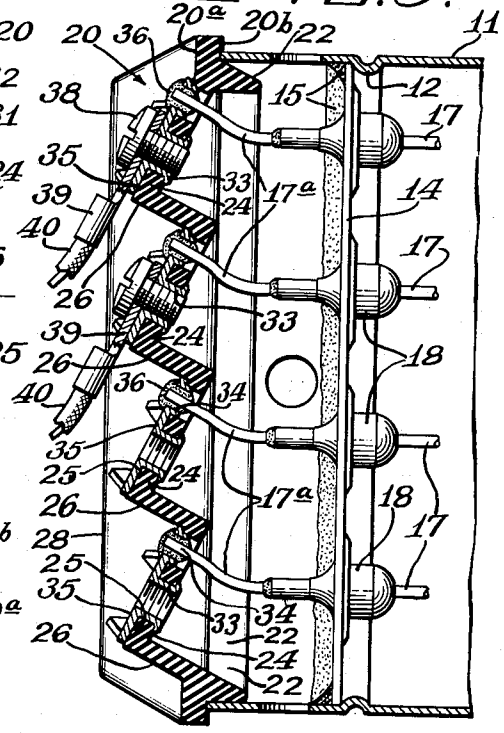


FIG. 5.

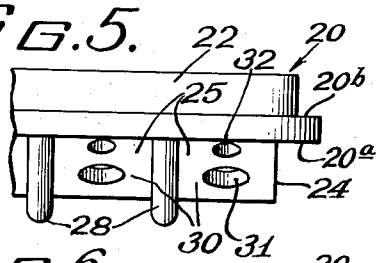
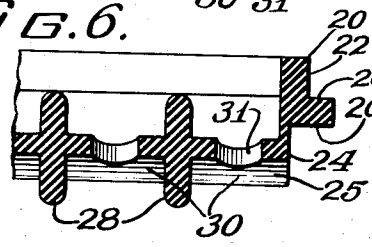


FIG. 6.



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TERMINAL BLOCK FOR HERMETICALLY SEALED RELAY

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Application April 9, 1951, Serial No. 219,921

3 Claims. (Cl. 339—198)

This invention relates to terminal blocks or terminal panels especially adaptable for use in conjunction with hermetically sealed, electro-magnetic relays. It is to be understood, however, that the present invention may also be advantageously employed in conjunction with relays of the unsealed type.

As is well known, in connection with present day aircraft, both military and commercial, it is of extremely great importance that the electro-magnetic relays that are employed for controlling the actuation of various instruments and devices, be hermetically sealed. Sealed relay components insure proper and satisfactory operation of the relays under a wide range of varying conditions of operation of the aircraft, such as for example at various altitudes, under wide ranges of humidity conditions, as well as under wide temperature ranges. The matter of space allocated to various instruments and control apparatus on aircraft is an extremely important factor in aircraft design, and hence it is important that such relays should be of relatively compact form so as to occupy a minimum amount of space.

The limited amount of space provided in aircraft for controls and the like, has resulted in the production of relay components, enclosed within the hermetically sealed cases of minimum dimensions. Due to such dimensional limitations, the terminal blocks or terminal panels employed in conjunction with such relays have been designed with a view to obtaining a proper mounting for the maximum number of sets of pole contacts. In such relays of the class herein referred to, it heretofore has been possible to provide space for only a maximum of three sets of terminals on the terminal blocks, for such pole contacts.

It is a primary object of this invention to provide a novel form of terminal block, for electro-magnetic relays, which is constructed and arranged so as to permit accommodating within limited space dimensions, as heretofore determined, a greater number of sets of terminals, for pole contacts, than has ever been possible.

Another object is to provide a novel terminal block which affords maximum convenience, and effects substantial saving of time, in attaching conductor wires to the terminals of the terminal block.

A further object is to provide a novel form of terminal block which is constructed and arranged so as to provide a greater number of terminal mounting faces per unit of area than has heretofore been possible, while at the same time providing adequate insulation space between adjacent terminals.

Other objects and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing, in which:

Figure 1 is a face view of a relay assembly provided with a terminal block embodying the present invention;

Figure 2 is a view of the relay assembly in side elevation with certain portions broken away and parts being shown in section;

Figure 3 is an enlarged sectional view through the

outer end of the relay assembly and through my novel terminal block, and taken substantially as indicated at line 3—3 on Figure 1;

Figure 4 is an enlarged, fragmentary face view of the novel terminal block, before attachment of the terminal elements thereto;

Figure 5 is a fragmentary end elevational view of the terminal block, looking down from the top of Figure 4, and

Figure 6 is a fragmentary sectional view through the terminal block, taken substantially as indicated at line 6—6 on Figure 4.

The relay assembly as illustrated in the drawing is of hermetically sealed type, and as represented in Figures 1 and 2 of the drawing, is shown at a scale corresponding to full size scale of the actual device. As shown in the drawing, the relay structure per se, which is indicated in Figure 2 in dotted lines at **10**, is completely enclosed in a cup-shaped housing or case **11**, formed of sheet metal. The case, adjacent the open end, is formed with an internal bead or shoulder **12** against which is seated a bulkhead **14** in the nature of a metal partition wall, the peripheral edges of which are sealed to the inner wall of the case by solder, as indicated at **15**. It is to be understood that the bulkhead is provided with a suitable fitting, not shown, by virtue of which the chamber in the case, below the bulkhead **14**, may be conveniently evacuated, and then subsequently filled, if desired, with an inert, non-inflammable gas, such as nitrogen, and the fitting is then sealed off so that the operating parts of the relay proper, at all times, are capable of proper functioning under various conditions of operation as above referred to.

It is to be understood that the relay enclosed within the case **11** is provided with four sets of pole contacts, as well as terminal contacts for supplying of energy from a source of power to the coil of the relay. Extending from such contacts and terminals are separate conductor wires, indicated generally at **17** which extend through glass bead type seal elements indicated at **18** mounted in the bulkhead or partition wall **14** and which are solder-sealed with respect thereto, and the conductor wires in a conventional manner, with the outer or free end portions of the wires, as indicated at **17*a***, projecting outwardly beyond the sealing beads.

The terminal portions **17*a*** of the conductor wires, leading from the interior of the case **11** are usually solder connected to terminal lugs on a terminal block. Heretofore, due to dimensional limitations, as above referred to, it has been possible only to construct and arrange the terminal block to provide terminal lugs for a maximum of three sets of pole contacts, in addition to two terminal lugs for supplying energy to the coil of the relay. By virtue of the novel construction of the terminal block, embodying the present invention, it is now, for the first time possible to provide terminal lugs for four sets of pole contacts, in addition to the two terminal lugs for supplying of energy to the relay coil.

The novel terminal block indicated at **20** is molded of suitable material possessing electrical insulating characteristics, and is formed on the underside with a peripheral depending flange **22**, to provide for a snug telescopic fit within the open end of the case **11**. The terminal blocks as heretofore produced for relays of the type here involved, are formed so that the conductor wires **17*a*** extend through apertures formed in the terminal block and are solder connected to suitable terminal lugs on the block. Such lugs are so formed as to provide for attachment thereof to terminal elements on the ends of the conductor wires of the electrical circuits to be controlled by the relay.

The terminal block, as may be seen in the drawing, is formed with four substantially parallel embossments **24**, each having a main mounting face or surface, indicated generally at **25**, disposed at an inclined angle with respect to the main planes, indicated at **20***a* and **20***b*, of the block proper. Each of the embossments **24** include contiguous surfaces, indicated at **26**, which extend toward the main planes of the terminal block at an angle approximately normal to the inclined surfaces **25**. By virtue of this construction, the embossments **24** provide four sets of terminal lug mounting faces, arranged in stepped relation to each other, in a generally saw-tooth pattern, as may be seen in Figure 3 of the drawing.

Extending transversely of the sets of embossments **24** are a plurality of parallel, paced-apart ribs **28**, projecting outwardly beyond said embossments as clearly seen in the drawing. Said ribs serve to separate the main mounting surfaces **25** of each of the embossments, into four individual terminal lug mounting areas, indicated at **30**. Each of these individual terminal lug mounting areas which are to be utilized, are provided with a pair of apertures **31** and **32** for the reception of tubular sleeve members **33** and **34** of a terminal lug **35**. The free end of the tubular sleeve **33** of the terminal lug, is rolled outwardly against the underside of the wall of the embossment **24**, to permanently anchor the terminal lug **35** in place. The end portion **17***a* of the conductor wires, leading from the interior of the case, extend through the tubular portions **34** of the terminal lugs and are firmly anchored in position by a mass of solder, as indicated at **36**. By virtue of such connections of the terminal portion **17***a* of the conductor wires, the terminal block assembly in thus firmly secured in place on the open end of the case **11**.

The interior of the tubular portion **33** of the terminal lugs is threaded for the reception of screws **38**, for securing the terminal elements **39**, of the conductor wires **40**, rigidly to the terminal lugs on the terminal mounting areas of the terminal block **20**.

It will be noted that by virtue of the ribs **28** the individual terminal mounting areas **30**, of each of the embossments, are separated into individual areas, and the ribs serve to insure providing adequate air gap between two adjacent terminals to avoid possible short-circuiting. By virtue of the offset or stepped relationship of the various sets of terminal mounting areas, the matter of securing of conductor wires to the various terminal lugs may be efficiently and expeditiously accomplished, resulting in substantial saving of time. Furthermore, the arrangement permits such conductor wires to be arranged in a suitable harness to further expedite attachment to the terminal lugs of the terminal block.

The terminal lugs, as disclosed herein, constitute the subject matter disclosed and claimed in my co-pending application Serial No. 219,922, filed April 9, 1951, now Patent No. 2,701,870, dated February 8, 1955.

Although I have herein shown and described a preferred embodiment of my invention, manifestly it is capable of modification without departing from the spirit and scope thereof. I do not, therefore, wish to be understood as limiting this invention to the precise form herein disclosed, except as I may be so limited by the appended claims.

I claim as my invention:

1. A molded terminal block formed of material possessing electrical insulating characteristics, said block having a plurality of spaced apart parallel rows of embossments, each embossment having a surface disposed at an inclined angle to the main planes of the block, said embossment being arranged with their inclined surfaces disposed in parallel spaced apart stepped relation, and a plurality of parallel, spaced apart ribs extending between adjacent parallel rows of embossments projecting outwardly beyond said embossments to separate said parallel rows into a plurality of individual, apertured, terminal mounting areas.

2. A molded terminal block formed of material possessing electrical insulating characteristics, said block having a plurality of spaced apart parallel rows of embossments, each embossment having a surface disposed at an inclined angle to the main planes of the block, each row of inclined surfaces providing a single row of closely spaced apart, apertured terminal mounting areas, each embossment having an end surface contiguous with and disposed substantially normal to the inclined surface of each embossment, and a plurality of parallel, spaced apart ribs extending between adjacent parallel rows of embossments and projecting outwardly beyond said embossments to separate the adjacent inclined surfaces of the embossments of each of said parallel rows into a plurality of individual, apertured, terminal mounting areas.

3. A molded terminal block formed of material possessing electrical insulating characteristics, said block having a plurality of spaced apart sets of embossments, each set comprising a main surface having a single row of closely spaced apart terminal mounting areas, each of said areas being disposed at an inclined angle to the main planes of the block and being formed with a pair of apertures for receiving separate portions of a terminal lug for connection to conductor wires disposed at opposite sides of the block and a plurality of parallel, spaced apart ribs extending between adjacent sets of embossments and projecting outwardly beyond said embossments to separate the adjacent main surfaces of said sets of embossments into a plurality of parallel rows of individual, apertured, terminal mounting areas.

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