Oct. 17, 1967 D. E. RITCHIE 3,347,608

INSTRUMENT HOUSING RETAINING MEMBER

Filed Oct. 28, 1966

Fig. 1.

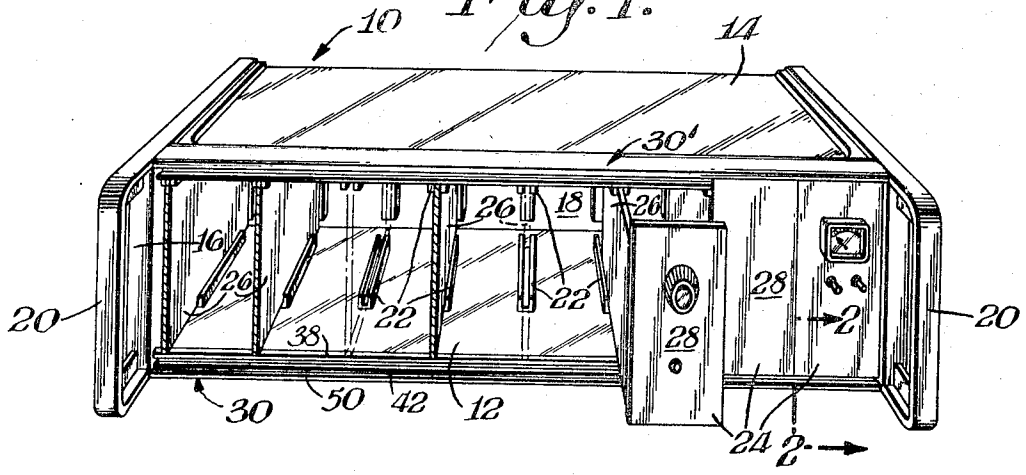


Fig. 2.

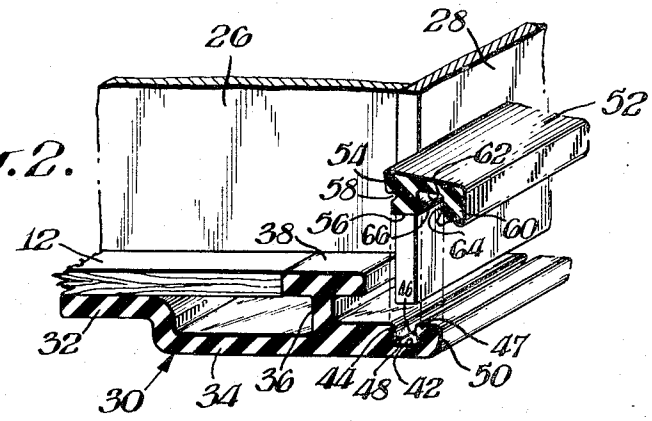
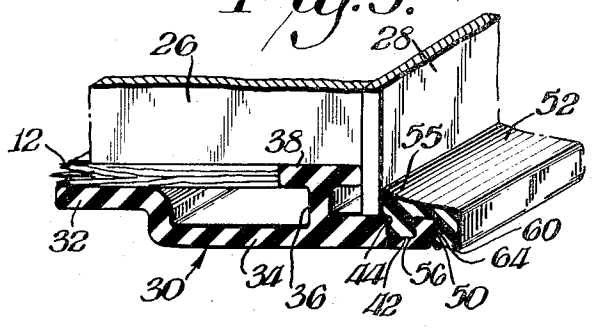


Fig. 3.



INVENTOR
Douglas Eugene Ritchie

BY
Mortenson and Weigel
ATTORNEYS

United States Patent Office 3,347,608 Patented Oct. 17, 1967

3,347,608

INSTRUMENT HOUSING RETAINING MEMBER

Douglas Eugene Ritchie, Chelmsford, Mass., assignor to Hewlett-Packard Company, Palo Alto, Calif., a corporation of California

Filed Oct. 28, 1966, Ser. No. 590,348
10 Claims. (Cl. 312—216)

This invention relates to retaining strips, and more particularly, to an elastomeric retaining strip adapted to retain sub-assembly panels within a housing.

Today many electronic instruments are housed in a cabinet having an open front end. Sub-assemblies used in the instrument are adapted to be individually or jointly slid into the instrument housing and locked. The locking means, typically screws or bolts, are adapted to be turned easily. Often the locking means is actuated by a thumb screw or the insertion of a coin, screwdriver or other article into a slotted screw head. Although generally satisfactory for this purpose, such means are relatively expensive not only to purchase but also to install in the cabinet. For each screw employed, a nut or socket into which the screw is threaded, must be attached to the housing. Also, if a number of sub-assemblies are employed within the housing, each must be individually locked.

Screws and bolts have another disadvantage. Often it is difficult to align the screw with its socket or receptacle. Also, if the operator twists too hard, he is liable to strip the threads off the screw, requiring a relatively expensive and time-consuming replacement or repair job.

It is therefore an object of this invention to obviate many of the disadvantages of the prior art means for retaining panels within a housing.

Another object of this invention is to provide an improved panel retaining assembly which is relatively cheap to construct.

An additional object of this invention is to provide an improved panel retaining means which facilitates the quick removal of sub-assembly panels from an instrument housing.

Still another object of this invention is to provide an improved instrument housing panel retaining means which is relatively secure and yet easily replaceable.

In accordance with a preferred embodiment of the invention there is provided a retaining assembly for the front panel of an instrument housing. The retaining assembly includes a longitudinally extending rigid strip secured to the front edge of the bottom panel of the housing. The rigid strip has an upwardly opening groove therein. A longitudinally extending piece of elastomeric material of uniform cross-section has inner and outer lips along its bottom edge defining a longitudinal groove therein. The inner lip is adapted to engage the groove of the rigid strip. In turn, the groove in the piece of elastomeric material is adapted to engage the outer lip of the rigid strip thereby locking the front panel within the housing. The elastomeric piece is easily removable and insertable to facilitate quick removal and replacement of the front panel.

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings, in which:

FIGURE 1 is a front perspective view of an instrument housing of the type with which this invention finds use;

FIGURE 2 is a partial perspective view of the retaining assembly prior to use; and

FIGURE 3 is a partial perspective view of the retaining assembly of this invention in its retaining position.

In the drawings there is seen an instrument cabinet or housing **10** of conventional construction. This instrument housing **10** includes a bottom wall **12**, top wall **14**, side walls **16**, and a back wall **18**, preferably fabricated from appropriate sheet metal stock such as aluminum or stainless steel as may be desired. The sheet metal pieces, after being cut into size, may be fastened together as by screwing, welding, brazing, or other appropriate means to form a rectangular type housing. The side walls **16** of the housing may be provided with U-shaped handles and corner guards **20** to facilitate handling and also to strengthen the housing. The handles **20** may extend along the length of the sides at the top and bottom portions thereof and may be attached by screws or bolts to the housing **10**.

On the interior portion of the walls **12**, **14**, and **18**, a plurality of U-shaped grooved slides **22** are secured by appropriate means as by welding, brazing or screwing. These grooved slides **22** are adapted to receive the vertically disposed, sheet-like frame members **26** of one or a plurality of sub-assemblies **24** which are to be inserted into the housing **14**. Other known slidable mounts may be employed as desired. These sub-assemblies **24** may be electronic amplifiers, modulators, meters, relays or other sub-components which are typically employed in instrumentation applications. Since the sub-assemblies **24** may be removed as by sliding them forward and hence out of the housing **10** and reinserted simply by properly aligning their vertical frame members **26** with the slides **22**, a means must be provided for locking the sub-assemblies **24** in place so they do not slide forward and fall out of the housing **10**.

In accordance with this invention, the sub-assemblies **24** are formed such that their front panel members **28** extend downwardly in the drawing below the bottom wall **12** of the housing **10**. These front panel members **28** may be formed from suitable sheet stock. As may be seen more clearly in FIGS. 2 and 3, the front panels are retained by a retaining means which comprises two pieces; namely, rigid extruded strips **30** and elastomeric retaining strips **52**. The extruded strips **30** may be formed by conventional extrusion processes from aluminum or other suitable material so as to have a relatively uniform cross-section. The strips **30** include a back-portion **32** which is secured as by welding, brazing, or other appropriate means to the bottom portion of the bottom wall **12** at the front portion thereof. The front portion of the extruded strip **30** extends downwardly so as to be offset slightly from the plane of the bottom wall **12**. Extending upwardly from this offset portion **64** of the extruded strip **30**, is a longitudinally disposed T-shaped member **36**. This T-shaped member **36** has a cross-bar **38**, the back edge of which abuts the front edge of the bottom wall **12** of the instrument housing **10**. In this manner, the sub-assemblies **24** may be slid back along the slides **22** until the back face of the front panel **28** abuts the front edge of the cross bar **38**. At the front of the offset portion **34**, a longitudinal groove **42** is formed in the upper surface. This longitudinal groove **42** has an enlarged bottom portion which is defined by an elongated protuberance or lip **44** and the front side wall **46** being slanted inwardly approximately at a 15° angle with the vertical. The back side wall **48** of the groove **42** is subsantially vertically disposed up to the lip **44**. The front edge **50** of the extruded strip **30** is arcuate, having its radius at the center of the lip **42**.

Further in accordance with this invention, an elasto meric retaining strip **52** having a protuberance **56**, shaped to substantially conform to the shape of the groove **42**

in the extruded strip 30, is adapted to be squeezed or snapped into the groove 42. The retaining strip also has a groove 62 adapted to interlock with the tongue 47 formed by front wall 46 of groove 42 and arcuate portion 50 of the extruded strip 30.

The retaining strip 52 has a uniform cross section throughout its length. The material of the retaining strip 52 may be of any suitable elastomeric material such as rubber, synthetic rubber such as butadiene-styrene copolymers, butadiene-acrylonitrile copolymers, polychloroprene, compatible mixtures of the above materials, plastic compounds such as certain of the vinyls, etc., the only requirements being that the material is sufficiently springy and rubber-like so that it will be stretched so as to admit unimpeded movement of the material so as to form a satisfactory interlock, as will be described, with the extruded strip 30. Actually, any other material suitable for forming a locking engagement with the extruded strip 30 and for deforming portions thereof so as to provide a relatively tight retention may be employed. Strips of this character may be made by molding or extrusion or any other satisfactory production method and may be compounded so as to form any color combination desired.

The back edge 54 of the retaining strip 52 is slanted outwardly and upwardly at a 15° angle with respect to the vertical so as to be capable of being deformed when inserted, as seen in FIG. 3 at 55, so as to tightly press the front panel member 28 against the front edge of the cross bar 38. The upper portion of the back edge 54 is offset and extends outwardly or backwardly in the drawing slightly more than the lower portion so as to enhance this squeezing retention. A concave recess 58 in the back edge 54 of the retaining strip 52 is formed so as to provide an improved lock when the protuberance or tongue 56, defined by the recess 58 and groove 62, is introduced into the groove 42 of the extruded strip 30. The tongue 56 is adapted to be squeezed or forced into the groove 42.

The front lip 60 of the retaining strip 52 together with the tongue 56 define a groove 62 which is substantially congruent in cross-section with the cross-section of the tongue 47 of the extruded strip 30. The front edge 64 of the groove 62 is thus seen to be arcuate to complement the curvature of the front edge 50 of the extruded strip 30, and the back edge 66 of the groove 62 is slanted so as to complement the slanted front edge 46 of the groove 42.

To employ the retaining assembly of this invention, the sub-assemblies 24 are slid into the housing 10 such that their front panels 28 each abut the front edge of the cross-bar 38 of the extruded strip 30. Next, the retaining strip 52 is installed by inserting the tongue 56 over and into the groove 42 and pressing downwardly and inwardly until the tongue 56 is brought in overlying relation with groove 42 and the protuberance or tongue 47 is in underlying relation with the groove 62, whereupon the final application of pressure along the length of the retaining strip 52 drives the strip into position and the inclined or wedged face 54 of the retaining strip presses against the front panel 28. The resulting wedging action of the face 54 produces a clamping or gripping and tightly holds the sub-assemblies within the housing.

To remove this retaining strip, it is merely necessary, as by prying with a sharp object such as a screwdriver or other device at hand, to loosen one end of the retaining strip 52 and withdraw the strip successively along its length as by peeling it from the interlocking relationship of the tongue 56 with the groove 42 and the tongue 47 with the groove 62.

While this invention is described in connection with an instrument housing, it should be apparent that it may find other panel retaining uses as well, such as the retaining of a pane of glass within a window frame. If desired, a locking strip similar to extruded strip 30 may be employed along the upper surface of the housing 10, as denoted by the reference numeral 30' in FIG. 1.

The invention as described results in a relatively simple, economical means of securely retaining individual sub-assemblies within an instrument housing.

It will be obvious that various modifications may be made in the apparatus and the manner of operating it. It is intended to cover such modifications and changes as would occur to those skilled in the art, as far as the following claims permit and as far as consistent with the state of the prior art.

What is claimed is:

1. An instrument housing panel retaining assembly, said housing having a bottom panel with a front edge and a removable sub-assembly adapted to be slidably positioned on said bottom panel within said housing, said sub-assembly having a vertically disposed front panel extending downwardly below said bottom panel, said retaining assembly comprising:

a longitudinally extending strip portion secured to the front edge portion of said bottom panel,

said strip portion having a pair, including outer and inner, of longitudinally extending lips defining an upwardly opening groove,

a longitudinally extending body portion of elastometric material of uniform cross section,

said body portion having a pair, including outer and inner, of longitudinally extending lips along one edge of said body portion defining a second groove, extending substantially throughout the length of said body portion, adapted to engage said outer lip of said strip portion, thereby to retain said sub-assembly within said housing.

2. The instrument housing assembly according to claim 1 in which said body portion also has a second edge adjacent said one edge having a longitudinally extending, protruding, bumper-like portion adapted to compressively engage said front panel.

3. The instrument housing assembly according to claim 2 in which said second edge is substantially planar and disposed at an angle with respect to said front panel, thereby to cause the inner lip of said body portion to engage more fully the groove of said strip portion.

4. The instrument housing assembly according to claim 3 wherein said second edge of said body portion extends outwardly beyond said inner lip.

5. The instrument housing assembly according to claim 1 wherein the inner wall of said groove in said strip portion slants inwardly toward said housing, thereby to aid in retaining said inner lip of said body portion.

6. The instrument housing according to claim 5 wherein said body portion also has a second edge adjacent said one edge having a longitudinally extending, protruding, bumper-like portion adapted to compressively engage said front panel.

7. The instrument housing assembly according to claim 6 wherein said second edge is substantially planar and disposed at an angle with respect to said front panel, thereby to cause the inner lip of said body portion to engage more fully the groove of said strip portion.

8. The instrument housing assembly according to claim 1 wherein said strip portion includes an upwardly and longitudinally extending flanged member adapted to abut the front edge portion of said bottom panel, said front panel also abutting said flanged member.

9. The instrument housing assembly according to claim 8 wherein said flanged member has a T-shaped cross section.

10. A panel locking assembly comprising:

a longitudinally extending strip portion,

said strip portion having a pair of longitudinally extending lips defining a groove and a longitudinally extending flanged member adapted to support one face of said panel,

a longitudinally extending body portion of elastomeric material of substantially uniform cross-section,

said body portion having a pair of longitudinally extending lips along one edge defining a groove extending substantially throughout the length of said body portion,

each of said grooves being adapted to engage one of the lips of the other said portion, thereby to compressively retain said panel against said flanged member.

References Cited

UNITED STATES PATENTS

2,699,370	1/1955	Weiskopf	312—346
2,826,475	3/1958	Larson	312—330
2,884,296	4/1959	Meilinger et al.	312—263
2,967,080	1/1961	Nelson	312—216
3,021,187	2/1962	Mitchell	312—263

CASMIR A. NUNBERG, *Primary Examiner.*