



(22) Date de dépôt/Filing Date: 1999/03/08

(41) Mise à la disp. pub./Open to Public Insp.: 2000/09/08

(45) Date de délivrance/Issue Date: 2008/05/13

(51) Cl.Int./Int.Cl. *E01F 9/011* (2006.01),
G12B 5/00 (2006.01)

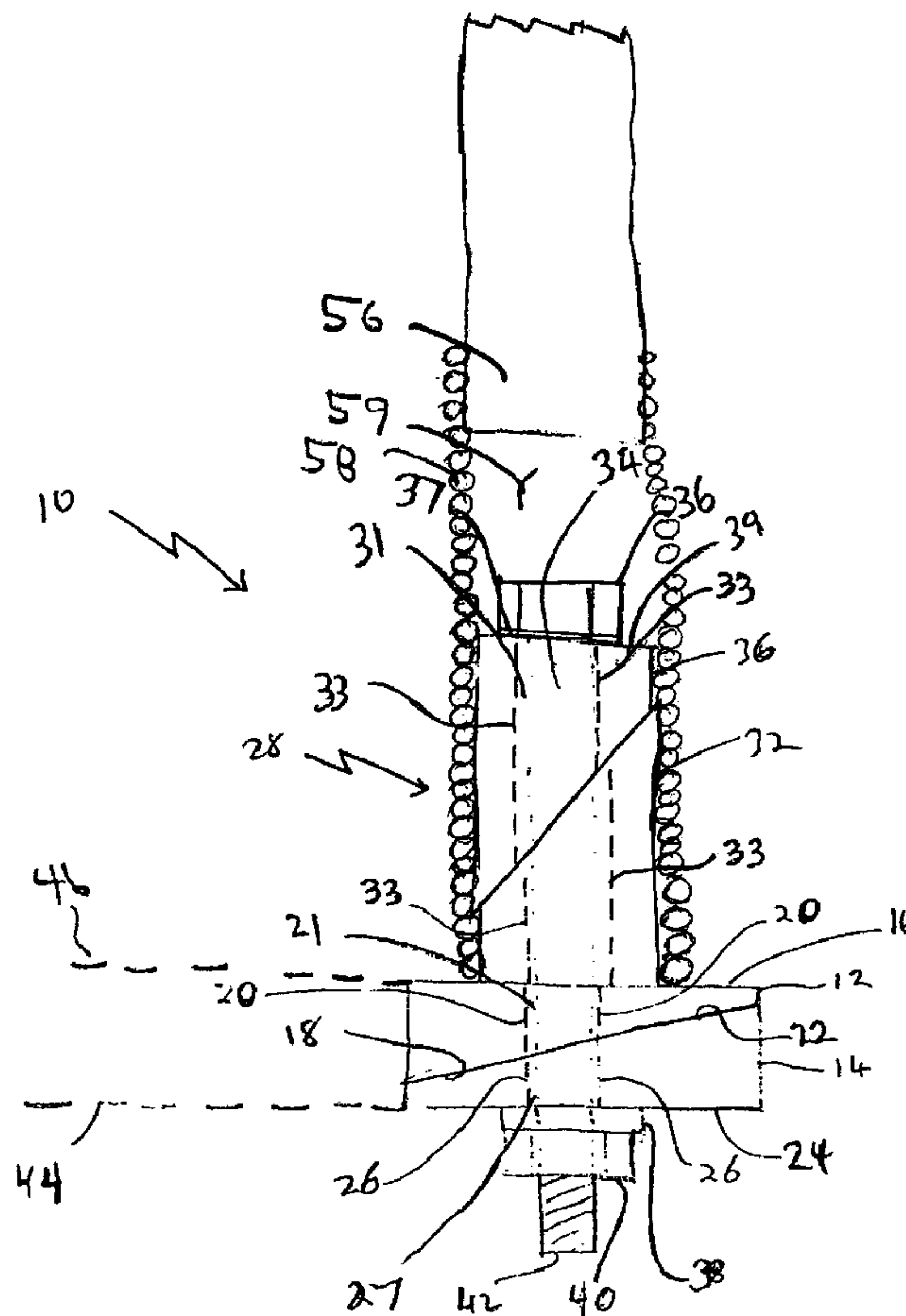
(72) Inventeurs/Inventors:
STERLING, ROBERT LAUREL, CA;
SCHMIDT, RUDIGER, CA

(73) Propriétaire/Owner:
STERLING, ROBERT LAUREL, CA

(74) Agent: THOMPSON, DOUGLAS B.

(54) Titre : DISPOSITIF DE MISE DE NIVEAU DE POTEAU INDICATEUR ET POTEAU INDICATEUR

(54) Title: LEVELLING ASSEMBLY FOR A MARKER POLE AND A MARKER POLE



(57) Abrégé/Abstract:

A levelling assembly for a marker pole includes a primary levelling member and a secondary levelling member. The primary levelling member has a pole mounting face and a primary angular contact face. The secondary member has a secondary angular



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

contact face. The relative rotational positioning of the primary angular contact face and the secondary angular contact face determines the angular offset of the pole mounting face. There is an opposed offsetting position, a cumulative offsetting position, and a range of intermediate offsetting positions. A pole mounting is positioned on the pole mounting face of the primary levelling member. A clamp is provided for clamping the primary levelling member and the secondary levelling member together to maintain the primary angular contact face and the secondary angular contact face in a selected rotational position.

ABSTRACT OF THE DISCLOSURE

A levelling assembly for a marker pole includes a primary levelling member and a secondary levelling member. The primarily levelling member has a pole mounting face and a primary angular contact face. The secondary member has a secondary angular contact face. The relative rotational positioning of the primary angular contact face and the secondary angular contact face determines the angular offset of the pole mounting face. There is an opposed offsetting position, a cumulative offsetting position, and a range of intermediate offsetting positions. A pole mounting is positioned on the pole mounting face of the primary levelling member. A clamp is provided for clamping the primary levelling member and the secondary levelling member together to maintain the primary angular contact face and the secondary angular contact face in a selected rotational position.

TITLE OF THE INVENTION:

Levelling Assembly for a Marker Pole and a Marker Pole

NAME(S) OF INVENTOR(S):

5 Robert Laurel Sterling
 Rudiger Schmidt

FIELD OF THE INVENTION

10 The present invention relates to a levelling assembly for
a marker pole, of the type used in marking the location of
culverts and other objects, and a marker pole having such a
levelling assembly.

BACKGROUND OF THE INVENTION

15 Marker poles are positioned in ditches to mark the
position of culverts as part of comprehensive highway
maintenance programs. The presence of the marker poles enables
a maintenance crew travelling along a highway in a vehicle
inspecting culverts to readily identify the position of each
20 culvert. It is preferred that a marker pole be secured at each
end of the culvert, with the marker pole extending vertically.
Unfortunately, culverts often are sloped at the ends. A marker
pole attached to a culvert that has a sloped end, extends at
an angle instead of vertically. This makes the marker pole
25 more difficult to spot. It is also not as aesthetically
pleasing when the marker poles are sloping at varying angles,
as when the marker poles extend vertically.

SUMMARY OF THE INVENTION

30 What is required is a levelling assembly for a marker pole
that can be used to ensure that the marker poles extends
vertically, notwithstanding the slope of the object to which
the marker pole is attached.

35 According to one aspect of the present invention there is
provided a levelling assembly for a marker pole which includes
a primary levelling member and at least one secondary levelling

member. The primary levelling member has a pole mounting face and a primary angular contact face. The at least one secondary member has a secondary angular contact face. The relative rotational positioning of the primary angular contact face and the secondary angular contact face determines the angular offset of the pole mounting face. When the angular contact faces are placed in an opposed offsetting position the angular offset of the pole mounting face is zero degrees. When the angular contact faces are placed in a cumulative offsetting position the angular offset of the pole mounting face is the sum of the offsets of the two angular contact faces. When the angular contact faces are placed in an intermediate offsetting position the angular offset of the pole mounting face is between the opposed offsetting position and the cumulative offsetting position. A pole mounting is positioned on the pole mounting face of the primary levelling member. A clamp is provided for clamping the primary levelling member and the at least one secondary levelling member together to maintain the primary angular contact face and the secondary angular contact face in a selected rotational position.

With the levelling assembly, as described above, although a number of secondary levelling members can be provided, it is preferred for simplicity that there be only one. The primary levelling member and the secondary levelling member can be placed in a relative rotational position to create any angular offset to position the pole mounting in a substantially vertical orientation. The primary angular contact face and the secondary angular contact face are offset to provide a desired range of adjustment. An offset of 15 degrees has been found to be sufficient, as it provides a cumulative offset of 30 degrees. Any offset of 2 degrees or greater is viewed as having utility, depending upon the demands of the application.

There are different forms of male or female pole mountings that can be used with the levelling assembly described above. Beneficial results have been obtained when the pole mounting

consists of two wedge members which expand outwardly when a clamping pressure is exerted .

According to another aspect of the present invention there is provided a marker pole that is equipped with the levelling assembly described. The marker pole has an elongate body with a first end and a second end. A female receptacle is positioned at the second end and receives an expandable pole mounting, such as described above.

10

Although beneficial results may be obtained through the use of the marker pole, as described above, when the marker pole is mounted to a culvert along a highway there is a danger it will be struck by a grader or a snow plow. Even more beneficial results may, therefore, be obtained when the female receptacle is formed from a spring. The spring will enable the marker pole to deflect from any impact and then return to its vertical position.

Although beneficial results may be obtained through the use of the marker pole, as described above, there are times when the marker pole must be located at night. Even more beneficial results may, therefore, be obtained when reflectors are positioned at the first end of the elongate body.

25

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:

FIGURE 1 is an exploded perspective view of a levelling assembly for a marker pole constructed in accordance with the teachings of the present invention.

FIGURE 2 is a side elevation view of the levelling assembly as illustrated in **FIGURE 1**, with angular contact faces in an opposed offsetting position.

FIGURE 3 is a side elevation view of the levelling assembly as illustrated in **FIGURE 1**, with angular contact faces

in a cumulative offsetting position.

FIGURE 4 is a side elevation view of the levelling assembly as illustrated in **FIGURE 1**, with angular contact faces in an intermediate offsetting position.

5 **FIGURE 5** is a side elevation view of a marker post having a levelling assembly as illustrated in **FIGURE 1**.

FIGURE 6 is a detailed side elevation view of the marker post illustrated in **FIGURE 6**.

10 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

The preferred embodiment, a levelling assembly for a marker post generally identified by reference numeral 10, will now be described with reference to **FIGURES 1** through **6**.

15 Referring to **FIGURE 1**, levelling assembly 10 for a marker pole, includes a primary levelling member 12 and a secondary levelling member 14. Primary levelling member 12 has a pole mounting face 16 and a primary angular contact face 18. Referring to **FIGURES 2** through **4**, a first inner surface
20 indicated by a pair of dashed lines 20 defines a first aperture 21 substantially perpendicular to pole mounting face 16 and extending through primary levelling member 12 to primary angular contact face 18. Referring to **FIGURE 1**, secondary levelling member 14 has a secondary angular contact face 22 and
25 a base face 24. Referring to **FIGURES 2** through **4**, a second inner surface indicated by a pair of dashed lines 26 defines a second aperture 27 substantially perpendicular to base face 24 and extending through secondary levelling member 14 to secondary angular contact face 22.

30

A pole mounting 28 is positioned on pole mounting face 14 of primary levelling member 12. Pole mounting 28 includes two wedge members 30, 32 which expand outwardly when a clamping pressure is exerted. A third aperture 31 extends coaxially
35 through wedge members 30, 32, the surface of which is indicated by dashed lines 33. A clamp comprising a bolt 34 with a head 36, a washer 38 and a nut 40 is provided for clamping together

wedge members 30, 32 of pole mounting 28 and clamping primary levelling member 12 and secondary levelling member 14 together, thereby maintaining primary angular contact face 18 and secondary angular contact face 22 in a selected rotational position. A locking washer 37 prevents bolt 34 from rotating relative to pole mounting 28 when nut 40 threadedly engages bolt 34 under an applied rotational force. Bolt 34 extends through first aperture 21, second aperture 27, and third aperture 31. Nut 40 is secured to a remote end 42 of bolt 34. A rotational force applied to nut 40, when nut 40 and washer 38 engage base face 24 of secondary levelling member 14, exerts a clamping force on levelling assembly 10.

Referring to **FIGURES 2** through **4**, it will now be described how the relative rotational positioning of primary angular contact face 18 and secondary angular contact face 22 determine an angular offset 44 of base face 24, as compared to a substantially horizontal orientation for pole mounting face 16 indicated by line 46. Referring to **FIGURE 2**, when primary angular contact face 18 and secondary angular contact face 22 are placed in an opposed offsetting position the angular offset of base face 24 is zero degrees. Referring to **FIGURE 3**, when primary angular contact face 18 and secondary angular contact face 22 are placed in a cumulative offsetting position the angular offset 44 of base face 24 as compared to horizontal orientation 46 of pole mounting face 16 is the sum of the offsets of the two angular contact faces. Referring to **FIGURE 4**, when primary angular contact face 18 and secondary angular contact face 22 are placed in an intermediate offsetting position the angular offset 44 of base face 24 as compared to horizontal orientation 46 of pole mounting face 16 is between the opposed offsetting position illustrated in **FIGURE 2** and the cumulative offsetting position illustrated in **FIGURE 3**. It is preferred that primary angular contact face 18 and secondary angular contact face 22 are each offset by 15 degrees, making the maximum cumulative angular offset 30 degrees. However, depending upon the application any offset greater than 2

degrees will have utility.

Referring to **FIGURE 5**, a marker pole, generally identified by reference numeral 50, has an elongate body 52 having a first end 54 and a second end 56. Referring to **FIGURES 2** through **4**, a female receptacle 58 is positioned at second end 56. A bore 59 of female receptacle 58 is sufficiently large to receive wedge members 30, 32 of pole mounting 28, when said pole mounting 28 is in an unclamped state and therefore is not expanded. When pole mounting 28 is clamped it expands, thereby matingly engages pole mounting 28 with female receptacle 58. Female receptacle 58 is formed from a spring, thereby allowing pole 50 to resiliently deflect from a selected position when subjected to an impact or a lateral force and then return to said selected position, as illustrated in **FIGURE 6**. Referring to **FIGURE 5**, Reflectors 60 are positioned at first end 54 of elongate body 52.

The use and operation of levelling assembly 10 and marker pole 50 will now be described with reference to **FIGURES 1** through **6**. Levelling assembly 10, as illustrated in **FIGURE 1**, is provided for attachment of marker pole 50, as illustrated in **FIGURE 5**, to a culvert 62. An open end 64 of culvert 62 extends from the earth 66 through which culvert 62 passes. A hole (not illustrated) is drilled at a top position 68 proximate to open end 64 of culvert 62 and not covered by earth 66. Referring to **FIGURE 1**, bolt 34 is inserted through locking washer 37, wedge members 30, 32, primary levelling member 12 and secondary levelling member 14. Referring to **FIGURE 5**, bolt 34 is then inserted through the hole at position 68 in culvert 62. End 42 of bolt 34 is passed through washer 38, and nut 40 threadedly loosely engages end 42 of bolt 34. Primary levelling member 12 and secondary levelling member 14 are rotated relative to each other until pole mounting face 16 is substantially horizontal. When culvert 62 is substantially horizontal primary angular contact face 18 and secondary angular contact face 22 are placed in an opposed offsetting

position the angular offset of the pole mounting face 16 is zero degrees, as illustrated in **FIGURE 2**. When a slope of culvert 62 is large primary angular contact face 18 and secondary angular contact face 22 are placed in a cumulative offsetting position as illustrated in **FIGURE 3**. The angular offset 44 of the pole mounting face 16 is the sum of the offsets of the two angular contact faces. When the slope of culvert 62 is less than in the previous example but more than zero, primary angular contact face 18 and secondary angular contact face 22 are placed in an intermediate offsetting position as illustrated in **FIGURE 4**. The angular offset 44 of the pole mounting face 16 is between the opposed offsetting position illustrated in **FIGURE 2** and the cumulative offsetting position illustrated in **FIGURE 3**. Referring to **FIGURES 2** through **4**, female receptacle 58 of marker pole 50 is then positioned over pole mounting 28, so that pole mounting 28 is positioned within bore 59. Nut 40 is then tightened onto remote end 42 of bolt 34, simultaneously clamping wedge members 30, 32 and clamping primary levelling member 12 and secondary levelling member 14 in the selected relative rotational positional. The clamping action causes wedge members 30, 32 to expand and matingly engage female receptacle 58, thereby securing marker pole 50 to levelling assembly 10. The clamping action also secures primary levelling member 12 and secondary levelling member 14 at the selected rotational position for angular offset 44 required to maintain marker pole 50 in a substantially vertical position. Referring to **FIGURE 6**, when marker pole 50 is subjected to an impact or a lateral force, said marker pole 50 female receptacle 58, which is a spring, can deform. Thus marker pole 50 can resiliently deflect from the substantially vertical position to a non-vertical position 70, 72, without substantial stress on or deformation of either levelling assembly 10 or culvert 62. When said impact or lateral force is removed marker pole 50 resiliently returns to the substantially vertical position. A cylindrical member 74 surrounds and protects remote end 42 of bolt 34 and nut 40 from damage from exposure to a fluid in culvert 62.

It will be apparent to one skilled in the art that modifications may be made to the illustrated embodiment without departing from the spirit and scope of the invention as hereinafter defined in the Claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

- 5 1. A levelling assembly for a marker pole, comprising:
a primary levelling member having a pole mounting face and
a primary angular contact face;
a least one secondary member having a secondary angular
contact face, the relative rotational positioning of the
10 primary angular contact face and the secondary angular contact
face determining the angular offset of the pole mounting face,
when the angular contact faces are placed in an opposed
offsetting position the angular offset of the pole mounting
face is zero degrees, when the angular contact faces are place
15 in a cumulative offsetting position the angular offset of the
pole mounting face is the sum of the offsets of the two angular
contact faces, when the angular contact faces are placed in an
intermediate offsetting position the angular offset of the pole
mounting face is between the opposed offsetting position and
20 the cumulative offsetting position;
a pole mounting positioned on the pole mounting face of
the primary levelling member; and
a clamp for clamping the primary levelling member and the
at least one secondary levelling member together to maintain
25 the primary angular contact face and the secondary angular
contact face in a selected rotational position.
2. The levelling assembly as defined in Claim 1, wherein each
of the primary angular contact face and the secondary angular
30 contact face are offset an equal amount, that offset being
between 2 degrees and 15 degrees.
3. The levelling assembly as defined in Claim 1, wherein the
pole mounting consists of two wedge members which expand
35 outwardly when a clamping pressure is exerted .

4. A levelling assembly for a marker pole, comprising:

a primary levelling member having a pole mounting face and a primary angular contact face;

5 a secondary member having a secondary angular contact face, the relative rotational positioning of the primary angular contact face and the secondary angular contact face determining the angular offset of the pole mounting face, when the angular contact faces are placed in an opposed offsetting position the angular offset of the pole mounting face is zero
10 degrees, when the angular contact faces are placed in a cumulative offsetting position the angular offset of the pole mounting face is the sum of the offsets of the two angular contact faces, when the angular contact faces are placed in an
15 intermediate offsetting position the angular offset of the pole mounting face is between the opposed offsetting position and the cumulative offsetting position;

a pole mounting positioned on the pole mounting face of the primary levelling member, the pole mounting consisting of
20 two wedge members which expand outwardly when a clamping pressure is exerted; and

a clamp for clamping together the two wedge members of the pole mounting and clamping the primary levelling member and the secondary levelling member together to maintain the primary
25 angular contact face and the secondary angular contact face in a selected rotational position, the clamp consisting of a bolt and a nut, the bolt extending through a central aperture in each of the two wedge members, the primary levelling member and the secondary levelling member, the nut being secured to a
30 remove end of the bolt to exert a clamping force.

5. The levelling assembly as defined in Claim 4, wherein each of the primary angular contact face and the secondary angular contact face are offset an equal amount, that offset being
35 between 2 degrees and 15 degrees.

6. A marker pole, comprising:

an elongate body having a first end and a second end, a female receptacle being positioned at the second end;

5 a levelling assembly for a marker pole, including

a primary levelling member having a pole mounting face and a primary angular contact face;

a least one secondary member having a secondary angular contact face, the relative rotational positioning of
10 the primary angular contact face and the secondary angular contact face determining the angular offset of the pole mounting face, when the angular contact faces are placed in an opposed offsetting position the angular offset of the pole mounting face is zero degrees, when the angular contact faces
15 are placed in a cumulative offsetting position the angular offset of the pole mounting face is the sum of the offsets of the two angular contact faces, when the angular contact faces are placed in an intermediate offsetting position the angular offset of the pole mounting face is between the opposed
20 offsetting position and the cumulative offsetting position;

an expandable pole mounting positioned on the pole mounting face of the primary levelling member and engaged in mating engagement with the female receptacle at the second end of the elongate body; and

25 a clamp for clamping the primary levelling member and the at least one secondary levelling member together to maintain the primary angular contact face and the secondary angular contact face in a selected rotational position.

30 7. The marker pole as defined in Claim 6, wherein each of the primary angular contact face and the secondary angular contact face are offset an equal amount, that offset being between 2 degrees and 15 degrees.

35 8. The marker pole as defined in Claim 6, wherein the expandable pole mounting consists of two wedge members which expand outwardly when a clamping pressure is exerted .

9. The marker pole as defined in Claim 6, wherein the female receptacle is formed from a spring.

5 10. The marker poles as defined in Claim 6, wherein reflectors are positioned at the first end of the elongate body.

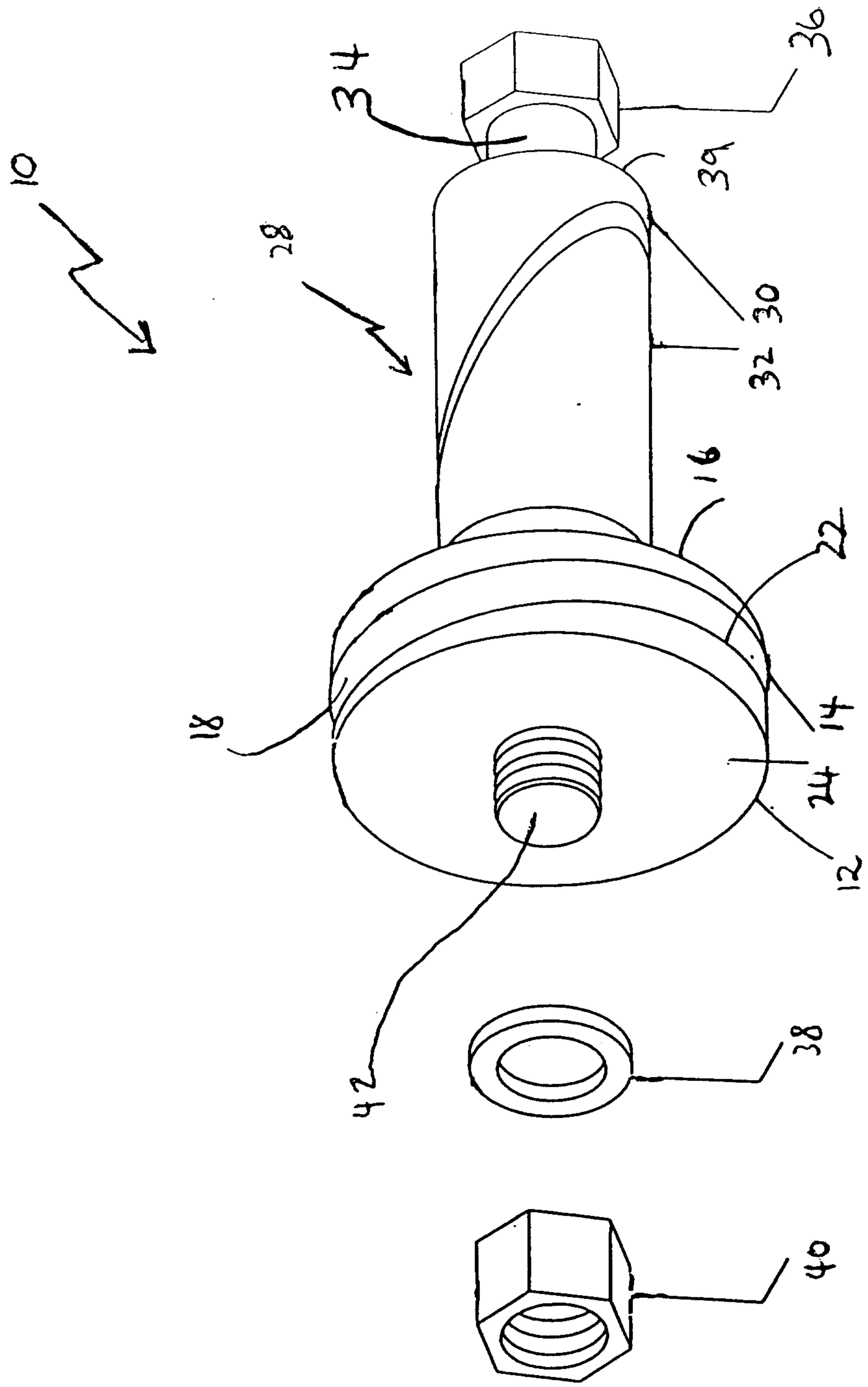
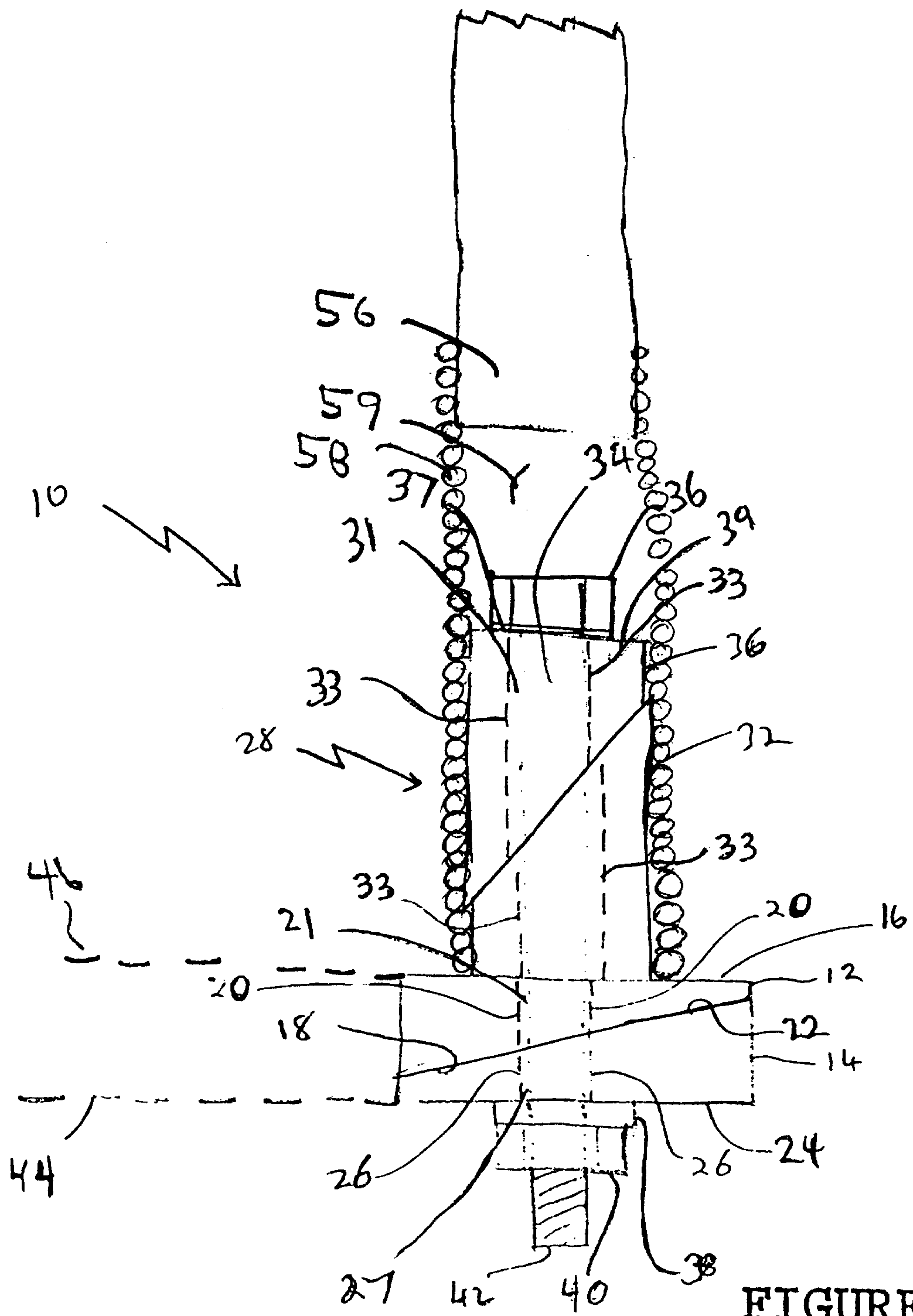


FIGURE 1



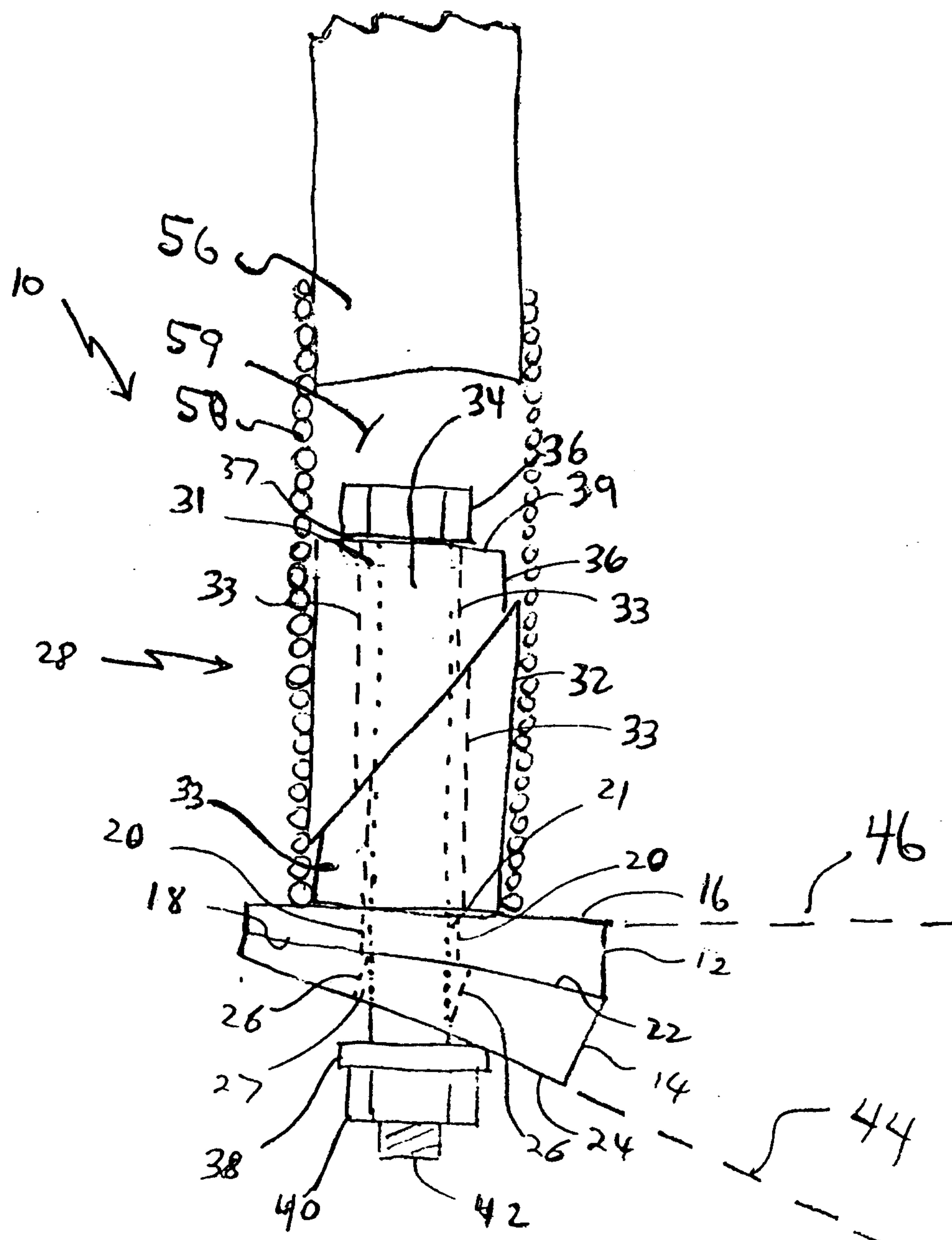


FIGURE 3

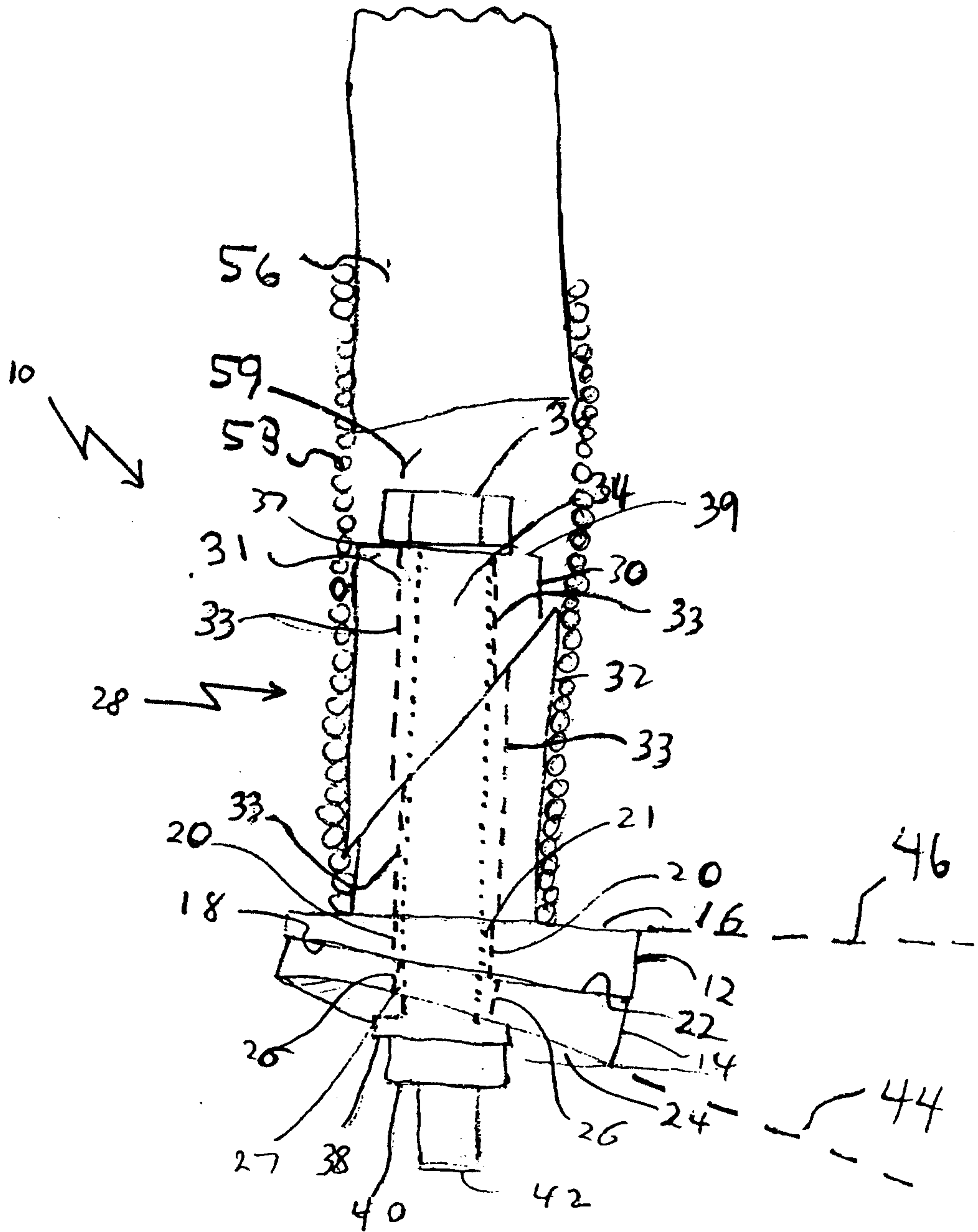


FIGURE 4

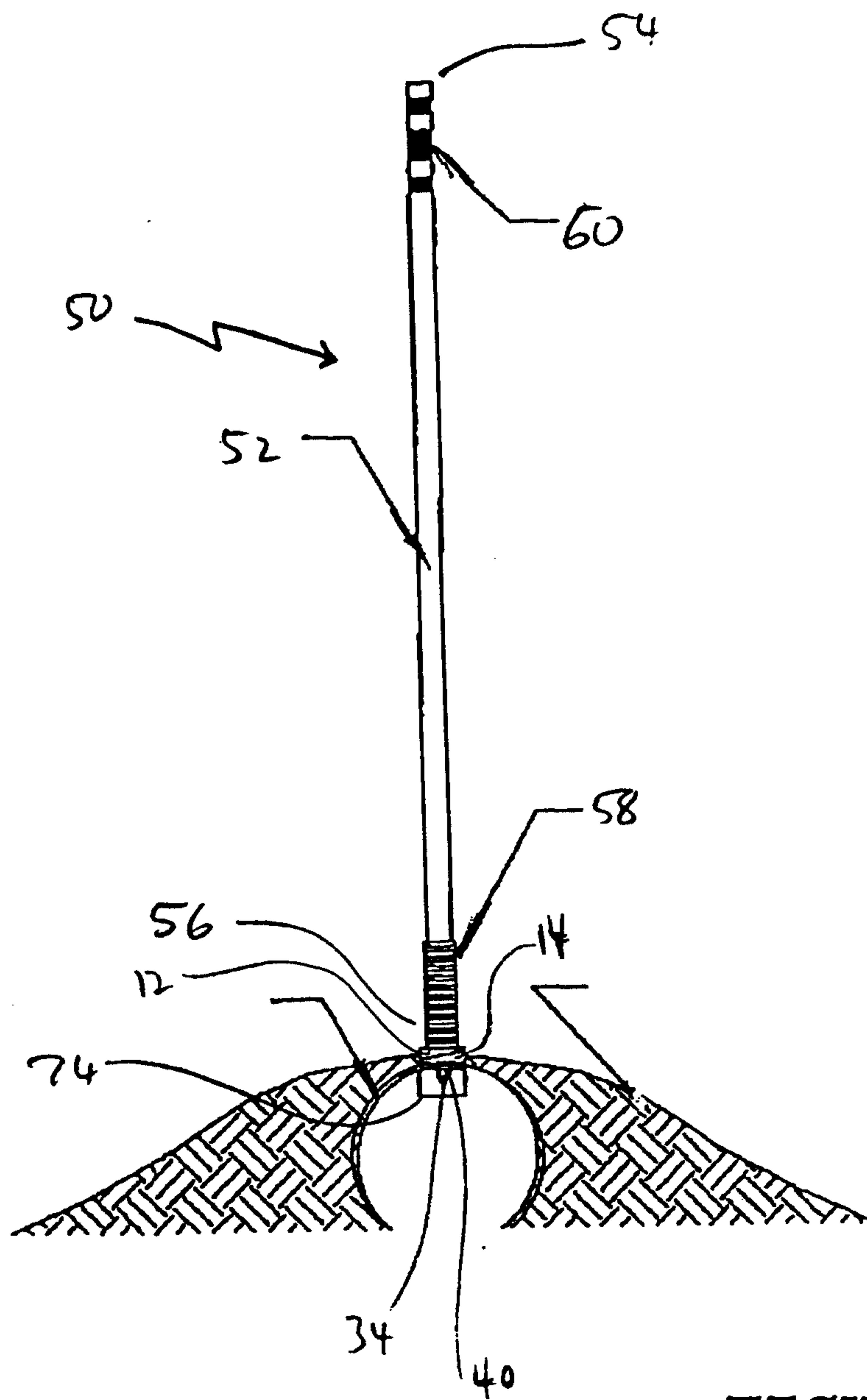


FIGURE 5

