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MOUNTING STACK

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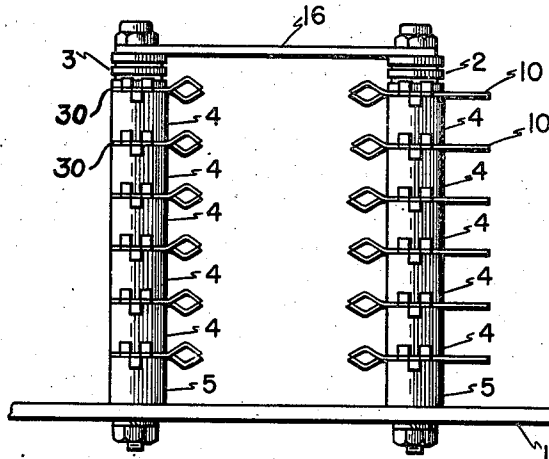


FIG. 1

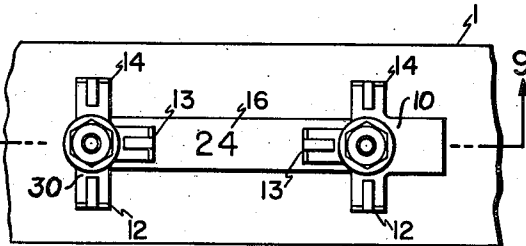
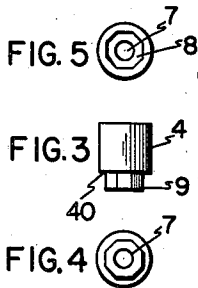


FIG. 2

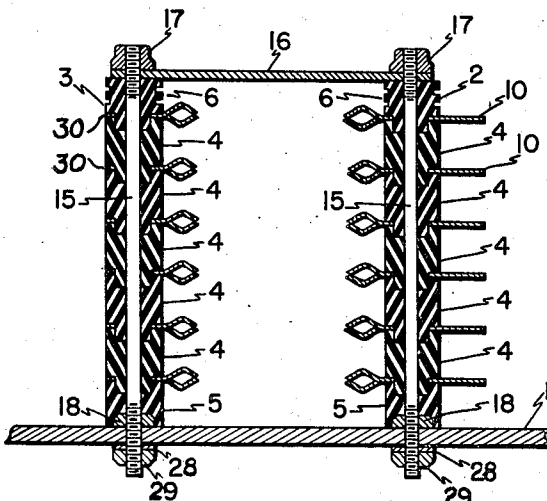
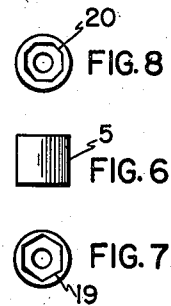


FIG. 9

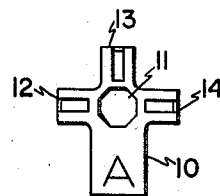


FIG. 10

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MOUNTING STACK

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7 Claims. (Cl. 173—328)

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The present invention relates to a device for mounting and support electrical elements such as small resistors and condensers, great numbers of which may frequently be used in electronic circuits.

It has been quite customary to permit the ordinary wire connections extending to the terminals of these elements to act as a support for them and in common practice the ends of the electrical elements are usually soldered to the connecting wires and suspended in air or strapped to the panel or insulating board. Such methods and means of connecting electrical elements are satisfactory in simple circuits where there are not too many parts and where the elements may be readily traced.

In complicated electronic apparatus, however, where the small electrical elements such as condensers and resistors may go up into the thousands, this means and method of mounting and supporting them become practically impossible. Not only does the wiring become confused so that it is impossible to follow the supports, but also there are apt to be grounds or leakage of such a magnitude as to interfere with the operation of the apparatus. In addition to this it is practically impossible to replace parts or to trace through supports readily such as necessary in locating the cause of failure and in addition to this the apparatus is not steady and reliable under such strenuous use as it may be put to particularly in time of war for electronic apparatus used by the armed forces.

The present invention overcomes these difficulties in wiring and assembling electronic apparatus by providing means for holding in proper electrical connections a great number of electrical elements neatly and uniformly arranged and marked so that they may be easily identified. Further, the assembly of the elements is such that any of them may be readily removed and the others put back in place without breaking any of the leads or connecting elements except those which are removed. In addition to this it is possible to assemble a great many elements together, many more than could otherwise be assembled on the same size panel.

This type of assembly allows standardization of pigtail lengths for all small electrical parts and permits the use of large quantity productions with very simple tools. It is also possible to have mass assembly of the stacks as a unit and thereby greatly simplify the manufacture of the equipment in which the stacks are being used. Replacement is also simplified. Further, since

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the parts are suspended away from a panel or support, it is possible to provide free air circulation, thus improving the power dissipation possibilities of all parts.

5 The present invention for supporting the electrical elements may be mounted on a panel board or in any suitable or desired fashion. The mounting board or panel may or may not be insulated since the mounting support or stack of the present invention insulates each connecting terminal for supporting the electrical elements from the other.

Without further describing the merits and advantages of the present invention, the invention will be described in the specification below in connection with the drawing illustrating an embodiment of the same in which Fig. 1 shows the invention in elevation; Fig. 2 shows a top view as viewed in Fig. 1; Fig. 3 shows an elevation of one section of the mounting stack or support of Fig. 1; Fig. 4 shows a bottom view of Fig. 3; Fig. 5 shows a top view of Fig. 3; Fig. 6 shows in elevation the lower two sections as viewed in Fig. 1; Fig. 7 shows a bottom view of Fig. 6; Fig. 8 shows a top view of Fig. 6; Fig. 9 shows a section taken on the line 9—9 of Fig. 2; and Fig. 10 shows a detail in plan of the electrical connecting terminals used in the present invention.

In the drawing, 1 represents a support which may be a terminal panel or any kind of a supporting member or bracket or even the inside of a cabinet on or in which the electrical support is mounted. Mounted on such a support are preferably two columns 2 and 3. These comprise a group of separable sections 4, 4, 4, etc., which may be all alike in construction and two base sections 5, 5 which may also be alike but slightly different in structure from other sections. Different top sections 6, 6 may also be provided the reasons for which will become clear from the specification below. The sections 4 are shown in Figs. 3, 4 and 5. The outer wall of the section may be cylindrical, square or any other desired shape. These sections are provided with a hole 7 axially through the center with the top of the section recessed at 8 in the shape preferably of a regular polygon although some other shape may, if desired, be used. The lower end of the section 4 is formed with a smaller neck portion 9 providing a shoulder 10 extending inwardly from the outer surface of the section 4. The neck 9 should have the same shape as the recess 8 so that successive sections will fit one into the other.

Between each section 4, 4 and 4, 5 there is

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supported a terminal or connecting element 10 shown in Fig. 10. These terminal connectors may be flat and provided with a hole 11 fitting over the neck 9. The end faces of the section also serve by bearing against the faces of the terminal 10 to clamp the terminal connection firmly in place. Various types of terminal connections may be provided. As indicated in the drawing these may be formed in clamping forked ends 12, 13 and 14 which may be faced in the manner indicated in Fig. 2 with the ends 13 facing toward each other and the ends 12 and 14 extending out to the side. The terminal is also provided with an extension piece extending to the rear which may bear a label of a number or letter indicating the element in the whole stack. Identical terminals may be used in both columns 2 and 3; or as shown, the terminal elements 30 in the left-hand column 3 may have the extension piece bearing the label omitted. The columns 2 and 3 are assembled preferably by means of a center rod or stud 15 extending through a top plate 16. The ends of the studs 15 may be threaded at the top to receive the elastic nuts 17, 17 and at the bottom to receive these sunken nuts 18, 18. If the nuts are hexagonal, the recess 19 in the element 5 (see Figs. 6, 7 and 8) should also be hexagonal with the recess 20 in the upper portion of the element 5 octagonal to receive the extending neck portion 9 of the element 4. The octagonal polygon used with the section pieces 4 is preferable since it permits the positioning of the terminal connections in right angles and half right angles on the supporting stacks.

In the assembly of the device each column is made up of a number of sections 4 which are nested end to end with a terminal plate or connector between each section or as many sections as is desired. If connecting elements are large, then every other terminal plate may be omitted, spacing those terminal plates which are used twice their distance apart. After the column has been assembled, the rod 15 is inserted after the nut 18 has been adjusted to its proper place on the rod. The column may then be placed on a supporting bracket 16 with the stud 15 extending upward through it, after which the nut 17 is tightened in place to tighten the whole stack. Both columns 2 and 3 are assembled in the same way. The terminals 13 may face each other inwardly or, if desired, for some reason they may be set at an angle to each other simply by orienting the column in the direction desired. The whole unit, then, comprising the columns 2 and 3 with the top supporting the bracket 16 may be mounted on the panel or board 1 through the clamping studs 15 the ends of which may be sufficiently long to extend through the panel 1 and receive supporting nuts and washers 29 and 28, respectively.

The identification of the stack may be completely established by giving the stack a number as, for instance, 24 which may be placed upon the supporting bracket 16 and identifying each of the terminal elements 10 with the letters A, B, C etc., marked in either direction. If a uniform practice is maintained for any one panel, the letter in the panel may be identified without any mark on it. The sections 4 and 5 are made up of insulating elements but the rods 15, 15 may be metallic since they are wholly insulated by the sections which completely enclose the rods. It will be noted also, as has been mentioned above, that each terminal is insulated

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from the next terminal. Electrical connections may be made to the terminals in either side connecting prongs and the electrical element or unit may be suspended between the inner terminals 13. If desired, electrical connection may be made to the tab ends by means of soldering or in any other suitable manner. The unit as designed may be built up with as many sections as desired and provides durable and uniform connecting means for the electrical elements employed. The orderly arrangement provided by this type of connection permits easy inspection to see if connections are properly made and ready substitutions for units which may be burnt out and also quick testing means because of the easy access to the elements.

Having now described my invention, I claim:

1. An electrical mounting stack comprising a pair of similar supporting columns each built up of insulating sections joined in mortise and tenon joints with electrical terminal elements having sections with holes conforming in shape to the tenon and positioned between insulating sections.

2. In an electrical mounting stack, a supporting column built up of insulating sections having end extensions and recesses forming mortise and tenon joints, electrical terminal elements with flat sections having holes adapted to fit over the tenon portion of the joint and lie between the adjacent ends of the insulating section and means holding the sections in alignment and clamping the terminals in place.

3. In an electrical mounting stack, a supporting column built up of insulating sections having at one end projecting neck portions and at the other end recesses adapted to receive such projecting neck portions of the neck section, electrical connecting elements having holes permitting them to fit over said neck portions and adapted to be clamped between successive insulating sections, a rod extending through said insulating sections and means at the ends of the rod for clamping the sections together.

4. In an electrical mounting stack, a supporting column built up of insulating sections having end extensions and recesses forming mortise and tenon joints, electrical terminal elements with flat sections having holes adapted to fit over the tenon portion of the joint and lie between the adjacent ends of the insulating section and means holding the sections in alignment and clamping the terminals in place, comprising a rod extending through the center of said sections and provided with terminal nuts at the end thereof for clamping said sections together.

5. An electrical mounting stack comprising a pair of similar supporting columns each built up of insulating sections joined in mortise and tenon joints with electrical terminal elements having sections with holes conforming in shape to the tenon and positioned between insulating sections and means for clamping said sections together and supporting said columns on a mounting board.

6. In an electrical mounting stack a supporting column built up of insulating sections having a neck portion in the shape of a regular polygon projecting from the end thereof and a similarly shaped recess at the other end of the section of a size to receive the polygon shaped neck, said sections adapted to be aligned together and being provided with a hole extending axially therethrough, a connecting terminal supported between sections, a rod extending through said hole

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and having a nut near one end thereof recessed in the end section, a clamping screw at the other end of the rod for clamping said sections together, said rod extending beyond said clamping sections and providing a clamping support for mounting the rod to a terminal board.

7. An electrical mounting stack comprising a pair of similar supporting columns each built up of insulating sections joined in mortise and tenon

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5 joints, electrical terminal elements having holes formed to fit over said tenon joints and be clamped between insulating sections, said electrical terminal elements having connecting portions directed in each column to the opposite column whereby electrical elements may be supported between opposite terminals on said mounting stacks.

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