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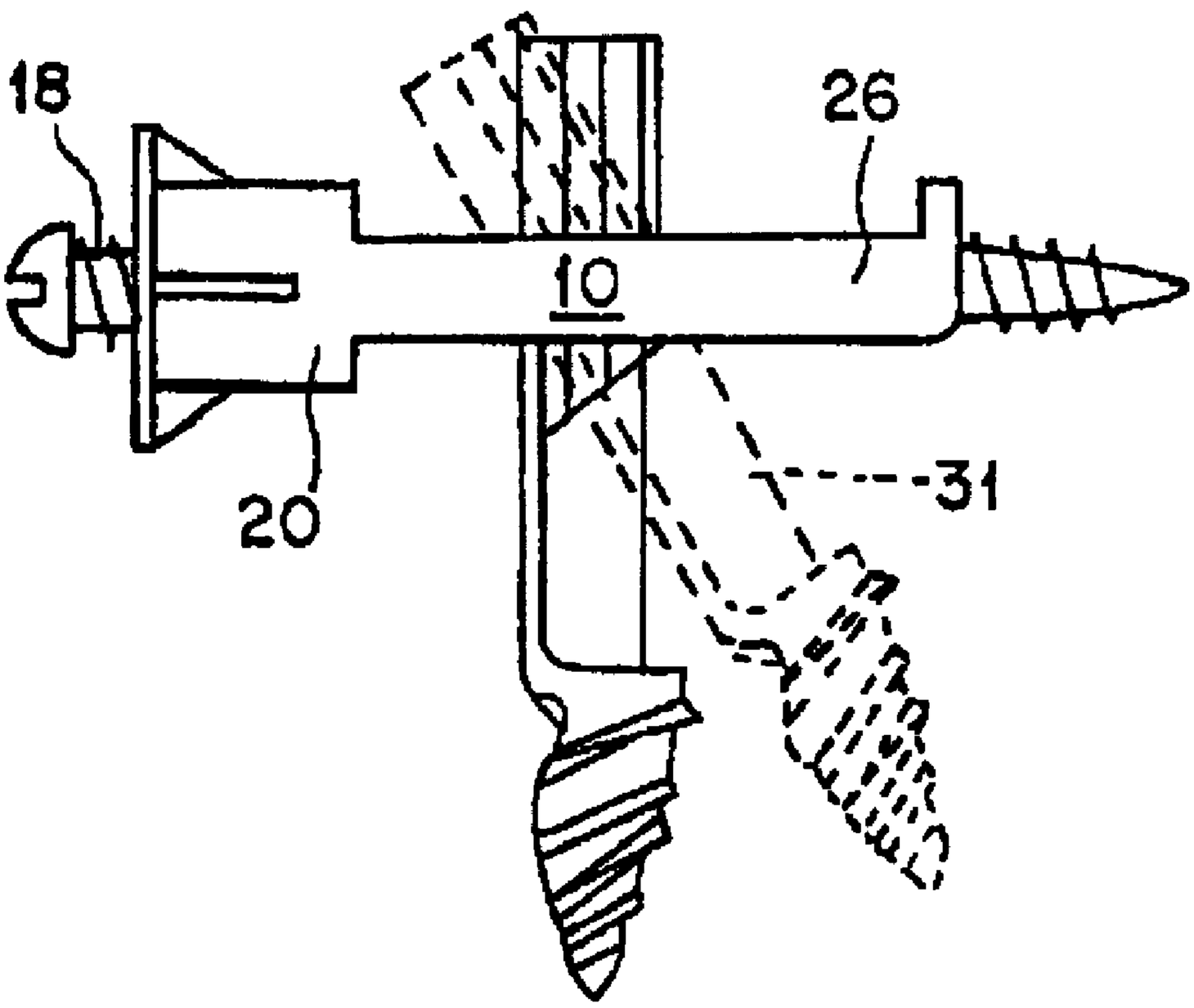
(54) Title: SCREW TIPPED ANCHOR ASSEMBLY



(57) Abrégé/Abstract:
A wall anchor assemmbly (10) has a collar (20) from which a pair of posts (26) extend. A bolt (18) can pass through the collar. An anchor member (31) is captive between the two pow. Ridges and channels slidable engage the anchor member with its longitudinal axis substantially parallel to the posts and transmit axial rotation from the collar to the anchor number. The anchor member has a tip for tapping through a wall and ramps for rotating the anchor member perpendicular to the posts. Screwing the bolt draws the anchor member against the wall to clamp the wall anchor assembly to the wall.

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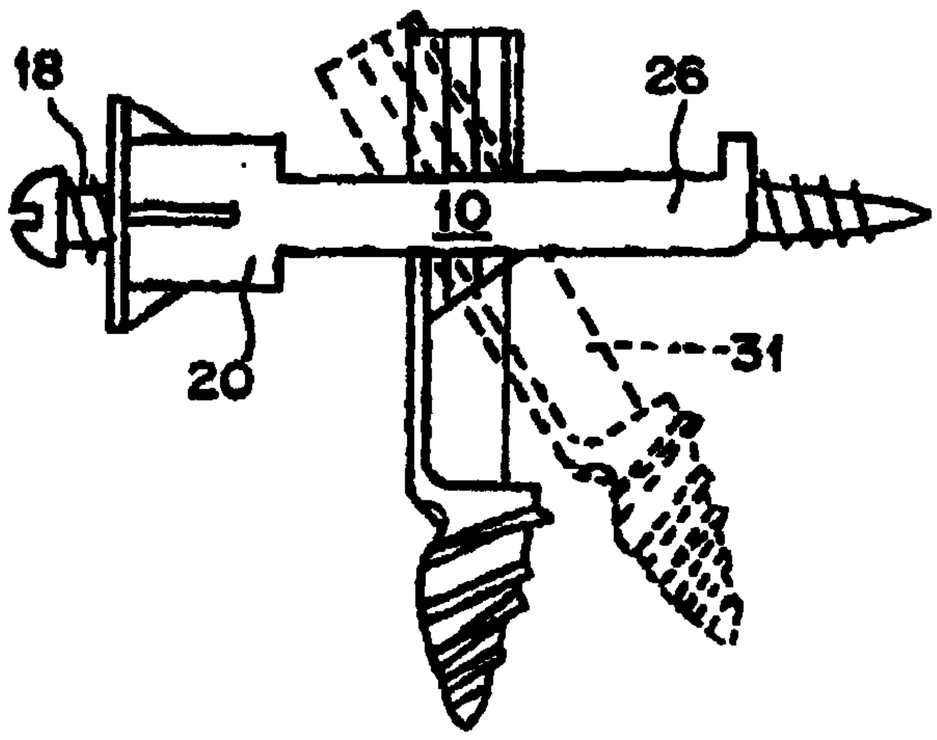
(54) Title: SCREW TIPPED ANCHOR ASSEMBLY

(57) Abstract

A wall anchor assembly (10) has a collar (20) from which a pair of posts (26) extend. A bolt (18) can pass through the collar. An anchor member (31) is captive between the two posts. Ridges and channels slidable engage the anchor member with its longitudinal axis substantially parallel to the posts and transmit axial rotation from the collar to the anchor member. The anchor member has a tip for tapping through a wall and ramps for rotating the anchor member perpendicular to the posts. Screwing the bolt draws the anchor member against the wall to clamp the wall anchor assembly to the wall.



Screw Tipped Anchor Assembly

Field of the Invention

This invention relates to anchoring devices for fastening objects to hollow walls of plaster board, masonry, brick and the like wherein elongated fasteners, such as bolts, screws, etc. may be attached for further attachment of a work piece or fixture. More particularly, the invention relates to so-called toggle bolt anchors which penetrate wall board material and the like with a nut or anchor portion extending along a first axis, the anchor portion being moveable to a position extending along an axis normal to the first axis so that a threaded bolt may engage the threads of the nut to draw the nut against the back surface of the wall board.

History of the Invention

In U.S. patent 5,221,169 (a copy of which is attached hereto and incorporated herein by reference) there is disclosed an anchor assembly for fasteners which comprises a pair of elongated wire-like legs supported in parallel relation with an anchor moveably supported on the legs and moveable from a first position substantially in alignment with the legs to a position transverse to the legs, and wherein the anchor defines tracks on each side to support the anchor on the legs. Pivotal movement of the anchor is achieved by the interaction between the tracks on the anchor and the legs upon which the anchor rides.

The problem with most anchors of the above type is that a hole has to be drilled in the wall before the anchor assembly can be inserted in the hole to dispose the anchor portion in the wall hollow to be drawn against the back surface of the wall. Drilling, especially in friable wall board material usually results in a damaged rear surface and thus a weakened wall. This results even

in the instance where a drill tip is applied to a leading end of an anchor in such an anchor assembly.

In all instances in the prior art of which I am aware, in such anchors, assembling of and interaction between the parts is complex and/or cumbersome.

Invention

The present invention is an improvement over the anchor assembly disclosed in U.S. 5,221,169 and provides a screw tip on an end of the anchor member of the anchor assembly. The legs which are integral with and extend distally from a hollow cylindrical body with a proximal flanged end, are structured as posts, as opposed to wire-like legs, so as to stabilize the anchor as the screw tip of the anchor screws into the wall when the assembly is rotated with a tool, such as a screwdriver for which the aperture at the proximal flanged end of the cylindrical body is formed as a tool receptor as well a fastener receptor. The screw tip is also formed with a flute which extends from the tip of the screw tip proximally to a channel which extends a distance sufficient to dispose of the wall material that is cut into the flute while the threads of the screw tip are taping the wall material which becomes compressed between the relatively high turns of the screw thread but less than if the material access flute had not been provided. Thus a clean cut through the wall material without exploding the material on the back side of the wall is ensured.

The Drawings

Figs. 1 is a side elevational view of the collar and posts of the anchor assembly of the invention;

Fig 2 is a section taken along the line A -A of fig 1;

Fig. 3 is a section taken along the line C- C of Fig. 1;

Fig. 4 is a section taken along the line B - B of Fig. 1;

Fig. 5 is a bottom plan view showing the flanged end of the collar and post portion of the assembly;

Fig. 6 is a front plan view of the screw tipped anchor portion of the anchor assembly of the invention;

Fig. 7 is a side plan view of the anchor portion of Fig. 6;

Fig. 8 is a rear plan view of the anchor portion of Fig. 6:

Fig. 9 is a section taken along the line A - A of Fig. 7:

Fig. 10 is a section taken along the line B - B of Fig 7;

Fig. 11 is an end view of the anchor of Fig.6;

Fig. 12 is a section taken along the line C- C of Fig. 7;

Fig. 13 is a side elevational view of the anchor of the invention in assembly and with a mock fastener head extending from the proximal end of the anchor assembly; and

Fig. 14 is a side elevational view of the assembly of Fig. 13 in "action" showing the positions of the anchor portion as it is pivoted to its anchoring position.

Description

The anchor assembly 10 includes a collar 20 having an aperture 22 dimensioned and configured to receive the shank portion of a bolt 18, or the like. A pair of posts, 24,26 extend integrally from the collar in parallel relation on either side of the post and collar portion of the assembly. The posts are connected to one another at their distal ends by a bent connecting end 28. The collar and aperture are configured to assure alignment between anchor member 31 and bolt fastener 18.

The anchor portion has forward and rearward tracks 35,36 disposed on opposite sides of the anchor portion which slideably engage the opposite sides of the posts as the anchor portion is initially moved forward by engagement of a forewardly moving bolt. The anchor portion is maintained in parallel relation with the posts by engagement of the ridges 40 and channels 50 on the posts and sides of the anchor portion respectively. When the anchor portion channels pass the end of the post ridges, the anchor is permitted to move from its position with its axis parallel with the posts to a position with its axis normal to the posts so that the bolt may be threaded in the threaded hole 60 of the anchor portion to draw the anchor portion against the back surface of the wall.

An internal ramp 70 is provided at the proximal end of the anchor portion to engage the end of the bolt resulting in the directing of the anchor portion out of parallel with the with the posts. External ramps 80 on either side of the anchor portion between the forward and rearward tracks 36,36, which slide on the edges of the posts, interact with the connection 28 between the posts to assure out of parallel relationship with the posts as well..

There is a space 100 between the foreward and rearward tracks on either side of the anchor portion equal to the width of the posts to permit the 90 degree axes displacement of the anchor portion and collar and post portion. Channels 101 within these spaces receive the post ridges 40 when the anchor axis is normal to the axes of the posts.

The anchor portion and the collar and post portions are press fit in the assembly process. The assembly can be made of various materials, metal or plastic.

A significant part of the invention os the provision of a screw tip 125 on the distal end of the anchor portion together with a flute 126 with a cutting

leading edge and which extends proximally to a channel 127. The leading edge 128 of the flute cuts the wall material which is deposited in the flute and given access to the channel thereby lessening the amount of wall board material which will be compressed between turns of the relatively high taping threads 129 of the screw tip and around the compression band 130 which runs between and parallel to the thread. The leading edge is distended and curves back at its proximal edge. This shape together with the screw threads draws the anchor through the wall material rather than pushing the material foreward as occurs with a drilling action

As in Fig. 2, protrusion 140 on ridge 40 of post 26 secures detent 142 (fig. 7) on channel 50 of anchor member 31.

Bolt 18 may be a bolt, a machine screw, a self-tapping screw, or the like. In the presently preferred embodiment, bolt 18 is a self tapping type screw having a coarse thread tapering smaller at shaft end to a truncated conical shaft tip, which engages an unthreaded hole 60 (Fig. 8) having four tappable ridges 160 protruding therein. Spaces 162 between ridges 160 provide a place for ridge material displaced by the tapping to go.

Bolt 18 has a head which receives either Phillips or blade screwdrivers, as does the cross-slot 200 of collar 20.

I Claim:

1. A wall anchor assembly comprising:

a collar;

a pair of posts extending from said collar;

the collar having means for passing a part of a bolt through said collar;

means for connecting the posts to each other, distal from the collar;

an anchor member, captive between said posts, and between said collar and said connecting means;

said anchor member having a longitudinal axis;

means:

for slidably engaging the anchor member with its longitudinal axis substantially parallel to the posts, and

for transmitting axial rotation from the collar to the anchor member;

said collar, passing means, and bolt further serving as means for disengaging the engaging means;

said anchor member having:

a tip comprising means for tapping through a wall;

means for receiving the bolt perpendicular to the longitudinal axis and for engaging a thread on said bolt;

means for rotating the longitudinal axis perpendicular to the posts and for locating said bolt in said receiving means, which receiving means further serves as means for drawing the anchor member against the wall to clamp the wall anchor assembly to the wall.

2. A wall anchor assembly according to claim 1 in which the posts, said collar and said connecting means, by holding the anchor member captive, further serve as means for retaining the anchor member after disengagement from the bolt and for repeatably relocating said bolt in said receiving means.

3. A wall anchor assembly according to claim 2 further comprising means for releasably securing the anchor member slidably engaged with its longitudinal axis substantially parallel to the posts.

4. A wall anchor assembly according to claim 1 in which the tapping means comprises:

a flute;

said flute having a cutting leading edge for cutting a wall material;

said flute extending to a channel means for receiving the wall material cut;

a high tapping thread upon the tip.

5. A wall anchor assembly according to claim 4, further comprising a compression band between the thread.

6. A wall anchor assembly according to claim 4, in which the cutting leading edge is distended and curves back at its proximal edge.

7. A wall anchor assembly according to claim 6 in which the collar comprises flange means for limiting penetration of the collar to substantially flush with an outer surface of the wall.

8. A wall anchor assembly according to claim 7 comprising fin means for limiting axial rotation of the collar after the collar has penetrated the wall.

9. A wall anchor assembly according to claim 1 in which the passing means further serves as means:

for directing the bolt to a proximal end of the anchor member when the anchor member is slidably engaged; and

for directing the bolt to the receiving means when the anchor member is perpendicular to the posts.

10. A wall anchor assembly according to claim 2 in which the retaining means further comprises:

a pair of parallel inner facing surfaces in the posts;

a pair of outer facing surfaces on the anchor member, said outer facing surfaces closely fitting within the inner facing surfaces;

a pair of outer non-facing surfaces on the anchor member;

a pair of proximal tracks on one of the outer non-facing surfaces, said first pair of tracks not fitting within the inner facing surfaces;

a pair of distal tracks on an opposite of the outer non-facing surfaces, said second pair of tracks not fitting within the inner facing surfaces.

10. A wall anchor assembly according to claim 10 in which the engaging means comprises:

a pair of ridges on one pair of the two pairs of facing surfaces; and

a pair of grooves, for engaging the pair of ridges, on the other pair of the two pairs of facing surfaces.

11. A wall anchor assembly according to claim 1 in which the rotating means comprises a bolt engaging ramp at the proximal end of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

12. A wall anchor assembly according to claim 1 in which the rotating means comprises a connecting means engaging ramp amid the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

13. A wall anchor assembly according to claim 1 in which the collar comprises means for receiving externally applied rotational energy.

14. A wall anchor assembly according to claim 13 in which means for receiving externally applied rotational energy is a screw head.

15. A wall anchor assembly according to claim 13 in which the screw head is a Phillips type head.

16. A wall anchor assembly according to claim 1 in which the posts, said collar and said connecting means, by holding the anchor member captive, further serve as means for retaining the anchor member after disengagement from the bolt and for repeatably relocating said bolt in said receiving means;

the retaining means further comprise:

a pair of parallel inner facing surfaces in the posts;

a pair of outer facing surfaces on the anchor member, said outer facing surfaces closely fitting within the inner facing surfaces;

a pair of outer non-facing surfaces on the anchor member;

a pair of proximal tracks on one of the outer non-facing surfaces, said first pair of tracks not fitting within the inner facing surfaces;

a pair of distal tracks on an opposite of the outer non-facing surfaces, said second pair of tracks not fitting within the inner facing surfaces;

further comprising means for releasably securing the anchor member slidably engaged with its longitudinal axis substantially parallel to the posts;

in which the tapping means comprises:

a flute;

said flute having a cutting leading edge for cutting a wall material, in which the cutting leading edge is distended and curves back at its proximal edge;

said flute extending to a channel means for receiving the wall material cut;

a high tapping thread upon the tip;

a compression band between the thread;

in which the collar comprises flange means for limiting penetration of the collar to substantially flush with an outer surface of the wall;

fin means for limiting axial rotation of the collar after the collar has penetrated the wall;

in which the passing means further serves as means:

for directing the bolt to a proximal end of the anchor member when the anchor member is slidably engaged; and

for directing the bolt to the receiving means when the anchor member is perpendicular to the posts;

in which the engaging means comprises:

a pair of ridges on one pair of the two pairs of facing surfaces; and

a pair of grooves, for engaging the pair of ridges, on the other pair of the two pairs of facing surfaces;

in which the rotating means comprises:

a bolt engaging ramp at the proximal end of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member; and

a connecting means engaging ramp amid the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member;

in which the collar comprises means for receiving externally applied rotational energy.

17. A wall anchor assembly according to claim 16 further including means for securing the anchor member slidably engaged, prior to the anchor assembly's first use.

18. A wall anchor assembly according to claim 17 in which the securing means includes a protrusion and a cooperating detent.

19. A method of anchoring a bolt to a wall, said method comprising the steps of:

applying a pointed tip of an anchor member of an anchor assembly to the wall,

engaging a screwdriver to a screw head of the anchor assembly;

pressing and screw head with the screwdriver to locate and depress the pointed tip;

rotating the screw head with the screwdriver:

to transmit rotation from a collar to a pair of posts to the anchor member, slidably engaged to the pair of posts;

to immediately engage a tapping thread on the tip;

to cut material of the wall with a cutting leading edge of a flute;

to compress outer material of the wall with a compression band;

to swallow the cut material into the flute and thereafter into an adjacent channel, thereby reducing compressing of the outer material, to thereby pull the tip through the wall;

terminating rotation after the tip has penetrated the wall;

pressing the anchor assembly into the wall without further rotation to engage anti-rotation fins on a collar to the wall, until a flange resists further inward motion;

inserting a bolt into the collar, which collar directs the bolt toward a proximal end of an anchor member;

pressing the bolt against a ramp on a proximal end of the anchor member;

by said pressing, releasing the anchor member from a securing detent and sliding the anchor member distally to disengage a ridge from a groove;

after disengaging, pressing a mid-ramp on the anchor member against a protrusion on the posts, which mid-ramp pressing, together with the pressing against the proximal ramp, rotates the anchor member to perpendicular to the posts;

said collar locating the bolt against a receiving means on the anchor member;

rotating the bolt to engage the receiving means and to pull a relatively flat surface of the anchor member against the wall, thereby clamping the anchor assembly to the wall.

FIG. 1

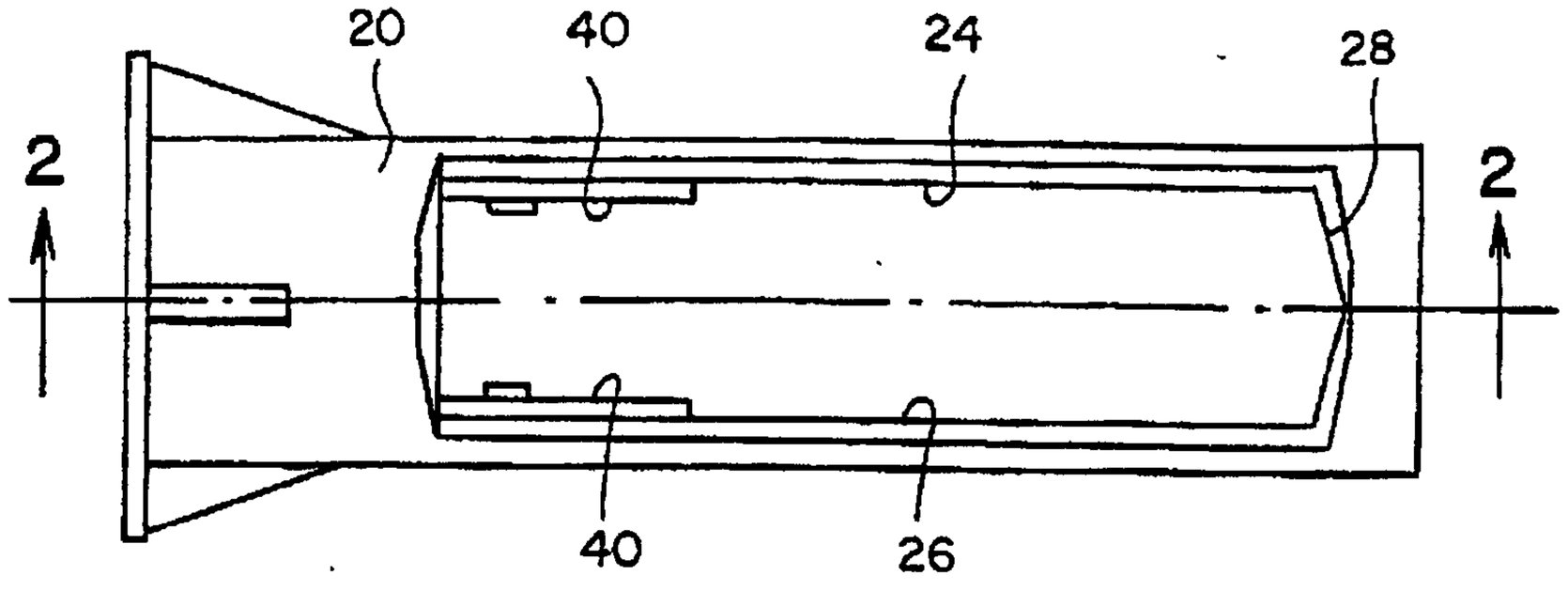


FIG. 2

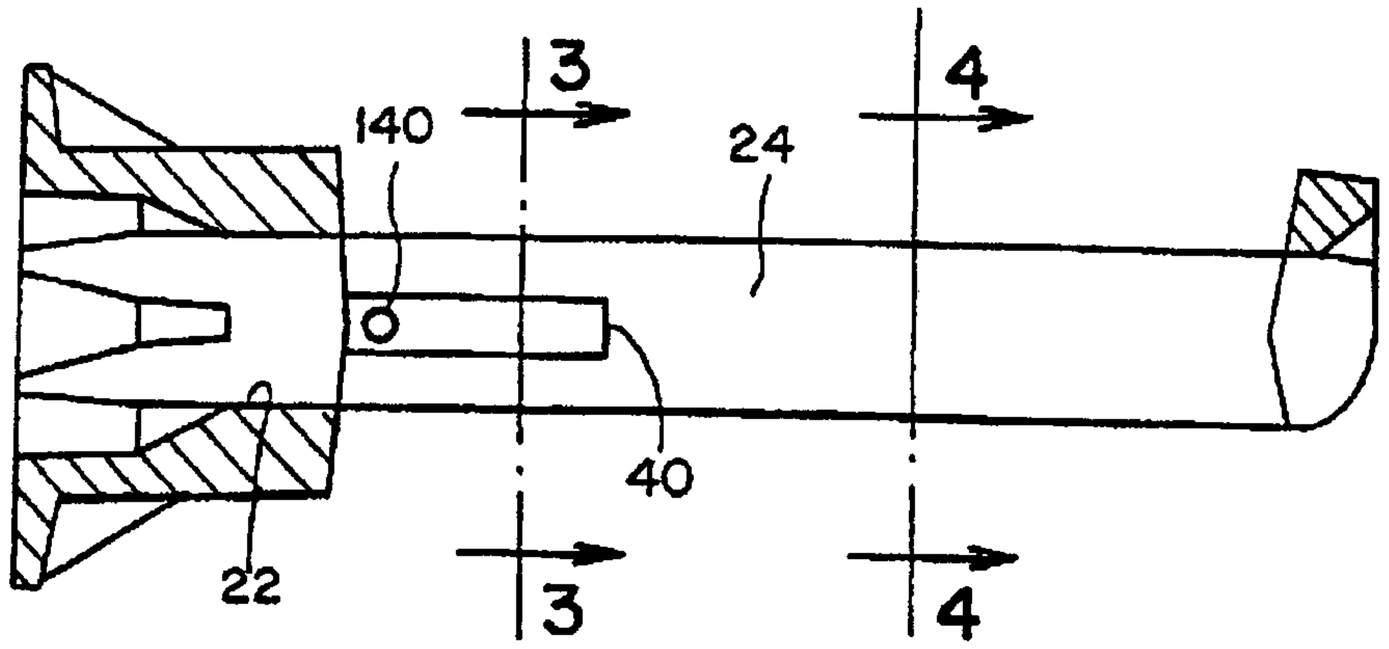
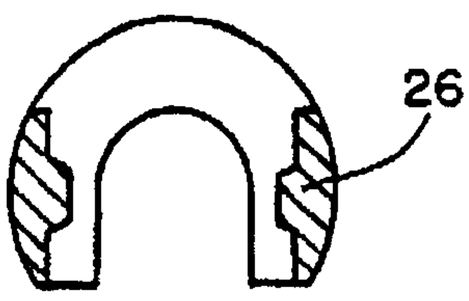


FIG. 3

FIG. 4



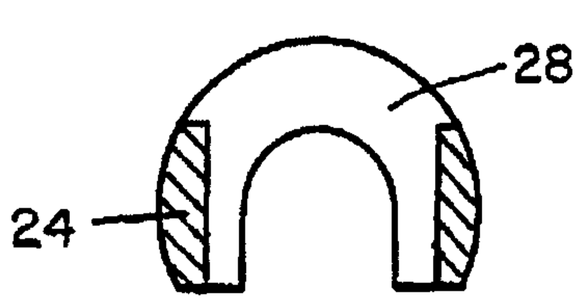


FIG. 6

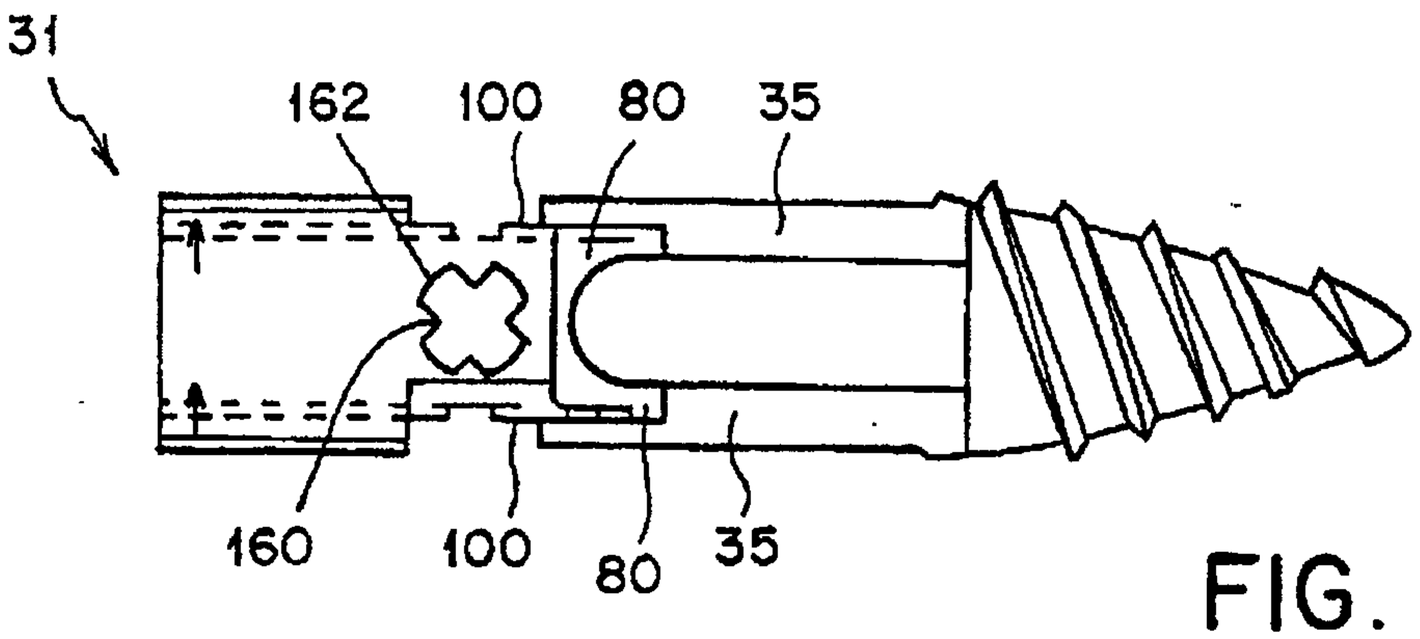


FIG. 5

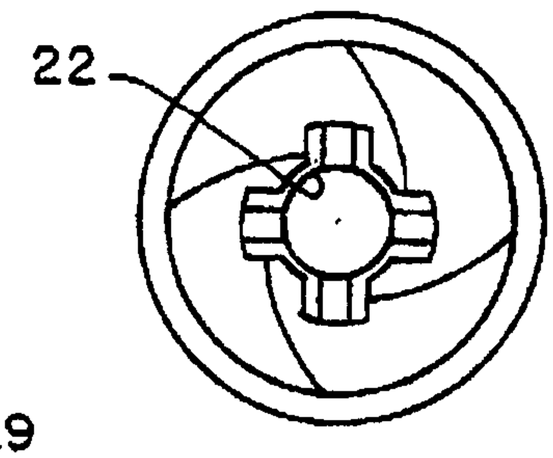


FIG. 7

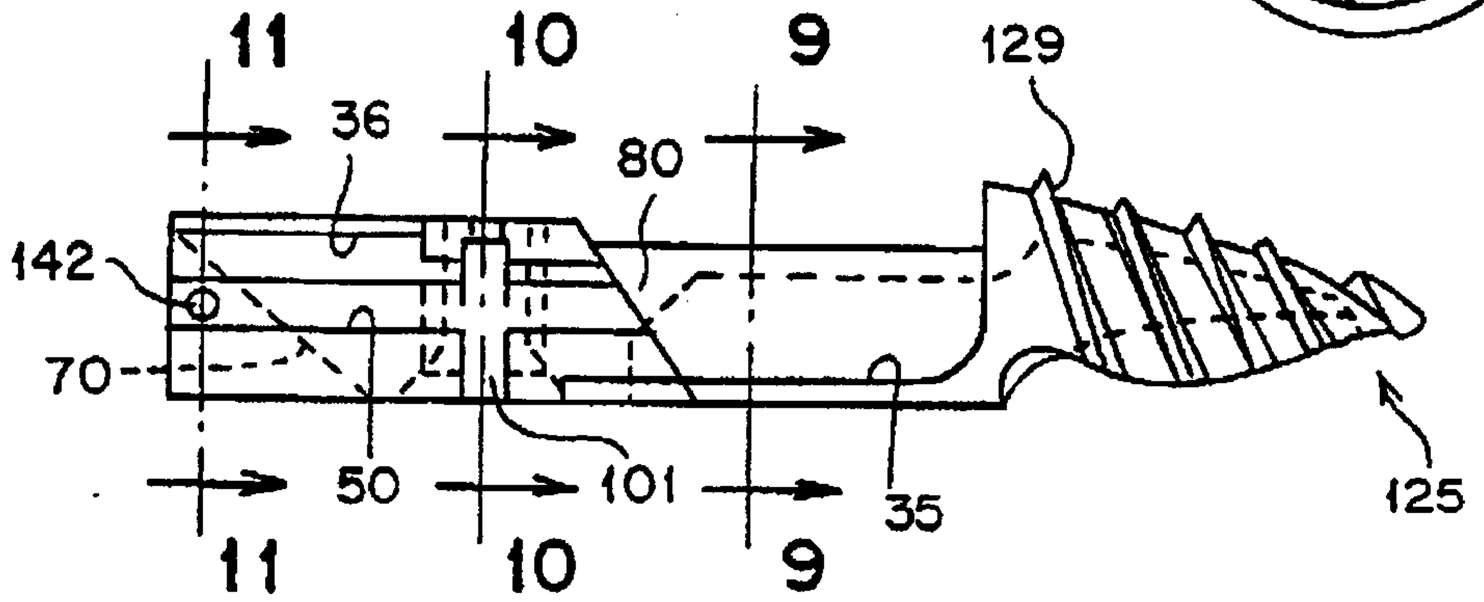


FIG. 8

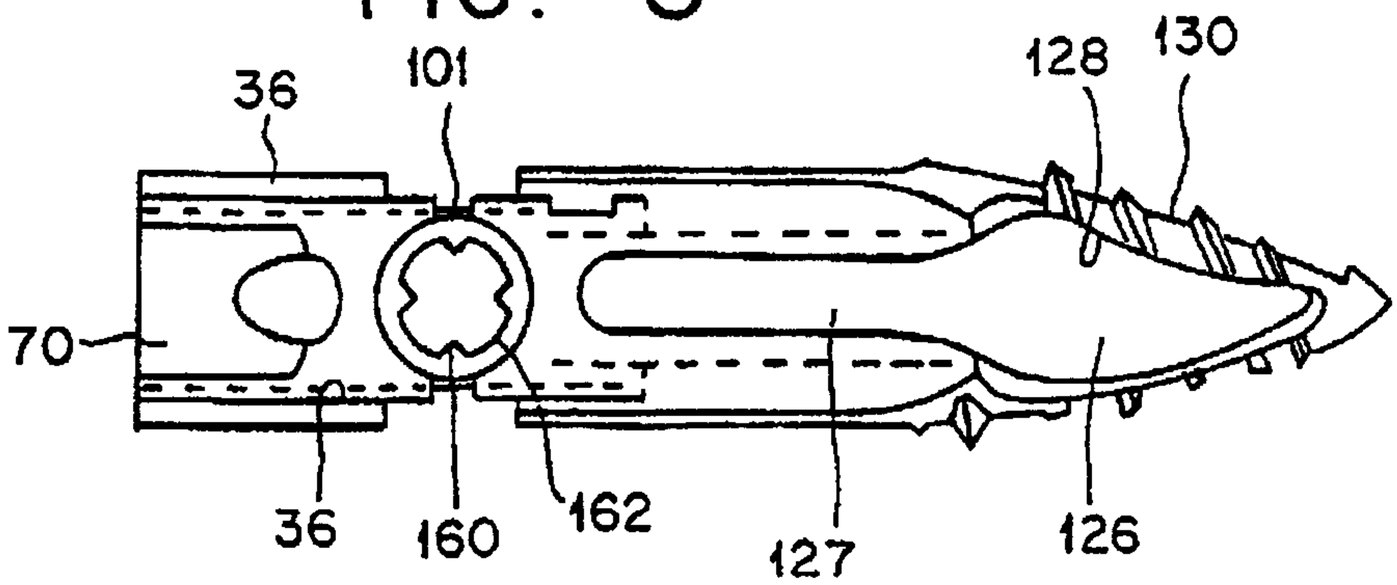


FIG. 9

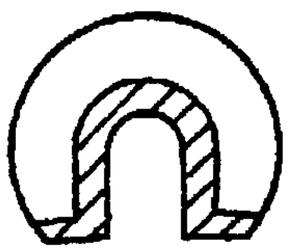


FIG. 10

FIG. 12

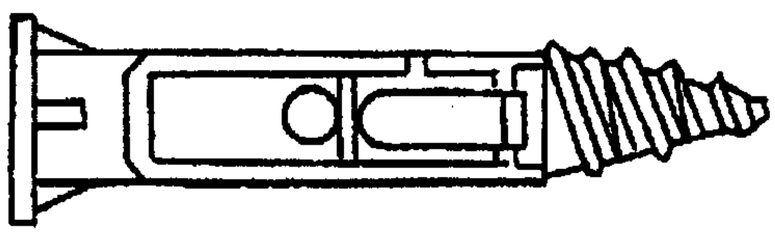


FIG. 13

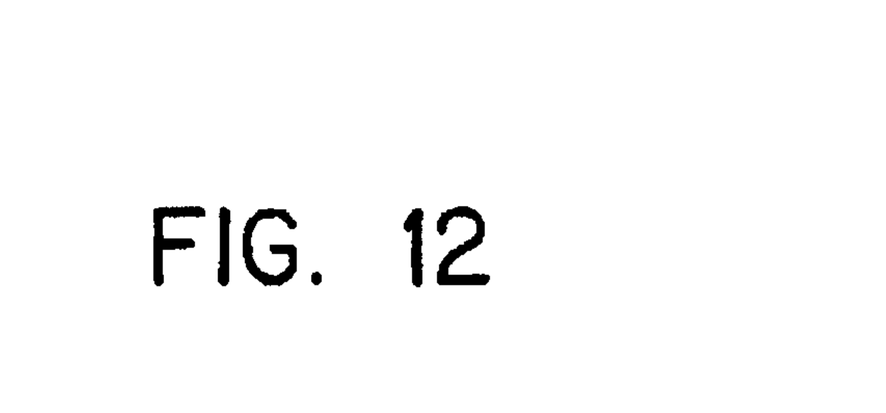


FIG. 14

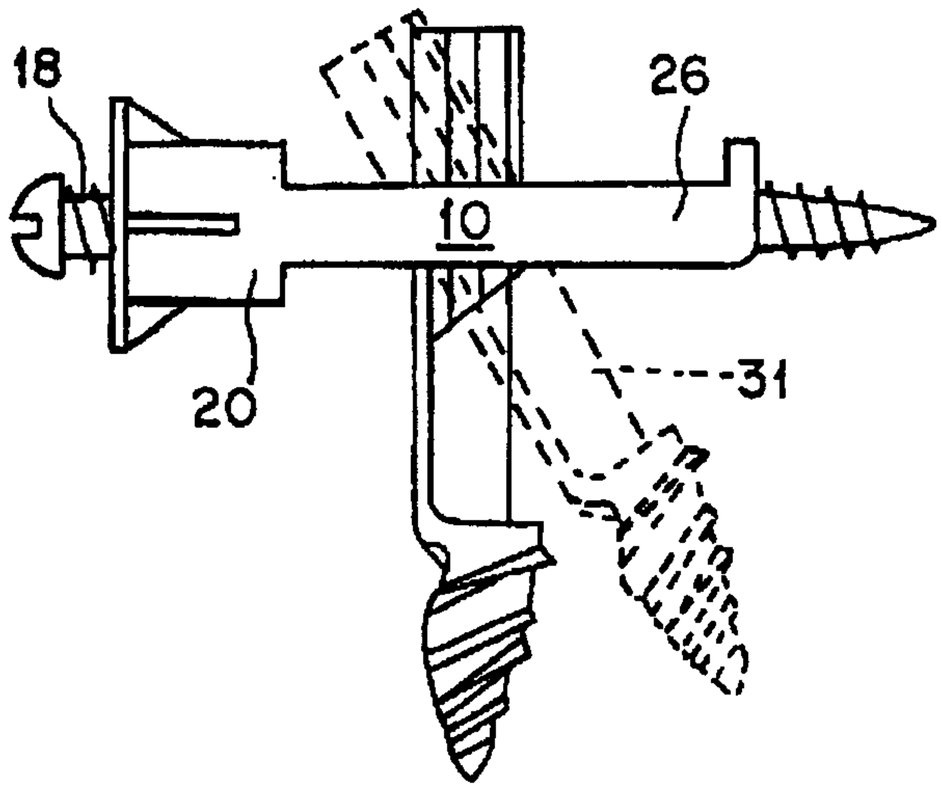
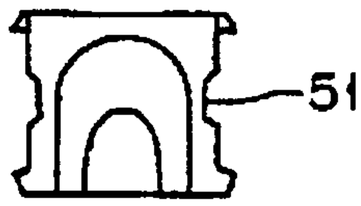
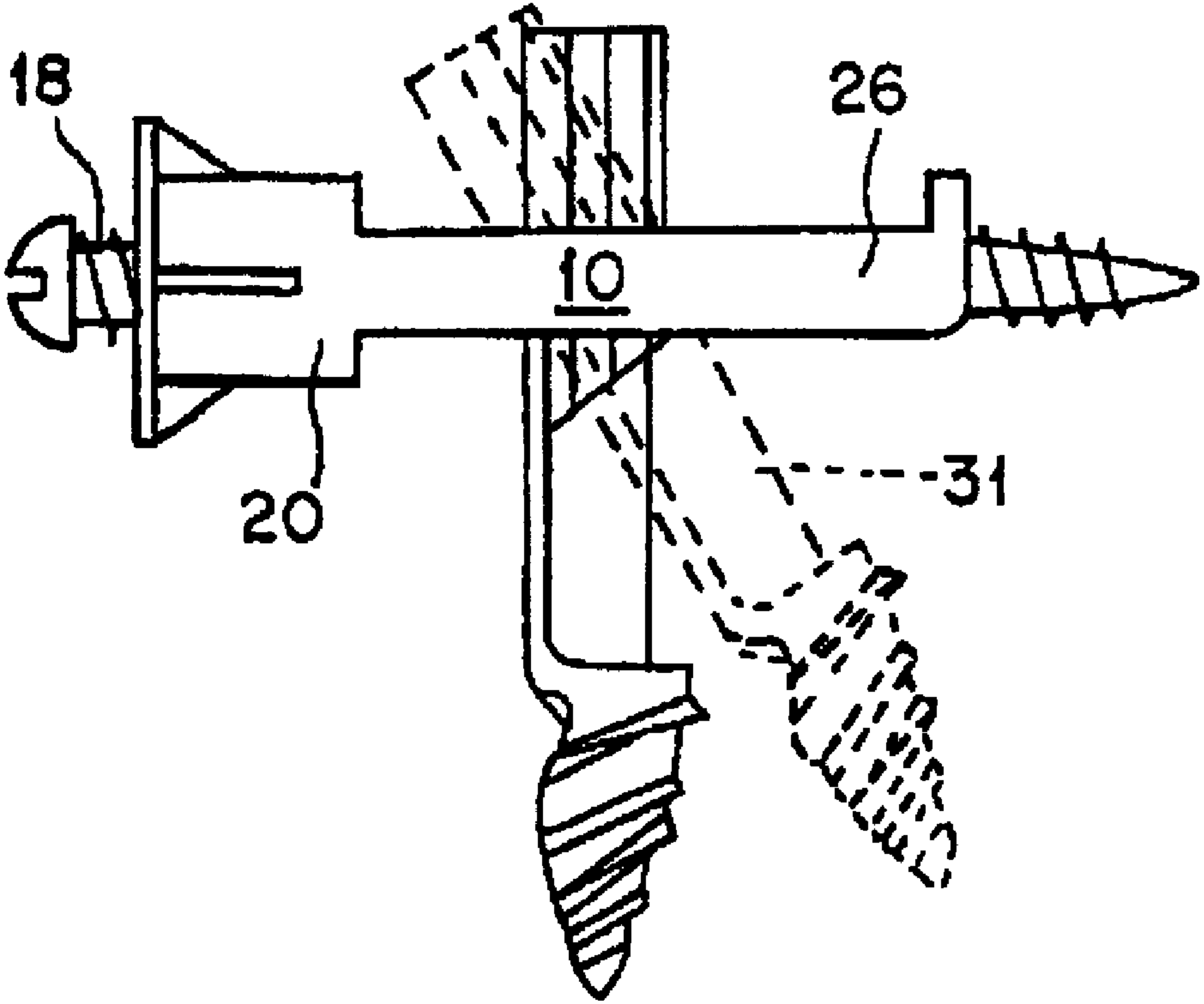


FIG. 11

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