March 9, 1954 E. L. HADDEN ET AL 2,671,888

TERMINAL BLOCK AND COVER ASSEMBLY

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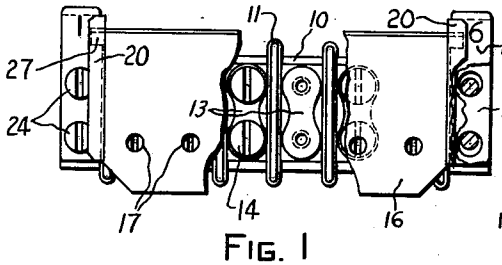



FIG. 1

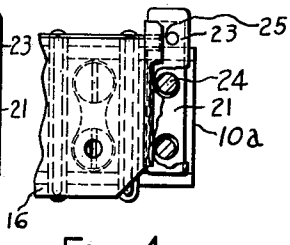



FIG. 4

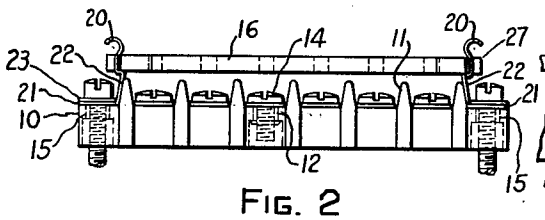



FIG. 2

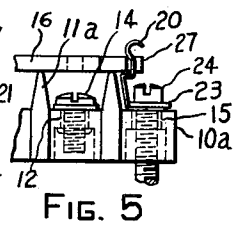



FIG. 5

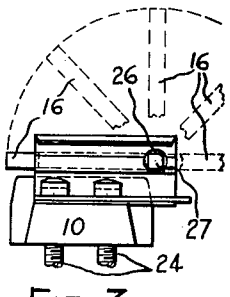



FIG. 3

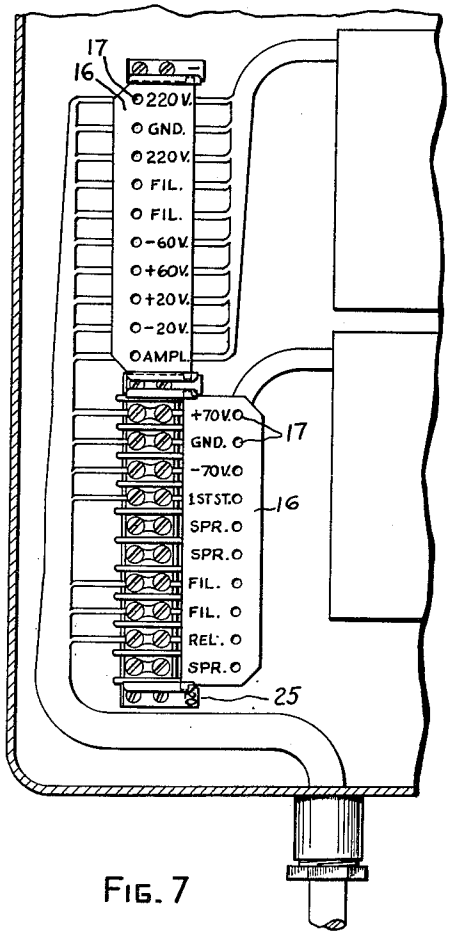



FIG. 7

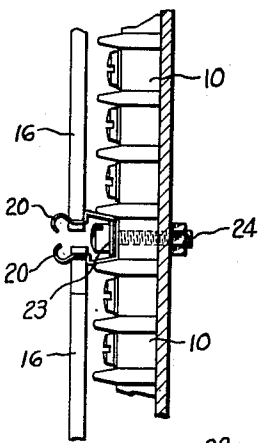



FIG. 8

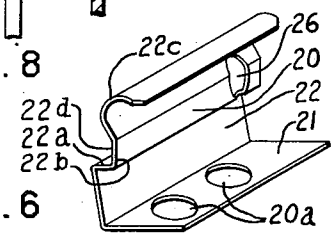



FIG. 6

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## TERMINAL BLOCK AND COVER ASSEMBLY

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6 Claims. (Cl. 339—198)

1

The present invention relates to terminal boards capable of being mounted in close or confined quarters and which permit convenient access to the terminals for either the interconnection of two or more conductors or for circuit testing purposes. In its more specific aspects the invention concerns improvements in a terminal-board hinged-cover assembly, useful in radar panel controls and other applications wherein space requirements are at a premium, and it has for a primary objective the construction of a simple yet sturdy terminal strip and cover assembly constructed of a minimum number of parts, and in which the cover element is readily operable at all times and safely protects and guards the electrical terminals and leads when in closed position. Another aim of the invention is to render available a terminal block assembly in which the cover element is self locking when moved to closed position and is held captive and steady when in a partially open or fully open position to the end of providing an assembly that not only is substantially vibrationless and silent when in use but which has a "solid" quality of operation that connotes confidence in the installation and the use thereof.

Still a further aim of the invention is the construction of a terminal block and cover assembly in which the movable cover member is devoid of metal elements likely to cause "shorts" of adjacent terminals or with the mechanics tools as connections are made or tested, and in which the cover mounting permits the cover to lie relatively close to the terminals so that it is possible to use test prods having short needles. By way of additional refinement the invention proposes a cover mounting comprising a single pair of spring clips, each adapted to interengage with opposite ends of the cover and to interlock therewith along substantially the entire width of the ends, but which nevertheless permits the cover conveniently to be rotated about a longitudinal axis completely to expose (or uncover) the terminal elements.

Another aim of the invention is to provide a cover and cover mounting means, particularly useful with a terminal strip having two or more transversely extending barrier elements, which may be secured to the terminal strip not alone at the ends thereof but, if desired, between adjacent sets of barriers so that a relatively long terminal strip may be divided into selected groups or banks of terminals and each provided with individually operable covers.

In realizing the aims of the invention it is proposed to construct the cover member from a sheet

2

of relatively hard resinous or plastic compound that possesses satisfactory insulating properties and to give the cover a shape approximating the length and width of the terminal block with which it is to be used. One longitudinal edge of the cover is constructed as the pivotal axis, and this one edge carries projecting hinge pins, preferably integral with the cover. At the desired location on the terminal block, left and right handed cover-supporting spring clips are mounted, each clip having an opening therein to receive one of the hinge pins of the cover. The spring clips are mounted crosswise the terminal strip proper and are substantially L-shaped in vertical section. The upstanding leg of each clip is preferably provided with an offset portion parallel its base that is designed to partially surround the end edge of the cover for its full width when the cover is in closed position. The offset in each clip preferably extends beyond the hinge pivot axis so that the cover again becomes pocketed in the offset upon being revolved from its closed to its fully opened position. In all intermediate positions, the upper portions of the pair of spring clips cramp on the cover in an endwise direction so that the cover is frictionally retained in the position to which it is affirmatively moved. The arrangement is such that the cover element is under spring pressure continuously and accordingly will not accidently close and interfere or annoy the mechanic when making connections, regardless of the position in space that the assembly is mounted.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawings.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which—

Figures 1, 2, and 3 are respectively plan, front and end views of a terminal strip and cover-assembly embodying this invention.

Figures 4 and 5 are plan and front views of portions of a terminal strip assembly of another size.

Figure 6 is a detail view of a disassembled cover clip.

Figure 7 is a representative installation assem-

bly of the terminal strip of this invention illustrating two cover elements, one closed and the other open.

Figure 8 is an enlarged side view of a portion of the strip represented in Figure 7, more clearly illustrating the positions of the mounting clip for tandem arranged cover elements.

Referring more particularly to Figures 1–3 the terminal strip illustrated is formed with an elongated base portion 10, of hard rubber, Bakelite, or functionally similar material, which has a series of transversely extending, spaced apart, barrier fins 11 integral therewith. Between pairs of barrier fins 11, the base 10 is formed with spaced pairs of openings adapted to receive threaded sleeves 12 that depend from metallic terminal plates 13. The openings in the under side of the base are preferably slightly enlarged so that the ends of the terminal plate sleeves may be swaged over and thereby firmly anchored to the base. Terminal screws 14 are threaded into the sleeves and by means of which interconnecting of circuits is conveniently made.

The end pair of holes 15 of a strip of any given length will usually not be provided with sleeved plates and are used for mounting the terminal strip to a control board panel, or the like, as indicated in Figures 2 and 8.

The cover 16 for the terminal strip comprises an elongated sheet of a rigid insulation material of a width slightly wider than the width of the base so that not only are the terminals 14 effectively covered but also the adjacent end portions of the lead wires that are connected therewith. When desired the cover 16 may be provided with one or more holes 17, in registry with the terminal elements, through which a test needle may be inserted.

In accordance with this invention the cover 16 is supported in overlying relation with the terminals of the strip by means of a pair of resilient end clips 20, each of which is generally L-shaped and has a base 21 and upstanding section 22. Each clip 20 is mounted crosswise the base 10 and is provided with two holes 20*a* located on centers more separated than the end holes in a small size terminal strip but less than the spacing of the end holes in a larger size terminal strip so that a set of clips of a given size may be mounted upon any one of a range of sizes of terminal strips. The size of the mounting holes in the clips will preferably be larger than the mounting screws, or they may be elongated, so as to straddle the range of the mounting holes in the bases of a range of terminal strip sizes. A double washer 23 may be placed over the base portions 21 of the cover clips before the mounting screws 24 are inserted. If desired the double washers 23 may be in the form of a strip and have one end marked, as at 25 in Figure 4 in a manner, for example, indicating the number of a particular terminal strip or a particular bank of circuits.

The upstanding section 22 of each of the L-shaped clips 20 is provided with a ledge 22*a* formed by bending the spring stock approximately 90° from the plane of the upright portion and then again bending the stock as at 22*b* upwardly and over and terminating in a reverse curve 22*c* similar to the top of an S. The final shape, as viewed from its end, is not unlike the form taken by an S connected to the top of an L. The channel 22*d* thereby formed extends the full width of the clip 20 and is deep enough partially to surround the end of the cover 16 for its full width as illustrated in Figure 1. Preferably the ledge portion 22*a* is formed to extend slightly beyond a vertical projection of the inner face of the curved top bead 22*c*.

The channeled portion 22*d* of each of the clips is pierced, as at 26, near its end to receive a pivot pin 27 that is carried at each end of the cover 16. Preferably the pivot pins 27 are integral with the cover member and form a continuation or extension of one of its longitudinal edges. Being integral with the cover, which is of a hard insulating material, metallic elements and other fastening devices are eliminated from both ends of the cover and the whole end width of the cover when in closed position is pocketed and held captive in the channels 22*d* in the clips, except the pintle portions 27 that extend through the pivot holes 26 in the clips.

When the device is assembled and mounted, the spring clips are spring tensioned toward each other and impinge upon the ends of the cover. This impinging action exists in all positions to which the cover may be rotated about the longitudinal axis of the pivot pins 27 by reason of the continuous inwardly pressing action of the whole length of the overlying bead 22*c* on the end edges of the cover. The pressing action progresses along the end edges of the cover as the cover is opened, from the outer edge toward the pivot, and if the cover is rotated approximately 180° it becomes again partially enveloped by the channeled portion 22*d* that extends rearwardly beyond the pivotal axis.

If desired the cover may be made slightly wider than the width of the terminal strip and mounted so that its free edge extends beyond the strip proper to provide a convenient lip for raising. It will be apparent also that the absence of separate metal hinge pivots mounted on the face of the cover and overlying the terminals not only eliminates hazards of shorting one or more circuits, but leaves the entire face of the cover clear for applying circuit identifying data opposite each terminal bar, as Battery, Antenna, etc. Such identifying data may, in the instant embodiment of the invention, be placed upon both sides of the cover so that the various circuits may be identified when the cover is open as well as when closed.

It will also be observed that the cover mounting of this invention is such as to admit of mounting one or more spring clips 20 between the barrier elements of a conventional terminal strip, by superposing and oppositely facing two of the spring clips at one location, as shown more clearly in Figure 8. With such an arrangement the length of the covers may be made to suit the number of terminals to be grouped under a given cover section and each is capable of independent operation without interference with the adjacent covers.

In the embodiment shown in Figures 4 and 5, the structure of the cover and its mounting means is identical with that previously described, but the elements 16 and 20 have been applied to a larger size terminal strip 10*a*. When used in this manner a cover proper may rest throughout its length upon the tops of the barrier elements 11*a* and thereby lifted slightly off the ledge 22*a* of the spring clips. The upper beadings 22*c*, however, partially overlap the top of the cover and applies a clamping force across each end edge thereof to firmly, yet releasably, hold the cover in place. In this construction also, the cover is held captive by the pressing—

in action of the mounting clips in all angular positions to which it is affirmatively moved.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention and, therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, we claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of the United States:

1. In a terminal strip and cover assembly an elongated base member adapted to support a plurality of pairs of electrical terminal elements, an elongated cover member adapted when in closed position to overlay said terminal elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising coaxially aligned pintle pins extending from the end faces of the cover adjacent one longitudinal edge thereof, and an L-shaped spring element carried by the base member at each end of the cover and each formed with an opening in which is received one of the pintle pins of the cover, said spring elements being mounted crosswise the base and having their inwardly directed faces tensioned toward the cover so as to impinge upon the respective end faces of the cover member whereby the latter is frictionally constrained in all positions of angular adjustment about its longitudinal pivotal axis.

2. In a terminal strip and cover assembly an elongated base member adapted to support a plurality of pairs of electrical terminal elements, an elongated cover member adapted when in closed position to overlie said terminal elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising coaxially aligned pintle pins integral with the cover and extending from the end faces thereof, and an L-shaped spring element carried by the base member at each end of the cover and each being formed with an opening therein in which is received one of said pintle pins, said spring elements being mounted crosswise the base and having their inwardly directed faces tensioned toward cover so as to impinge upon the respective end faces of the cover member, and at least one of said L-shaped elements having a channel formed in the face thereof adjacent the cover end to receive and partially envelope the said end of the cover when the latter is in closed position.

3. A terminal strip and cover assembly comprising an elongated base member formed of insulating material and mounting a plurality of pairs of electrical terminal elements, and said base member having barrier elements projecting from said face at opposite sides of each pair of terminal elements, an elongated movable cover member adapted when in closed position to overlay said terminal elements and the tops of the barrier elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising integrally formed aligned pintle pins extending from the ends of the cover and resilient means carried by said base member at the ends of the cover member, said resilient means comprising a pair of L-shaped spring elements each having an opening therein in which is received one of said pintle pins, and said spring elements having their inwardly directed faces tensioned toward the associated end faces of the cover member whereby the cover is frictionally constrained by the pair of spring elements against movement, and at least one of said spring elements being formed with a channel adapted yieldingly to receive and partially surround the end portion of the cover.

4. A terminal strip and cover assembly comprising an elongated base member formed of insulating material and mounting a plurality of pairs of electrical terminal elements, and said base member having barrier elements projecting from said face at opposite sides of each pair of terminal elements, an elongated movable cover member adapted when in closed position to overlie said terminal elements and the tops of the barrier elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising coaxially aligned pintle pins adjacent one longitudinal edge of the cover and resilient supporting means carried by said base member, said resilient means comprising a pair of L-shaped spring elements each having their inwardly directed faces tensioned toward the associated end faces of the cover member whereby the latter is frictionally constrained between the pair of spring elements against movement, and at least one of said spring elements being formed with a ledge portion adapted to underlie the cover when the latter is in closed position.

5. A terminal strip and cover assembly comprising an elongated base member adapted to mount a plurality of pairs of electrical terminal elements, an elongated cover member adapted when in closed position to overlie said terminal elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising coaxially aligned pintle pins adjacent one longitudinal edge of the cover, and spring means carried by said base member for supporting said pintle pins, said spring means having their inwardly directed faces tensioned toward associated end faces of the cover member whereby the latter is frictionally held captive therebetween, and said spring means having a channel formed in the face thereof adjacent the end of the cover in which is received the full width of the end portion of the cover when the latter is in closed position over the terminal elements and with a portion of the width of the cover when the latter is revolved 180° from closed position and to impinge with captivating force upon the end face of the cover in all intermediate positions.

6. A terminal strip and cover assembly comprising an elongated base member adapted to mount a plurality of pairs of electrical terminal elements, an elongated cover member adapted when in closed position to overlie said terminal elements, means pivotally supporting said cover member for angular movement about an axis extending longitudinally thereof comprising coaxially aligned pintle pins adjacent one longitudinal edge of the cover and projecting from the end faces of the cover, and spring means carried by said base member and formed with openings located inwardly from the ends thereof in which are received the said pintle pins, said spring means having their inwardly directed faces tensioned toward associated end faces of the cover

member whereby the latter is frictionally held captive therebetween, and said spring means having channeled portions extending crosswise the base member to receive the end portion of the cover its full width when the latter is in closed position, and a portion of the width of the end portion of the cover when the latter is revolved 180° from closed position and to impinge with captivating force upon the end face of the cover in all intermediate positions.

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