



(22) Date de dépôt/Filing Date: 1992/05/04

(41) Mise à la disp. pub./Open to Public Insp.: 1993/09/27

(45) Date de délivrance/Issue Date: 2003/11/11

(30) Priorité/Priority: 1992/03/26 (858,062) US

(51) Cl.Int.⁵/Int.Cl.⁵ B05B 15/06

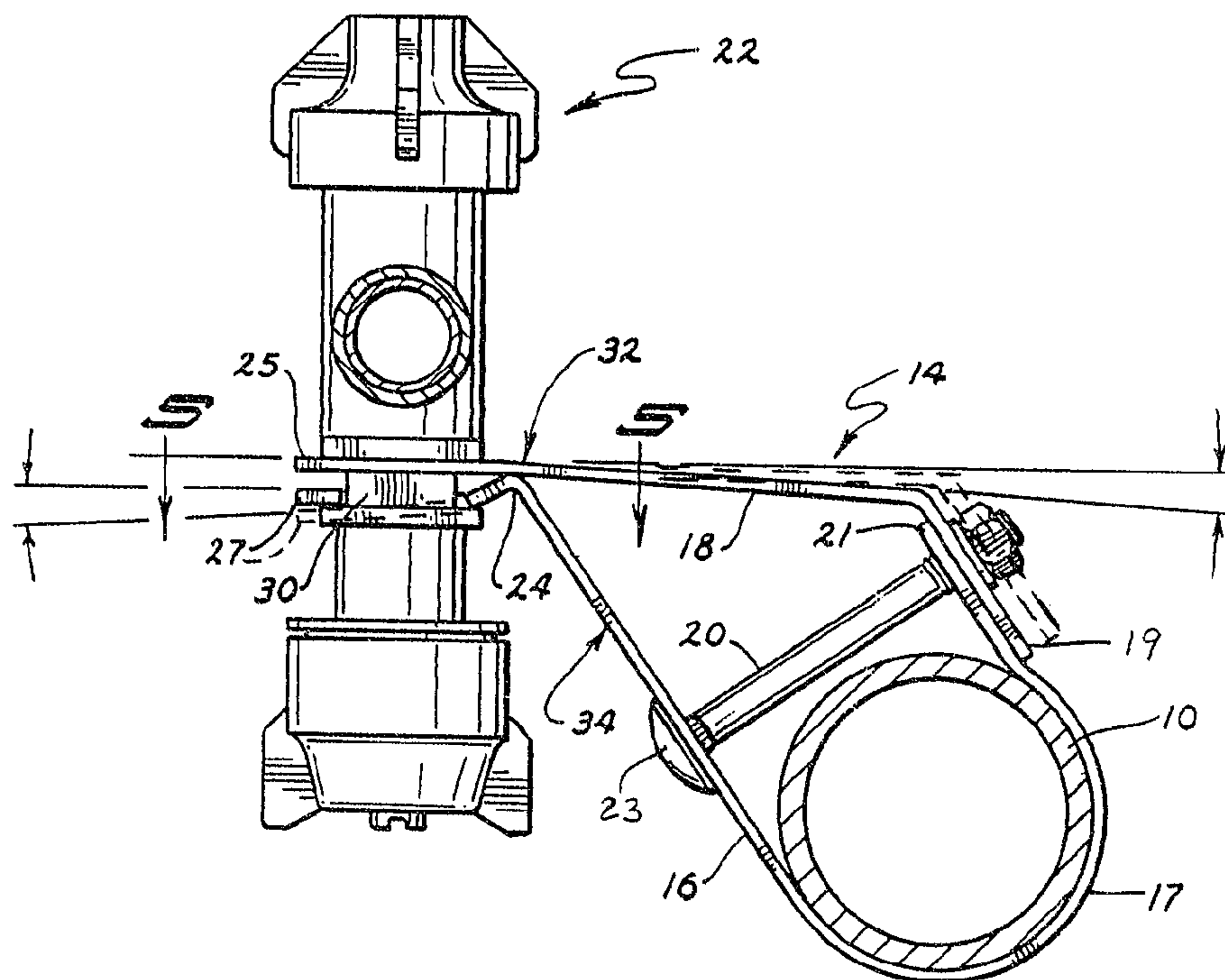
(72) Inventeur/Inventor:
THYBERG, MICHAEL M., US

(73) Propriétaire/Owner:
CLARK EQUIPMENT COMPANY, US

(74) Agent: BORDEN LADNER GERVAIS LLP

(54) Titre : SUPPORT

(54) Title: BRACKET ASSEMBLY



(57) Abrégé/Abstract:

A bracket assembly mounts a spray nozzle above and behind a supporting boom tube. The bracket assembly provides positive spring clamping force on the nozzle to be mounted, by spreading a pair of retainer legs as a clamp bolt is tightened. The bracket is made so the overtightening of the clamp bolt used will not damage the spray nozzles. The clamp bolt also clamps the bracket to the boom tube.



BRACKET ASSEMBLY**ABSTRACT OF THE DISCLOSURE**

A bracket assembly mounts a spray nozzle above and behind a supporting boom tube. The bracket assembly provides positive spring clamping force on the nozzle to be mounted, by spreading a pair of retainer legs as a clamp bolt is tightened. The bracket is made so the overtightening of the clamp bolt used will not damage the spray nozzles. The clamp bolt also clamps the bracket to the boom tube.

BRACKET ASSEMBLYBACKGROUND OF THE INVENTION

The present invention relates to a bracket assembly for mounting a spray nozzle on a boom tube
5 whereby the nozzle is mounted upwardly from and behind the boom tube and clamped in place with a single bolt.

There are many known clamp or bracket assemblies for spray nozzles. Some problems with these assemblies include complicated assembly, poor clamping
10 under vibration, and damage to the mounted apparatus due to over tightening. The present invention rectifies these problems.

A prior art patent to O'Brien, U.S. Patent No. 4,915,305, discloses a spray nozzle boom mounting
15 arrangement. The O'Brien patent mounts a spray nozzle directly onto a boom tube. The bracket contains a pair of mounting elements, each element frictionally contacting one-half of the boom tube. The bracket in the O'Brien patent is secured to the boom with a bolt on
20 the opposite side of boom tube from the nozzle.

The bracket of the present invention mounts the spray nozzle above and behind the boom tube. The bracket assembly is fastened or secured on the same side of the boom tube as the nozzle being mounted, and it is
25 positively clamped in place. In the O'Brien patent, overtightening of the mounting bolt arrangement is likely to damage the spray nozzle. In the bracket of the present invention, overtightening will not damage the spray nozzle.

30

SUMMARY OF THE INVENTION

This invention relates to a bracket assembly to mount an apparatus, preferably a spray nozzle, above

-2-

and behind a boom tube to protect the nozzle from damage.

5 The bracket assembly has a unique shape wherein a lower portion of the bracket assembly encompasses a portion of the boom tube. An upper portion of the bracket assembly has a pair of overlying legs, one of which is bent to form a rocker. The legs have nozzle receiving slots cut out of the bracket assembly legs. These receiving slots fit into a recess
10 in the nozzle body and when the bracket assembly is clamped together the rocker causes the legs to separate or spread and frictionally hold the nozzle body. A spring loaded clamping force is obtained. The clamping means is preferably a single bolt, positioned on the
15 same side of the boom tube as the nozzle and made to clamp the two main parts of the bracket assembly together. Further clamping of the bracket by tightening, or overtightening the bolt, tends to collapse portions of the bracket toward each other
20 without causing excess loads on the nozzle through the rocker.

Other types of nozzle mountings can be used with the present bracket as well. An alternative fastener could be a single member clamp with a hole to
25 accommodate a threaded stud on the nozzle. A single bolt would also be used to clamp the bracket in place. The bracket would extend to mount the nozzle above and behind, and closely adjacent to the boom tube, as shown herein.

30 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic top view showing a vehicle with a spray boom having nozzles mounted therein;

-3-

Figure 2 is a side elevational view of a bracket assembly mounting a spray nozzle upwardly and behind a boom tube taken along line 2--2 of Figure 1;

Figure 3A is a top view of a first mounting member;

Figure 3B is a side view of the mounting member shown in Figure 3A;

Figure 4A is a top view of a second mounting member;

Figure 4B is a side view of the second mounting member;

Figure 5 is a sectional view taken along the line 5--5 in Figure 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Figures 1 and 2, a typical application of a bracket assembly 14 made according to the present invention, is to individually mount each one of a series of spray nozzles 22 to a boom tube 10, which is carried by a vehicle 12. The nozzles 22 are used to dispense chemicals to crops. As can be seen in Figure 2, the spray nozzle 22 is mounted above and behind and closely adjacent to the boom tube 10 to protect the nozzle. The nozzle 22 is mounted behind the boom tube 10 within twice the width of the boom tube 10. Normally the boom tube 10, and spray nozzles 22, extend outward much farther than the width of the mounting vehicle 12 so it is possible an object may be missed by the driver and hit the nozzle. If the spray nozzle 22 is not protected by the boom tube 10, the nozzle 22 may be damaged. The present invention protects the nozzle 22 from damage of this sort, and also provides for ease of assembly due to single bolt construction.

-4-

In the preferred embodiment, the bracket assembly 14 is formed of two mounting members or portions, namely a first mounting member 16, and a second mounting member 18. The two mounting members 16, 18 fit around the boom tube 10 and are held together by a single bolt 20. The first mounting member 16 has a saddle portion 17 that partially encircles the boom tube 10 and the second member 18 has a tab 19 that overlaps an end portion 21 of the saddle portion (17). Bolt 20 passes through an opening in member 16, spans the diameter of the boom tube and passes through the end portion 21 of the saddle 17 and the overlying tab 19 of the second member 18 to hold the members 16 and 18 together. Bolt 20 also is the clamping means for clamping the saddle 17 onto the boom tube 10. As can be seen in Figure 2, the bolt 20 is positioned behind the boom tube 10, which is the same side of boom tube 10 as the spray nozzle. By placing the bolt 20 on this side of the boom tube 10 and close to the tube, clamping to hold the bracket in place on the boom tube 10 and clamping to hold the spray nozzle 22 are provided. The bolt also is shielded by the boom, which leads the bolt, so it is less likely to snag on tall plants or other objects.

The saddle portion forms a "U" shape that permits it to be slipped onto the boom tube. The end portion 21 is aligned with and spaced from the main length of the first support member 16. The bolt 20 spans the diameter of the boom tube 10 and clamps the legs of the "U" shaped saddle together.

Bracket assembly 14 extends rearwardly and upwardly from the boom tube. As can be seen in Figure 2, the first mounting member 16 is bent at its outer end

-5-

to form a rocker or pivot at 24. It is the rocker 24 that acts to provide a positive spring load clamping force to secure the spray nozzle 22 in place. Both mounting members 16, 18 have leg portions 25 and 27 with
5 nozzle receiving slots 26 and 28 seen in Figure 4A and 3A respectively. These nozzle receiving slots are formed to fit into a bracket receiving recess 30 formed in the spray nozzle 22, as seen in Figures 2 and 5. The receiving slots 26, 28 have open ends which face in
10 opposite directions to lock the nozzle in place when assembled.

The leg portions 25 and 27 of the mounting members 16, 18 are placed close together and slipped into the bracket receiving recess 30 of the nozzle from
15 opposite directions. The assembly 14 then is held in place with bolt 20, which is tightened to clamp the saddle portion 17 to the boom tube. As the mounting members 16, 18 are moved together (from the dotted position of member 18) by tightening the bolt 20, the
20 rocker 24 will cause a separating force on the leg portions 25 and 27. The leg portions 25 and 27 separate and engage the upper and lower surfaces defining the recess 30 in the nozzle body and are loaded under upward and downward separating forces caused by the clamping of
25 the bolt 20 and the pivoting action of rocker 24. The dotted position of leg portion 27 illustrates the position it would take if it was not in slot 30.

Tightening bolt 20 creates a force that rotates member 18 down and leg 19 toward the end portion
30 21. Members 18 and 19 pivot on the rocker 24 relative to each other, providing an outward clamping force between leg portions 25 and 27. Section 32 of member 18 reacts to the clamping force executed on member 18 with

little bending. This action clamps the saddle 17 onto the boom tube at the same time. The rocker 24 causes a pivoting from the force at 34 to provide the separating force on the leg portions 25 and 27 to exert a friction
5 load on the surfaces defining the recess 30 on the nozzle body, to thereby clamp the nozzle securely.

Another feature of the present invention is that overtightening of the bolt 20 on the bracket assembly 14 will not damage the spray nozzle 22. The
10 members 16 and 18 forming the bracket assembly 14 are spaced substantially in the region where bolt 20 is located. The clamping of bolt 20 bends member 16 inwardly and the bracket assembly 14 will deform by bending at the rocker region and in the area of the bolt
15 head 23 before enough separating force is present at leg portions 25 and 27 to damage the spray nozzle 22. The boom tube 10 will not be damaged because it is usually a thick walled tube.

Figure 4B illustrates a clamp part that can be
20 used alone for supporting a nozzle which fastens with a threaded stud to leg 27. A single bolt can be used to clamp end portion 21 toward mounting member 16.

The bracket 14 locates the nozzle tip above and to the rear of the boom tube 10 and closely adjacent
25 to the boom tube 10 to protect it from damage. The bracket 14 has a smooth leading surface, because saddle 17 wraps around the front or forward side of the boom tube 10 and the bolt 20 is to the rear of the boom tube 10. The bracket 14 does not tend to catch material when
30 the boom is a "break away" boom and breaks away after striking an object. The bracket 14 is easy to make and easy to assembly, and securely holds the nozzle 22 without damaging it.

Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from
5 the spirit and scope of the invention.

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

1. A bracket assembly for mounting an apparatus on a boom tube wherein a saddle portion of the bracket assembly encompasses a portion of the boom tube, the bracket assembly being formed so the apparatus is mounted behind and above the boom tube and closely adjacent to said boom tube, comprising a lower bracket member spaced apart from an upper bracket member, the lower and upper bracket members extending in the same direction away from the boom tube, one of said bracket members being bent to form a rocker that engages the other bracket member between the saddle portion and outer ends of the bracket members, said bracket members both having apparatus receiving slots between the outer ends of the bracket members and the rocker, and clamping means between the rocker and the saddle portion for forcing the bracket members toward each other and for causing the outer ends to tend to separate due to pivoting of at least one of the bracket members on the rocker.
2. The apparatus as defined in claim 1 wherein the apparatus to be mounted is a spray nozzle.
3. The apparatus as defined in claim 1 wherein the apparatus receiving slots are formed to have open sides facing in opposite directions on the bracket members.
4. The apparatus as defined in claim 1 wherein the clamping means is a threaded bolt.
5. The apparatus as defined in claim 1 wherein the clamping means is positioned closer to the boom tube than to the rocker.

6. A bracket assembly for mounting an apparatus on a boom tube wherein the bracket comprises:

a first mounting member having a saddle portion in contact with a portion of the boom tube, and an upper portion extending rearwardly and upwardly from the saddle portion, the first mounting member having a bend which forms a rocker and a first outer end leg;

a second mounting member mounted on the saddle portion and extending from an upper side of the boom tube rearwardly and having a portion bent toward the first member and overlying the rocker;

an end portion of the second mounting member forming a second outer end leg overlying the first outer end leg; and

fastening means to compress the first and second mounting members toward each other to clamp around the boom tube and to cause the rocker to engage the second mounting member and cause a separation of the first and second outer end legs as the mounting members pivot relative to each other on the rocker.

7. The bracket assembly of claim 6 wherein the apparatus to be mounted is a spray nozzle.

8. The bracket assembly of claim 6 wherein the first and second outer end legs have open ended slots formed to open in opposite lateral directions, and are of a size to fit into a recess in the apparatus defined by spaced apart surfaces which are engaged by the outer end legs as the outer end legs separate from clamping and the action of the rocker.

9. The bracket assembly of claim 6 wherein the fastening means is a single bolt.

10. The bracket assembly of claim 6 wherein the fastening means is located between the saddle portion and the rocker.

11. The bracket assembly of claim 9 wherein said single bolt is positioned between the rocker and the boom tube and closer to the boom tube, the saddle portion extending to form a U shaped saddle with a clamp leg parallel to and spaced from the first mounting member, the single bolt passing through both the first mounting member and the clamp leg.

12. The bracket assembly of claim 11 wherein the second mounting member overlies the clamp leg and the single bolt also passes through the second mounting member.

13. A bracket for mounting a spray nozzle on a boom of a mobile machine with the boom having a rearward side facing in an opposite direction from the direction of travel when the mobile machine is in use, the bracket having means for mounting the spray nozzle in a position upwardly and rearwardly from and closely adjacent to the boom, said bracket comprising strap sections formed around the boom and clamping means rearwardly of the boom to clamp the strap sections about the boom.

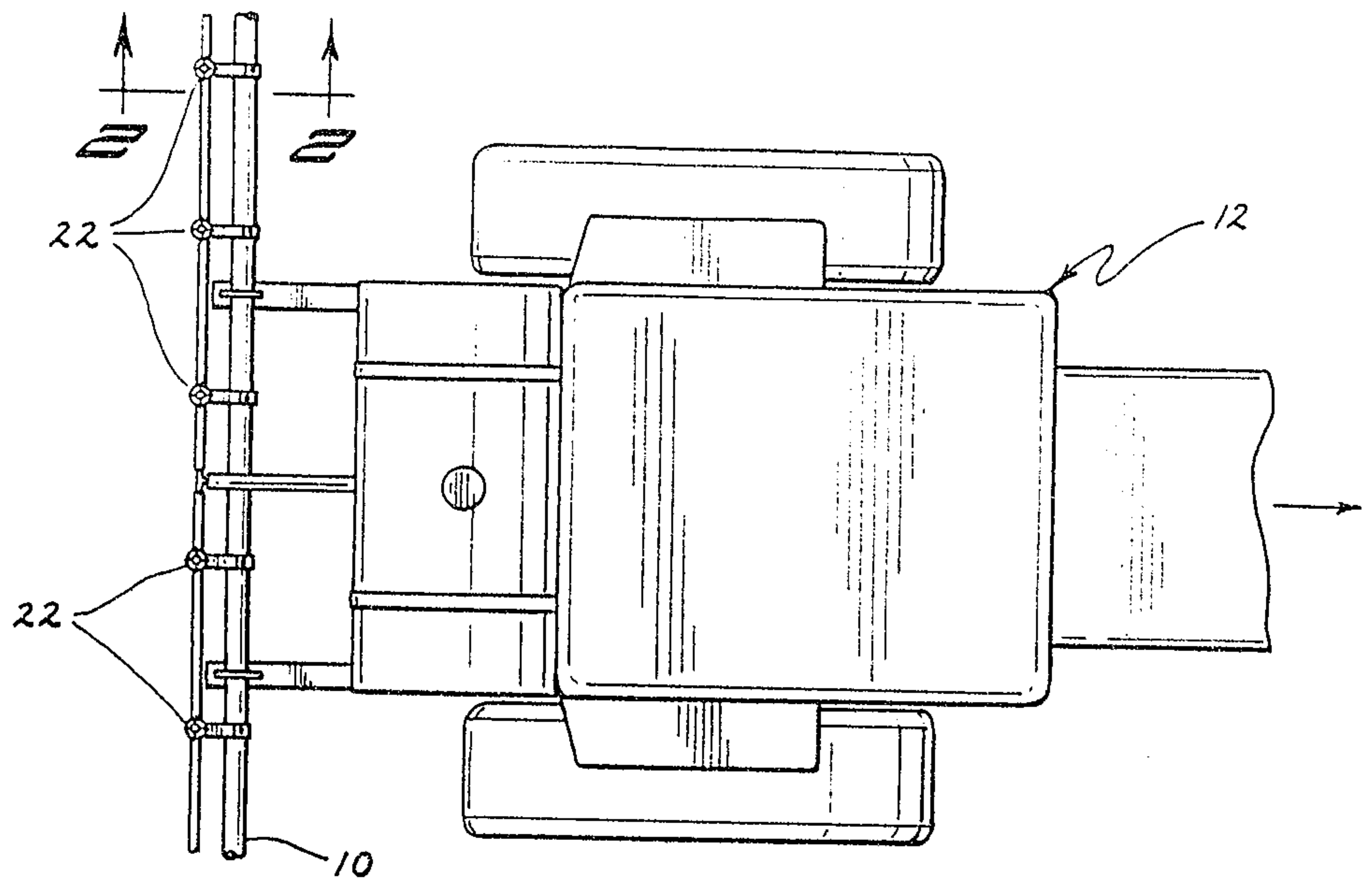
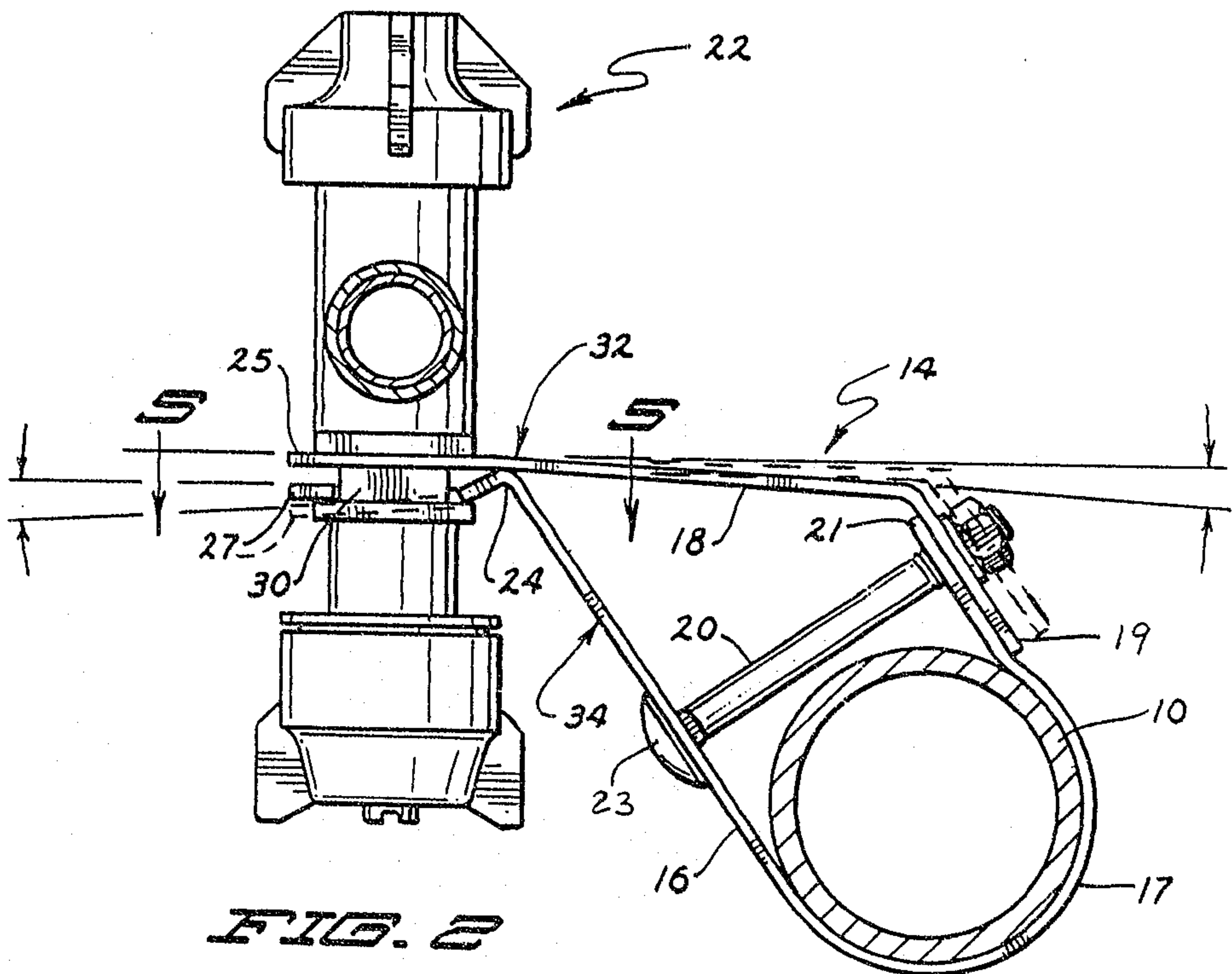
14. The apparatus as defined in claim 13 wherein the clamping means comprises a single bolt positioned to span the strap sections at a location between the boom and the spray nozzle.

15. The apparatus as defined in claim 13 wherein the spray nozzle is mounted behind the boom within twice the width of the boom.

- 4 -

16. The apparatus as defined in claim 15 wherein the spray nozzle comprises a tip above a lower side of the boom.

::ODMA\PCDOCS\CCT\269066\1

**FIG. 1****FIG. 2**

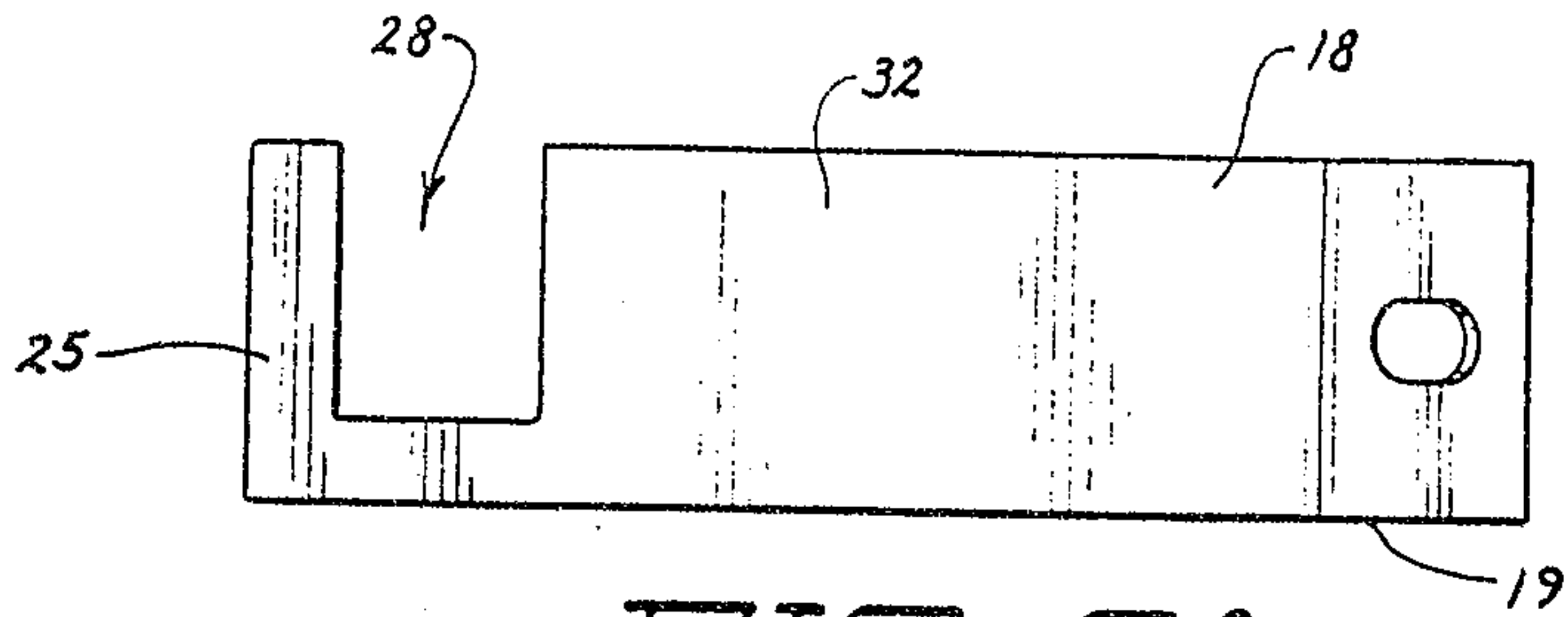


FIG. 3A

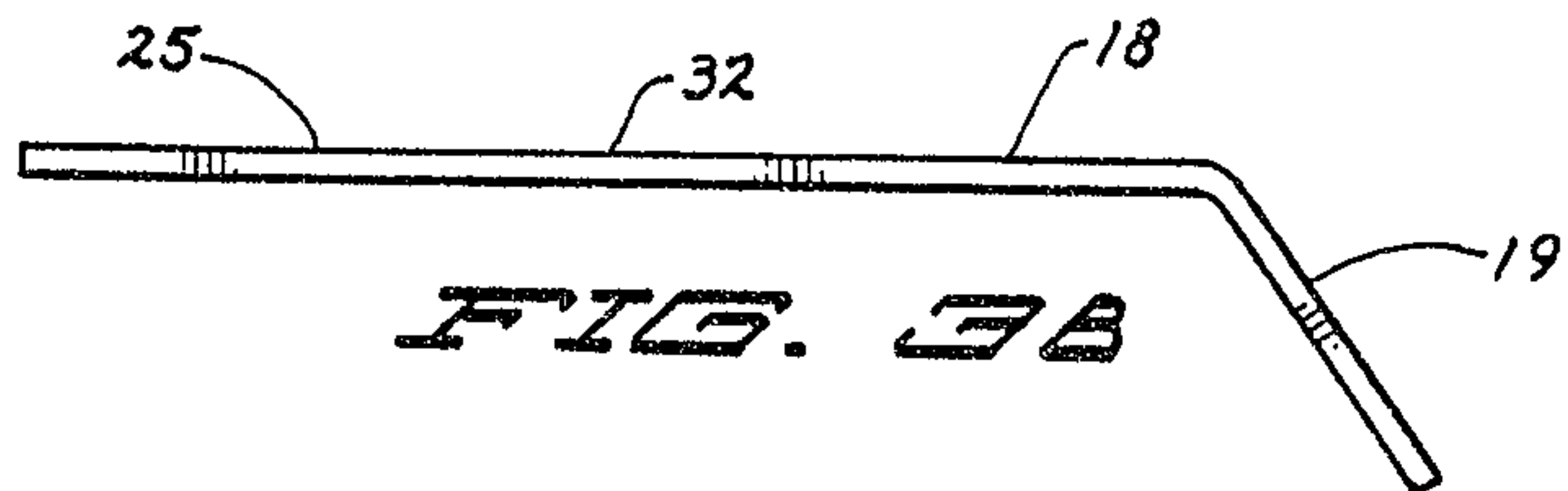


FIG. 3B

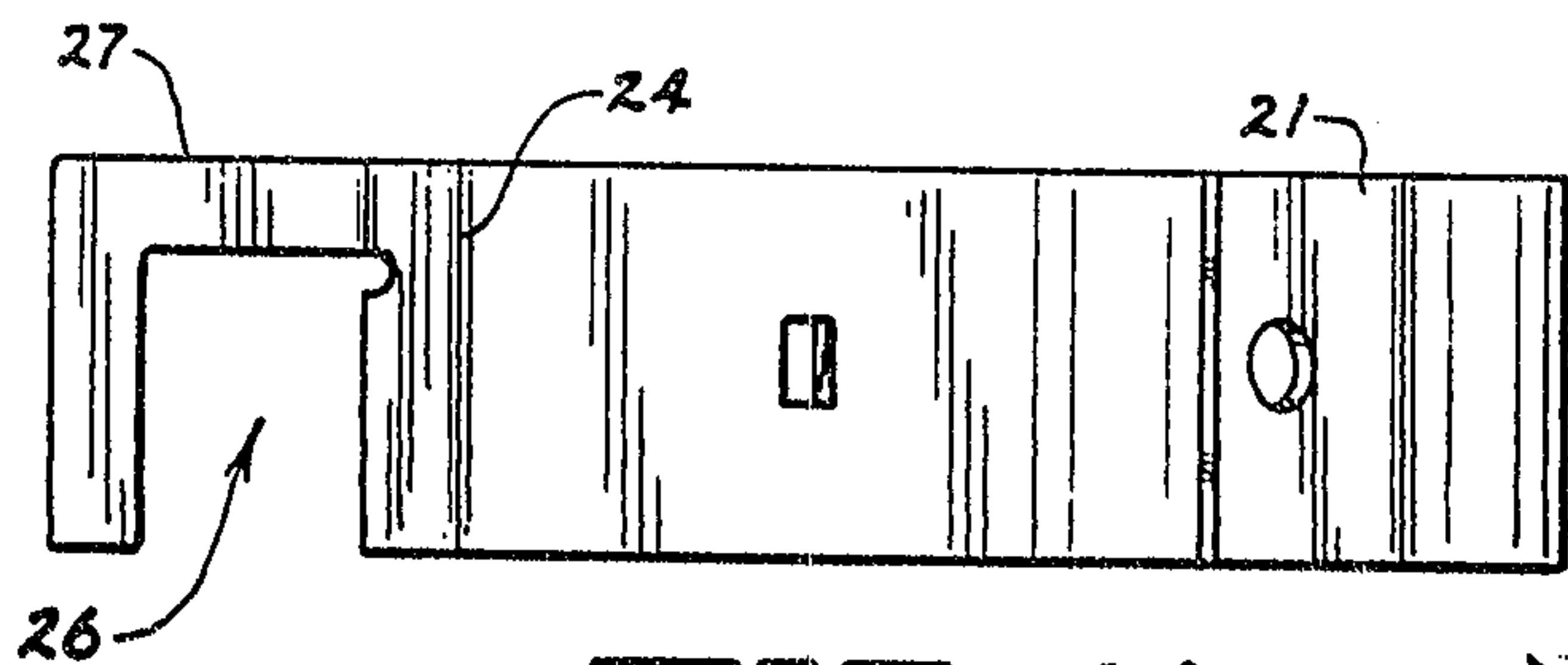


FIG. 4A

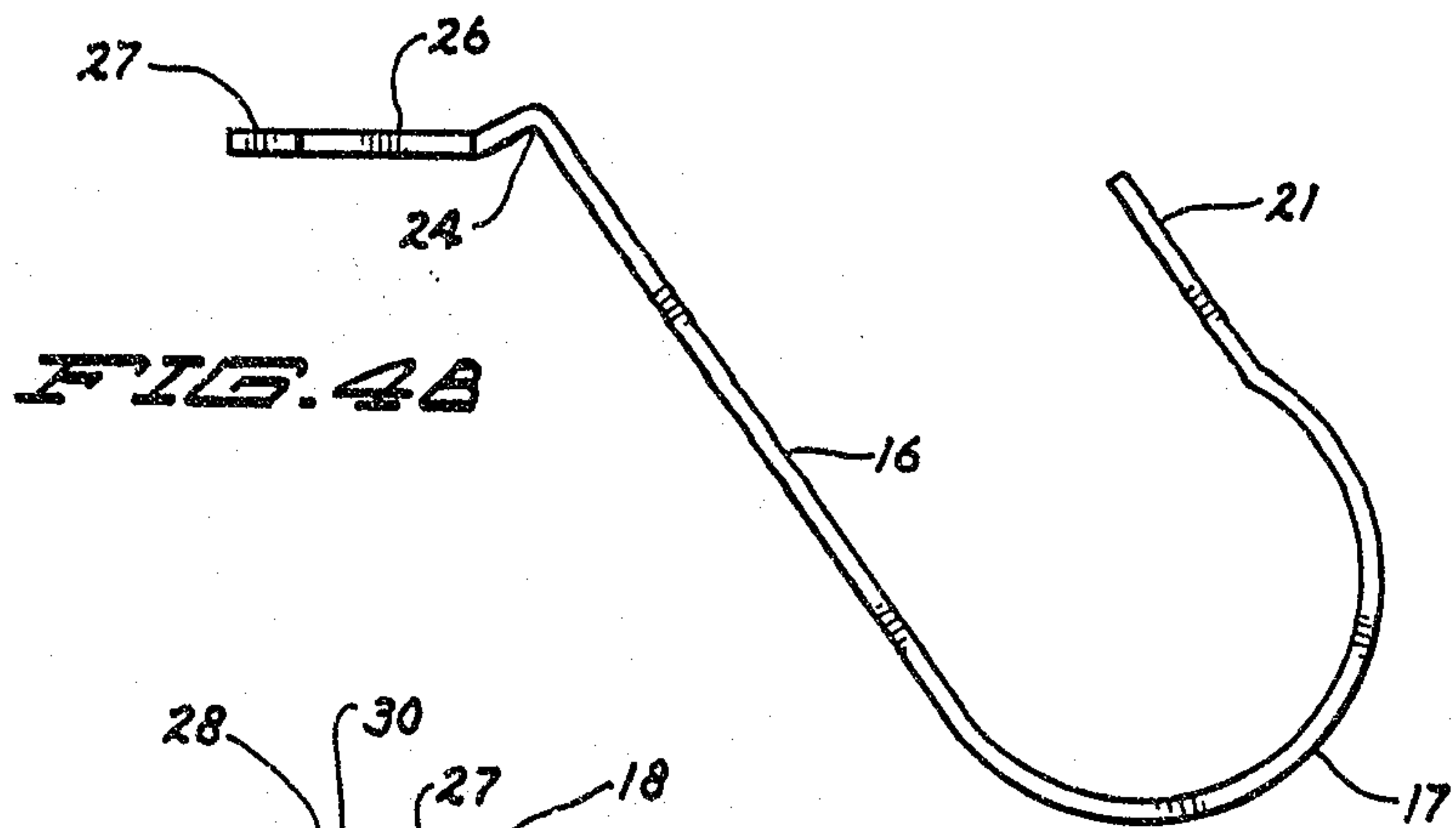


FIG. 4B

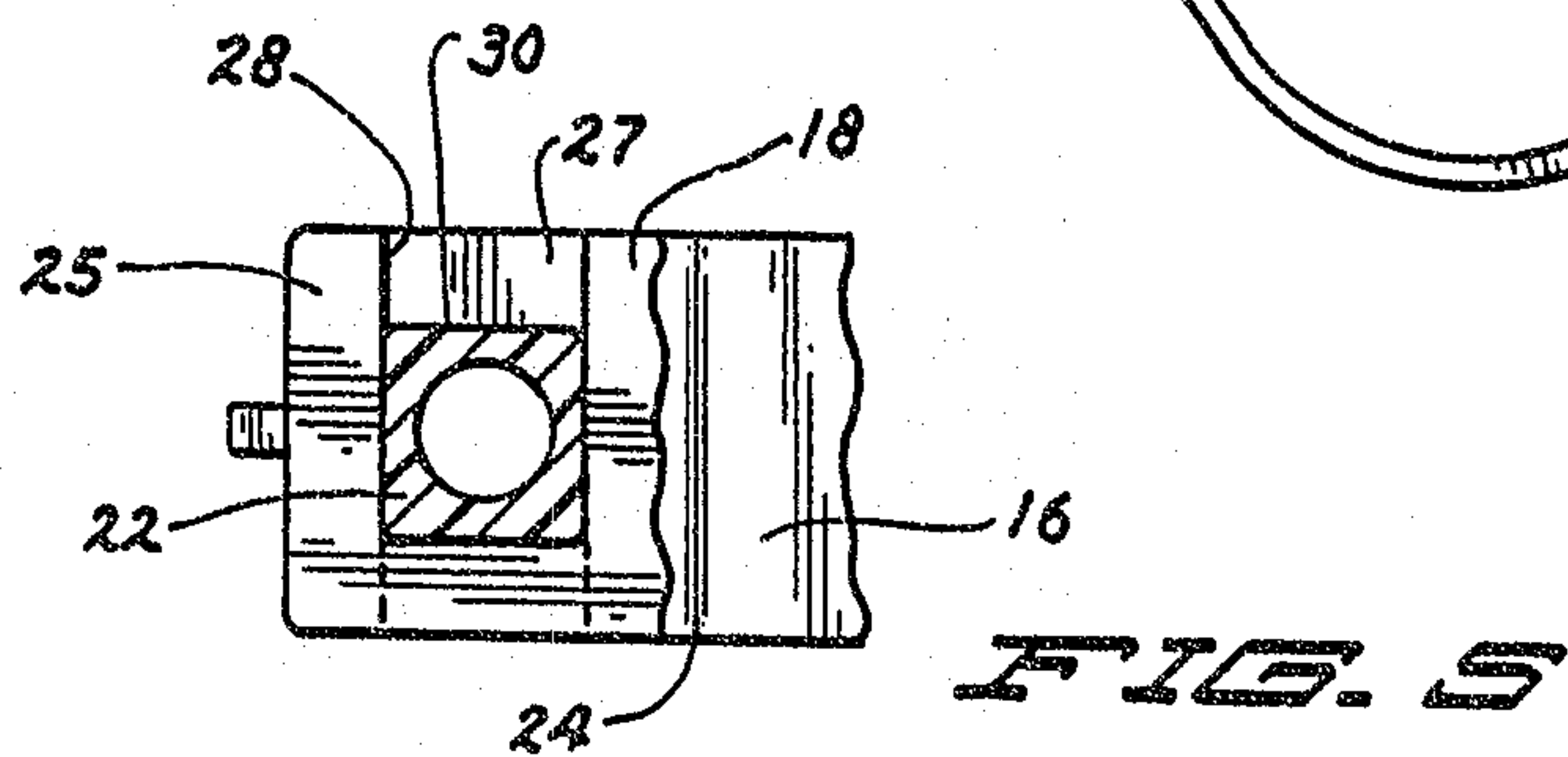


FIG. 5

