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J. W. BOWERSOX

2,313,616

RIVET

Original Filed Jan. 22, 1937

Fig. 1

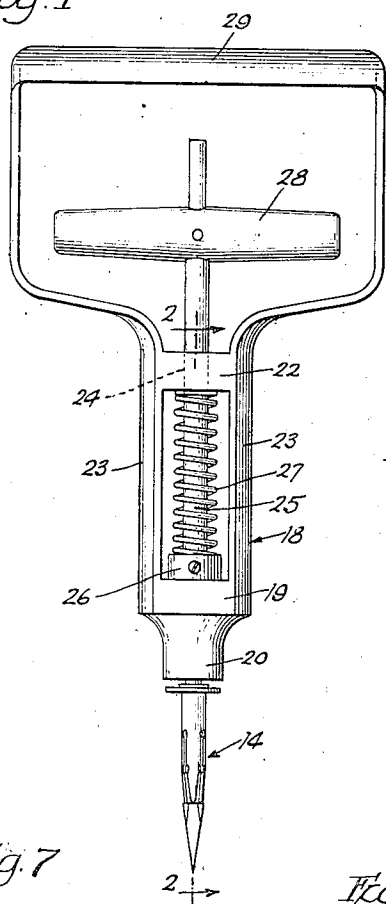


Fig. 2

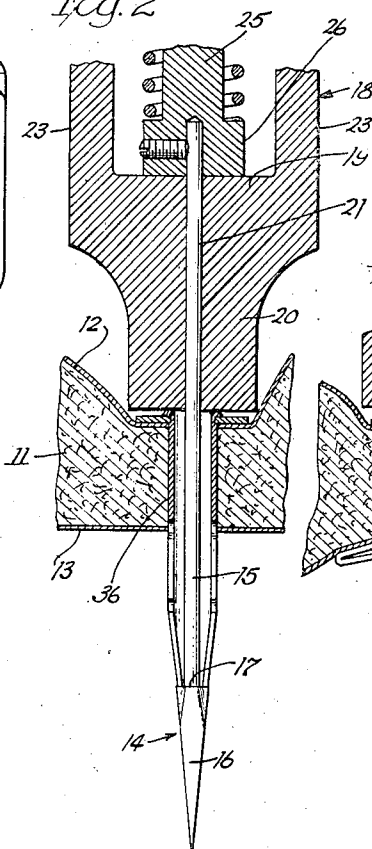


Fig. 3

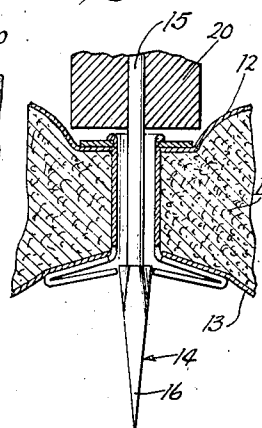


Fig. 7

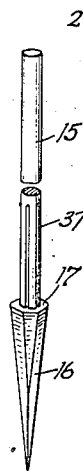


Fig. 4

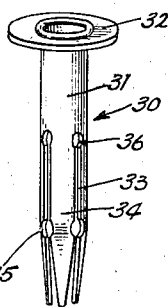


Fig. 6

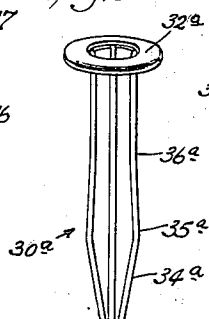
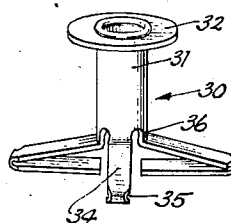


Fig. 5



INVENTOR.
Joseph W. Bowersox
BY
Parker, Carlson, Pinyan & Hubbard
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,313,616

RIVET

Joseph Wallace Bowersox, Glen Ellyn, Ill.

Original application January 22, 1937, Serial No. 121,740. Divided and this application December 22, 1939, Serial No. 310,488

3 Claims. (Cl. 85—40)

The present invention relates to a new and improved rivet and has particular reference to a rivet adapted for blind tufting mattresses, cushions, automobile seats, davenports and other upholstered articles where tufting is desirable, and adapted also for securing various kinds of materials together, such, for example, as paper files and superimposed layers of fabric or leather.

One of the objects of the present invention resides in the provision of a novel rivet which is capable of being inserted through the material to be tufted or fastened without unnecessarily cutting or injuring the material and without necessarily providing a preformed hole to receive the rivet.

Further objects and advantages will become apparent as the description proceeds.

In the accompanying drawing, Figure 1 is a side view of a tufting device by means of which a rivet embodying the features of my invention is adapted to be inserted through the material and clinched.

Fig. 2 is a fragmentary sectional view on an enlarged scale of the device taken along line 2—2 of Fig. 1 and illustrating one step in the tufting operation.

Fig. 3 is a view similar to Fig. 2 and illustrating another step in the operation.

Fig. 4 is a perspective view of one form of rivet or tufting element adapted for use with the device and embodying the features of my invention.

Fig. 5 is a perspective view illustrating the shape of the rivet or tufting element after the tufting operation.

Fig. 6 is a perspective view of a modified form of rivet or tufting element.

Fig. 7 is a perspective view of a modified form of awl forming part of the tufting device, and adapted for use with the rivet or element of Fig. 6.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail the preferred embodiments, but it is to be understood that I do not thereby intend to limit the invention to the specific forms disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more particularly to the drawing, the tufting device shown is especially adapted for mattresses with a resilient core, such as inner-spring mattresses having multiple-ply quilted top and bottom portions, but it will be evident that

the device may be used advantageously on many other upholstered articles, such as cushions, pads and seats, where tufting is desired, or generally for quilting two or more layers of material where one side is not conveniently accessible. To illustrate the tufting operation, a section of the quilted wall of an inner-spring mattress is shown in Figs. 2 and 3. This mattress wall section comprises a relatively thick layer 11 of compressible padding material such as cotton, an outer fabric tick or covering 12, and an inner fabric lining 13. It will be understood that the lining 13 is not accessible from the exterior since mattresses customarily are fully closed before being tufted.

The tufting device comprises an awl or needle 14 having an elongated stem 15, and a sharply pointed head 16 on one end of the stem and adapted to be forced through the mattress wall from the exterior to the interior. The pointed head 16 may be provided in any suitable form, and is herein shown as tapered, with a triangular tip and a hexagonal base, to define longitudinal edges facilitating penetration of the mattress wall by the awl 14. The base of the awl head 16 is larger than the stem 15 so as to define an outwardly facing transverse shoulder 17.

The tufting device also comprises a suitable hollow body 18 in which the awl stem 15 is operatively mounted. In the present instance, the body 18 has an end wall 19 formed with a tubular extension 20 which constitutes a riveting abutment, and formed with an axial bore 21 in which the awl stem 15 is slidably disposed. The body 18 also has a transverse wall 22 connected by spaced parallel side members 23 to the wall 19, and formed with a guide bore 24 aligned with the bore 21 and slidably receiving an actuating plunger 25 in one end of which the awl stem 15 is removably secured.

The awl 14 may be reciprocated by any suitable means, and is especially adapted for manual actuation. To this end, a stop collar 26 is formed on one end of the plunger 25, and a coiled compression spring 27 is disposed about the plunger in end abutment with the collar and the wall 22. It will be evident that the spring 27 tends to hold the collar 26 against the wall 19, and thereby to maintain the awl 14 in its outermost position of movement. A finger grip 28 secured to the outer end of the plunger 25 affords means for moving the awl 14 against the action of the spring 27. The body 18 has a hand grip 29 to facilitate use of the tufting device and manipulation of the finger grip 28 with one hand.

Referring to Figs. 1 to 5, the tufting element

constituting the exemplary embodiment of the invention is in the form of a metal rivet 30 having a tubular shank 31 with a head 32 rigid on one end. The other end portion of the shank 31 is formed with a plurality of longitudinal slots 33 defining peripherally spaced arms or prongs 34 pointed at their free ends. The prongs 34 are weakened intermediate their ends, and preferably also at their junctures with the solid portion of the shank 31, as by means of notches 35 and 36 to define transverse points of bend.

In use, the rivet 30 is slipped over the awl point 15 onto the shank 15, the ends of the prongs 34 flexing outwardly and then snapping inwardly into abutment with the shoulder 17. The length of the awl shank 15 is such that when the collar 26 engages the wall 19 the rivet head 32 is closely adjacent the abutment 20, and the length of the nonslitted portion of the rivet shank 31 is approximately equal to the compressed thickness of the mattress wall after tufting. Where the material to be tufted or quilted is of a different thickness, an awl 14 and rivet 30 of corresponding lengths may be substituted. Initially, the ends of the prongs 34 are bent slightly about the notches 35, as illustrated in Figs. 2 and 4, so as to conform to the taper of the awl point 16 and to facilitate clinching.

The awl 14 with the rivet 30 thereon is now inserted through the mattress wall, thereby forming a hole 36 snugly embracing the shank 31. It will be seen that the prongs 34 by reason of their engagement with the shoulder 17 are guided by the awl point 16 without interference through the mattress wall as shown in Fig. 2. Pressure is now applied through the medium of the abutment 20 against the head 32 of the rivet 30, and thereby against the outer surface of the mattress wall to compress the latter approximately to the length of the solid portion of the shank 31. In this step, the lining 13 and the inside of the mattress wall, which is supported by the mattress core, remains substantially flat. While the mattress wall is held compressed, the awl 14 is pulled outwardly relatively to the body 18 by means of the finger grip 28, and in the course of this movement, the shoulder 17 acting against the ends of the prongs 34 clinches the latter by bending them radially outwardly at the weakened junctures 35 and back on themselves at the notches 35. After the rivet 30 is clinched, the awl 14 may be withdrawn through the shank 31, the ends of the prongs 34 slipping over the shoulder 17 as illustrated in Fig. 3. When the tufting device is removed, relieving the pressure on the rivet 30, the head 32 and the bent prongs 34 retain the mattress wall under compression, and the pull of the tick 12 results in flexure of the lining 13 to complete and center the tuft.

It will be evident that the tuft does not require more than one perforation of the mattress wall in which it is secured, nor perforation of the opposed mattress wall, as where a double end needle is employed, and hence avoids unnecessary cutting of the tick. Also, the tuft is self-contained in one wall, instead of extending completely through the mattress, and hence will not pull out

by reason of tension on the tick when the mattress is bent. The tuft is held securely in place and the tufting element when in the form of a tubular rivet 30 as shown constitutes a ventilating eyelet. The tufting device permits easy and convenient clinching of the rivet from one side of the mattress, and in general results in a substantial saving in time, labor and expense.

A modified form of tufting rivet 30^a is illustrated in Fig. 6. The rivet 30^a has a head 32^a, and a plurality of wire prongs 34^a, four being shown. To define the points of bend, the prongs 34^a are bent inwardly at 35^a, and preferably are bent outwardly slightly at 36^a. If desired, the shank 15 of the awl 14 may be formed adjacent the shoulder 17 with longitudinal grooves 37 (see Fig. 7) in which the end portions of the prongs 34^a are adapted to rest.

It will be evident that I have provided a novel rivet or tufting element for quickly, conveniently and securely tufting upholstered articles. The rivet is particularly useful for blind tufting, where one side is inaccessible or not visible. In general, the rivet may also be adapted for securing various kinds of materials together, for example, paper files and superimposed layers of fabric or leather.

This application is a division of my copending application Serial No. 121,740, filed January 22, 1937, for Rivet setting device which issued as Patent No. 2,205,772.

I claim as my invention:

1. A rivet comprising, in combination, a head, and a plurality of laterally spaced wires constituting prongs secured to said head, each wire being bent outwardly at one longitudinal point and inwardly at another longitudinal point to define lines of bend when said rivet is placed under longitudinal compression, said prongs being resilient and adapted to spread and contract upon insertion of a shouldered awl used for creating such longitudinal compression.

2. A rivet having a tubular shank, an annular head rigid with and encircling one end of said shank, a plurality of peripherally spaced yieldable prongs integral with and extending longitudinally from the other end of said shank, said prongs being weakened at their respective points of juncture with said shank and also being weakened intermediate their ends, the free ends of said prongs being tapered and also being bent to converge at their ends.

3. A rivet, comprising in combination, a head, and a plurality of spaced wires constituting prongs secured to said head, each wire being bent outwardly at one longitudinal point and inwardly at another longitudinal point to define lines of bend when said rivet is placed under longitudinal compression, said other longitudinal point being slightly closer to the free end of said wire than to said one longitudinal point, said wires being resilient and adapted to be spread by a shouldered awl and to contract over the shoulder of said awl after movement thereof past the free ends of said wires.

JOSEPH WALLACE BOWERSOX.