United States Patent [19]

Dean

[11] **3,857,136**

[45] **Dec. 31, 1974**

[54] **CABLE BUSHING APPARATUS**

[75] Inventor: **Carl J. Dean,** Southbridge, Mass.

[73] Assignee: **Barry-Wright Corporation,** Watertown, Mass.

[22] Filed: **July 6, 1973**

[21] Appl. No.: **376,969**

[52] **U.S. Cl.** **16/2,** 16/150, 220/3.94

[51] **Int. Cl.** **B65d 7/48**

[58] **Field of Search** ..... 16/2, 128, 150; 174/153 G, 174/152 G; 220/27, 3.94; 248/56

[56] **References Cited**

UNITED STATES PATENTS

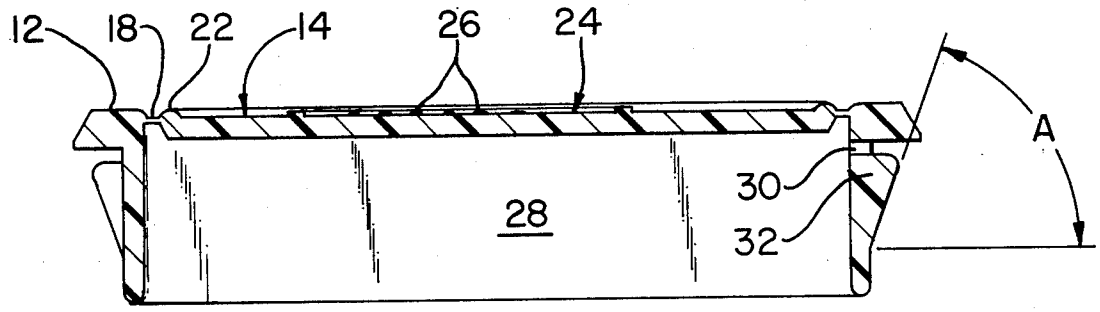
2,312,358	3/1943	Punte	220/27
2,959,633	11/1960	Palmer et al.	220/3.94
3,690,501	9/1972	Ware	220/3.94
3,770,873	11/1973	Brown	220/27

Primary Examiner—Paul R. Gilliam
Assistant Examiner—Doris L. Troutman
Attorney, Agent, or Firm—Milton E. Gilbert

[57] **ABSTRACT**

Electric wire and cables are accommodated in metal panel furniture by cutting a hole through a metal panel and inserting a cable bushing to protect cables from the cut edge of the hole. The bushing comprises a frame surrounding a central removable portion in the plane of the panel and a protrusion orthogonal to said plane extending through the hole. Yieldable tabs in the protrusion, cooperate with the frame to define multiple spaced pairs of panel grip jaws. Spaced thin strips mount the central portion within the frame and are selectively severable to convert the central portion into a hinged door or to remove the portion.

5 Claims, 4 Drawing Figures



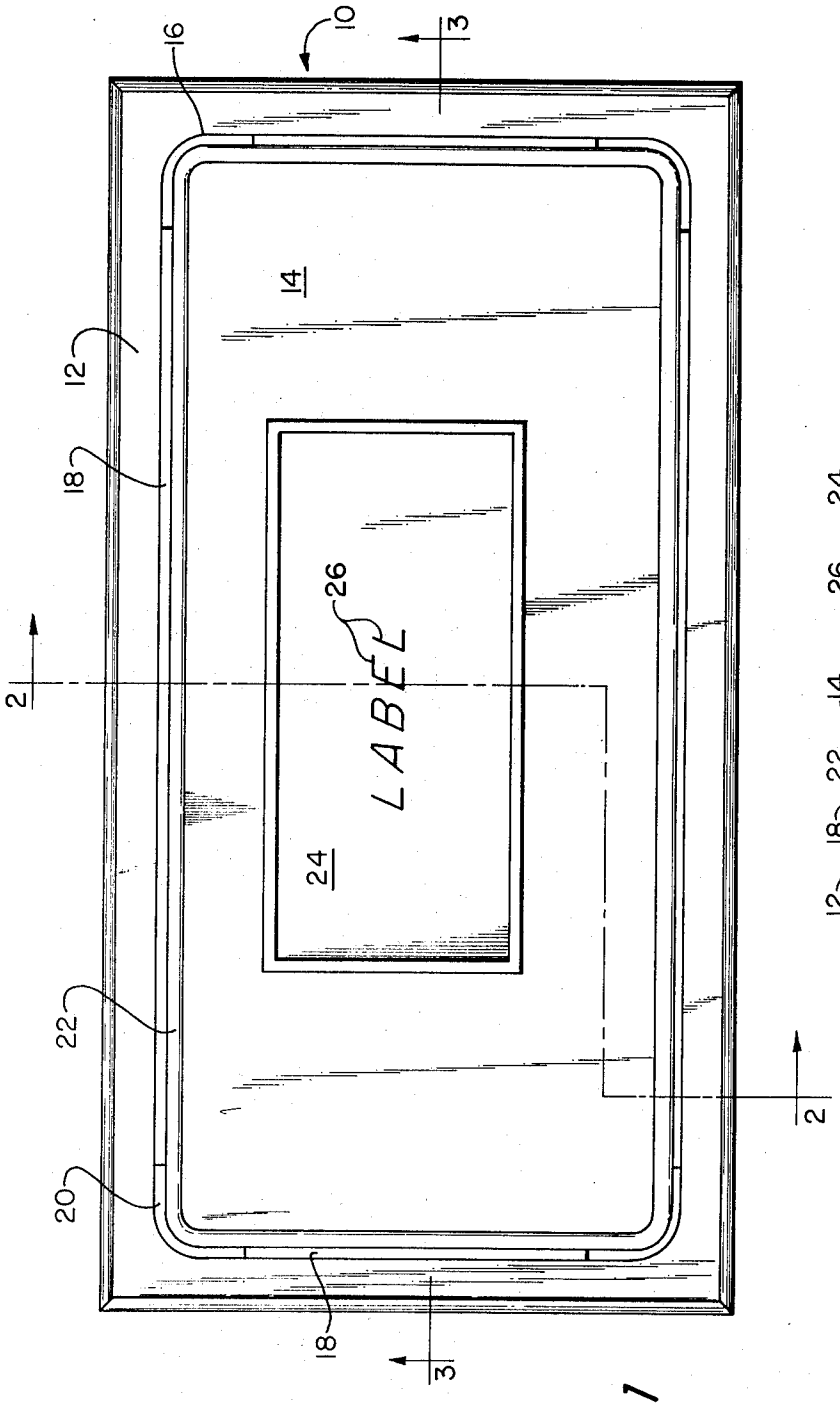


FIG. 1

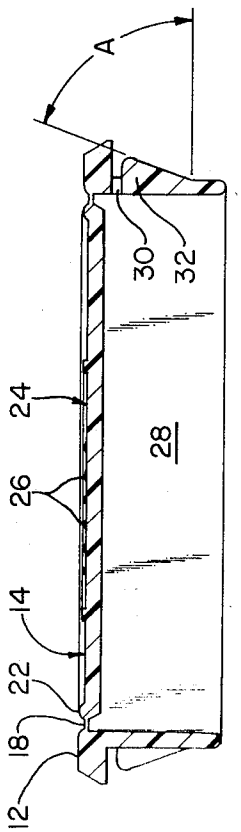


FIG. 2

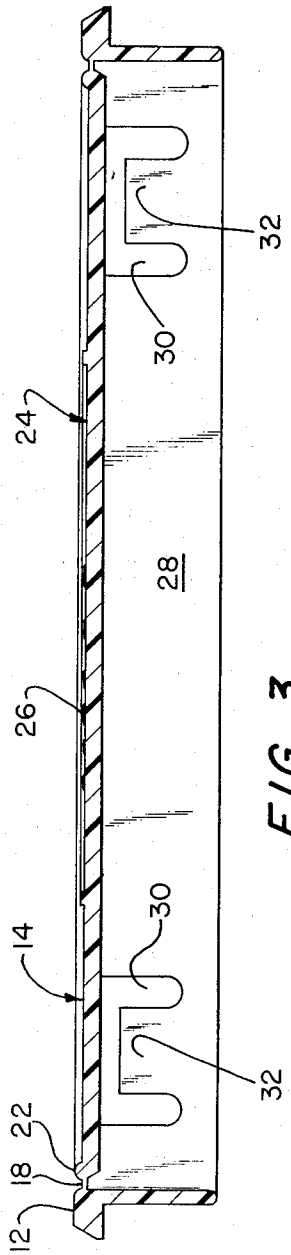


FIG. 3

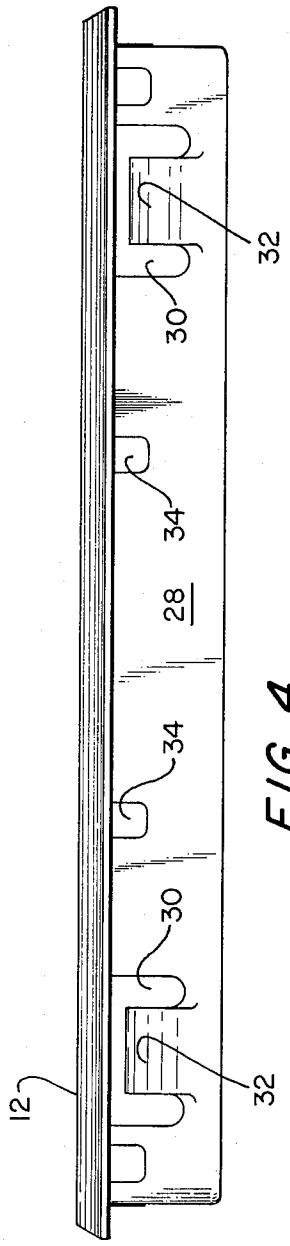


FIG. 4

CABLE BUSHING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a cable bushing and more particularly concerns a cable bushing including a conduitlike hollow plastic insert for covering an opening in the metal wall of a desk or cabinet. The plastic insert includes a panel whose sides may be easily separated from the rest of the insert with the tip of a knife to remove the panel or let it function as a door hinged on one side. The invention not only protects cables but attractively covers otherwise unsightly holes not then accommodating cables.

It is an important object of the invention to provide a bushing for protecting wires and cables passing through a metal panel hole.

It is a further object of the invention to provide a bushing having an integrally formed hole cover consistent with the preceding object.

It is a further object of the invention to provide an easily inserted bushing consistent with one or more of the preceding objects.

It is a further object of the invention to provide a hinged, door openable in several directions consistent with one or more of the preceding objects.

It is a further object of the invention to provide an esthetically pleasing structure consistent with one or more of the preceding objects that covers otherwise unsightly holes not then accommodating cables.

It is a further object of the invention to provide a low cost structure consistent with one or more of the preceding objects.

SUMMARY OF THE INVENTION

According to the invention, cable bushing apparatus comprises a frame surrounding a central portion. Both the frame and central portion are of coplanar sheet form and preferably of molded plastic construction. An elongated spacing path separates the frame and central portion. The path is more than half filled with thin section, elongated strips uniformly spaced along the path length. Selected strips may be cut so that the remaining strips serve as a hinge for the central portion. Alternatively, all the strips may be cut for removal of the central portion. The strips thus comprise means for removably and hingeably supporting the central portion, the thin strips being breakable with the tip of a knife and sufficiently flexible to function as a hinge when the central portion is otherwise free to move and may then function as a hinged door.

A protruding wall extends from the frame orthogonally to the common plane of the frame and central portion. The protruding wall conforms to the metal panel hole in which the apparatus is to be mounted. A plurality of yieldable tabs are arrayed along the outer surface of the protruding wall and spaced from the frame by a distance corresponding to metal panel thickness. The protruding wall is passed through a hole in the metal panel until the frame seats against the panel. The tabs and frame then define multiple spaced pairs of jaws gripping the panel.

Decorative or identifying patterns may be impressed on the surface of the central portion by change of height and/or surface finish therein.

The apparatus provides decorative cover to unused metal panel holes and a safety grommet with an optional hinged door to the used holes. The central portion is convertible to its door function or wholly removable reliably and without use of special tools.

These and other objects, features and advantages of the invention will become apparent from the following detailed description when read with the accompanying drawing in which:

BRIEF DESCRIPTION OF THE DRAWING

FIGS. **1** and **4** are plan and front views, respectively, of a cable bushing according to a preferred embodiment of the invention; and

FIGS. **2** and **3** are sectional views of the bushing along sections **2—2** and **3—3**, respectively, of FIG. **1.**

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawing and more particularly FIG. **1** thereof, there is shown a cable bushing **10** according to a preferred embodiment of the invention made in rectangular form and comprising a rectangular frame **12** surrounding a central rectangular portion **14.** A thin gap **16** spaces portions **12** and **14** from each other and the gap is filled in part with spaced flexible strips **18,** alternating with gaps such as **20** located at the corners of the apparatus.

The central portion **14** comprises a raised ridge **22** around its outer edge and a label portion **24** therein. The label writing is preferably formed as raised projection(s) such as **26** on the label portion **24.** The label portion **24** and balance of central portion **14** preferably have contrasting textures, one being embossed or matte surfaced and the other being smooth, for example.

Referring now to the front view of FIG. **4** and the sectional views of FIGS. **2** and **3** along sections **2—2** and **3—3,** respectively, of FIG. **1,** a rectangular frame protrusion **28** depends from frame **12.** The protrusion comprises four spaced cutouts **30** with yieldable tabs **32** therein formed integrally with the protrusion. These tabs have a thicker cross section than the protrusion and slope outwardly from the protrusion wall at an angle A of 40°–80°, preferably 70°. Reinforcing bumps **34** are provided around the protrusion **28** just below frame **12.**

It will be understood that round, square or other shapes may be used in lieu of the above described rectangular frame and/or protrusion shapes.

The cable bushing apparatus may be mounted in a wall panel by cutting a hole conforming to the depending protrusion **28** of the bushing in the panel and sliding the protrusion through the hole. Tabs **32** yield inwardly to allow passage of the protrusion and then snap out to form a grip on the back face of the wall panel while frame **12** grips the front face. Bumps **34** span the slight gap from the protrusion **28** to the wall and are compressed within such gaps to stabilize the cable bushing and prevent wobbling thereof.

After installation, three of the four strips **18** may be cut with a knife, leaving the remaining strip **18** as a hinge and the central portion **14** as a hinged door. Alternatively, the fourth strip **18** may also be cut and portion **14** removed. In either case, the remaining firmly secured frame **12** serves as a protective and decorative grommet sealing the edge of the panel hole from cable which passes centrally through it.

The cable bushing may be made by injection molding a thermo-plastic material, preferably polypropylene,

and preferred dimensions for the above described portions thereof are:

for the thickness of frame	12 : .095 - .105 in.
for the thickness of strips	18 : .015 - .025 in.
for the thickness of portion	14 : .055 - .065 in.
for the thickness of protrusion	28 : .045 - .055 in.
maximum thickness of tabs	32 : .125 - 135 in.
added thickness of bumps	34 : .010 - 020 in.

Other dimensional relationships and scales may be used to accomplish the same purposes of ease of entry and stable holding of the bushing, consistent with ease of selective removal of one or more or all of strips **18** to provide a door opening in a desired direction or complete removal of central portion **14.**

It is evident that those skilled in the art, once given the benefit of the foregoing disclosure, may now make numerous other uses and modifications of, and departures from the specific embodiments described herein without departing from the inventive concepts. Consequently, the invention is to be construed as embracing each and every novel feature and novel combination of features present in, or possessed by, the apparatus and techniques herein disclosed and limited solely by the scope and spirit of the appended claims.

What is claimed is:

1. Cable bushing apparatus comprising,

means defining a frame,

means defining a central removable portion at least partially enclosed by said frame and spaced therefrom,

means defining a plurality of thin strips spanning the distance from the frame to said central removable portion for removably and hingeably supporting said central portion,

said thin strips being breakable with the tip of a knife and sufficiently flexible to function as a hinge when said central portion is otherwise free to move and may then function as a hinged door,

means defining an elongated protrusion of the frame coextensive therewith,

and means defining a plurality of yieldable tabs along an outer surface of said protrusion arranged adjacent to said frame to define multiple pairs of panel gripping jaws,

said frame and central removable portion defining a common plane and said protrusion being arranged orthogonally to said common plane.

2. Cable bushing apparatus in accordance with claim 1 wherein;

said central portion is wholly surrounded by said frame,

and said frame to central portion spacing is an elongated path with at least half the length thereof filled with said spanning strips.

3. Cable bushing apparatus in accordance with claim 2 wherein;

said spanning strips are uniformly spaced from each other.

4. Cable bushing apparatus in accordance with claim 1 and further comprising;

means defining an array of cutouts in said protrusion,

and means defining an array of bumps along the outer surface of said protrusion aligned with said cutouts,

said tabs being contained within said protrusion cutouts.

5. Cable bushing apparatus in accordance with claim 1 and further comprising;

means defining a ridge on a first side of said plane,

said protrusion being on the second side of said plane,

and means defining areas of different surface finish on said first surface with said ridge forming a boundary line between said areas.

* * * * *