

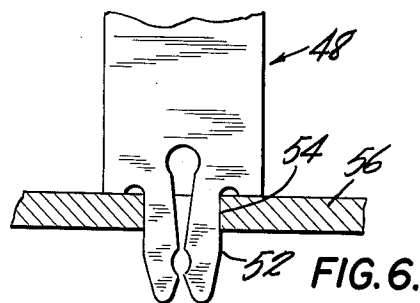
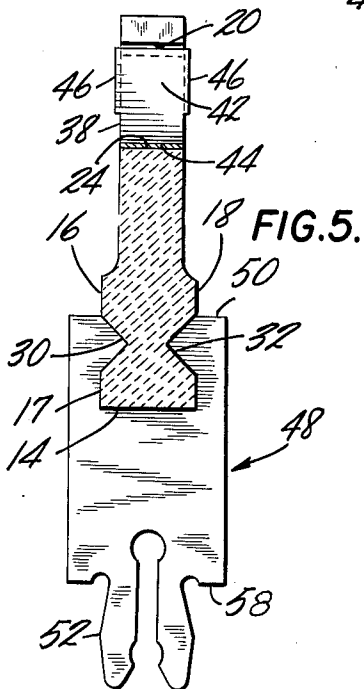
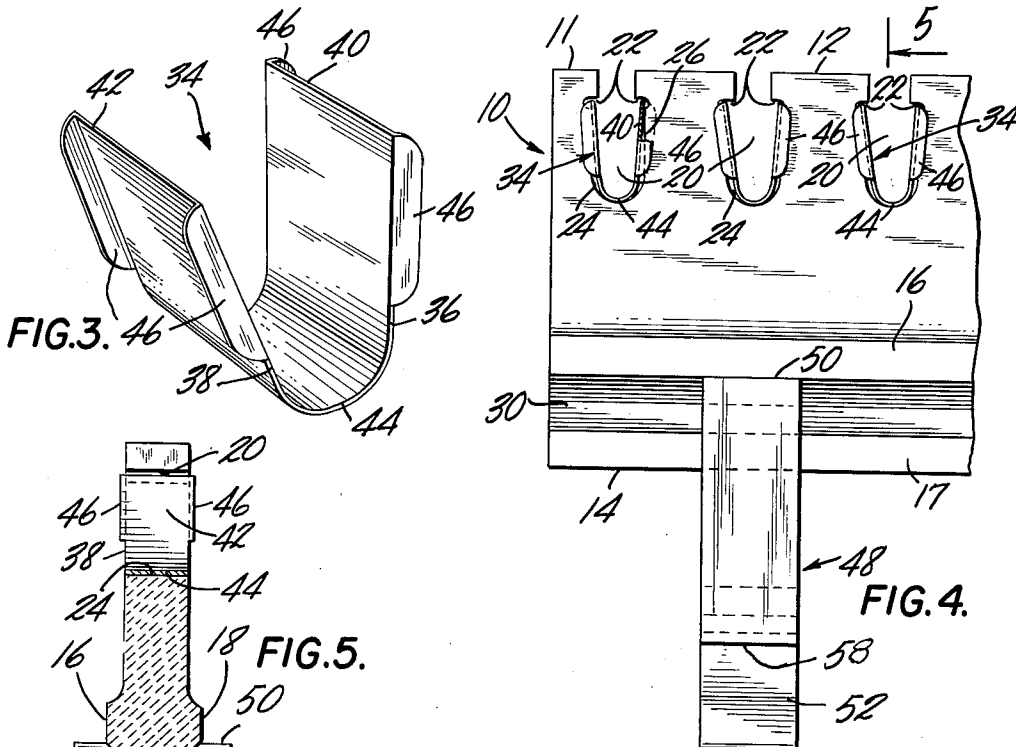
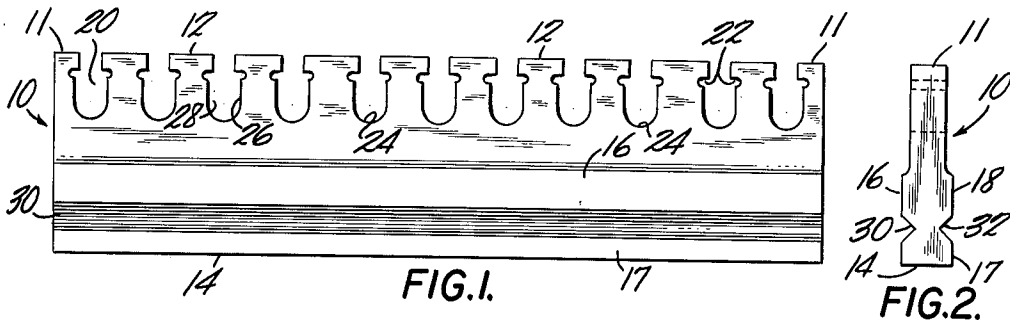
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ELECTRICAL TERMINAL BOARD FOR INTERCONNECTING COMPONENTS

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ELECTRICAL TERMINAL BOARD FOR INTERCONNECTING COMPONENTS

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The invention relates generally to electrical terminal boards and more particularly to terminal boards for electronic apparatus.

It is an object of the invention to provide a terminal board having electrically conducting resilient terminal clips to which various electrical and electronic components can be interconnected by soldering according to their preselected circuitry, the resilient terminal clips being retained in recesses defined in a strip of insulating material and being insulated from each other by said material.

Another object of the invention is to provide a terminal board in which the resilient terminal clips are locked in place on the insulating strip by pretensioning the terminal clips when inserted into the strip recesses thereby causing complementary parts of the terminals and strip to be biased into interlocking mechanical engagement.

Still another object of the invention is to provide electrically conducting terminal clips that are retained in the recesses of the insulating strip to provide heat-insulating air spaces there-between and thereby inhibit the heat of soldering from being substantially transmitted to the insulating strips.

Yet, another object of the invention is to provide adjustable mounting means for the terminal board that can be slidably positioned thereon to conform to variations in the complementary fastening structure with which engagement is required.

Other objects and features of the invention can be fully comprehended from the ensuing description taken in conjunction with the drawing, in which:

FIG. 1 is a side view of a strip of insulating material having one edge recessed,

FIG. 2 is a vertical end view of the insulating strip shown in FIG. 1,

FIG. 3 is an enlarged perspective view of one of the resilient clips,

FIG. 4 is an enlarged partial side view as in FIG. 1 showing terminal clips in place in a plurality of recesses, and showing a mounting clamp engaging the unrecessed edge of said strip,

FIG. 5 is a cross section taken approximately on the line 5—5 in FIG. 4, and

FIG. 6 is a fragmentary view of the mounting clamp showing the other end of the clamp engaged in a chassis structure.

Referring to FIGS. 1 and 2, the invention comprises an elongated insulating strip 10 of insulating material having oppositely disposed longitudinal edges 12 and 14 and oppositely disposed side faces 16 and 18 extending respectively therebetween. The longitudinal edge 12 is recessed with a plurality of U-shaped recesses 20, each of which defines opposite shoulders 22 adjacent the longitudinal edge 12. The bottoms 24 of the recesses 20 are rounded and the sides 26 and 28 extend parallel from the rounded bottoms 24 to the shoulders 22. The opposite side faces 16 and 18 of the strip 10 are respectively grooved with longitudinal grooves 30 and 32 adjacent the edge 14. The grooves 30, 32 are shown as being of V-shaped cross section. The portion of the strip in

which the grooves 30, 32 are formed is preferably thicker than the opposite edge portion having the recesses 20.

Referring to FIGS. 3 and 4, resilient metal clips 34, in which soldered connections are made, have legs 36 and 38 that slopingly converge from free ends 40 and 42 to a common rounded junction 44 to define an approximate U-shape. Side flanges 46 extend along the longitudinal edges of each leg and are approximately normal thereto. The clips 34 are dimensioned so that they can be inserted in the recesses by flexing the free ends 40 and 42 of the legs towards each other so as to slip past the shoulders 22 defined in the recess. When the pressure on the legs is released after the clip is inserted in the recess, the clip legs are spread apart, the free ends biased outwardly by spring tension to engage under the shoulders 22, thereby locking the clip against coming out of the end of the recess. The flanges 46 on the sides of the outwardly biased legs lock the clip from slipping out of either side of the recess. Thus, the clips are securely locked in the respective recesses. They can be removed only by pressing the free ends of the legs towards each other sufficiently for the ends to clear the recess shoulders 22 or the flanges 46 to clear the recess sides.

The rounded junction portions 44 of the clips are smaller than the adjoining rounded bottoms of the recesses, so that adjacent leg portions of the clips are spaced from the sides of the recesses 20 to provide insulating air spaces which substantially inhibit heat from soldering connection to the terminal clips from being transmitted to the insulating strip. If desired, outer portions of the legs of a clip may also fit loosely in the recess, the legs being spread apart just sufficiently to prevent the ends from slipping from under the recess shoulders 22 and the flanges 46 from slipping through the recess.

Referring to FIGS. 4, 5, and 6, a mounting clamp 48 is shown attached to the insulating strip 10 by a female end portion 50 engaging the edge 14 and grooves 30 and 32 of the insulating strip 10, and to a chassis by an oppositely disposed male end portion 52 of the mounting clamp 48 engaging in a hole 54 in a chassis structure 56. The female end of the mounting clamp is slidable along the grooves 30 and 32 to position the mounting clamp for the male end to engage in the hole 54 which accordingly can be drilled or punched where desired rather than in conformance with a preselected and inflexible dimension. This feature also permits the mounting of terminal boards having any desired number of recesses. The mounting clamps 48 are formed of resilient material such as metal, but preferably are of a resilient insulating material such as nylon or Teflon. The female end engaging the strip 10 is bifurcated to provide opposite fingers having V-shaped portions engaging in the grooves 30, 32. The distance between the fingers is normally less than the thickness of corresponding portions of the strip so that when the clamp is slipped on the strip, the fingers are spread apart and resiliently grip the strip to hold the strip firmly and securely. The male end 52 of the clamp 48 is also bifurcated to provide spaced fingers separated by a central recess. The outer surfaces of the fingers diverge and then converge to provide portions which are spaced apart a distance greater than the width of the hole 54 in the chassis. When the male end of the clamp is inserted in a hole 54, the opposite fingers flex toward one another, but tend to spring apart so as to grip the opposite sides of the hole and hold the clamp securely in place. Shoulders 58 on clamp members 48 engage the face of the chassis portion 56 and co-operate with the resilient fingers of the male end 52 to provide a firm mounting of the terminal board on the chassis. Two or

more mounting clamps may be provided for each terminal strip as desired.

In the manufacture of terminal boards in accordance with the invention, the elongated strip 10 is molded of an insulating material having high dielectric strength and also sufficient mechanical strength to withstand the intended service. While various plastic insulating materials may be used, it is preferred to form the insulating strip 10 from ceramic material. The material is molded to provide the configuration shown in the drawings and after suitable curing, the strip is glazed and fired. Glazing is not required in the recesses 20, but it is not objectionable if the glaze extends over the edges into the recesses. To provide terminal strips of different lengths, the green strips may be cut between successive recesses into whatever lengths are desired.

The clips 34 shown in FIGURES 3, 4, and 5 are stamped from suitable metal sheets or strips. For example, brass, silver or other suitable metal may be used. The metal may be either homogeneous or plated as desired. The clips are formed to the shape shown in FIGURE 3 with the free ends of the legs spaced apart a greater distance than the width of the recesses. The clips are then inserted into the recesses, the legs of the clip being flexed toward one another to permit the clips to enter the recesses. They snap into place and are securely locked in position by engagement of the ends of the clips with the shoulders 22 of the recesses and engagement of the flanges 46 of the clips with opposite side faces of the strip 10.

The mounting clamps or posts 48 are molded, stamped or otherwise suitably formed of resilient material for example, nylon or Teflon and are assembled on the strip 10 by being slipped onto the strip in a longitudinal direction. Although the clamps grip the strips firmly, they can be slipped longitudinally to any desired position so as to correspond to the position of holes punched in the chassis part 56 on which the terminal board is to be mounted. The male ends 52 of the clamp members 48 are then pressed into the holes 54 of the chassis 56 and snap into place to hold the clamp members and the terminal strip securely.

The terminal strip is used by inserting the ends of two or more wires into a respective clip 34 and soldering, brazing or welding the wire ends to one another and to the clip. The spacing of leg portions of the clip from the sides of the recess as described above, permits the clip to retain its resiliency so as to fit smaller wires and yet spread to accept larger wires or more wires. The inner surface of the clip may, if desired, be coated with solder or other material having a lower fusion point than the body of the clip so as to facilitate soldering the wires in the clip.

What we claim is:

1. An electrical terminal board comprising an elongated strip of insulating material having opposite edges and substantially parallel opposite side faces, said strip being of substantially greater width than thickness and being of substantially greater length than width, means defining a plurality of recesses in one longitudinal edge portion of said strip, said recesses extending transversely between said side faces of the strip, each of said recesses having approximately parallel side portions, a rounded bottom portion and a restricted mouth portion having a width less than the distance between said parallel side portions and defining opposite shoulders, a resilient U-

shaped metal clip received in each of said recesses, said clip having opposite leg portions with free end portions which in relaxed condition are spaced apart a greater distance than the distance between said parallel side portions of said recesses, said end portions being resiliently pressed toward each other by the opposite sides of said recess when said clip is inserted in said recess, said clip being thereby pretensioned to press said end portions resiliently against the sides of said recess, said free end portions engaging said shoulders to lock said clip in said recess, said leg portions having side flanges engaging the opposite side faces of said strip to prevent said clip from moving sidewise out of said recess, and a plurality of mounting posts each having a bifurcated end portion resiliently gripping the edge portion of said strip opposite said recesses, said strip having longitudinally extending ridges on its opposite side faces adjacent said opposite edge portion and said bifurcated end portion of each of said posts having portions engaging said ridges to retain said strip while permitting said posts to be moved frictionally lengthwise of said strip to selected positions.

2. An electrical terminal board comprising an elongated strip of insulating material having opposite longitudinal edges and substantially parallel opposite side faces; a plurality of recesses in one of said longitudinal edges, said recesses extending transversely of the strip between said side faces, each recess having a rounded bottom portion, approximately parallel side portions, and a restricted mouth portion having a width less than the distance between said side portions and defining opposite shoulders; and a resilient U-shaped metal clip received in each recess, the free end portions of said clip being spaced apart in relaxed condition a distance greater than that between the side portions of said recess and being resiliently pressed toward each other by said side portions of the recess, said clip being thereby pretensioned to press said free end portions resiliently against the side portions of the recess, said free end portions engaging said shoulders to lock the clip in the recess, and the leg portions of said clip having parallel side flanges engaging the opposite side faces of the strip to prevent the clip from moving sidewise out of the recess.

3. An electrical terminal board according to claim 2, in which the rounded bottom portion of the clip is smaller than the rounded bottom of the recess, whereby the leg portions of the clip are spaced from the side portions of the recess to provide insulating air spaces for inhibiting heat transfer between the clip and the strip.

References Cited by the Examiner

UNITED STATES PATENTS

2,099,655	11/37	MacFadden	248—27 X
2,627,385	2/53	Tinnerman	248—27
2,846,672	8/58	Hennessey	339—217 X
2,925,577	2/60	Cetran et al.	339—198
2,945,205	7/60	Dierstein	339—217 X
2,948,875	8/60	Batcheller	339—217 X
3,032,603	5/62	Whitley	174—168 X

FOREIGN PATENTS

309,772 4/29 Great Britain.

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