United States Patent [19]

Critchfield

[11] 3,829,935

[45] Aug. 20, 1974

[54] **BUTTON COLLET**

[75] Inventor: **Jack G. Critchfield,** Clarendon Hills, Ill.

[73] Assignee: **Handy Button Machine Company,** Chicago, Ill.

[22] Filed: **Feb. 17, 1972**

[21] Appl. No.: **227,128**

[52] **U.S. Cl.** ..... **24/90 B,** 5/356, 24/113, 24/230.5 S, 24/102 T

[51] **Int. Cl.** **A44b 1/18**

[58] **Field of Search** ..... 5/356; 24/113, 230.5 S, 24/230.57 P, 230.5 R, 90 B, 90 C, 90 E, 102 T, 231-237, 239, 198; 248/303-308; 16/172

[56] **References Cited**

UNITED STATES PATENTS

1,611,605	12/1926	Newton et al.	5/356
1,841,423	1/1932	Wells	24/237
2,075,722	3/1937	Illsche	24/90 C X
2,151,964	3/1939	Gay	24/237 X
2,246,316	6/1941	Oharek et al.	24/113 R
2,640,238	6/1953	Schuhr	24/113 R
3,654,671	4/1972	Berning	24/102 T

FOREIGN PATENTS OR APPLICATIONS

1,232,711	3/1961	Germany	16/87.2

Primary Examiner—Paul R. Gilliam
Assistant Examiner—Peter A. Aschenbrenner
Attorney, Agent, or Firm—Olson, Trexler, Wolters, Bushnell & Fosse, Ltd.

[57] **ABSTRACT**

A collet for a tufting button comprises a one piece molded plastic body having a peripheral side formed with a series of annular steps. When a button shell is crimped onto the collet with button-covering material interposed between the sidewall of the shell and the side of the collet, the steps form slip-resistant regions that are engaged by the covering material to prevent separation of the shell and cover material from the collet. The base of the collet has a stem with a hook structure for receiving a pre-tied tufting loop. Dual snap locks are provided to prevent removal of the tufting loop.

3 Claims, 8 Drawing Figures

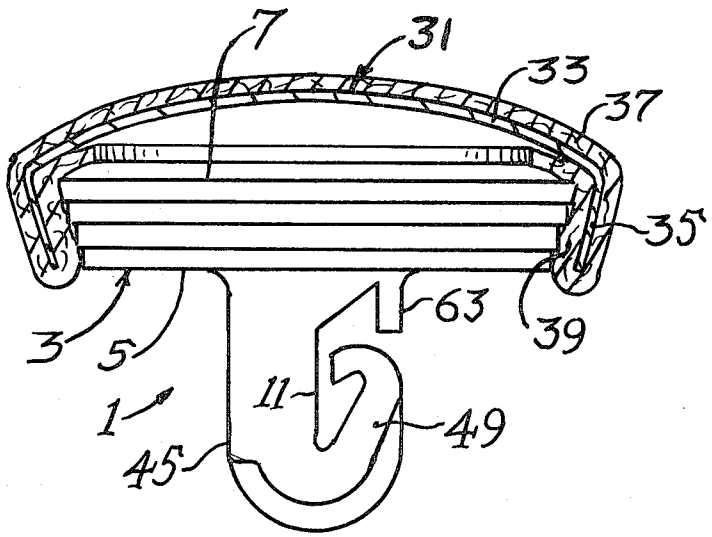


FIG-1

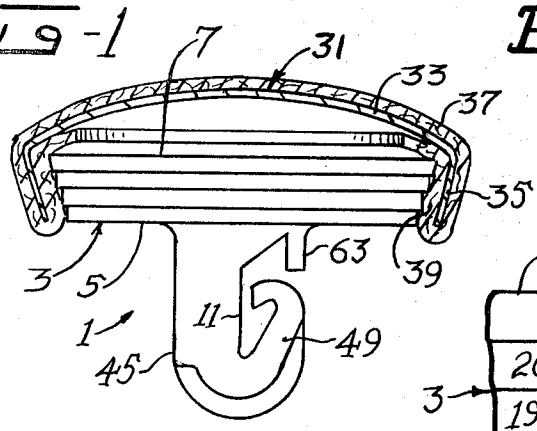
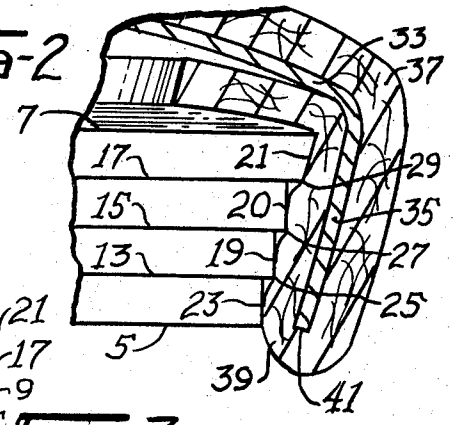


FIG-2



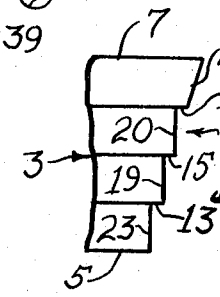


FIG-3

FIG-4

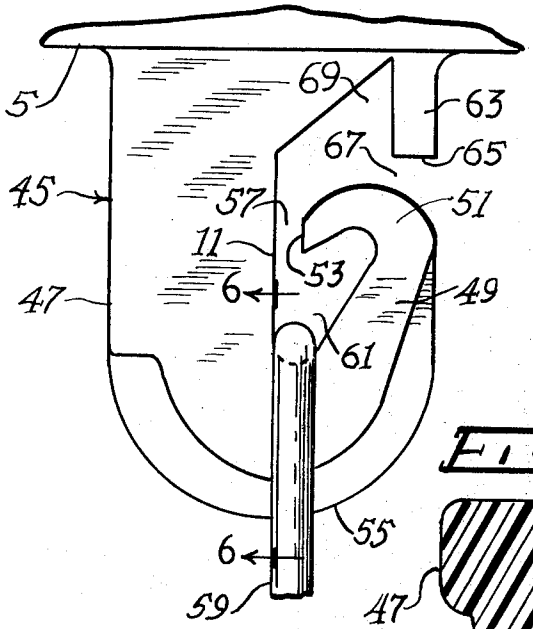


FIG-5

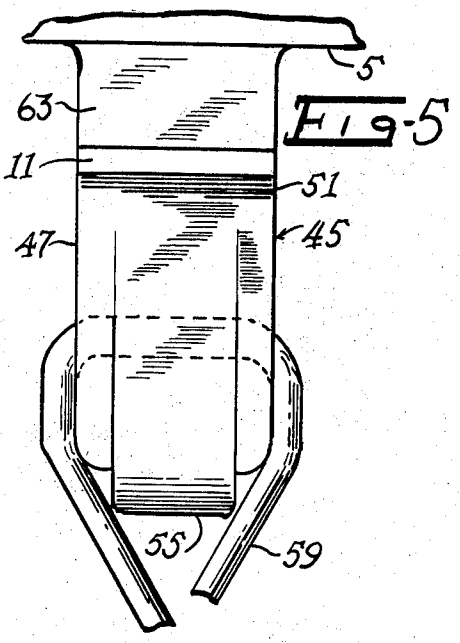


FIG-6

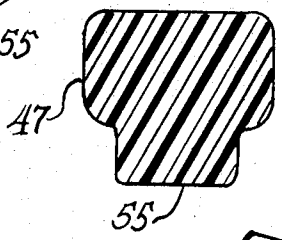


FIG-7

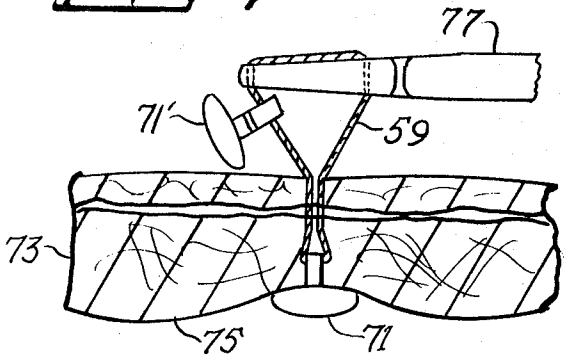
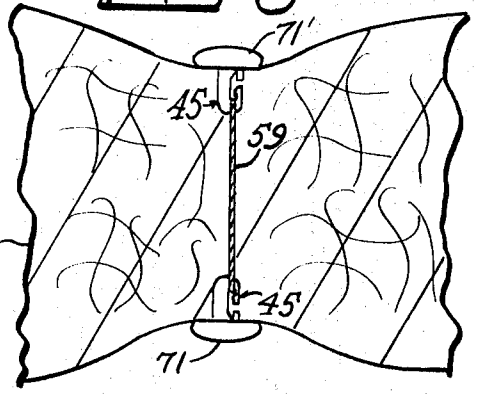


FIG-8



BUTTON COLLET

BACKGROUND OF THE INVENTION

This invention relates generally to improvements in buttons, and more particularly to backs or collets for tufting buttons.

In a typical commercial tufting button, the collet comprises a sheet metal body with a conical sidewall which cooperates with the sidewall of the button shell for clinching the collet, the shell and the button covering together. The resistance to separation or "popping" of the shell from the collet depends upon the surface-to-surface frictional engagement of the cover material with the smoothe sidewall of the collet. In some instances, however, "popping" or separation occurs despite the use of well designed crimping dies for assembling the button components. Efforts have been made to avoid button popping. In one known type of button, the sheet metal collet has a radial flange or lip at the upper end of the sidewall which is intended to retain the inturned sidewall of the shell. In principle, however, the use of this lip or flange is essentially an effort to increase the radial overlap of the sidewall of the shell and the sidewall of the collet.

A conventional tufting button also includes an eye or hook arrangement on the base of the collet for attaching a tufting loop to the button. The eye configuration, while satisfactorily securing the loop in place against subsequent removal, requires threading the twine through the eye and then tying the twine to complete the loop. On the other hand, a pre-tied loop can be used with a hook. The problem with known hook structures has been that the loops can be removed by persons tampering or playing with the buttons. Even known multiple hook button collets are not adequately "fiddle proof." For example, in one known type of plastic collet, the hook structure is in the form of a double U having two hook portions on opposite sides of a common shank. Aside from other shortcomings of this collet, it has been found that the tufting loop can be quite easily removed from both hooks.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of this invention to provide a button collet that has a peripheral sidewall so constructed as to offer a markedly improved grip on the cover material as compared to collets of the prior art, thereby reducing the possibility of button separation or "popping."

It is a further object of this invention to provide a button collet that has a unique hook structure on which a pre-tied tufting loop can be snapped, and wherein the hook structure is so designed to prevent manipulative removal of the tufting loop therefrom.

It is an additional object of the present invention to provide a molded plastic button collet with the foregoing characteristics which is capable of assembly with button shells of conventional design and in conventional button- making machinery.

In accordance with the foregoing objects the collet of the present invention has a peripheral side that surrounds the central axis of the collet and includes a series of annular, axially spaced shoulders of progressively increasing diameter that are joined respectively by generally radial surfaces so as to form a series of annular steps against which the button cover material

may be pressed as a result of clinching of the sidewall of the button shell to the collet. The edges of the steps grip the cover firmly. The interfit between the shell, collet and cover is such that a significantly greater amount of force is required to separate the button components than if a conventional steel collet with a smooth conical sidewall is used.

There is further provided on the collet a stem having a hook structure comprising a pair of snap locks which are in mechanical series, so to speak, in that a pre-tied tufting loop must be snapped past both locks in sequence in order to seat in its intended position in the recess of the hook. These dual snap locks are formed first by cooperating shank and hook portions of the stem, and secondly by a tab and the hook portion. To insert the tufting loop requires passage through the second mentioned snap lock and then passage through the first mentioned snap lock. This, however, may be easily done by relatively unskilled workers. However, once the tufting loop is in place it is extremely difficult to remove since this requires passing the hook back through both snap locks. In addition, and of considerable importance, is the fact that the second mentioned snap lock has a barrier that effectively prevents persons tampering or "fiddling" with the button from passing an additional length of the tufting loop through to the hook recess so as to unhook the loop therefrom.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** is an elevational view of a tufting button constructed in accordance with and embodying the present invention, the button shell and cover material being shown in cross-section;

FIG. **2** is a fragmentary portion of FIG. **1** on an enlarged scale;

FIG. **3** shows a fragmentary elevational portion of the collet at the peripheral side thereof;

FIG. **4** is an enlarged fragmentary portion of FIG. **1** and showing the stem portion of the collet with a tufting loop therein;

FIG. **5** is an elevational view as seen from the right hand side of FIG. **4**;

FIG. **6** is a sectional view taken along line **6—6** of FIG. **4**;

FIG. **7** shows a sectional view through a cushion and illustrates a step in assemblying a pair of loop-connected tufting buttons to the cushion; and

FIG. **8** is a sectional view through the cushion and showing the tufting buttons installed therein.

DETAILED DESCRIPTION

Referring now in more detail to the drawing, there is shown a collet **1** comprising a one piece plastic body **3**, of nylon or other suitable material. The body **3** has a base **5**, a top **7**, and a peripheral side **9** that joins the base and top and surrounds the central axis of the collet, which centeral axis coincides with the surface **11**. Typically tufting buttons are of circular configuration and thus the base **5** and top **7** will appear circular when viewed normal thereto.

The peripheral side **9** is formed with a series of axially spaced, annular shoulders **13, 15, 17** presented toward the base and of progressively increasing maximum diameter in the direction toward the top **7**. These annular shoulders **13, 15, 17** are preferably parallel with both the base **5** and top **7**. The annular shoulders **13, 15, 17** are respectively joined at their outer diameters by radi-

ally presented, annular surfaces **19, 20, 21.** An additional annular surface **23** extends from the inner diameter of the shoulder **13** to the base **5.** The radially presented surfaces **19, 20, 23** are preferably substantially cylindrical whereas the surface **21** may be conical, flaring outwardly at an angle of the order of 12°. It is within the scope of the present invention to make all of the surfaces **19, 20, 21, 23** cylindrical or even somewhat conical, the significant thing being that these radially presented surfaces intersect the respective annular shoulders to form a series of concentric annular steps with outer diameter circular edges **25, 27, 29** of progressively increasing diameter. The number of annular shoulders and radially presented surfaces used to form the circular edges may vary from that specifically disclosed herein without departing from the principles of the present invention.

Cooperating with the collet **1** to form the finished button is a metal button shell **31,** having a generally circular wall or dome **33** above the collet top **7.** Marginally of the dome **33** is an annular skirt **35** that surrounds the peripheral side **9** of the collet. Also provided is a cover **37** of cloth, plastic, etc. that overlies the dome **33** and skirt **35** and has a marginal portion **39** that is wrapped around the lower edge **41** of the skirt **35** and extends upwardly between the skirt **35** and peripheral side **9,** terminating in the space between the top **7** and the inside surface of the dome **33.** The shell **31** with the cover **33** is clinched to the collet **1** by suitable dies of known design. During the clinching operation the skirt **35** is die-formed into a substantially conical configuration whereby the marginal portion **39** of the cover **37** is firmly pressed against the peripheral side **9** of the collet. The pressure of the metal of the skirt **35** forces the marginal portion **39** against the circular edges **25, 27, 29.** The shoulders **13, 15, 17** in cooperation with the surfaces **19, 20, 23** provide relief regions for receiving the flow of cover material, as shown in FIG. **2.** The amount of flow of cover material and the extent to which one or more of the circular edges **25, 27, 29** presses into the cover material will depend upon the thickness of the cover material. In any event, the foregoing structure provides an exceedingly strong resistance to slippage of the cover material relative to the collet. As a result, resistance to separation of the shell and cover from the collet is significantly increased.

Projecting downwardly from the base **5** is a stem, generally designated at **45.** The stem **45** includes a substantially axial shank portion **47** of substantially rectangular cross-section which terminates in an upwardly inclined resilient hook portion **49,** the upper end of which has an arcuate bend **51** and a termination **53.** The lower regions of the shank portion **47** and hook portion **49** are somewhat thinned out to leave an arcuate rib **55.** As pointed out above, the surface **11,** which is a surface of the shank portion **47,** is coincident with the central axis of the collet, and such axis is centered between opposite sides of such surface, viewed from FIG. **5.** The surface **11** and termination **53** provide a gap **57** through which a tufting loop **59** is adapted to pass. When seated in its proper place, the tufting loop **59** will be disposed in the notch or recess **61** formed by the shank portion **47** and the hook portion **49.**

Also depending from the base **5** (and which may form part of the stem **45**) is a resilient tab **63** having a termination **65** that is adjacent to the curved bend **51** whereby to from a gap **67** therebetween. The gap **67** is spaced from the gap **57** and opens into an additional notch or recess **69.** The gaps **57, 67** are designed to be smaller than the diameter of the thread of the tufting loop **59.**

The resilient tab **63** and the bend **51** of the hook portion **49** provide a snap lock past which the tufting loop **59** passes as the loop is assembled with the collet. The hook portion **49** also cooperates with the shank portion **47** to provide an additional snap lock past which the tufting loop moves to seat the tufting loop in its intended position, namely within the recess **61.** Thus, the pretied tufting loop **59** is snapped through the gap **67** and is then snapped through the gap **57** which, as will be apparent from FIG. **4,** can be done without reversal of movement of the direction of tufting loop **59.** This can be done quite easily in any suitable assembly fixture. This provides an assembled button **71** (FIGS. **7** and **8**) and tufting loop preparatory to mounting on a resilient cushion **73.**

Utilizing a conventional needle (not shown) the tufting loop **59** is pushed through the cushion **73** so that the button **71** is forced against a side **75** of the cushion causing it to distend. The opposite end of the tufting loop is then held in a spread-open condition by a suitable tool **77** following which an additional button **71'** with a similar hook structure is snapped in place. The tool **77** is then withdrawn from the tufting loop leaving the two buttons **71, 71'** in position with tension on the tufting loop **59,** as shown in FIG. **8.** Since the tufting loop is exceedingly close to the central axis of the collet, the pull on each button is axial, which aids in keeping the button seated flush against the surface of the cushion.

By pressing against a side of the cushion **73** (as by a person seated thereon) it is possible to expose a stem **45** of a button, putting it in a position so that it can be subject to manipulation or tampering. It has been found to be extremely difficult for a person to work the tufting loop past the gap **57,** but even if this were done, the tufting loop would be in the recess **69,** and would be prevented from separating from the button by reason of the snap lock formed by the tab **63** and the arcuate bend **51.** In addition, the tab **63** and bend **51** form a barrier or obstruction that prevents manipulating a length of tufting loop through the gap **67** and into the recess **69.** Even if this were done that length of tufting loop would have to be passed through the gap **57** to permit removal of the tufting loop from the button. Therefore, both snap locks prevent tampering resulting from an attempt to pass a second length of the tufting loop through to the recess **61** as well as to prevent working of the loop back out of the recess **61.**

The invention is claimed as follows:

1. In a button collet for a tufting button comprising a body with a central axis, said body having a base, a peripheral side surrounding said axis and joined to said base, and means projecting from said base and including a stem having a recess for receiving a length of a tufting loop; an improvement in said means that comprises first resilient means forming a first snap lock for retaining the tufting loop on the stem, said first resilient means including a hook cooperating with an adjacent shank that forms part of said projecting means, and second resilient means forming a second snap lock for retaining the tufting loop assembled with the collet if the loop is accidentally withdrawn from said recess and past the first snap lock and for providing an obstruction

against the entry of an additional length of the tufting loop into said recess, the second and first snap locks thereby being in mechanical series so that the tufting loop must be snapped past both locks in sequence to position the tufting loop in said recess, and the snap locks furthermore being relatively positioned such that the tufting loop can be snapped past the two snap locks without reversal of direction of movement of said tufting loop, said first snap lock being axially between said second snap lock and recess.

2. A button collet according to claim **1** in which said peripheral side has a series of annular steps of progressively increasing diameter in the direction away from said stem.

3. A button collet for a tufting button comprising a body having a central axis and a base, a stem projecting from said base, a resilient hook joined to the end of said stem that is remote from said base and cooperating therewith to form a recess, said hook having an arcuate bend and a termination spaced from said stem and at the free end of said arcuate bend to provide a first gap through which a tufting loop is adapted to snap upon deflection of the hook away from said stem a sufficient amount to permit passage of such tufting loop into said recess, and a resilient tab joined to said base and having a termination spaced from said arcuate bend and remote from said hook termination to provide with said arcuate bend a second gap through which the tufting loop snaps, upon sufficient deflection of said tab, prior to snapping through said first-mentioned gap, said gaps being positioned such that the tufting loop can be snapped through said gaps without reversal of direction of movement of said tufting loop, said first gap being axially between said second gap and said recess.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,829,935 Dated August 20, 1974

Inventor(s) Jack G. Critchfield

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 2, line 57, "centeral" should be "central"

Col. 3, line 67, "from" should be "form"

Signed and Sealed this

Seventh Day of September 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks