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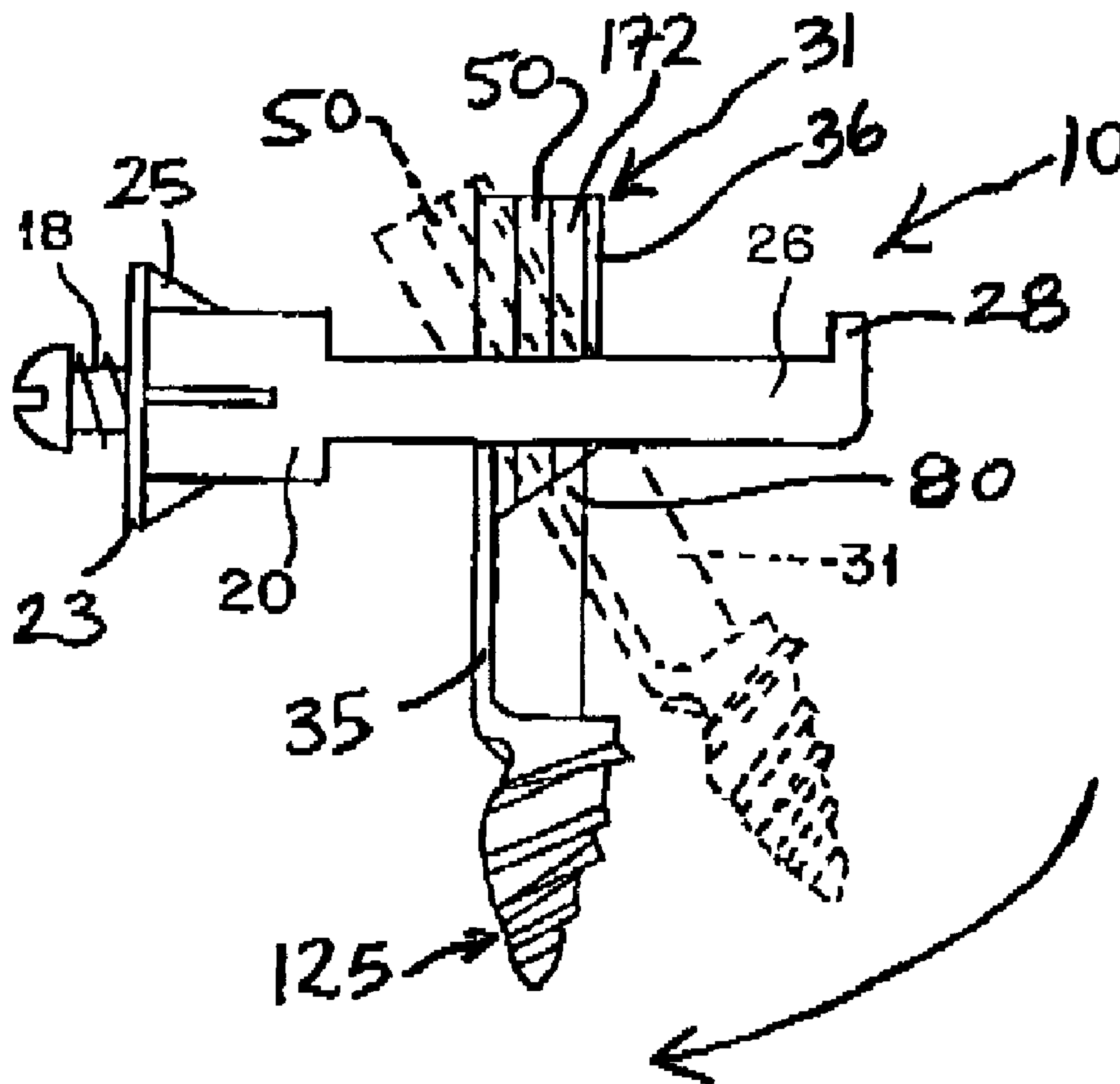
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(54) Title: SCREW TIPPED ANCHOR ASSEMBLY



(57) **Abrégé/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

(57) **Abrégé(suite)/Abstract(continued):**

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.

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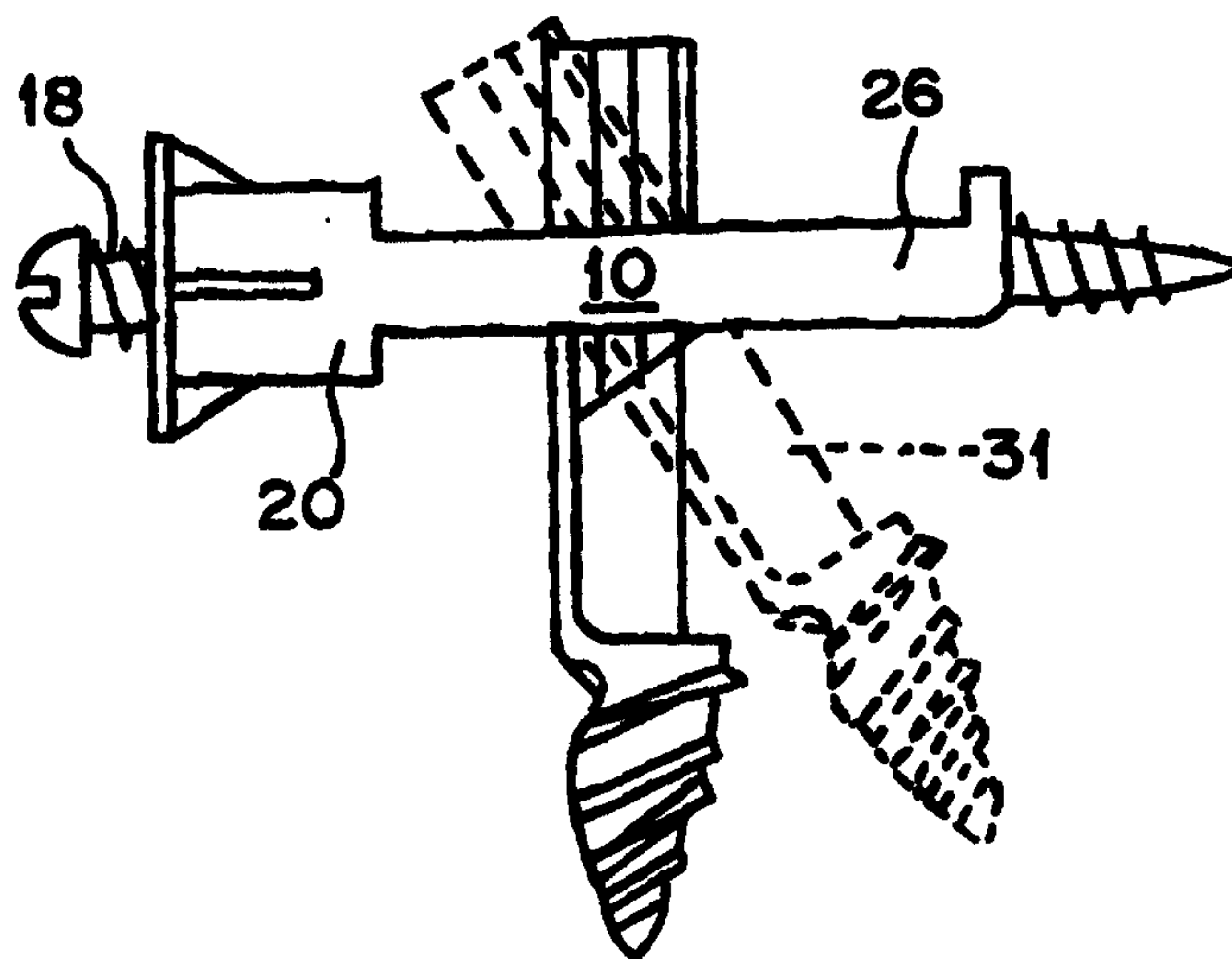
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(54) Title: SCREW TIPPED ANCHOR ASSEMBLY

(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.

BACKGROUND OF THE INVENTION

In U.S. Pat. No. 5,221,169 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.

SUMMARY OF THE INVENTION

The present invention is an improvement over the anchor assembly disclosed in U.S. Pat. No. 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.

Therefore, in accordance with present invention, there is provided a wall anchor assembly comprising:

- an assembly axis at the longitudinal center of the assembly;
- 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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads;

there is a chordal surface on a chord of the partly cylindrical body portion;

said anchor member further having:

means for screwing through the wall;

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

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

a retaining means comprising:

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;

at least one proximal track extending from one of the outer non-facing surfaces beyond

an edge of the outer facing surfaces, said proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces;

at least one distal track extending from an opposite of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of the inner facing surfaces.

Also in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads;

there is a chordal surface on a chord of the partly cylindrical body portion;

said anchor member further having:

means for screwing through the wall;

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

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

in which the rotating means comprises a connecting means engaging ramp surface facing the distal end between the proximal and distal ends of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

Further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads;

there is a chordal surface on a chord of the partly cylindrical body portion;

means in the screwing configuration:

for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and

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

said anchor member further having:

means for screwing through the wall;

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

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

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;

at least one proximal track extending from one of the outer non-facing surfaces, said

proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces;

at least one distal track extending from an opposite of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of 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 screwing 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 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 elongated ridges on the pair of parallel inner facing surfaces; and

a pair of complementary grooves, for engaging the pair of elongated ridges, on the pair of outer facing surfaces;

in which the anchor axis 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 surface facing the distal end between the proximal and distal ends of 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.

Still further in accordance with present invention, there is provided 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 screwing 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, and thereafter to a chordal surface, thereby reducing compressing of the outer material, to thereby pull the tip through the wall;

terminating rotation after the tip and threads have 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 ramp surface facing the distal end, said ramp surface located on the anchor member between the distal and proximal ends of the anchor member, against a protrusion on the posts, which ramp surface 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 the chordal surface of the anchor member against the wall, thereby clamping the anchor assembly to the wall.

Still further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

a collar;

said collar having a flange, said flange having a longitudinal radial fin means for restricting rotation around the assembly axis;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads,

there is a chordal surface on a chord of the partly cylindrical body portion;

means in the screwing configuration:

for slidably engaging the anchor member with the anchor axis substantially parallel to the assembly axis, said engaging means comprising:

a pair of substantially flat inner surfaces inside the posts,

at least one elongated ridge on at least one of the inner surfaces;

a pair of substantially flat outer surfaces outside the anchor member, closely fitting within the inner surfaces;

at least one complementary groove on at least one of the outer surfaces for engaging the ridge;

for transmitting axial rotation from the collar to the anchor member, and

for maintaining the anchor axis parallel to the assembly axis;

the ridge and the groove further serving as means:

for sliding the anchor member longitudinally; and

for disengaging to permit rotation of the anchor axis perpendicular to the assembly axis;

said anchor member further having:

a channel on the chordal surface;

means for screwing through a wall said screwing means comprising:

a dome having:

a base,

a pointed centering tip at the anchor axis,

an outer surface there-between, tapering from the base to the pointed centering tip;

a single outwardly facing flute defined by outer edges and extending proximally along one side of said outer surface radially of said anchor axis from said pointed tip to and communicating with and forming an extension of said channel, said flute being partially closed at said pointed centering tip along the side of said outer surface radially of said anchor axis opposite said one side because of a diminishing diameter along said outer surface;

said outer edges of said flute comprising a leading cutting edge and a trailing edge;

said leading cutting edge extending radially outward to said base from said pointed tip and diverging from said trailing edge to provide access to said flute and channel for receiving material cut from the wall by said leading cutting edge;

an outer thread extending from at the pointed tip and terminating at the base;

said flute and said outer thread being positioned relative to one another so as to serve as screw means for drawing the anchor through the wall structure;

said collar, passing means, and bolt further serving as means for disengaging the engaging means and for rotating the anchor axis, anchor member, and screwing means perpendicular to the assembly axis, to form the assembly into an anchoring configuration;

said anchor member further comprising:

forward and rearward tracks, extending from the outer surfaces, and serving as means for cooperating with edges of the posts to guide the anchor member sliding along the assembly axis;

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

means for rotating the anchor axis perpendicular to the posts, comprising:

an end ramp at a longitudinal end of the anchor member, and

a side ramp having a surface facing the distal end, said side ramp at the outer surfaces, and spaced from the tip and from the end ramp, for cooperating with the connecting means;

said forward and rearward tracks further serving as means for:

after rotation of the anchor axis, stopping the anchor member perpendicular to the assembly axis, and

locating the receiving means to reliably receive the bolt;

said receiving means further serving as a means for drawing the anchor member against the wall to clamp the wall anchor assembly to the wall.

Still further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

a collar;

a pair of posts extending from said collar, having a uniform space between said posts;

each post of the pair has an inside surface;

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

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

an anchor member between said posts,

a proximate track on a first edge of the anchor member extending the first edge outside the uniform space to engage a first post edge of a first post of the pair of posts;

a distal track on a second edge of the anchor member extending the second edge outside the uniform space to engage a second post edge;

said proximate and distal tracks thereby retaining said anchor member captive between said pair of posts;

said anchor member having a longitudinal anchor axis;

a penetrating configuration in which the longitudinal anchor axis is substantially parallel to the assembly axis,

a tongue protrudes from one of said inside surfaces;

a groove on the anchor member for engaging said tongue in the penetrating configuration, said anchor member further having:

a tip for penetrating the wall;

an intermediate distal ramped surface for rotating the longitudinal anchor axis perpendicular to the assembly axis;

a hole for receiving the bolt perpendicular to the longitudinal anchor axis,

said hole having an interior surface for engaging a bolt thread on said bolt, which interior surface cooperates with said bolt thread to draw the anchor member against the wall to clamp the anchor assembly to the wall.

Still further in accordance with present invention, there is provided a method of anchoring a bolt to a wall, said method comprising the steps of:

applying a penetrating 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 penetrating 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 rotate a penetrating tip;

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 ramp surface facing the distal end, said ramp surface located on the anchor member between the distal and proximal ends of the anchor member, against a protrusion on the posts, which ramp surface 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 hole on the anchor member;

rotating the bolt to engage an interior surface of the hole and to pull a chordal surface of the anchor member against the wall, thereby clamping the anchor assembly to the wall.

Still further in accordance with present invention, there is provided a wall anchor assembly (10) comprising:

an assembly axis at the longitudinal center of the assembly (10);

a collar (20);

a pair of posts (24, 26) extending from said collar (20);

the collar (20) having means (22) for passing a part of a bolt (18) through said collar (20);

means (28) for connecting the posts (24, 26) to each other, distal from the collar (20);

an anchor member (31), captive between said posts (24, 26) and between said collar (20)

and said connecting means (28);

said anchor member (31) having:

an anchor axis at the longitudinal center of the anchor member (31), and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis,

the anchor body portion and posts (24, 26) form a partly cylindrical body portion without threads; and

there is a chordal surface on a chord of the partly cylindrical body portion;

said anchor member (31) further having:

- means (125) for screwing through the wall;
- means (60) for receiving the bolt (18) perpendicular to the anchor axis and for engaging a bolt thread on said bolt (18); and
- means for rotating (28, 70, 80) the anchor axis perpendicular to the posts (24, 26) and for locating said bolt (18) in said receiving means (60), which receiving means (60) further serves as a means for drawing the anchor member (31) against the wall to clamp the wall anchor assembly (10) to the wall;

a retaining means comprising:

- a pair of parallel inner facing surfaces in the posts (24, 26);
- a pair of outer facing surfaces on the anchor member (31), said outer facing surfaces closely fitting within the inner facing surfaces;
- a pair of outer non-facing surfaces on the anchor member;

characterised in that said retaining means further comprises:

- at least one proximal track (36) extending from one of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said proximal track (36) not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces; and
- at least one distal track (35) extending from an opposite one of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track (35) not fitting within the inner facing surfaces and thereby engaging an other edge of the inner facing surfaces.

Still further in accordance with present invention, there is provided a method of anchoring a bolt (18) to a wall, said method comprising the steps of:

- applying a pointed tip of an anchor member (31) of an anchor assembly (10) to the wall;
- engaging a screwdriver to a screw head of the anchor assembly (10);
- pressing said 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 (20) to a pair of posts (24, 26) to the anchor member (31), slidably engaged to the pair of posts (24, 26) until said anchor assembly (10) is sufficiently inserted in the wall,
 inserting a bolt (18) into the collar (20), which collar (20) directs the bolt (18) toward a proximal end of an anchor member (31);
 pressing the bolt (18) against a ramp (70) on a proximal end of the anchor member (31);
 by said pressing, releasing the anchor member (31) from a securing detent and sliding the anchor member (31) distally to disengage a ridge (40) from a groove (50);
 after disengaging, pressing a ramp surface (80) facing the distal end, said ramp surface (80) located on the anchor member (31) between the distal and proximal ends of the anchor member, against a protrusion on the posts (24, 26), which ramp surface (80) pressing, together with the pressing against the proximal ramp (70), rotates the anchor member (31) to perpendicular to the posts (24, 26);
 said collar (20) locating the bolt (18) against a receiving means (60) on the anchor member (31);
 rotating the bolt (18) to engage the receiving means (60) and to pull the chordal surface of the anchor member (31) against the wall, thereby clamping the anchor assembly (10) to the wall.

Still further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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 within said posts;

said anchor member having:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;
 a wall-penetrating configuration in which:
 the anchor axis is substantially parallel to the assembly axis
 ;
 said anchor member further having:
 means for penetrating through the wall;
 means for receiving the bolt perpendicular to the anchor axis and for engaging a
 bolt thread on said bolt;
 means for rotating the anchor axis perpendicular to the posts and for locating said
 bolt in said receiving means, which receiving means further serves as a means for
 drawing the anchor member against the wall to clamp the wall anchor assembly to the
 wall;
 in which the rotating means comprises a connecting means engaging ramp surface facing
 the distal end between the proximal and distal ends of the anchor member for translating
 a longitudinal bolt induced force into a rotational force against the anchor member.

Still further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;
 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 within said posts;
 said anchor member having:
 an anchor axis at the longitudinal center of the anchor member, and
 an anchor body portion;
 a wall-penetrating configuration in which:
 the anchor axis is substantially parallel to the assembly axis

;

means in the wall-penetrating configuration:

for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and

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

said anchor member further having:

means for penetrating through the wall;

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

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

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;

at least one proximal track extending from one of the outer non-facing surfaces, said proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces;

at least one distal track extending from an opposite of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of 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 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:

at least a first member provided on at least one of the posts and the post connecting means; and

at least a second member provided on the anchor member;

the first and second members being engaged to each other in the wall-penetrating configuration;

in which the anchor axis 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 surface facing the distal end between the proximal and distal ends of 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.

Still further in accordance with present invention, there is provided a wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

a collar;

a pair of posts extending from said collar, having a uniform space between said posts;

each post of the pair has an inside surface;

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

a connector for connecting the posts to each other, distal from the collar;
 an anchor member between said posts,
 a proximate track on a first edge of the anchor member extending the first edge outside the uniform space to engage a first post edge of a first post of the pair of posts;
 a distal track on a second edge of the anchor member extending the second edge outside the uniform space to engage a second post edge;
 said proximate and distal tracks thereby retaining said anchor member captive between said pair of posts;
 said anchor member having a longitudinal anchor axis;
 a penetrating configuration in which the longitudinal anchor axis is substantially parallel to the assembly axis,
 said anchor member further having:
 a tip for penetrating the wall;
 an intermediate distal ramped surface for rotating the longitudinal anchor axis perpendicular to the assembly axis;
 a hole for receiving the bolt perpendicular to the longitudinal anchor axis,
 said hole having an interior surface for engaging a bolt thread on said bolt, which interior surface cooperates with said bolt thread to draw the anchor member against the wall to clamp the anchor assembly to the wall.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the collar and posts of the anchor assembly of the invention;
 FIG. 2 is a cross-sectional view taken along the line 2-2 of FIG. 1;
 FIG. 3 is a cross-sectional view taken along the line 3-3 of FIG. 2;
 FIG. 4 is a cross-sectional view taken along the line 4-4 of FIG. 2;
 FIG. 5 is a left end view showing the flanged end of the collar and post portion of the assembly;
 FIG. 6 is a top plan view of the screw tipped anchor member of the anchor assembly of the invention;

FIG. 7 is a side elevational view of the anchor member of FIG. 6;

FIG. 8 is a bottom plan view of the anchor member of FIG. 6;

FIG. 9 is a cross-sectional view taken along the line 9-9 of FIG. 7;

FIG. 10 is a cross-sectional view taken along the line 10-10 of FIG. 7;

FIG. 11 is a cross-sectional view taken along the line 11-11 of FIG. 7;

FIG. 12 is a top plan view of the anchor assembly of the invention;

FIG. 13 is a side elevational view of the anchor assembly of FIG. 12 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 member as it is pivoted to its anchoring position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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. The collar includes a flange 23 at a proximal end thereof. A pair of posts, 24 and 26 extend integrally from the collar 20 in parallel relation on either side of the post and collar portion of the assembly. The posts 24 and 26 are connected to one another at their distal ends by a bent connecting end 28. The collar 20 and aperture 22 are configured to assure alignment between anchor member 31 and the bolt fastener 18.

The posts 24 and 26 are provided with inner facing surfaces 170 (FIGS. 1 to 4). The anchor member 31 is provided with outer facing surfaces 172 (that face the inner facing surfaces 170 of the posts 24 and 26 when the anchor assembly 10 is in its position shown in FIGS. 12 and 13), and outer non-facing surfaces 174.

When the post and collar portion of the anchor assembly 10 is rotatably inserted in the wall, the flange 23 limits the penetration of the collar 20 in the wall up to when the flange 23 becomes substantially flush with an outer surface of the wall. Fins 25 are

provided on the collar 20 to engage the wall and limit the axial rotation of the collar 20 once the collar has penetrated the wall.

The anchor member 31 has forward (distal) and rearward (proximal) tracks 35 and 36, respectively, disposed on opposite sides of the anchor member 31, which slidably engage the opposite sides of the posts 24 and 26 as the anchor member 31 is initially moved forward by engagement of the forwardly moving bolt 18. The anchor member 31 is maintained in parallel relation with the posts 24 and 26 by engagement of ridges (or tongues) 40 and channels (or grooves) 50 provided on the posts 24 and 26 and sides of the anchor member 31, respectively. When the channels 50 of the anchor member 31 pass the end of the post ridges 40, the anchor member 31 is permitted to move from its position with its axis parallel with the posts 24 and 26 to a position with its axis normal to the posts 24 and 26, so that the bolt 18 may be threaded in a threaded hole 60 defined in the anchor member 31 to draw a chordal surface 150 of a chord 152 of the anchor member 31 against the back surface of the wall. The collar 20 and the aperture 22 guide the bolt 18 axially such that the forward progress of the bolt 18 causes the axial movement of the anchor member 31 until it disengages from its parallel restraint relative to the post and collar portion, this restraint being provided by the engagement of the ridges 40 and channels 50.

An internal ramp 70 is provided at the proximal end of the anchor member 31 to engage the leading end of the bolt 18 resulting in the directing of the anchor member 31 out of parallel with the with the posts. External ramps (or ramp surfaces) 80 on either side of the anchor member 31 between the forward and rearward tracks 35 and 36, which slide on the edges of the posts 24 and 26, interact with the connecting end 28 between the posts 24 and 26 to assure out of parallel relationship with the posts 24 and 26 as well.

There is an axial space 100 between the forward and rearward tracks 35 and 36, on either side of the anchor member 31, which is equal to the width of the posts 24 and 26 to permit the 90 degree axes displacement of the anchor member 31 and collar and

post portion. Channels 101 within these spaces 100 receive the post ridges 40 when the anchor axis is normal to the axes of the posts 24 and 26.

The anchor member 31 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 further part of the invention is the provision of a screw tip 125 on the distal end of the anchor member 31, together with a flute 126 with a cutting leading edge 128 and which extends proximally to a channel 127 defined in the chordal surface 150 of the anchor member 31. The screw tip 125 includes a dome 154 having a base 156 and a pointed centering tip 158, the flute 126 being partially closed (FIGS. 7 and 8) at the pointed centering tip 158.

The leading edge 128 of the flute 126 cuts the wall material which is deposited in the flute 126 and given access to the channel 127 thereby lessening the amount of wall board material which will be compressed between turns of relatively high tapping threads 129 of the screw tip 125 and around a compression band 130 which runs between and parallel to the threads 129. The leading edge 128 is distended and curves back at its proximal edge. This shape together with the screw threads 129 draws the anchor member 31 through the wall material rather than pushing the material forward as occurs with a drilling action.

As shown in FIG. 2, a protrusion 140 on the ridge 40 of the post 26 and a detent 142 (FIG. 7) provided on the channel 50 of the anchor member 31 cooperate, in the position of the anchor assembly 10 shown in FIGS. 12 and 13 (the position of the assembly 10 prior to it being inserted in the wall), to releasably secure the anchor member 31 to the post and collar portion.

The bolt 18 may be a bolt, a machine screw, a self-tapping screw, or the like. In the presently preferred embodiment, the 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 the tappable ridges 160 provide a place for ridge material displaced by the tapping to go.

The bolt 18 has a head which receives either Phillips or blade screwdrivers, as does the cross-slots 200 defined in the collar 20.

The anchor member 31 is thus pivotally mounted to the collar and post portion of the anchor assembly 10 and remains attached thereto by the interaction of the posts 24 and 26 with tracks 35 and 36 and by the provision of the collar 20 and connecting end 28. Therefore, when the bolt 18 is removed from the anchor member 31, the anchor member 31 can be brought back in parallel engagement with the collar and post portion (i.e. in the position of the anchor assembly 10 shown in FIGS. 12 and 13). The anchor assembly 10 can thus be re-used, with the bolt 18 repeatably relocating in the hole 60.

CLAIMS:

1. A wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads;

there is a chordal surface on a chord of the partly cylindrical body portion;

said anchor member further having:

means for screwing through the wall;

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

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

in which the rotating means comprises a connecting means engaging ramp surface facing the distal end between the proximal and distal ends of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

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

3. A wall anchor assembly according to claim 2 in which the means for receiving externally applied rotational energy is a screw head.

4. A wall anchor assembly according to claim 2 in which the screw head is a Phillips type head.

5. A wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis, and

the anchor body portion and posts form a partly cylindrical body portion without threads;

there is a chordal surface on a chord of the partly cylindrical body portion;

means in the screwing configuration:

for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and

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

said anchor member further having:

means for screwing through the wall;

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

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

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;

at least one proximal track extending from one of the outer non-facing surfaces, said proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces;

at least one distal track extending from an opposite of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of 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 screwing 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 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 elongated ridges on the pair of parallel inner facing surfaces; and

a pair of complementary grooves, for engaging the pair of elongated ridges, on the pair of outer facing surfaces;

in which the anchor axis 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 surface facing the distal end between the proximal and distal ends of 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.

6. A wall anchor assembly according to claim 5 further including means for securing the anchor member slidably engaged, prior to the anchor assembly's first use.

7. A wall anchor assembly according to claim 6 in which the securing means includes a protrusion and a cooperating detent.

8. A wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

a collar;

a pair of posts extending from said collar, having a uniform space between said posts;

each post of the pair has an inside surface;

the collar having an opening for passing a part of a bolt through said collar;
 a connector for connecting the posts to each other, distal from the collar;
 an anchor member between said posts,

 a proximate track on a first edge of the anchor member extending the first edge outside the uniform space to engage a first post edge of a first post of the pair of posts;

 a distal track on a second edge of the anchor member extending the second edge outside the uniform space to engage a second post edge;

 said proximate and distal tracks thereby retaining said anchor member captive between said pair of posts;

 said anchor member having a longitudinal anchor axis;

 a penetrating configuration in which the longitudinal anchor axis is substantially parallel to the assembly axis,

 a tongue protrudes from one of said inside surfaces;
 a groove on the anchor member for engaging said tongue in the penetrating configuration,
 said anchor member further having:

 a tip for penetrating the wall;

 an intermediate distal ramped surface for rotating the longitudinal anchor axis perpendicular to the assembly axis;

 a hole for receiving the bolt perpendicular to the longitudinal anchor axis,

 said hole having an interior surface for engaging a bolt thread on said bolt, which interior surface cooperates with said bolt thread to draw the anchor member against the wall to clamp the anchor assembly to the wall.

9. A wall anchor assembly according to claim 8 in which there is a second proximate track on a third edge of the anchor member, said third edge opposite said first edge for balancing proximate retaining forces.

10. A wall anchor assembly according to claim 8 in which there is a second distal track on a fourth edge of the anchor member, said fourth edge opposite said second edge for balancing distal retaining forces.

11. A wall anchor assembly according to claim 8 in which a second tongue engages a second groove to balance engaging forces on opposite sides of the anchor member in the penetrating configuration.

12. A wall anchor assembly according to claim 8 in which the posts, said collar and said connector, by holding the anchor member captive, further serve to retain the anchor member after disengagement from the bolt and for repeatably relocating said bolt in said hole.

13. A wall anchor assembly, according to claim 8, further comprising:

a second proximate track on a third edge of the anchor member, said third edge opposite said first edge for balancing proximate retaining forces;

a second distal track on a fourth edge of the anchor member, said fourth edge opposite said second edge for balancing distal retaining forces;

a second tongue engages a second groove to balance engaging forces on opposite sides of the anchor member in the penetrating configuration.

14. A wall anchor assembly, according to claim 13, in which the posts, said collar and said connector, by holding the anchor member captive, further serve to retain the anchor

member after disengagement from the bolt and for repeatably relocating said bolt in said hole.

15. A wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

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:

an anchor axis at the longitudinal center of the anchor member, and

an anchor body portion;

a screwing configuration in which:

the anchor axis is substantially parallel to the assembly axis,

the anchor body portion and posts form a partly cylindrical body portion without threads; and

there is a chordal surface on a chord of the partly cylindrical body portion;

said anchor member further having:

means for screwing through the wall;

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

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

a retaining means comprising:

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;
at least one proximal track extending from one of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces; and
at least one distal track extending from an opposite one of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of the inner facing surfaces.

16. A wall anchor assembly according to claim 15, wherein said anchor assembly further comprises means in the screwing configuration:

for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and
for transmitting axial rotation from the collar to the anchor member.

17. A wall anchor assembly according to claim 16, wherein 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.

18. A wall anchor assembly according to claim 15, wherein said anchor assembly further comprises:

a detent as means for releasably securing the anchor member; and
a tongue as an elongated protrusion on the inner facing surface and a complementary groove on the outer facing surface;

for maintaining the anchor member engaged with the anchor axis substantially parallel to the posts,
 for transmitting axial rotation; and
 for slidably releasing the anchor member from a parallel restraint thereof relative to the posts.

19. A wall anchor assembly according to claim 16, wherein the screwing means comprises:

a dome having:

a base,

a pointed centering tip at the anchor axis, and

an outer surface there-between, tapering from the base to the pointed centering tip;

a single outwardly facing flute defined by outer edges and extending proximally along one side of said outer surface radially of said anchor axis from said pointed tip to said base, said flute being partially closed at said pointed centering tip along the side of said outer surface radially of said anchor axis opposite said one side because of a diminishing diameter along said outer surface;

said outer edges of said flute comprising a cutting leading edge, for cutting a wall material, and a trailing edge;

an outer thread extending from at the pointed tip and terminating at the base;

said flute and said outer thread being positioned relative to one another so as to serve as screw means for drawing the tip through the wall structure without drilling a hole in advance of said outer thread;

said collar, passing means, and bolt further serving as means for disengaging the engaging means and for rotating the anchor axis, anchor member, and screwing means perpendicular to the assembly axis, to form the assembly into an anchoring configuration;

said flute communicating with and forming an extension of a channel defined on the chordal surface for receiving the wall material cut and for expelling said wall material out the chordal surface.

20. A wall anchor assembly according to claim 19, wherein said anchor assembly further comprises a compression band between the thread.

21. A wall anchor assembly according to claim 19, wherein the cutting leading edge is distended and curves back at its proximal edge.

22. A wall anchor assembly according to claim 21, wherein the collar comprises flange means for limiting penetration of the collar to substantially flush with an outer surface of the wall.

23. A wall anchor assembly according to claim 22, wherein fin means are provided for limiting axial rotation of the collar after the collar has penetrated the wall.

24. A wall anchor assembly according to claim 16, wherein 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.

25. A wall anchor assembly according to claim 15, wherein the engaging means comprises:

an elongated ridge on at least one of the inner facing surfaces, and

a complementary groove on the outer facing surface, for engaging the ridge.

26. A wall anchor assembly according to claim 24, wherein the rotating means comprises a connecting means engaging ramp surface facing the distal end between the proximal and distal ends of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

27. A wall anchor assembly according to claim 26, wherein the collar comprises means for receiving externally applied rotational energy.

28. A wall anchor assembly according to claim 27, wherein said means for receiving externally applied rotational energy is a screw head, e.g. a Phillips type head.

29. A wall anchor assembly according to claim 15, wherein said anchor assembly further comprises:

means in the screwing configuration:

for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and

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

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;

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

in which the screwing 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 thread upon the tip; and

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 elongated ridges on the pair of parallel inner facing surfaces, and

a pair of complementary grooves, for engaging the pair of elongated ridges, on the pair of outer facing surfaces;

in which the anchor axis 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 surface facing the distal end between the proximal and distal ends of 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.

30. A wall anchor assembly according to claim 29, wherein said anchor assembly further includes means for securing the anchor member slidably engaged, prior to the anchor assembly's first use.

31. A wall anchor assembly according to claim 30, wherein the securing means includes a protrusion and a cooperating detent.

32. A wall anchor assembly according to claim 15, wherein:

said collar has a flange, said flange having a longitudinal radial fin means for restricting rotation around the assembly axis;

means in the screwing configuration:

for slidably engaging the anchor member with the anchor axis substantially parallel to the assembly axis, said engaging means comprising:

a pair of substantially flat inner surfaces inside the posts;

at least one elongated ridge on at least one of the inner surfaces;

a pair of substantially flat outer surfaces outside the anchor member, closely fitting within the inner surfaces; and

at least one complementary groove on at least one of the outer surfaces for engaging the ridge:

for transmitting axial rotation from the collar to the anchor member, and

for maintaining the anchor axis parallel to the assembly axis;

the ridge and the groove further serving as means:

for sliding the anchor member longitudinally, and

for disengaging to permit rotation of the anchor axis perpendicular to the assembly axis;

said anchor member further having:

a channel on the chordal surface, and

means for screwing through a wall, said screwing means comprising:

a dome having:

a base,

a pointed centering tip at the anchor axis, and

an outer surface there-between, tapering from the base to the pointed centering tip;

a single outwardly facing flute defined by outer edges and extending proximally along one side of said outer surface radially of said anchor axis from said pointed tip to and communicating

with and forming an extension of said channel, said flute being partially closed at said pointed centering tip along the side of said outer surface radially of said anchor axis opposite said one side because of a diminishing diameter along said outer surface;

said outer edges of said flute comprising a cutting leading edge and a trailing edge;

said cutting leading edge extending radially outward to said base from said pointed tip and diverging from said trailing edge to provide access to said flute and channel for receiving material cut from the wall by said cutting leading edge;

an outer thread extending from at the pointed tip and terminating at the base;

said flute and said outer thread being positioned relative to one another so as to serve as screw means for drawing the anchor through the wall structure;

said collar, passing means, and bolt further serving as means for disengaging the engaging means and for rotating the anchor axis, anchor member, and screwing means perpendicular to the assembly axis, to form the assembly into an anchoring configuration;

said distal and proximal tracks, extending from the outer surfaces, and serving as means for cooperating with edges of the posts to guide the anchor member sliding along the assembly axis;

the means for rotating the anchor axis perpendicular to the posts, comprising:

an end ramp at a longitudinal end of the anchor member, and

a side ramp having a surface facing the distal end, said side ramp at the outer surfaces, and spaced from the tip and from the end ramp, for cooperating with the connecting means;

said distal and proximal tracks further serving as means for:

after rotation of the anchor axis, stopping the anchor member perpendicular to the assembly axis, and

locating the receiving means to reliably receive the bolt.

33. A wall anchor assembly according to claim 15, wherein an axial distance between said proximal and said distal tracks is substantially equal to a width of said posts so that said posts assist in retaining said anchor member substantially perpendicular to said assembly axis after said anchor axis has been rotated out of parallelism with said assembly axis.

34. A wall anchor assembly comprising:
 an assembly axis at the longitudinal center of the assembly;
 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 within said posts;
 said anchor member having:
 an anchor axis at the longitudinal center of the anchor member, and
 an anchor body portion;
 a wall-penetrating configuration in which:
 the anchor axis is substantially parallel to the assembly axis;
 said anchor member further having:
 means for penetrating through the wall;
 means for receiving the bolt perpendicular to the anchor axis and for engaging a bolt thread on said bolt;
 means for rotating the anchor axis perpendicular to the posts and for locating said bolt in said receiving means, which receiving means further serves as a means for drawing the anchor member against the wall to clamp the wall anchor assembly to the wall;
 in which the rotating means comprises a connecting means engaging ramp surface facing

the distal end between the proximal and distal ends of the anchor member for translating a longitudinal bolt induced force into a rotational force against the anchor member.

35. A wall anchor assembly according to claim 34 in which the collar comprises means for receiving externally applied rotational energy.

36. A wall anchor assembly according to claim 35 in which the means for receiving externally applied rotational energy is a screw head.

37. A wall anchor assembly according to claim 35 in which the screw head is a Phillips type head.

38. A wall anchor assembly comprising:
 an assembly axis at the longitudinal center of the assembly;
 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 within said posts;
 said anchor member having:
 an anchor axis at the longitudinal center of the anchor member, and
 an anchor body portion;
 a wall-penetrating configuration in which:
 the anchor axis is substantially parallel to the assembly axis;
 means in the wall-penetrating configuration:
 for engaging the anchor member with the anchor axis substantially parallel to the assembly axis, and
 for transmitting axial rotation from the collar to the anchor member;
 said anchor member further having:

means for penetrating through the wall;

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

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

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;

at least one proximal track extending from one of the outer non-facing surfaces, said proximal track not fitting within the inner facing surfaces and thereby engaging an edge of the inner facing surfaces;

at least one distal track extending from an opposite of the outer non-facing surfaces beyond an edge of the outer facing surfaces, said distal track not fitting within the inner facing surfaces and thereby engaging an other edge of 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 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:

at least a first member provided on at least one of the posts and the post connecting means; and

at least a second member provided on the anchor member;

the first and second members being engaged to each other in the wall-penetrating configuration;

in which the anchor axis 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 surface facing the distal end between the proximal and distal ends of 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.

39. A wall anchor assembly according to claim 38 further including means for securing the anchor member slidably engaged, prior to the anchor assembly's first use.

40. A wall anchor assembly according to claim 39 in which the securing means includes a protrusion and a cooperating detent.

41. A wall anchor assembly comprising:

an assembly axis at the longitudinal center of the assembly;

a collar;

a pair of posts extending from said collar, having a uniform space between said posts;

each post of the pair has an inside surface;

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

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

an anchor member between said posts,
 a proximate track on a first edge of the anchor member extending the first edge outside the uniform space to engage a first post edge of a first post of the pair of posts;
 a distal track on a second edge of the anchor member extending the second edge outside the uniform space to engage a second post edge;
 said proximate and distal tracks thereby retaining said anchor member captive between said pair of posts;
 said anchor member having a longitudinal anchor axis;
 a penetrating configuration in which the longitudinal anchor axis is substantially parallel to the assembly axis,
 said anchor member further having:
 a tip for penetrating the wall;
 an intermediate distal ramped surface for rotating the longitudinal anchor axis perpendicular to the assembly axis;
 a hole for receiving the bolt perpendicular to the longitudinal anchor axis,
 said hole having an interior surface for engaging a bolt thread on said bolt, which interior surface cooperates with said bolt thread to draw the anchor member against the wall to clamp the anchor assembly to the wall.

42. A wall anchor assembly according to claim 41 in which there is a second proximate track on a third edge of the anchor member, said third edge opposite said first edge for balancing proximate retaining forces.

43. A wall anchor assembly according to claim 41 in which there is a second distal track on a fourth edge of the anchor member, said fourth edge opposite said second edge for balancing distal retaining forces.

44. A wall anchor assembly according to claim 41 in which a tongue protrudes from one of said inside surfaces, a groove being defined on the anchor member for engaging

said tongue in the penetrating configuration, a second tongue engaging a second groove to balance engaging forces on opposite sides of the anchor member in the penetrating configuration.

45. A wall anchor assembly according to claim 41 in which the posts, said collar and said connector, by holding the anchor member captive, further serve to retain the anchor member after disengagement from the bolt and for repeatably relocating said bolt in said hole.

46. A wall anchor assembly, according to claim 41, further comprising:
a second proximate track on a third edge of the anchor member, said third edge opposite said first edge for balancing proximate retaining forces;
a second distal track on a fourth edge of the anchor member, said fourth edge opposite said second edge for balancing distal retaining forces;
a pair of tongues protruding each from one of said inside surfaces;
a pair of grooves defined on the anchor member, each for engaging a respective one of said tongues in the penetrating configuration and in such a way as to balance engaging forces on opposite sides of the anchor member in the penetrating configuration.

47. A wall anchor assembly, according to claim 46, in which the posts, said collar and said connector, by holding the anchor member captive, further serve to retain the anchor member after disengagement from the bolt and for repeatably relocating said bolt in said hole.

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FIG. 1

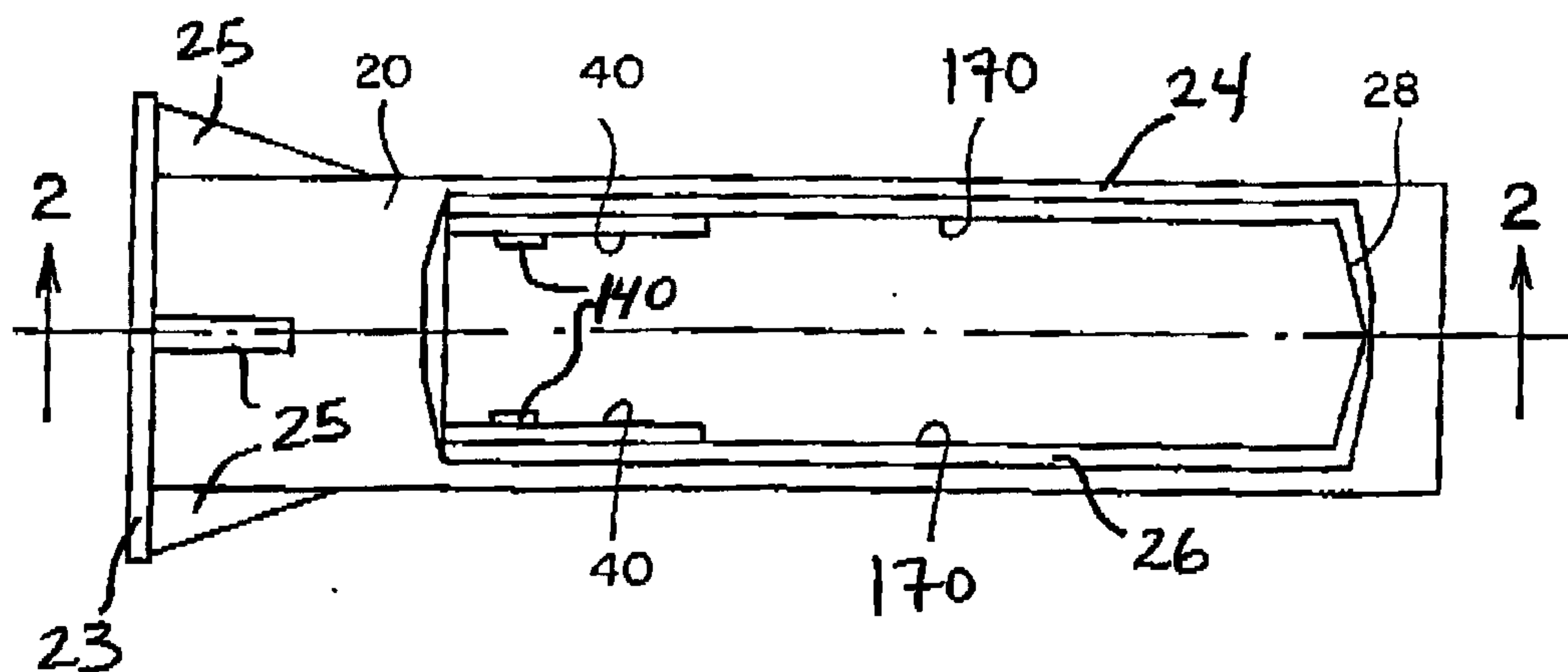


FIG. 2

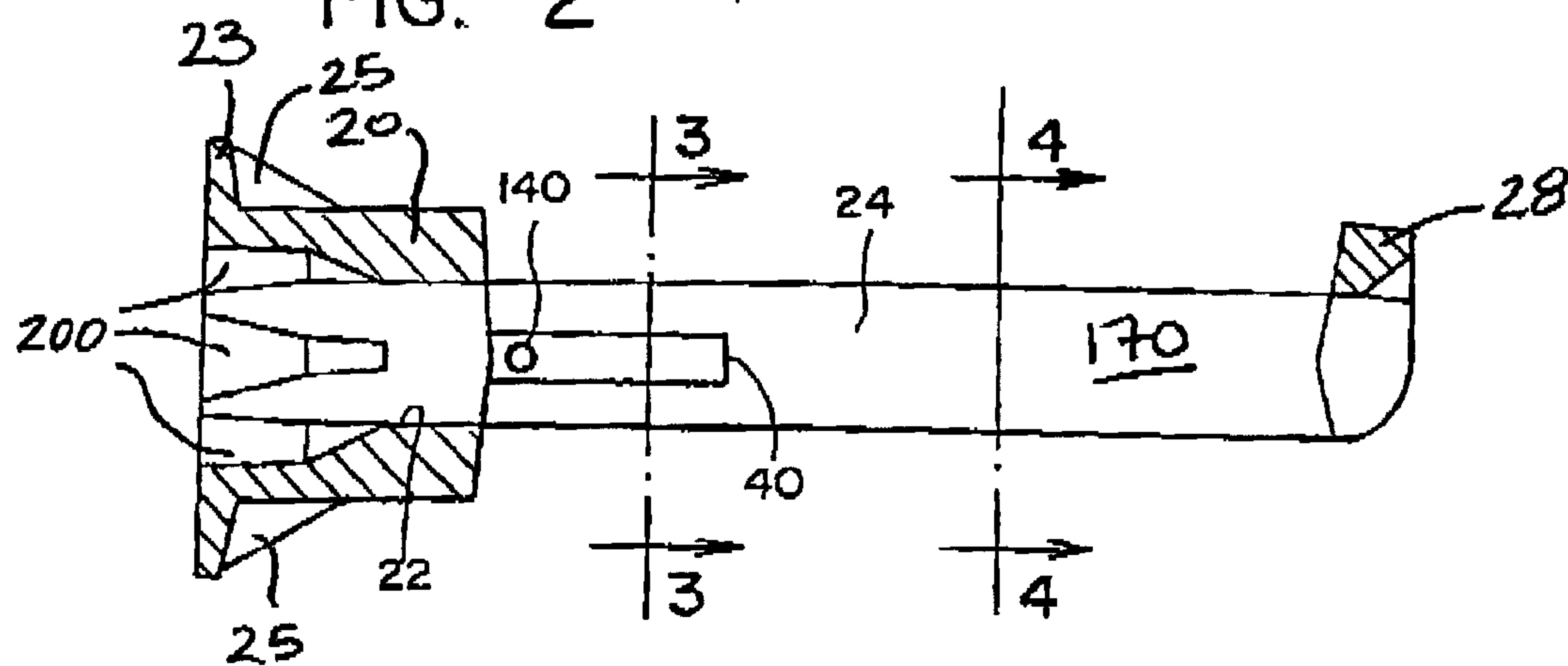


FIG. 3

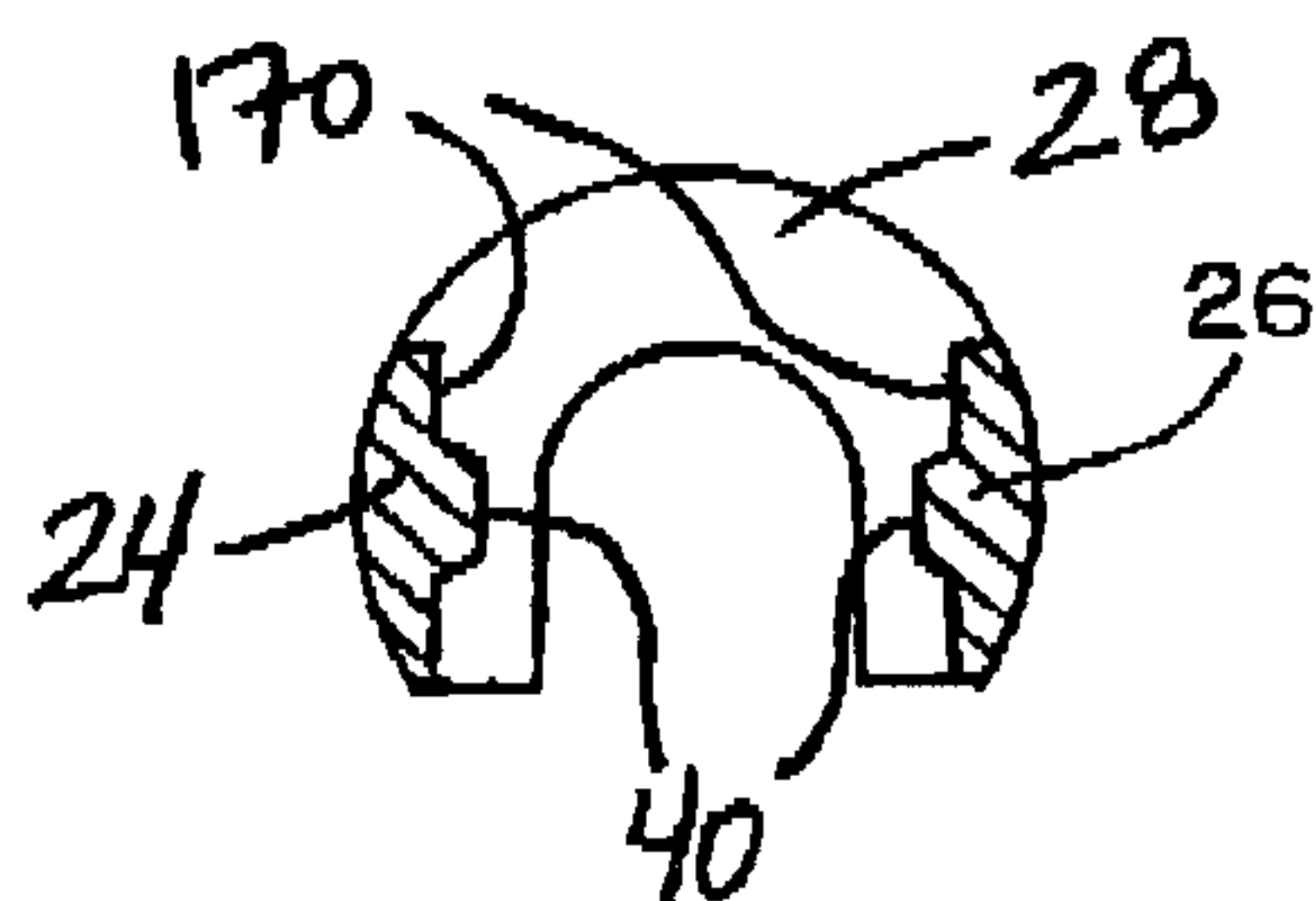
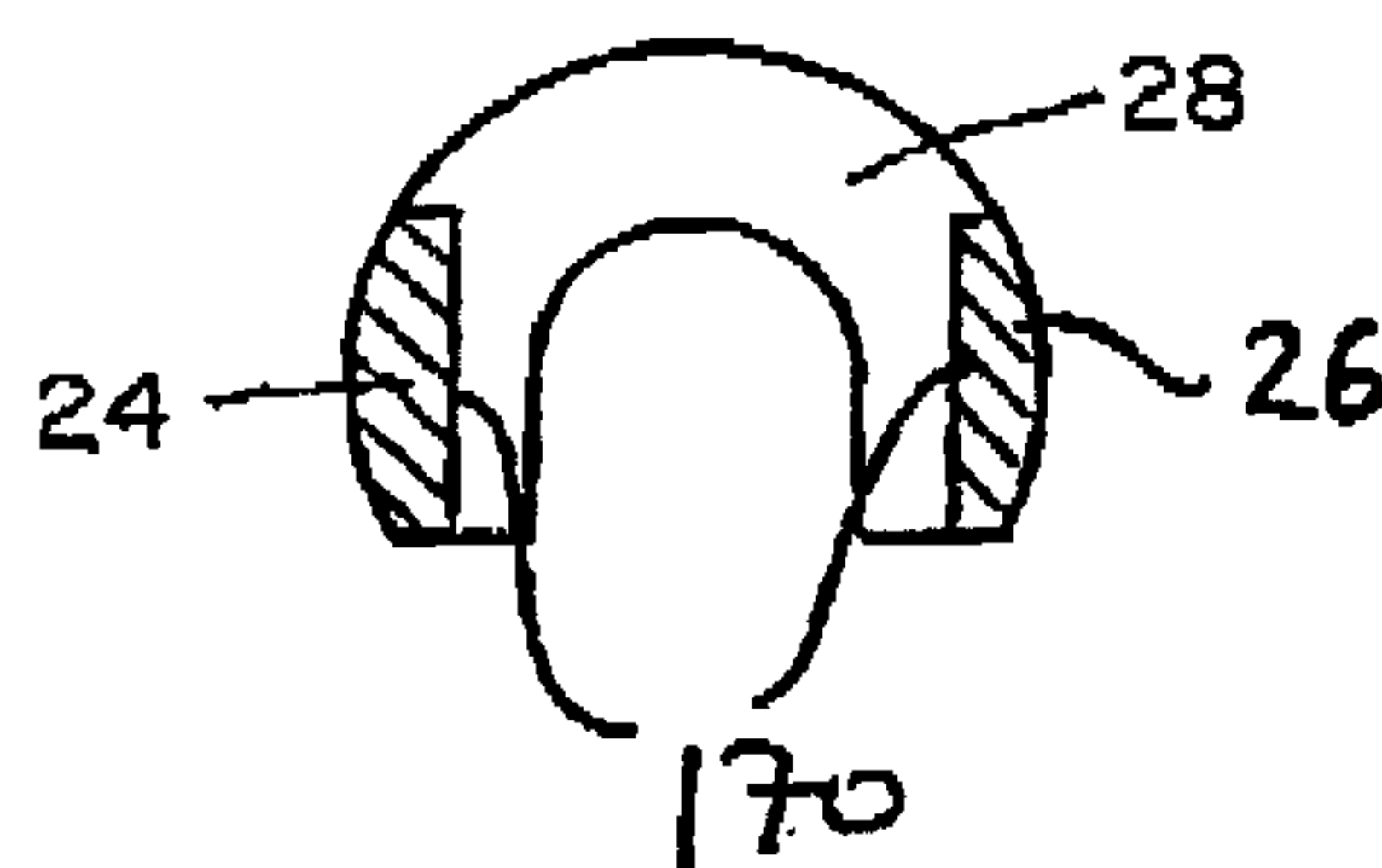


FIG. 4



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FIG. 6

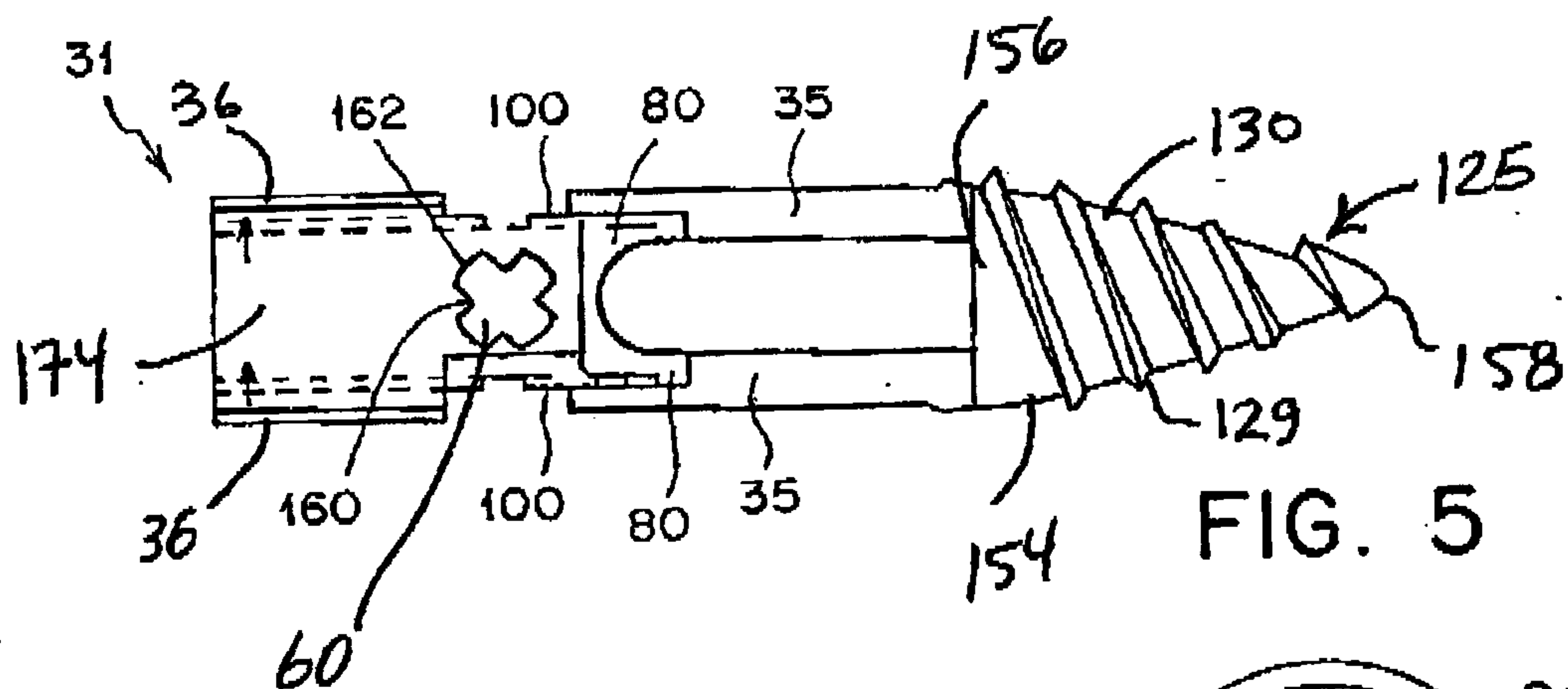


FIG. 5

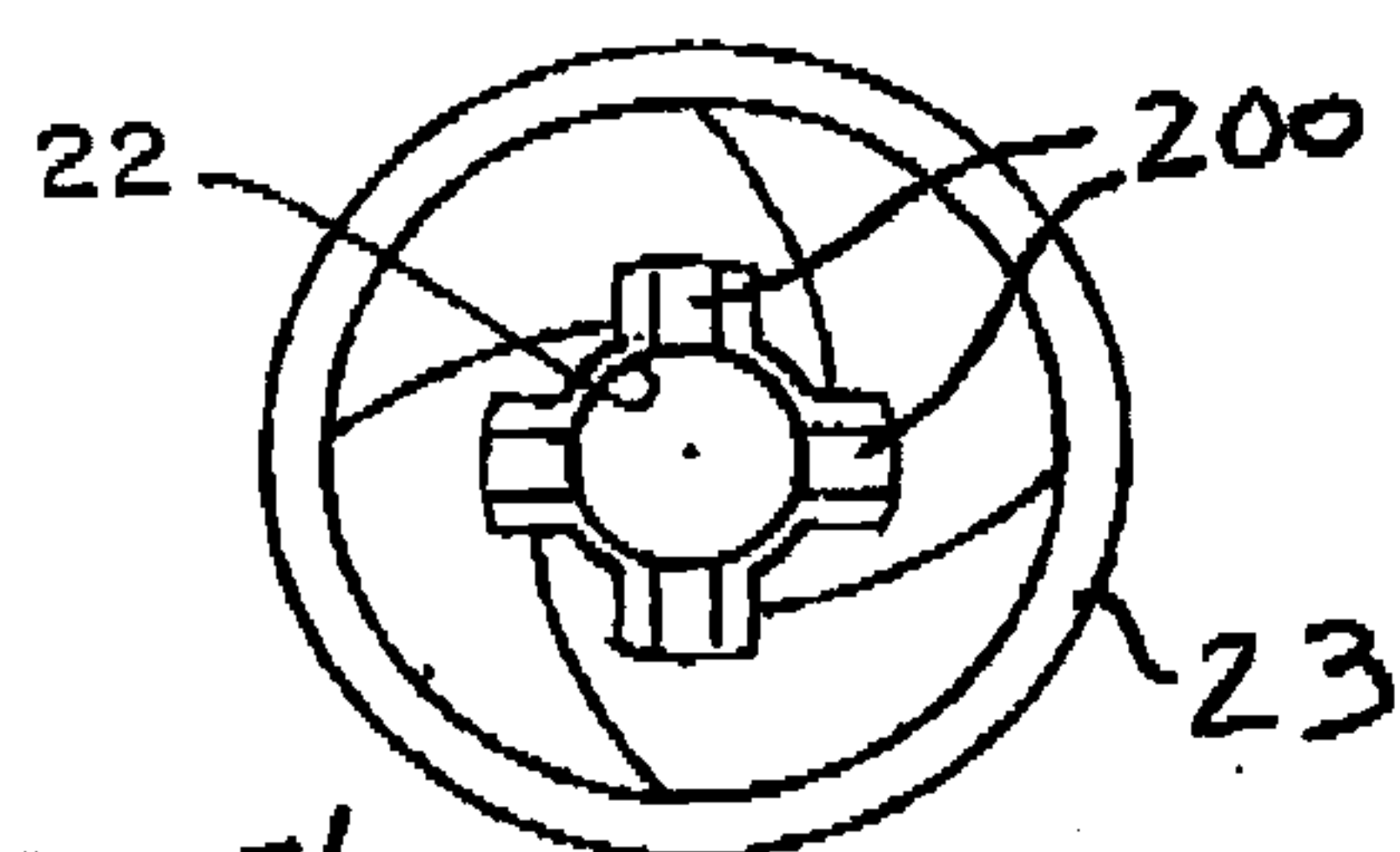


FIG. 7

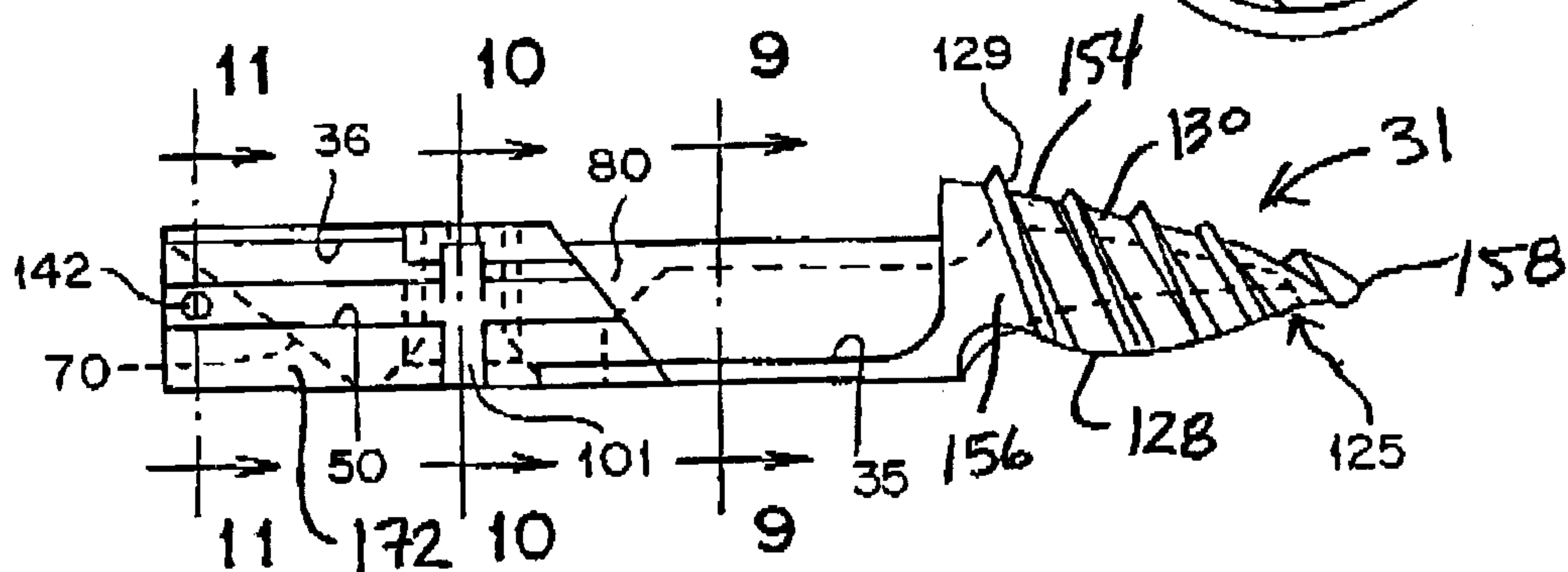


FIG. 8

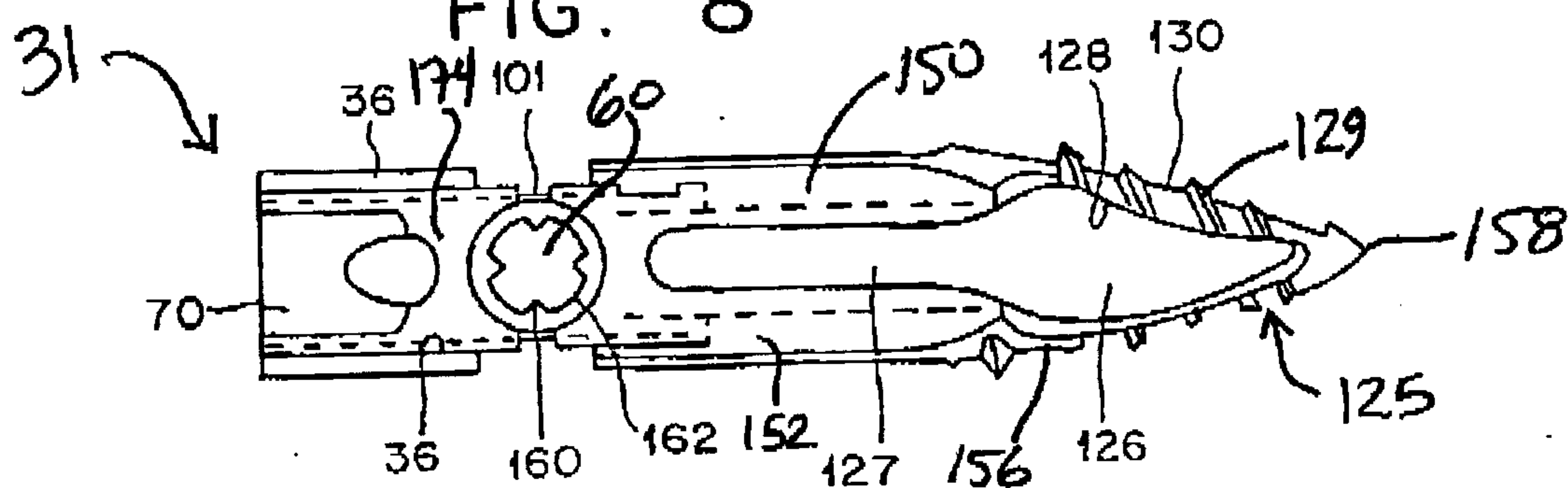


FIG. 9

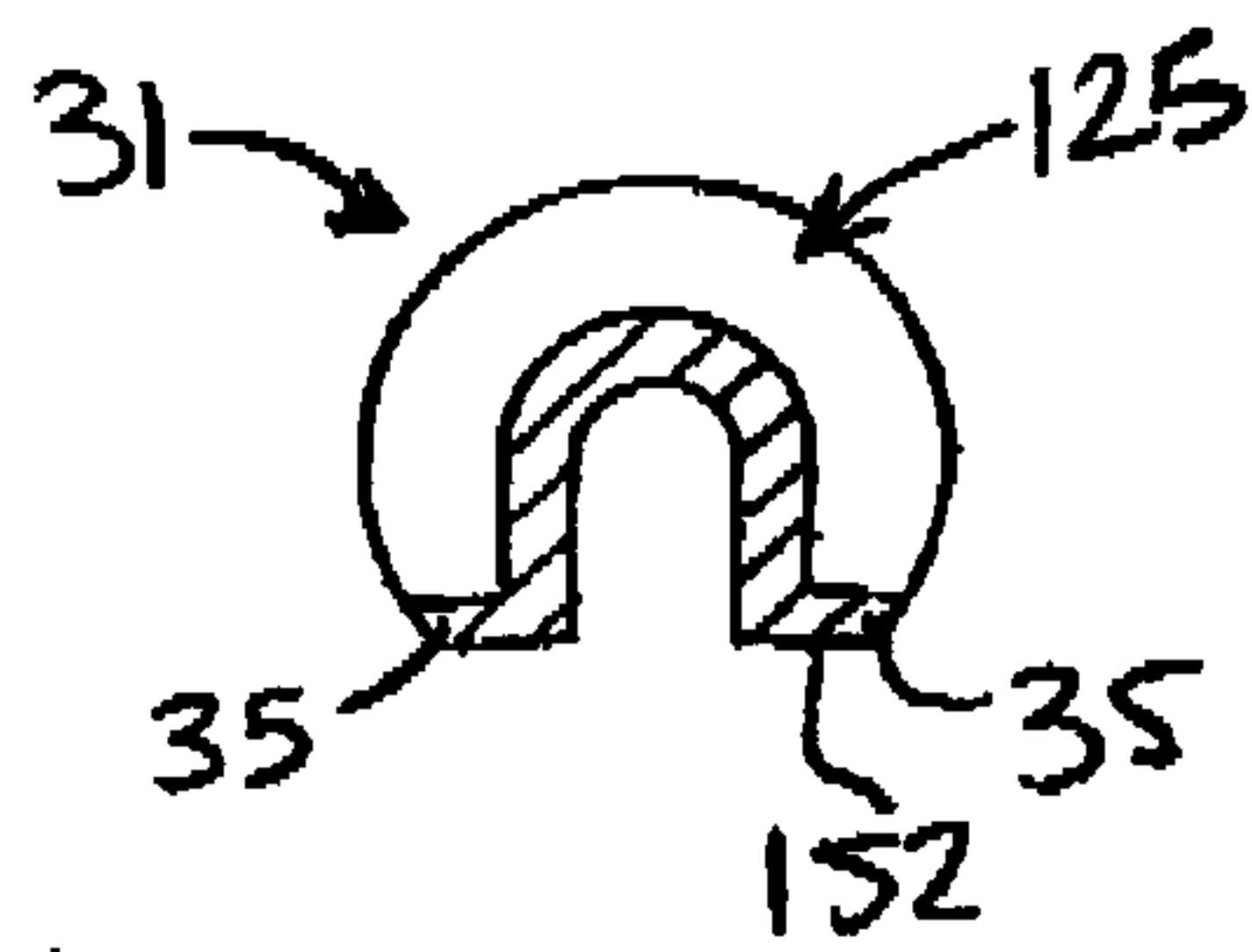


FIG. 10

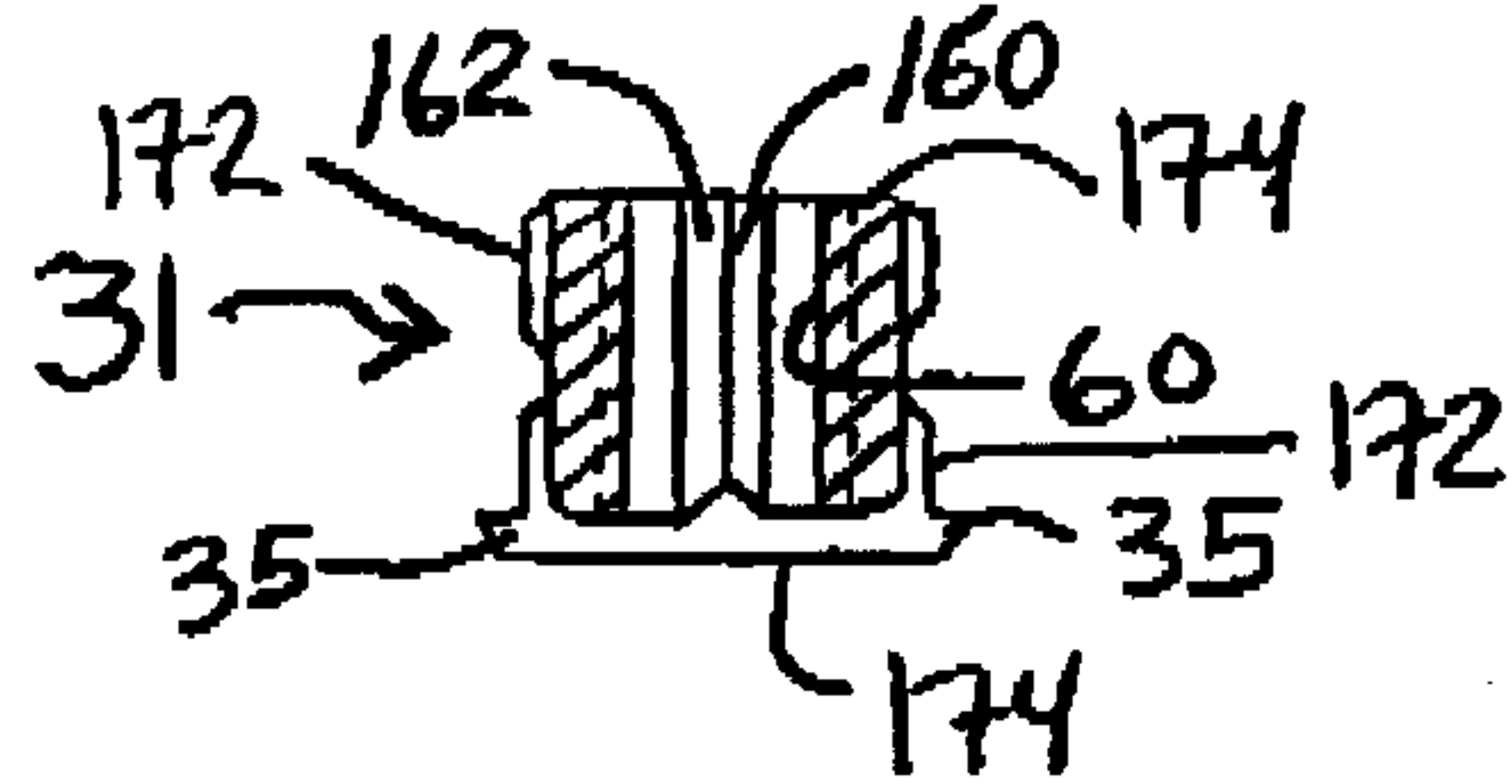


FIG. 14

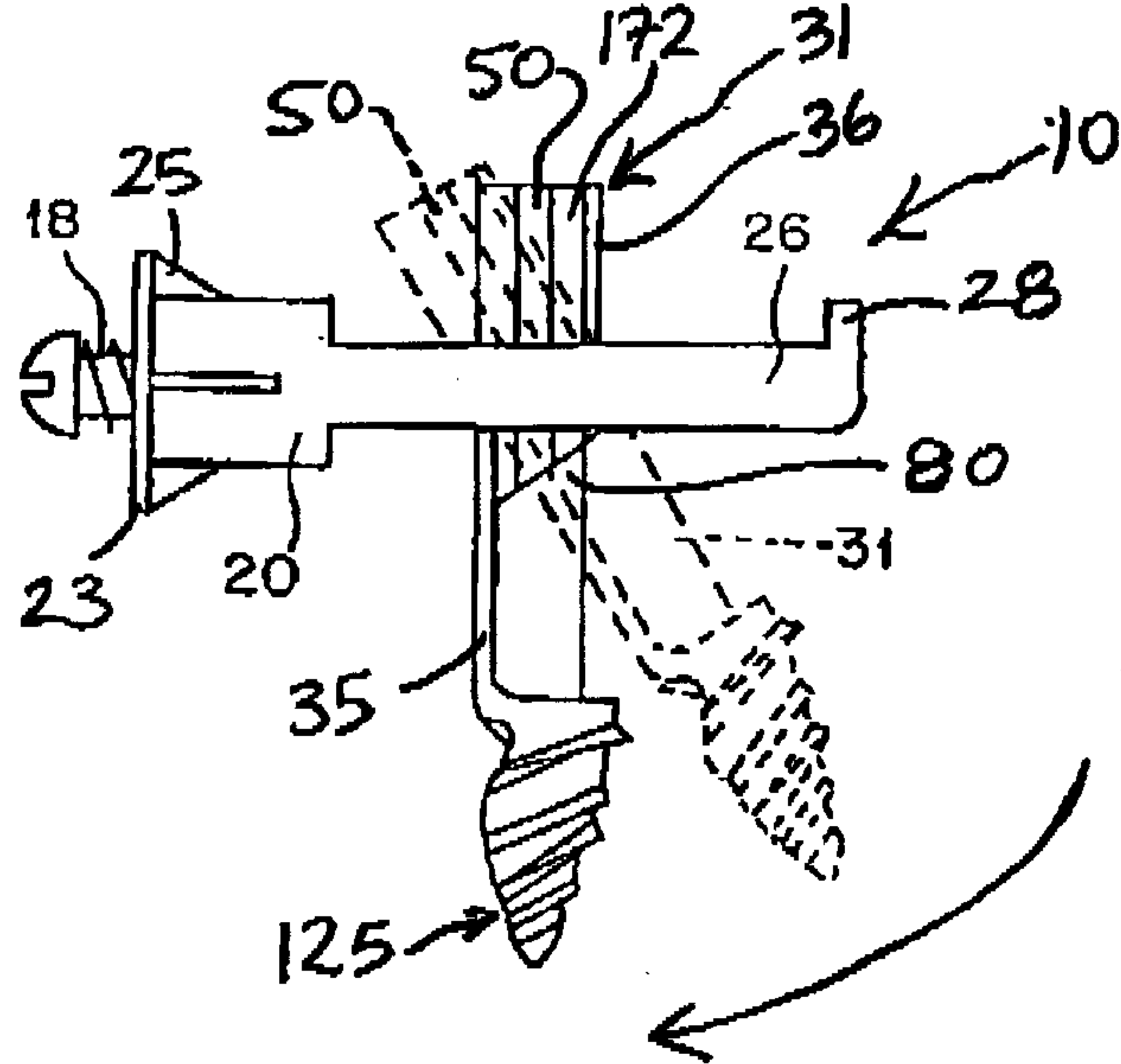


FIG. 12

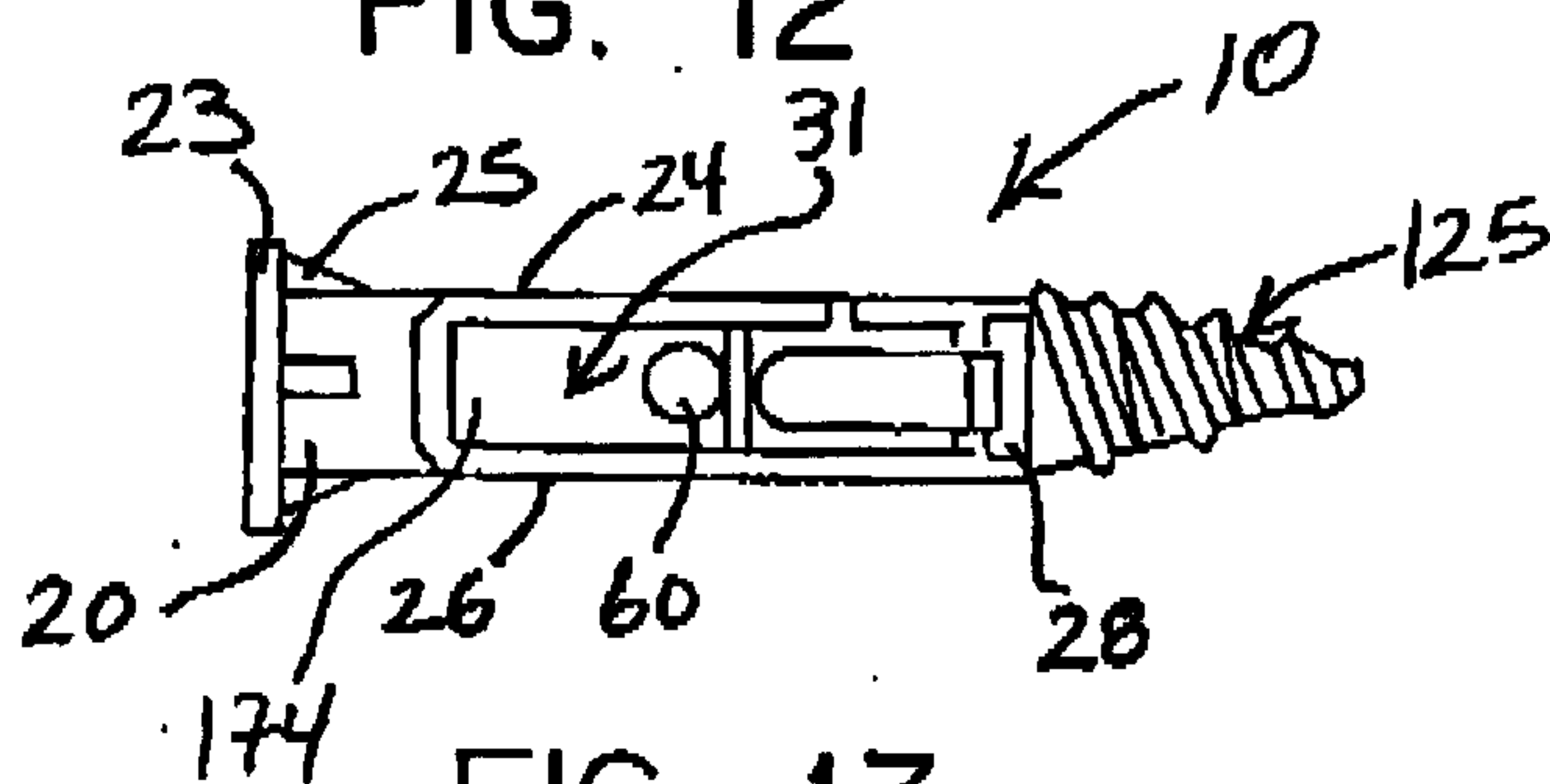


FIG. 13

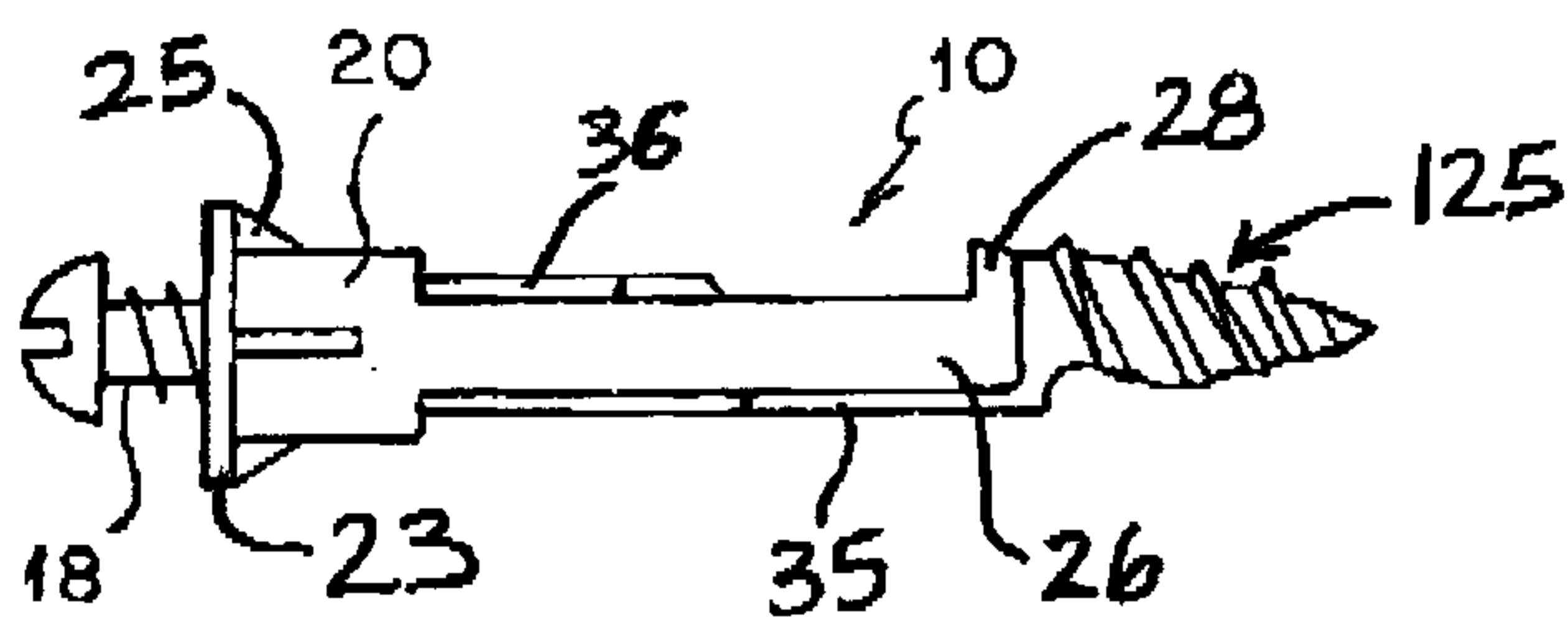


FIG. 11

