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Eldringhoff

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[54] **SHAFT-LOCKING-COVER-CLAMP BUTTON ASSEMBLY**

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[52] **U.S. Cl.** ..... **24/113 R,** 24/90 B, 24/92

[51] **Int. Cl.** **A44b 1/12**

[58] **Field of Search** ..... 24/113 R, 113 MP, 24/90 B, 90 C, 90 E, 90 F, 92

[56] **References Cited**

UNITED STATES PATENTS

3,500,506	3/1970	Mitchell	24/113 R
1,374,210	4/1921	Langrock	24/90 B
3,440,693	4/1969	Reynolds	24/113 R
209,320	10/1878	Bates	24/92

FOREIGN PATENTS OR APPLICATIONS

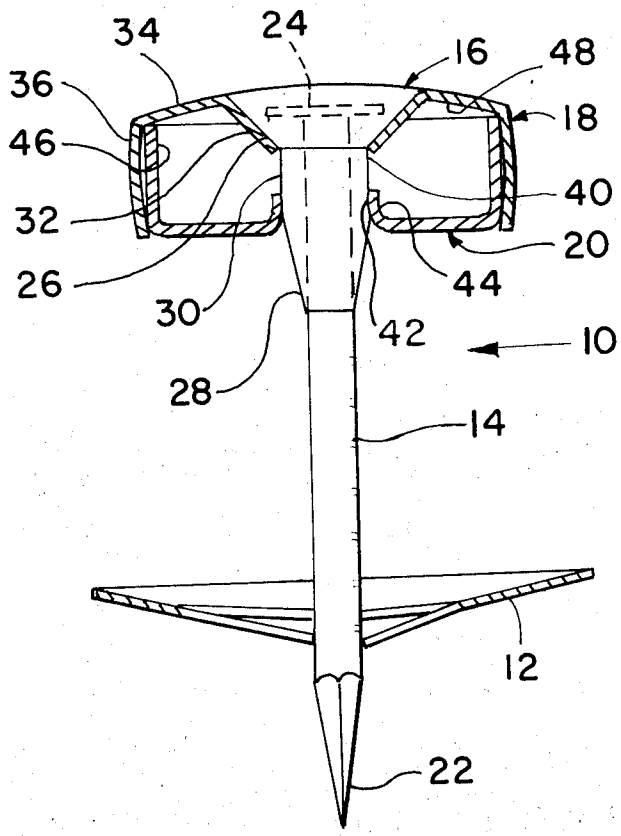
463,829	10/1913	France	24/113 R

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[57] **ABSTRACT**

A button assembly having an outer shell fixed on the end of a shaft by a plastic head integral with the shaft and protrusive through the outer shell, and an inner shell having a flange adapted to clamp the edges of sheet material covering the outer shell against the interior face of the outer shell under clamping pressure maintained by force fit of a flanged perforation in the inner shell on a uniform-section portion of the plastic head; special shapes of the parts and a double-locking provision are also disclosed.

8 Claims, 6 Drawing Figures



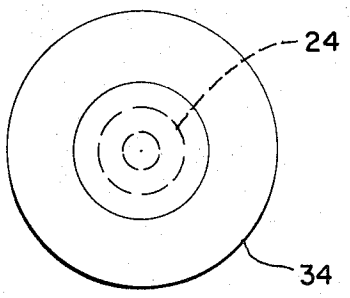


FIG. 1a

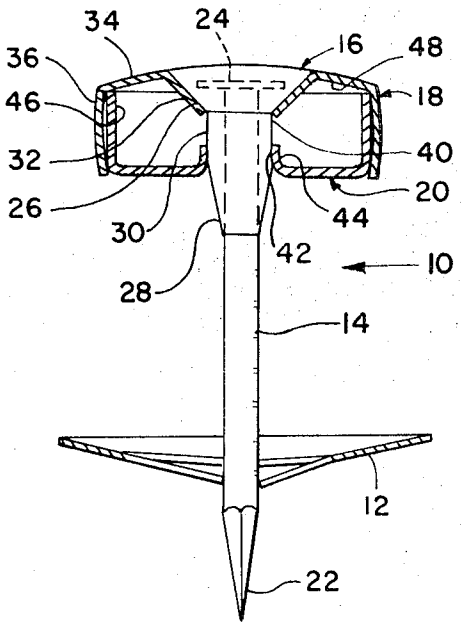


FIG. 1b

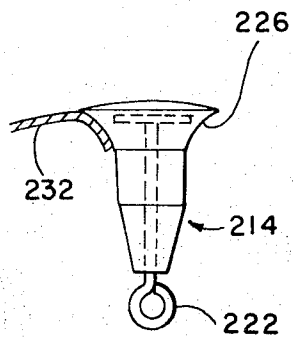


FIG. 2

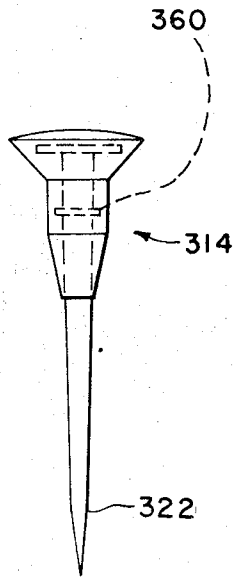


FIG. 3

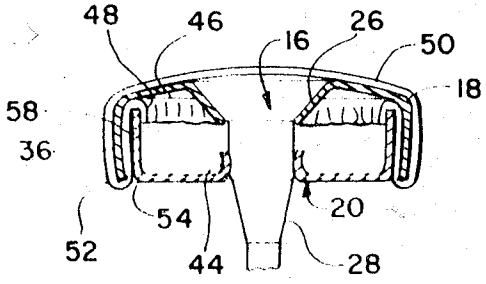


FIG. 4

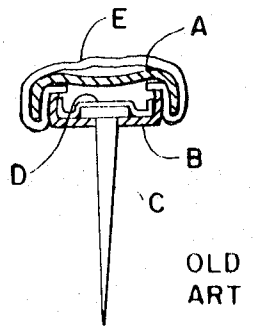


FIG. 5

SHAFT-LOCKING-COVER-CLAMP BUTTON ASSEMBLY

This invention relates generally to fasteners and particularly to button type securances adapted to co-act with perforations, buttonholes, loops, and the like, particularly with regard to heavy duty permanent-type headed grips such as upholstery buttons.

In the prior art a principal difficulty with upholstery buttons has always been the deheading tendency of buttons provided for the purpose of securing leather, fabric and plastic type covering. Stress applied has the tendency to shuck the outer part of the button away from the stem, usually as result of crimping deficiencies during customary assembly in a button machine, or as result of distortion on installation, both of which old-art flaws are illustrated in the last Figure appened hereto.

Crimping deficiences usually result from use of covering material in thickness not accommodatable by the button. Distortion on installation usually results from button-head deformation when driven. Peeling away of button covers and caps in response to excess load has been accepted as natural by the supplier, but not the consumer. Stripped button facades expose non-decorative parts of fasteners at best, and often reveal gaping holes left by forced dis-assembly of button heads. Additionally, stripped buttons may be hazardous, the portions remaining presenting sharp or hooked parts which can cause injury.

It is therefore a primary object of the present invention to provide overlapping self-locking structure avoiding the detrimental effects of stress-disassembling button-type fasteners in such applications as upholstery securances and other similar applications.

Other principle objects of the invention are to provide a sliding force-fit shaft locking button which does not depend on crimping to remain assembled and which adjusts under machine pressure to accommodate and grip securely various covering thicknesses.

Still other objects are to provide a fastener which doubly grips covering material, which holds tightly on assembly by spring tension, and which tightens under load rather than loosening.

Further objects are to provide a button type fastener assembly which is adapted for production by existing machinery, to provide a button type fastener assembly which can be installed without distortion, which is adapted to serve for indefinite periods of time in all ordinary usage without pulling apart, which is inexpensive, and which effectively closes and keeps closed the necessary perforation through the upholstery or other material being retained by the button assembly, without chafing.

In exemplary embodiment the button assembly of this invention includes a fastener having a pointed shaft with an enlarged portion at one end, a double truncated-cone-shaped plastic head at the enlarged portion having a uniform diameter shank between cones, with the cones tapering smaller toward the exposed part of the shaft, and a pair of axially related outer and inner shells mounted on the shaft, each having inward turned axial and peripheral flanges, the outer shell having a tapering axial flange matching the taper of the plastic head, the inner shell having an axial flange fitting the uniform diameter portion of the shaft and a peripheral flange adapted to press on the inner surface of the end of the outer shell with fabric or other sheet material gripped between.

The above and other objects and advantages of this invention will become more readily appreciated on examination of the following description, including the drawings in which:

FIG. **1***a* and FIG. **1***b* are plan and side view in partial section respectively of an embodiment of this invention;

FIG. **2** is a side view in partial section of a portion of another embodiment;

FIG. **3** is a side view in partial section of a portion of yet another embodiment;

FIG. **4** illustrates in partial section a typical assembly with fabric or other covering; and

FIG. **5** shows an old art device, in partial section.

In the Figures, like parts are indicated by similar numerals.

Taking up the Figures in detail, FIG. **1** shows plan and partial sectional side view respectively at **1***a* and **1***b* of a preferred embodiment **10** of the invention. The fastener assembly consists of four axially overlapping parts plus a clip **12,** if desired, to secure the fastener in place. The four overlapping parts are a nail-type shaft **14,** the enlarged upper end **24** of which securely overlaps a portion of a plastic head **16** molded in place around it, an outer shell **18** overlapped by the shaft head and the plastic head, and an inner shell **20** overlapped by the shaft head, the plastic head, and the outer shell.

It can be seen that the assembly is self-braced, self-stabilized and self-secured by the shapes and relations of the parts, particularly the overlaps.

The nail-like shaft **14** has a pointed end **22** adapted for punching through material, and an enlarged end **24.** A clip **12** may be employed to secure the shaft on installation, and the intermediate portion of the shaft may be roughened to pimprove the grip of the clip.

The plastic head **16** which is preferably of "Nylon" or equivalent thermoplastic, is integrally molded to the shaft in such manner as to encapsulate the enlarged end **24** of the shaft together with an adjacent length of the shaft.

The plastic head **16** has differing portions in axial relation to each other. Two of these are sloping portions, preferably in the shape of a pair of truncated cone tapers **26, 28.** These are integrally connected by a cylindrical or outer substantially constant section midbody **30.** The larger tapered portion **26** flares out from the midbody **30** over the enlarged end of the shaft and terminates in a slightly rounded axial crown.

The smaller tapered portion **28** of the plastic head tapers down from the midbody **30** to a smooth faired intersection with the shaft.

The outer shell **18** has a center perforation **40** with an inwardly turned central conical flange **32,** shaped to fit the larger taper of the plastic head. The face **34** of the outer shell **18** is preferably rounded in conformance with the end of the plastic head and rounds over into a peripheral flange or skirt.

The outer shell peripheral flange or skirt **36** may be crimped inwardly around the inner shell during assembly in a button machine; this provides a second annular grip of the cover but is not essential; for crimping purposes the outer shell flange should be slightly deeper than the inner shell flange.

The inner shell **20** is generally similar in shape to the outer shell, having a center perforation **42** with an aligning flanged edge **44** force-fitting the uniform sec-

tion midbody **30** of the plastic head, and an outer flange or skirt **46** fitting within the peripheral flange **36** of the outer shell. Both flanges of the inner shell turn toward the outer shell. The peripheral flange or skirt **46** of the inner shell preferably extends into the outer shell approximately the full depth of the outer shell, being designed to exert pressure on the inner surface **48** of the rounded end **34** of the outer shell when the two shells are assembled tightly together with fabric or other covering between, as will be discussed later in reference to FIG. **4.**

Assembly is very easy. The shells, which are preferably metallic, are assembled one at a time. The central openings of the shells slide loosely over the exposed portion of the shaft until they reach the taper **28** of the plastic head. The taper guides them and centers them as they pass onto the cylindrical midbody **30.** The outer shell finally engages the large taper **26** of the plastic head, and the inner shell elastically force-fits over the uniform section midbody **30** of the plastic head. The length of the inner flange reinforces the inner shell and squares the inner shell with the shaft; it need be no longer than necessary to assure perpendicularlity.

Failure under stress is practically impossible without destruction of the parts. The nail-type end **24** of the shaft **14** is embedded in the plastic head **16** which in turn overlaps the outer shell **18** which similarly retains the inner shell **20.** The nail-type end **24** is preferably made large enough in diameter so that even if the plastic head **16** is ruptured, the outer shell cannot come off.

FIG. **2** and **3** illustrate further embodiments **214** and **314** of the shaft. These are similar to the FIG. **1** embodiment except for the fastening arrangement. In FIG. **2** the fastening arrangement is a standard tie-on eyelet **222** and in FIG. **3** a standard tack-on end **322.** An especially valuable feature in reference to FIG. **3** is that the rounded plastic head **16** takes the full force of hammer blows or other pressure-installation devices so that the outer shell is not sprung loose or deformed. The plastic, being relatively soft, tends to prevent the covering material from being abraded by hammer blows. A second nail-head-like enlargement **360** may be embedded in the plastic head for heavy duty type installations. It can be seen that the invention is adapted to be used in any and all conventional fastening configurations.

FIG. **2** also shows a preferred shape of the large taper **226** of the plastic head and of the central flange **232** which fits it. These are slightly toroidal to make the drawing of the metal of the outer shell easier when constructed while preserving the fit of the two units on assembly.

FIG. **4** illustrates in partial section similar to FIG. **1** a detail of how fabric or other covering **50** may be secured and optionally double-secured by the assembly. The covering is tightly stretched over the outer shell **18** when the inner shell **20** is forced onto the shaft a sufficient distance to grip the covering between the edge **58** of the skirt **46** of the inner shell and the inner surface **48** of the end of the outer shell.

The amount of cover clamping pressure is determined by how far the inner shell is forced over the shaft, to which it locks. Pressure is equalized by the previously mentioned "squaring up" of the inner shell on the shaft. Additionally, as noted previously, if the outer shell is crimped, this grips the covering material between the skirt **52** and the bend **54** of the inner shell.

It can also be seen that pressure of the inner shell against the upholstery, or other material against which it is drawn on installation, tends to tighten and retain the assembly, rather than tending to force the assembly apart, as in similar prior art devices, and that the smooth plastic taper **28** will tightly close the shaft hole in upholstery and will prevent destructive abrasive action on the edges of the hole during the flexures of everyday use.

FIG. **5** shows a typical old-art device having outer shell A, inner shell B, shank C, retainer D and covering E. Two typical causes of failure are indicated: the first is bumping-in of the top of the hollow head, opening the skirts of A and releasing the cover; the second is the using of slightly overthick material, preventing the outer flange from crimping properly and releasing the cover.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed and desired to be secured by United States letters patent is:

1. A fastener comprising a head having differing axially adjacent portions, a shaft rigidly encapsulated within the head at one end of the shaft and having first fastening means at the other end of the shaft; first and second shells having central perforations and peripheral flanges, the peripheral flange of the second shell adapted to fit within the peripheral flange of the first shell; a first portion of the head having an out-ward slope toward one end of the shaft for engaging the first shell at the perforation in the first shell; a second portion of the head comprising a uniform-section midbody, the second shell having an aligning flange around the perforation therein, proportioned for sliding force-fit on the midbody for thereby adjustably fixing the second shell in position for exerting axial pressure on the first shell; and a third portion of the head sloping from the midbody to the shaft.

2. A fastener assembly as recited in claim **1,** wherein the head has a crowned end proportioned for protrusion beyond the first shell for thereby protecting the first shell from impact.

3. A fastener assembly as recited in claim **2,** wherein the head is of plastic, thereby protecting the cover material on impact and wherein the shaft has an enlarged portion engaging the interior of the plastic head.

4. A fastener assembly as recited in claim **3,** wherein the enlarged portion is a disk shaped end on the shaft, and wherein a second disk shaped member is fixedly spaced therefrom on the shaft within the plastic head.

5. A fastener assembly as recited in claim **4,** and a cover, the cover arranged over the exterior of the first shell with the cover edges clamped against the inner face of the end of the first shell by said axial pressure of the second shell.

6. A fastener assembly as recited in claim **5,** wherein the axial pressure is applied by the second shell through the edge of the peripheral flange thereof to the cover.

7. A fastener assembly as recited in claim **6,** wherein the first shell peripheral flange has an inward crimp over the second shell.

8. A fastener assembly as recited in claim **7,** wherein the first portion of the head has a surface with a toroidal shape and wherein the first shell has a correspondingly shaped axial flange at the perforation.

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