

PATENT SPECIFICATION

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(54) IN-LINE AND EARTHING TERMINAL

(71) We, HEGO ELECTRIC G.M.B.H. of Spielhof 16, 8750 Glarus, Switzerland, a Swiss Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrical terminal blocks of the kind comprising an electrically insulating housing of generally slab-like form, in which are mounted electrical terminals. By "generally slab-like form", we mean that the housing has two parallel major side faces, and intervening narrow sides. The terminals are accessible at one or more of the narrow sides and the terminal blocks are mounted face to face with one another so as to form a terminal assembly. Such terminal blocks have become widely known and used, since they enable a large number and a wide variety of circuit connections to be made in a small space.

Hitherto, when a particular circuit or appliance has to be connected both to a power conductor and to earth or a neutral conductor, it has been necessary to use two separate terminal blocks, one provided with clamping terminals for connection of the power conductor, and the other provided with a special earthing clamp for connection to an earthing or neutral bus-bar. This increases the space required to accommodate the necessary connections and also increases this risk of an incorrect connection since two terminal blocks are required for one appliance or circuit.

The present invention resides in an electrical terminal block comprising an electrically insulating housing of generally slab-like form provided with a foot for mounting the terminal block, a first pair of electrically interconnected electrical terminals mounted in the housing and each accessible at a narrow side of the housing for connection of

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respective electrical conductors and a second pair of electrically interconnected electrical terminals mounted in the housing and each accessible at a narrow side of the housing for connection of respective electrical conductors, the second pair of interconnected terminals being disposed generally between the said foot and the first pair of interconnected terminals, and a terminal of the second pair being a clamp arranged and adapted to grip a bus-bar extending transversely relative to the slab-like housing.

In such a terminal block, the first pair of terminals can be used to make a power connection and the second pair of terminals in the same block can be used to make an earth or neutral connection.

Preferably, the clamp includes a movable jaw and a clamping screw for releasably exerting a clamping pressure on the jaw. In a particular convenient construction, the clamp comprises two movable jaws and an interconnecting bar disposed between the jaws in a first region thereof, a gap being provided between the jaws in a further region thereof for receiving the bus-bar, so that in use the clamping screw urges the jaws against both the bus-bar and the interconnecting bar, the latter connecting the jaws to the other terminal of the second pair.

The housing is preferably provided with a projecting insulating seat for receiving the bus-bar, which seat is preferably integral with the housing.

One convenient embodiment of the invention is shown by way of example in the accompanying drawing, in which:—

Figure 1 is a side view of a terminal block with a bus-bar clamped thereto; and

Figure 2 is a plan view of the terminal block shown in Figure 1.

The terminal block shown has an electrically insulating moulded plastics housing of generally slab-form. In the illustrated em-

bodiment, the housing has an integral foot 11 provided with a notch and a detent spring 12, by means of which it can be clipped onto a mounting rail 13 (Figure 2) with inwardly turned flanges. As can be seen in Figure 2, the major side surfaces of the housing are perpendicular to the rail 13, so that a multiplicity of terminal blocks each provided with generally slab-like housings can be mounted side by side on the same rail in well known manner.

Alternatively, the foot of the housing may be provided with a second notch instead of the spring, and/or may be adapted to engage a support rail with outwardly turned flanges. The foot illustrated can be used to mount the terminal block in an opening in a panel, instead of on a flanged rail. In a further arrangement, the foot may be adapted to mount the terminal block on a flat surface. All of these various mounting arrangements are well known.

One side face of the housing is provided with recesses accommodating electrical terminals; this face is visible in Figure 1. The other side face is completely closed to insulate the terminals from those of an adjacent block. To align and retain individual terminal blocks in an assembly of terminal blocks, the recessed side may be provided with locating sockets, and the closed side with corresponding locating pins for engaging the locating sockets of an adjacent terminal block.

The terminal block shown contains two pairs of terminals. The first pair of terminals, in the upper region of the housing, consist of clamping sleeves for embracing a common interconnecting bar and provided with a clamping screws 2. The clamping screws are accessible through the upper narrow side of the housing and each sleeve 4 is accessible through a respective narrow side of the housing for insertion of conductors to be interconnected. The clamping screws 2 serve to draw the sleeves 4 upwards when tightened, so as to clamp an inserted conductor against the bar 3. These terminals are used to connect power or signal-carrying conductors.

A second pair of terminals is provided between the first mentioned terminals and the foot of the housing. The second pair of terminals includes one terminal 5 consisting of a clamping sleeve and screw similar to those already described, associated with an interconnecting bar 6.

Any or all of the terminals mentioned so far may be replaced by other kinds of terminal if desired, for example plug-in terminals, solder tags, or crimping tags.

The other terminal of the second pair is a clamp comprising a pair of jaws 8 which, in the position shown, project from one narrow side of the housing so that they can

clamp between them an earthing or neutral bus-bar 10 extending perpendicular to the side faces of the housing, i.e. parallel to the support rail 13. The housing is provided with a projecting integral seat 9 which receives, locates and protects the bus-bar, which is nevertheless effectively outside the housing.

The projecting outer ends of the jaws are provided with serrations for gripping the bus-bar. Each jaw is a solid substantially rectangular bar of metal. The other ends of these bars have between them one end of the interconnecting bar 6, so that the clamp is connected to the terminal 5.

A sleeve or stirrup 7 of generally rectangular cross-section encircles the clamp jaw bars at an intermediate position of the latter, and a clamping screw 15 is threaded in a tapped hole in the wall of the sleeve 7. The clamp jaw bars are provided with recesses receiving the sleeve, so that the bars and sleeve are maintained in their correct relative positions. The sleeve is provided with a pair of fingers 14 perpendicular to the longitudinal directions of the jaw bars and the bar 6, these fingers adjoining the ends of respective clamp bars and being respectively above and below the connecting bar 6, so as to maintain the jaws and sleeve in the correct position on the interconnecting bar 6. The arrangement is such that, when the jaws are not clamping a bus-bar, the assembly consisting of the jaws, sleeve 7, and screw 13 can be slid along the interconnecting bar 6 between the illustrated position in which the jaws project from the housing, and a withdrawn position in which the bars are within the housing and therefore will not make contact with a bus-bar disposed in the seat 9. To permit access to the clamping screw in both of these positions, an elongate slot 15 is provided in the housing. Consequently, a conductor connected to the terminal 5 can be connected to or disconnected from the bus-bar 10, at will.

The terminal block may be provided with means for making a cross-connection from the upper pair of terminals to terminals of other blocks, and in particular the upper interconnecting bar 3 is provided with a central screw-threaded hole 16 to receive a pillar to which is attached a cross-connecting metal strip accommodated in a recessed region 17 of the housing.

WHAT WE CLAIM IS:—

1. An electrical terminal block comprising an electrically insulating housing of generally slab-like form provided with a foot for mounting the terminal block, a first pair of electrically interconnected electrical terminals mounted in the housing and each accessible at a narrow side of the housing for connection of respective electrical con-

bodiment, the housing has an integral foot 11 provided with a notch and a detent spring 12, by means of which it can be clipped onto a mounting rail 13 (Figure 2) with inwardly turned flanges. As can be seen in Figure 2, the major side surfaces of the housing are perpendicular to the rail 13, so that a multiplicity of terminal blocks each provided with generally slab-like housings can be mounted side by side on the same rail in well known manner.

Alternatively, the foot of the housing may be provided with a second notch instead of the spring, and/or may be adapted to engage a support rail with outwardly turned flanges. The foot illustrated can be used to mount the terminal block in an opening in a panel, instead of on a flanged rail. In a further arrangement, the foot may be adapted to mount the terminal block on a flat surface. All of these various mounting arrangements are well known.

One side face of the housing is provided with recesses accommodating electrical terminals; this face is visible in Figure 1. The other side face is completely closed to insulate the terminals from those of an adjacent block. To align and retain individual terminal blocks in an assembly of terminal blocks, the recessed side may be provided with locating sockets, and the closed side with corresponding locating pins for engaging the locating sockets of an adjacent terminal block.

The terminal block shown contains two pairs of terminals. The first pair of terminals, in the upper region of the housing, consist of clamping sleeves for embracing a common interconnecting bar and provided with a clamping screws 2. The clamping screws are accessible through the upper narrow side of the housing and each sleeve 4 is accessible through a respective narrow side of the housing for insertion of conductors to be interconnected. The clamping screws 2 serve to draw the sleeves 4 upwards when tightened, so as to clamp an inserted conductor against the bar 3. These terminals are used to connect power or signal-carrying conductors.

A second pair of terminals is provided between the first mentioned terminals and the foot of the housing. The second pair of terminals includes one terminal 5 consisting of a clamping sleeve and screw similar to those already described, associated with an interconnecting bar 6.

Any or all of the terminals mentioned so far may be replaced by other kinds of terminal if desired, for example plug-in terminals, solder tags, or crimping tags.

The other terminal of the second pair is a clamp comprising a pair of jaws 8 which, in the position shown, project from one narrow side of the housing so that they can

clamp between them an earthing or neutral bus-bar 10 extending perpendicular to the side faces of the housing, i.e. parallel to the support rail 13. The housing is provided with a projecting integral seat 9 which receives, locates and protects the bus-bar, which is nevertheless effectively outside the housing.

The projecting outer ends of the jaws are provided with serrations for gripping the bus-bar. Each jaw is a solid substantially rectangular bar of metal. The other ends of these bars have between them one end of the interconnecting bar 6, so that the clamp is connected to the terminal 5.

A sleeve or stirrup 7 of generally rectangular cross-section encircles the clamp jaw bars at an intermediate position of the latter, and a clamping screw 15 is threaded in a tapped hole in the wall of the sleeve 7. The clamp jaw bars are provided with recesses receiving the sleeve, so that the bars and sleeve are maintained in their correct relative positions. The sleeve is provided with a pair of fingers 14 perpendicular to the longitudinal directions of the jaw bars and the bar 6, these fingers adjoining the ends of respective clamp bars and being respectively above and below the connecting bar 6, so as to maintain the jaws and sleeve in the correct position on the interconnecting bar 6. The arrangement is such that, when the jaws are not clamping a bus-bar, the assembly consisting of the jaws, sleeve 7, and screw 13 can be slid along the interconnecting bar 6 between the illustrated position in which the jaws project from the housing, and a withdrawn position in which the bars are within the housing and therefore will not make contact with a bus-bar disposed in the seat 9. To permit access to the clamping screw in both of these positions, an elongate slot 15 is provided in the housing. Consequently, a conductor connected to the terminal 5 can be connected to or disconnected from the bus-bar 10, at will.

The terminal block may be provided with means for making a cross-connection from the upper pair of terminals to terminals of other blocks, and in particular the upper interconnecting bar 3 is provided with a central screw-threaded hole 16 to receive a pillar to which is attached a cross-connecting metal strip accommodated in a recessed region 17 of the housing.

WHAT WE CLAIM IS:—

1. An electrical terminal block comprising an electrically insulating housing of generally slab-like form provided with a foot for mounting the terminal block, a first pair of electrically interconnected electrical terminals mounted in the housing and each accessible at a narrow side of the housing for connection of respective electrical con-



ductors, and a second pair of electrically interconnected electrical terminals mounted in the housing and each accessible at a narrow side of the housing for connection of
 5 respective electrical conductors, the second pair of interconnected terminals being disposed generally between the said foot and the first pair of interconnected terminals and a terminal of the second pair being a clamp
 10 arranged and adapted to grip a bus-bar extending transversely relative to the slab-like housing.

2. A terminal block as claimed in Claim 1 in which the housing is provided with a projecting insulating seat for receiving a bus-bar clamped in the said clamp.
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3. A terminal block as claimed in Claim 2 in which the said projecting seat is integral with the housing.

4. A terminal block as claimed in Claim 1, 2 or 3 in which the foot is adapted to mount the terminal block on a flanged support rail.
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5. A terminal block as claimed in claim 1, 2, 3 or 4 in which the foot is adapted to mount the terminal block in an opening in a panel.
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6. A terminal block as claimed in any of Claims 1 to 3 in which the foot is adapted to mount the terminal block on a flat surface.
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7. A terminal block as claimed in any preceding claim in which the clamp includes

a movable jaw and a clamping screw for releasably exerting a clamping pressure on
 35 the said jaw.

8. A terminal block as claimed in Claim 7 in which the clamp comprises two movable jaws, and an interconnecting bar disposed between the jaws in a first region
 40 thereof, a gap being provided between the jaws in a further region thereof for receiving the bus-bar, whereby the clamping screw will urge the jaws, in use, against the bus-bar and the interconnecting bar, the latter
 45 connecting the jaws to the other terminal of the second pair.

9. A terminal block as claimed in Claim 8 in which a clamping sleeve embraces the jaws and interconnecting bar and the screw
 50 is threaded in the wall of the sleeve.

10. A terminal block as claimed in any preceding claim wherein the clamp is movable between a position in which it projects from the housing for engagement with
 55 a bus-bar, and a position in which it is withdrawn into the housing.

11. An electrical terminal block substantially as herein described with reference to the accompanying drawing.
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