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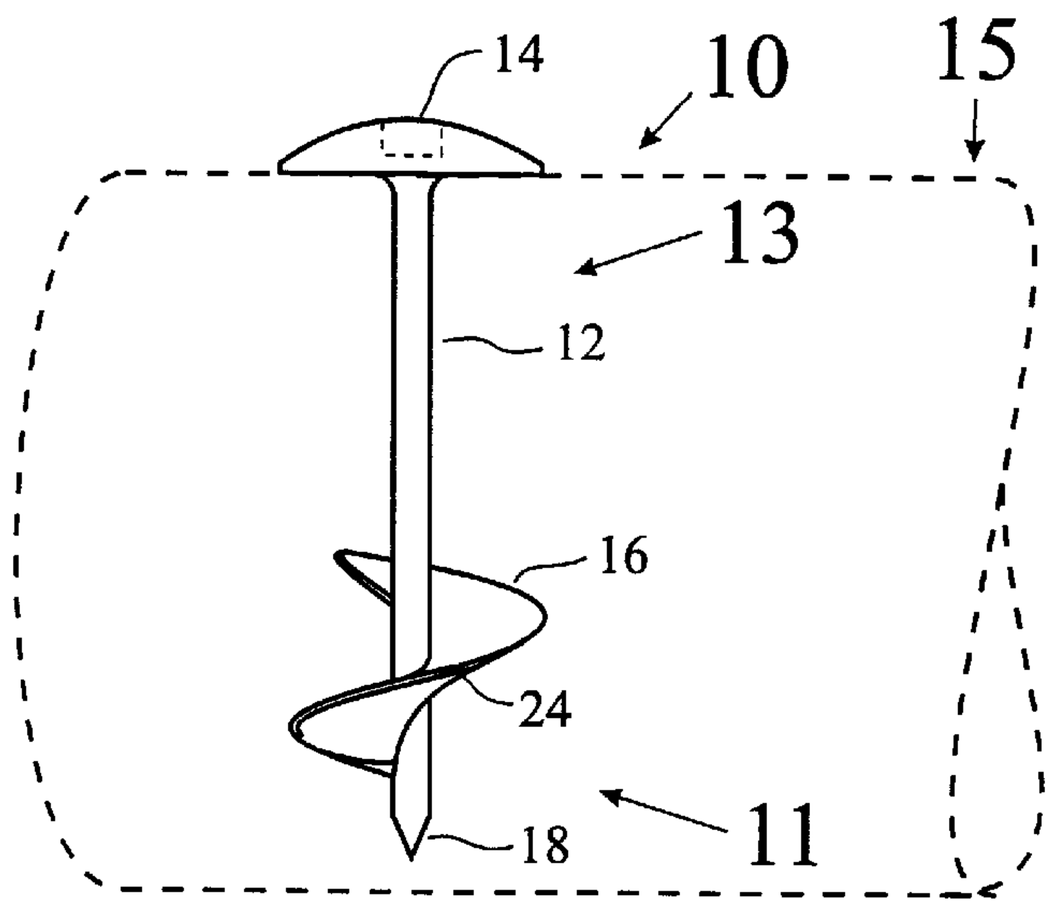
(54) **ORGANE D'ASSEMBLAGE AVEC BOBINE PLANE**

(54) **FASTENER WITH PLANAR COIL**



(57) A fastener includes a shaft, means for turning said shaft presented at one end of said shaft, and planular helical coil disposed along said shaft. The fastener provides for a construction that is adaptable for creating a releasable attachment with a target member comprising a soft buoyant resilient material such as a thermoplastic foam.

FASTENER WITH PLANULAR COIL

Abstract of the Disclosure

A fastener includes a shaft, means for turning said shaft presented at one end of said shaft, and planular helical coil disposed along said shaft. The fastener provides for a construction that is adaptable for creating a releasable attachment with a target member comprising a soft buoyant resilient material such as a thermoplastic foam.

Description

FASTENER WITH PLANULAR COIL

Field of Invention

This invention relates generally to a fastener releasably securable to a target member, and more particularly to a screw releasably securable to a thermoplastic member.

Background Art

Screws releasably securable to wooden, stone, or metal target members are well known. In their conventional embodiment, said screws generally comprise a shaft, turning means disposed at one end of said shaft, and thread co-axially disposed on said shaft.

However, said conventional screws cannot be adequately secured in a releasable fashion to certain target members having a particular shape, orientation or composition. Consequently, specialized attaching structures have been developed and made known.

For example, U.S. Patent No. 4,463,753 discloses a compression bone screw for repairing a fibular bone fracture having a shaft, tool interengaging means at one end of said shaft, distal thread disposed at the distal portion of said shaft, intermediate portion of said shaft having a substantially smooth surface, and proximal thread disposed at the proximal portion of said shaft.

U.S. Patent No. 4,403,895 provides for a retainer for securing a floor mat to the carpet layer and padding layer, if any, installed on the floor of a vehicle. Said retainer includes a tapered shank having a self-piercing point at its lower end; external spiral high lead disposed along said shank; partial shoulder adjacent to the lower end of said shank; and full shoulder adjacent the upper end of said shank. Since the distance between said partial shoulder and said full shoulder is less than the thickness of said carpet layer, said carpet layer is compressed between said partial shoulder and said full shoulder to create a demountable attachment between said carpet layer and said retainer when said retainer is rotated into said carpet layer.

Said conventional screws are not an effective means for creating a releasable attachment with a target member comprised of a soft buoyant resilient material such as a thermoplastic foam because of the relatively low structural integrity of soft buoyant resilient materials such as thermoplastic foam. Consequently, there is a need for a fastener having a construction that is particularly applied to create a releasable attachment with a target member comprising a soft buoyant resilient material such as a thermoplastic foam.

Disclosure of Invention

In accordance with one aspect of the invention, there is provided a fastener releasably securable to a target member comprising a shaft, means for turning said shaft presented at one end of said shaft, and planular helical coil disposed along said shaft.

In accordance with another aspect of the present invention, there is provided a screw releasably securable to a thermoplastic member comprising a shaft rotatable about an axis of rotation, head which includes a turning means at one end of said shaft, and planular helical coil co-axially mounted on said shaft.

In accordance with still another aspect of the invention, there is provided a screw releasably securable to a thermoplastic member comprising a rotatable shaft; head disposed at one end of said shaft which includes a turning means for turning said shaft in a first direction to secure said screw in to said thermoplastic member and for turning said shaft in a second direction to release said shaft from said thermoplastic member; said shaft including a locking ridge to inhibit rotation of said screw in said second direction when said thermoplastic member is engaged by said screw; and at least one planular helical coil disposed on said shaft which includes a rounded helical edge to minimize destructure of said thermoplastic member; and locking means comprising a straight radial edge disposed on said planular helical coil which further impedes rotation of said screw in said second direction.

In accordance with a further aspect of the invention, a screw releasably securable to a thermoplastic member comprising a shaft rotatable about an axis of rotation, means for turning said shaft at one end of said shaft, surface disposed outwardly from said shaft to define a helical edge for insertion into said thermoplastic member, and wherein said surface resists axial withdrawal of said screw from said thermoplastic member.

Brief Description of Drawings

Fig. **1** is a side view of the first preferred embodiment of the fastener;

Fig. **2** is a side view of the first preferred embodiment of the fastener at a 45-degree angle;

Fig. **3** is a side view of the second preferred embodiment of the fastener.

Fig. **4** is a cross-sectional view of the planular helical coil of said fastener at a point of the shaft adjacent to the lower extremity of said planular helical coil.

Fig. **5** is a partial side view of the fastener in which the turning means has wings.

Fig. **6** is a top view of the turning means of the fastener showing variations of the turning socket thereof.

Fig. **7** is a partial side view of the fastener in which the bottom of the turning means includes a plurality of spikes for biting into the surface of the target member.

Best Mode for Carrying Out the Invention

In the description which follows, like parts are marked throughout the specification and the drawings with the same respective reference numerals. The drawings are not necessarily to scale and in some instances proportions may have been exaggerated in order to more clearly depict certain features of the invention.

Referring to Fig. **1** there is illustrated in a side view, a fastener **10** in accordance with the first preferred embodiment of the present invention. Said fastener **10** includes a shaft **12**, turning means **14** presented at one end of said shaft **12** adjacent to the top of said shaft **12** for turning said shaft, planular helical coil **16** disposed along said shaft, and shaft end **18** presented at another end of said shaft **12**. Said shaft end **18** can be pointed, as in the case of the first preferred embodiment of the fastener shown in Fig. **1**, or rounded or straight, as the case may be.

When said shaft end **18** is brought into contact with a target member **15** comprising a soft buoyant resilient material such as a thermoplastic foam, if said fastener **10** is turned in a first direction, the same is rotated into said target member **15**. When said fastener is turned in a second direction, said fastener is rotated out of said target member **15**.

As best shown in Fig. **2**, said planular helical coil **16** includes a cutting edge **20** disposed at the distal end **21** of said planular helical coil **16** for cutting into the target member **15** comprised of a soft buoyant resilient material such as a thermoplastic foam. When said fastener **10** is brought into contact with said target member **15** comprising a soft buoyant resilient material such as a thermoplastic foam and turned in said first direction, said cutting edge **20** cuts in to said target member **15**, consequently, said fastener **10** can be rotated into said target member comprising a soft buoyant resilient material such as a thermoplastic foam.

As shown in Fig. **2**, said planular helical coil **16** further includes a locking means **22** consisting of a straight radial edge disposed at the proximal end **23** of said planular helical coil **16**. Said locking means **22** inhibits the turning of said fastener **10** in said second direction once said fastener **10** has been rotated into said target member **15** because the soft buoyant resilient material, such as a thermoplastic foam, comprising said target member **15** decompresses adjacent to said locking means **22** so as to present a blocking mass impeding rotation of said fastener **10** in said second direction.

As best shown in Fig. **1**, said planular helical coil **16** also includes a rounded helical edge **24** for biting into said target member **15** when said fastener **10** is rotated into said target member **15** to minimize destructure of said target member.

Said shaft **12** can be smooth, as shown in Figs. **1** and **2**, or threaded as shown in Fig. **3**. In addition, as best shown in Fig. **4** which shows a cross-sectional view of said fastener, said shaft **12** can be fashioned to include a locking ridge **26** which further impedes rotation of said fastener in said second direction.

As shown in Fig. **5**, said turning means **14** can be adapted to include wings **27** to facilitate manual rotation of said fastener **10** without the use of a tool such as a screw driver for rotating said fastener **10**. In addition, as shown in Fig. **6**, said turning means **14** can be modified to include various forms of sockets. Lastly, said turning means **14** can be further adapted to include a means for biting into the surface of said target member when said fastener is rotated into said target member, such as a plurality of spikes **28** shown in Fig. **7** which extend downwardly from the bottom of said turning means **14** and are spaced apart

from said shaft **12**. Said spikes **28** engage the surface of said target member when said fastener is fully rotated into said target member so as to further secure the attachment of said fastener to said target member.

Both the first and second preferred embodiment of the present invention shown in Figs. **1**, **2**, and **3** include one planular helical coil disposed adjacent to the distal end **11** of said shaft **12**. However, other embodiments of the fastener are contemplated in which said planular helical coil is disposed at an intermediate position along said shaft **12**, for example, adjacent to the proximal end **13** of said shaft **12**. The invention disclosed herein is also adaptable to include more than one planular helical coil disposed along said shaft **12**, for example, one planular helical coil at said distal end **11** end of said shaft and another planular helical coil at the proximal end **13** of said shaft.

Various embodiments of the invention have now been described in detail. Since changes in and/or additions to the above-described best mode may be made without departing from the nature, spirit or scope of the invention, the invention is not to be limited to said details.

Claims

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A fastener releasably securable to a target member comprising:
   (a) a shaft;
   (b) means for turning said shaft presented at one end of said shaft; and
   (c) planular helical coil disposed along said shaft.

2. A fastener as claimed in claim 1, wherein another end of said shaft presents a distal end and wherein said planular helical coil is disposed at said distal end of said fastener.

3. A fastener as claimed in claim 1, wherein said planular helical coil presents a proximal and a distal end, said distal end in the region remote from said turning means and wherein said fastener further includes a cutting means comprising a cutting edge disposed at the distal end of said planular helical coil.

4. A fastener as claimed in claim 1, further comprising a locking means disposed at said proximal end of said planular helical coil.

5. A fastener as claimed in claim 4, wherein said locking means consists of a straight radial edge disposed at said proximal end of said planular helical coil.

6. A fastener as claimed in claim 1, wherein said planular helical coil has a rounded helical edge for biting into said target member to minimize destructure of said target member.

7. A fastener as claimed in claim 1, wherein said fastener is securable when turning said shaft in a first direction and releasable when turning said shaft in a second direction.

8. A fastener as claimed in claim 7, wherein said shaft includes a locking ridge for impeding rotation of said fastener in said second direction.

9. A fastener as claimed in claim 1, wherein said shaft is pointed.

10. A fastener as claimed in claim 1, wherein said shaft is threaded.

11. A fastener as claimed in claim 1, wherein said target member is comprised of a thermoplastic material.

12. A screw releasably securable to a thermoplastic member comprising:

(a) a shaft rotatable about an axis of rotation;

(b) head which includes a turning means at one end of said shaft;

(c) planular helical coil co-axially mounted on said shaft;

13. A screw as claimed in claim 12, wherein said planular helical coil is disposed along said shaft.

14. A screw as claimed in claim 12, which includes a locking means comprising a straight radial edge disposed on said planular helical coil to inhibit rotation of said screw when said thermoplastic member is engaged by said screw.

15. A screw as claimed in claim 12, wherein said planular helical coil has a rounded helical edge to minimize destructure of said thermoplastic member when said shaft is rotated into said thermoplastic member.

16. A screw as claimed in claim 12, wherein said shaft includes a locking ridge for inhibiting rotation of said screw when said thermoplastic member is engaged by said screw.

17. A screw as claimed in claim 12, wherein said shaft is pointed.

18. A screw as claimed in claim 12, wherein said shaft is threaded.

19. A screw releasably securable to a thermoplastic member comprising:

(a) a rotatable shaft;

(b) head disposed at one end of said shaft which includes a turning means for turning said shaft in a first direction to secure said screw in to said thermoplastic member and for turning said shaft in a second direction to release said shaft from said thermoplastic member;

(c) said shaft including a locking ridge to inhibit rotation of said screw when said thermoplastic member is engaged by said screw; and

(d) at least one planular helical coil disposed on said shaft which includes:

(i) a rounded helical edge to minimize destructure of said thermoplastic member; and

(ii) locking means comprising a straight radial edge disposed on said planular helical coil which impedes rotation of said screw in said second direction.

20. A screw releasably securable to a thermoplastic member comprising:

(a) a shaft rotatable about an axis of rotation;

(b) means for turning said shaft at one end of said shaft;

(c) a surface disposed outwardly from said shaft to define a helical edge for insertion into said thermoplastic member, and wherein said surface resists axial withdrawal of said screw from said thermoplastic member.

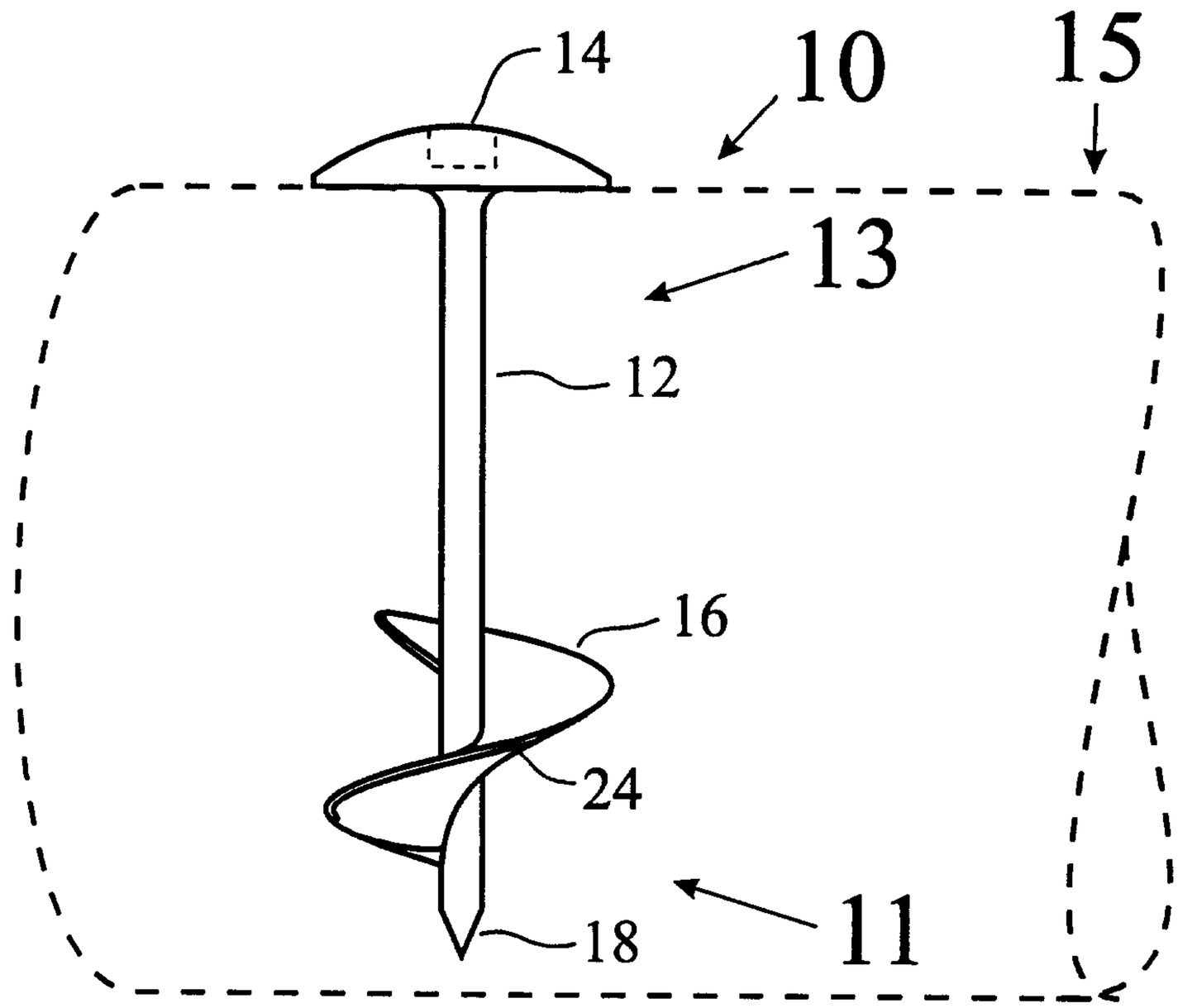


Figure 1

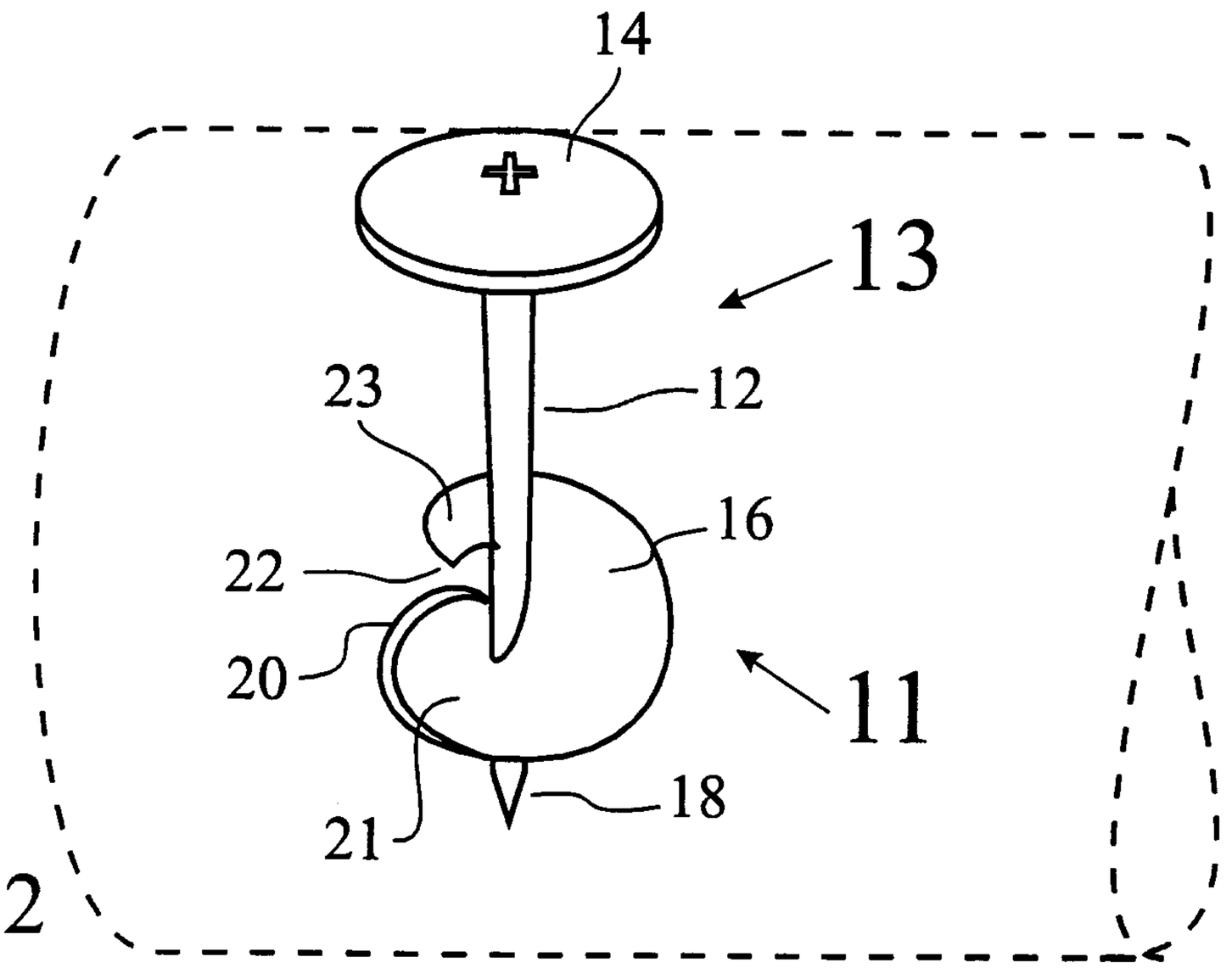


Figure 2

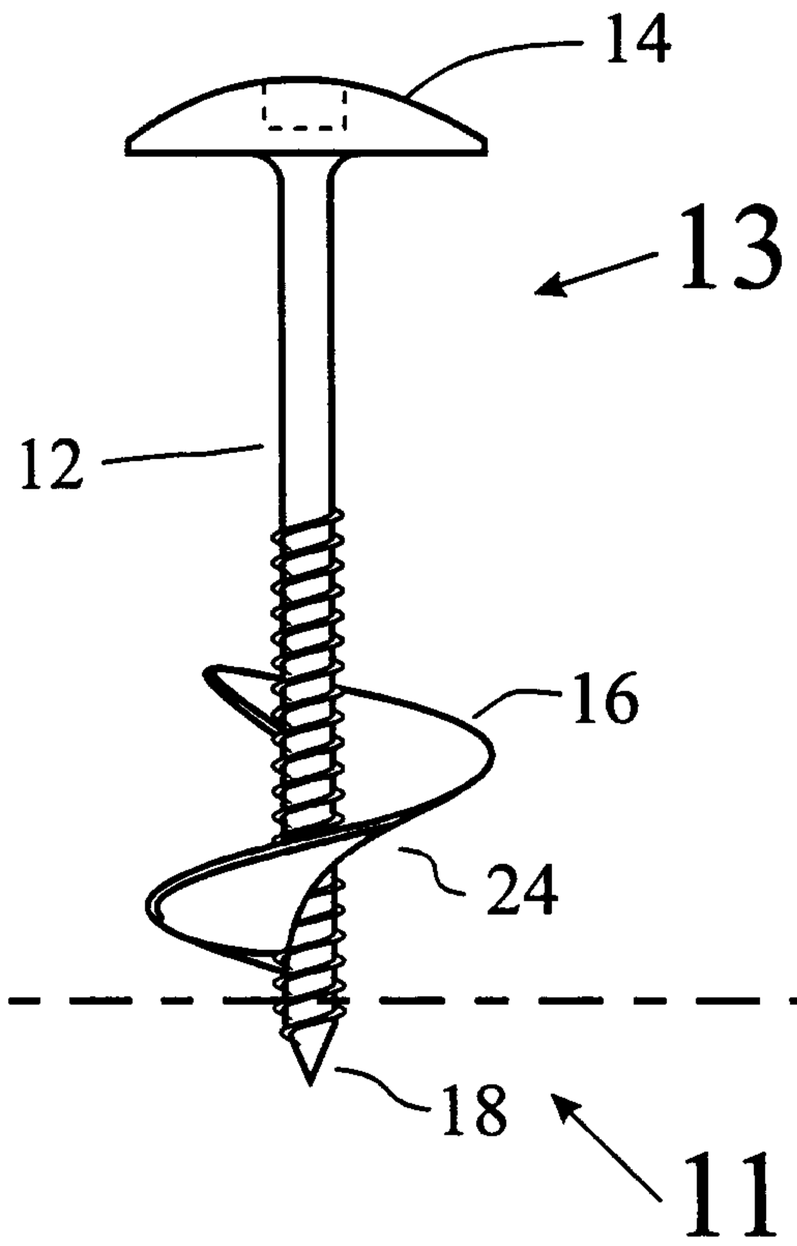


Fig. 4

Fig. 4

Figure 3

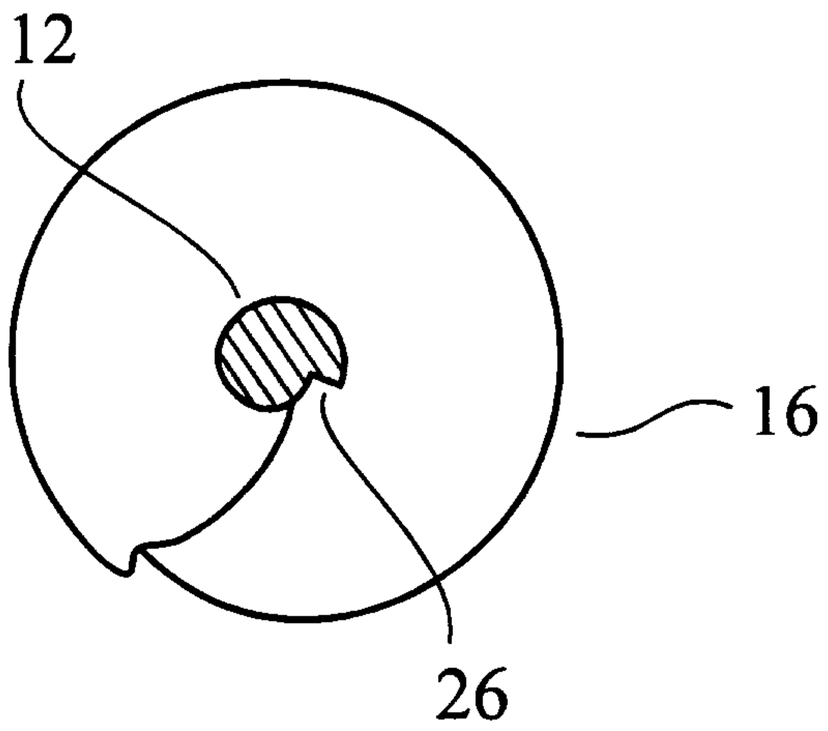


Figure 4

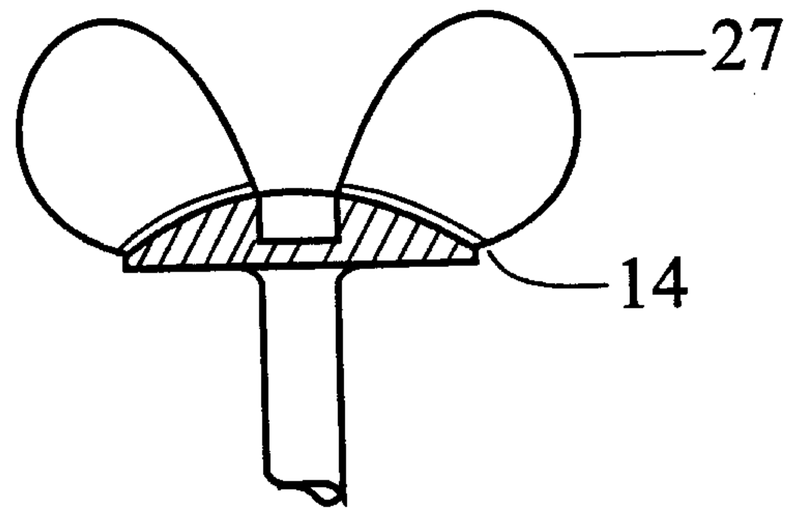


Figure 5

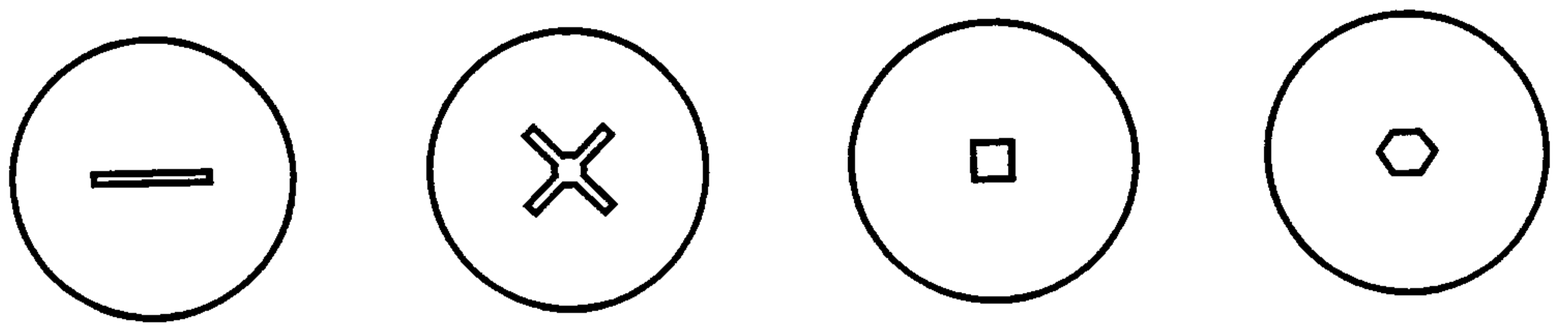


Figure 6

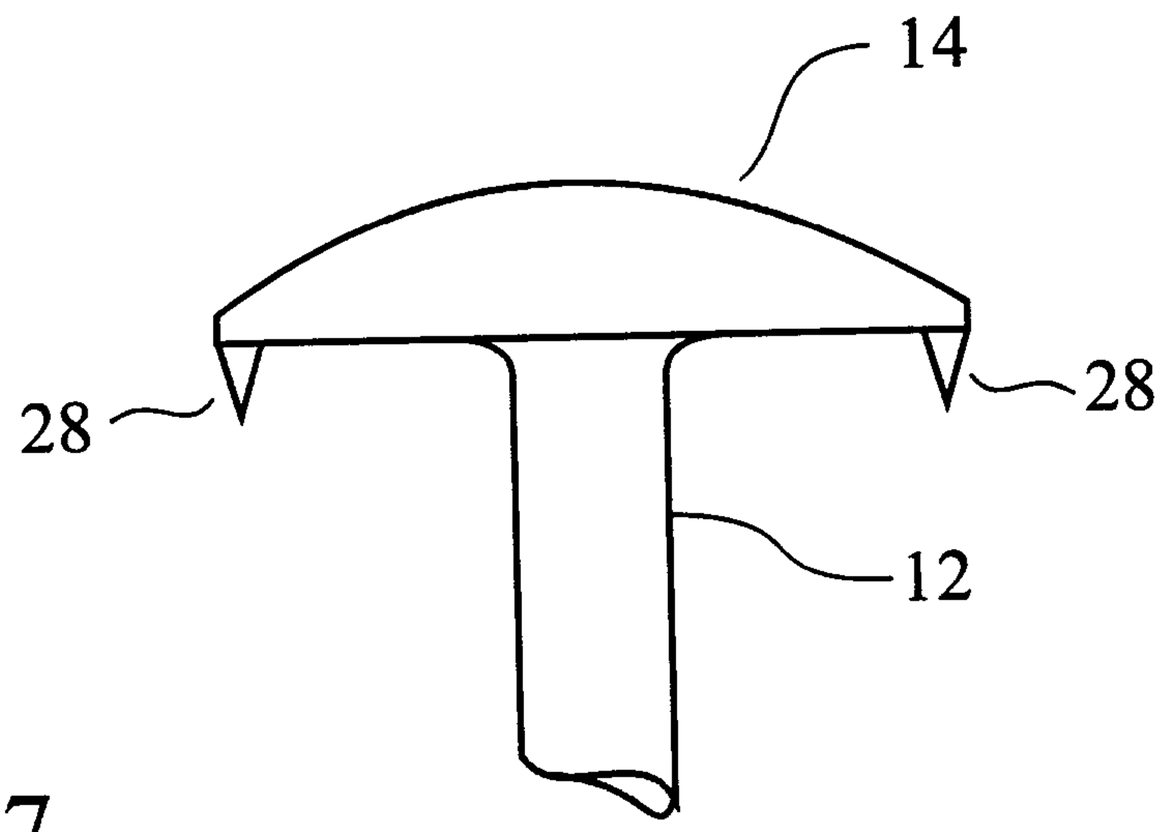


Figure 7