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D. ELLIS ET AL

2,361,184

PANEL MOUNTING

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Fig. 1.

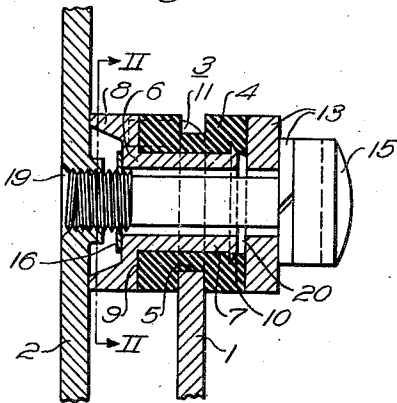


Fig. 2.

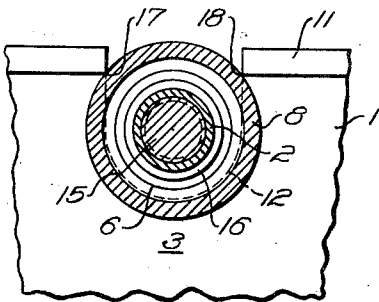
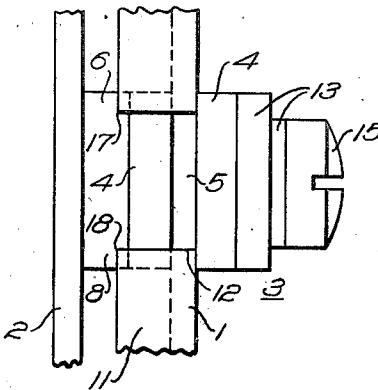


Fig. 3.



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PANEL MOUNTING

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2 Claims. (Cl. 248—358)

Our invention relates to a resilient mounting and, more particularly, to an improved mounting for securing an electrical circuit control mechanism to a suitable support, such as a panel box or housing.

Electrical circuit control devices are commonly assembled as a unit in the shop on a plate-like member and thereafter shipped to customers who mount the unit on a panel-board or the back surface of a panel box which has previously been secured in position. It is, of course, desirable that the means for mounting the control unit in position be easily handled in order to facilitate not only the mounting of the unit but also its removal for repair or replacement. In addition, it is desirable that the mounting means be effective to prevent transmission of noise and vibration from the control unit to its support and from the support to the control unit. It is also desirable that the mounting means be compact to conserve space.

One of the principal objects of our invention is to provide an improved form of device for mounting a circuit control unit on a suitable support, such as a panelboard, which will be effective to insulate the support from the noise and vibration caused by operation of the unit and to insulate the unit from the vibrations of the support.

A further object of our invention is to provide a mounting of the character mentioned which will occupy a minimum of space and which may be readily handled with a minimum of effort to effect mounting and removal of the unit from its support.

A further object of our invention is to provide a mounting of the character mentioned which can be assembled in position with respect to the control unit prior to the mounting of the unit in position on a support.

Other objects and advantages of our invention will become apparent from a study of the following specification and the accompanying drawing, in which:

Figure 1 is a vertical sectional view of a mounting constructed in accordance with the principles of our invention;

Fig. 2 is a sectional view taken substantially on the section line II—II of Fig. 1; and

Fig. 3 is a plan view of the part shown in Fig. 1.

Reference numeral 1 designates a plate upon which an electric device is mounted, usually rigidly, and this plate is mounted on base 2 by a plurality of mounting structures generally designated by numeral 3. Only one of these structures

need be described in detail since they are all alike.

The mounting structure 3 comprises a generally cylindrical bushing or sleeve 4 of resilient material as rubber, neoprene, or some similar rubber-like material. The sleeve 4 has a circumferential groove 5 preferably at its mid-portion and preferably having a depth in the neighborhood of half the radial thickness of the sleeve 4.

Numerals 6 designates a generally cylindrical relatively stiff metallic ferrule or sleeve having a right-hand end portion 7 with an outside diameter slightly larger than the inside diameter of the sleeve 4 and having an axial length somewhat less than the normal axial length of the sleeve 4. This ferrule has an enlarged left-hand end 8 having an outside diameter substantially equal to the outside diameter of the ends of the sleeve. The end 8 has any suitable axial length and has its central portion at the left reamed out for an axial depth less than the axial length of the enlarged end 8. The diameter chosen for the reamed out portion is such that an annular end at the left of the ferrule of sufficient rigidity for the desired purposes is retained. Preferably the inside diameter of the ferrule at the left may be about equal to its outside diameter at the right.

This left hand or thickened portion of the ferrule need not be an integral part of the ferrule as shown but may be a separate annular member in the nature of a cup-shaped washer.

The right-hand end of the thickened portion 8 of ferrule 6 terminates in a ledge 9, the surface of which falls in a plane normal to the axis of the ferrule. This ledge 9 thus forms a surface against which the left-hand end of sleeve 4, when assembled as shown, rests. The right-hand end of the ferrule is provided with an annular projection 10 as shown.

The plate 1 has a portion 11 at its edges bent at right angles to the plane of the plate to give it strength. A U-shaped notch 12 is cut in the plate at its edge, as shown. The distance between the legs of the U is chosen to be substantially equal to the outside diameter of the sleeve at the base of the groove and the bight of the U has a diameter of a corresponding dimension so that the sleeve at the groove may fit snugly in the bight of the U.

In assembling the structure the sleeve 4 is first placed in position. Its resilient character permits it to be forced into place. The ferrule 6 is then inserted and, since its outside diameter at the right is slightly larger than the inside diameter of the sleeve, a snug fit is provided. Wash-

ers 13 are then placed in positions and the bolt 15, having a quite loose fit in the ferrule, is then inserted and the washer 16 is threaded onto the end of the bolt to hold all the parts together. Thus assembled the parts may be shipped or otherwise handled without danger of having the parts become disassembled. This is all the more certain because the corners 17 and 18 of the portion 11 of plate 1 bent at right angles thereto engage the outside diameters of sleeve 4 and the thickened end 8 of the ferrule 6.

The base 2 is provided with an opening 19. Since the base is usually of thin material, the opening is swaged out as shown to give it greater axial length and thus providing more strength, conserving space, and providing more threads to receive the threaded end of bolt 15. When plate 1 is to be mounted on the base, the bolt 15 is screwed into the opening by an amount to take up the space 20. The sleeve 4 is thus compressed axially and thus firmly grips the plate 1 at the edges of the U-shaped notch. At the same time the annular left-hand end portion 8 of ferrule 6 engages the base 2 at some radial distance from the hole 19 thus in no way causing any injury or distortion of the base in the region of the hole.

The ferrule 6 upon insertion into the resilient sleeve 4 expands it to some extent and further the annular projection 10 embeds itself in the sleeve as shown in Fig. 1 and effects a further expansion of the sleeve at its right end thus at the side of plate remotest from base 2.

If during shipment, or other handling, of plate 1 with the devices attached thereto, the assembly is struck in such manner that the axial alignment of the ferrule and sleeve is disturbed, the annular projection 10 will function to compress the rubber intermediate the projection 10 and the plate 1. The resiliency of the compressed rubber is thus effective to restore the alignment of the parts as soon as the force causing the disalignment is removed.

In the event the bolt 15 becomes separated from the assembly, the ferrule 6 and sleeve 4 will nevertheless remain in firm position on plate 1. The projection 10, the snug fit of the parts, the resiliency of the sleeve, and the corners 17 and 18 of the bent edge all contributing to hold the plate, ferrule, and sleeve together.

The notch 12 in the edge of the plate need not be U-shaped but may be a circular opening only. With a circular hole the assembly will be not quite so easy but all the parts will be held together just as well.

From the foregoing, it will be apparent that the mounting structure provides an effective and simple means for connecting the plate 1 to the base. Since the plate 1 is entirely supported by the rubber sleeve, it will also be apparent that the mounting structure is effective to insulate the

base from noise causing vibrations produced from mechanism mounted on the plate 4. In addition, it is to be noted that the parts comprising the mounting structure take up little more space than the usual nut and bolt arrangement.

Since certain changes may be made in the above described construction and different embodiments of the invention may be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim as our invention:

1. Means for mounting an apparatus on a support, comprising in combination a plate to be attached to said support substantially in parallel thereto, said plate having a substantially U-shaped marginal recess and a projection extending away from the plate surface at a place adjacent to said recess, a substantially cylindrical bushing of resilient material having a circumferential groove for snugly engaging the bight of said recess so as to be prevented by engagement axially along its peripheral surface with said projection from moving accidentally out of said recess, a metallic sleeve snugly seated in said bushing and having a flange to rest on said support, a fastening screw extending through said sleeve for engaging said support, and a washer disposed between said screw and said bushing opposite said flange for axially compressing said bushing between said washer and flange when said screw engages said support.
2. Means for mounting an apparatus on a support, comprising in combination a plate to be attached to said support substantially in parallel thereto, said plate having a substantially U-shaped marginal recess and a projection extending away from the plate surface at a place adjacent to said recess, a substantially cylindrical bushing of resilient material having a circumferential groove for snugly engaging the bight of said recess so as to be prevented by engagement axially along its peripheral surface with said projection from moving accidentally out of said recess, a sleeve of rigid material snugly seated in said bushing and having a flange to rest on said support, said flange having a concentric cavity open towards said support and under them the inner opening of said sleeve, a fastening bolt extending through said sleeve for attachment to said support, a washer disposed between said bolt and said bushing opposite said flange for axially compressing said bushing when said bolt is attached to said support, and another washer placed on said bolt within said cavity to prevent accidental removal of said bolt from said sleeve when not attached to said support.

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