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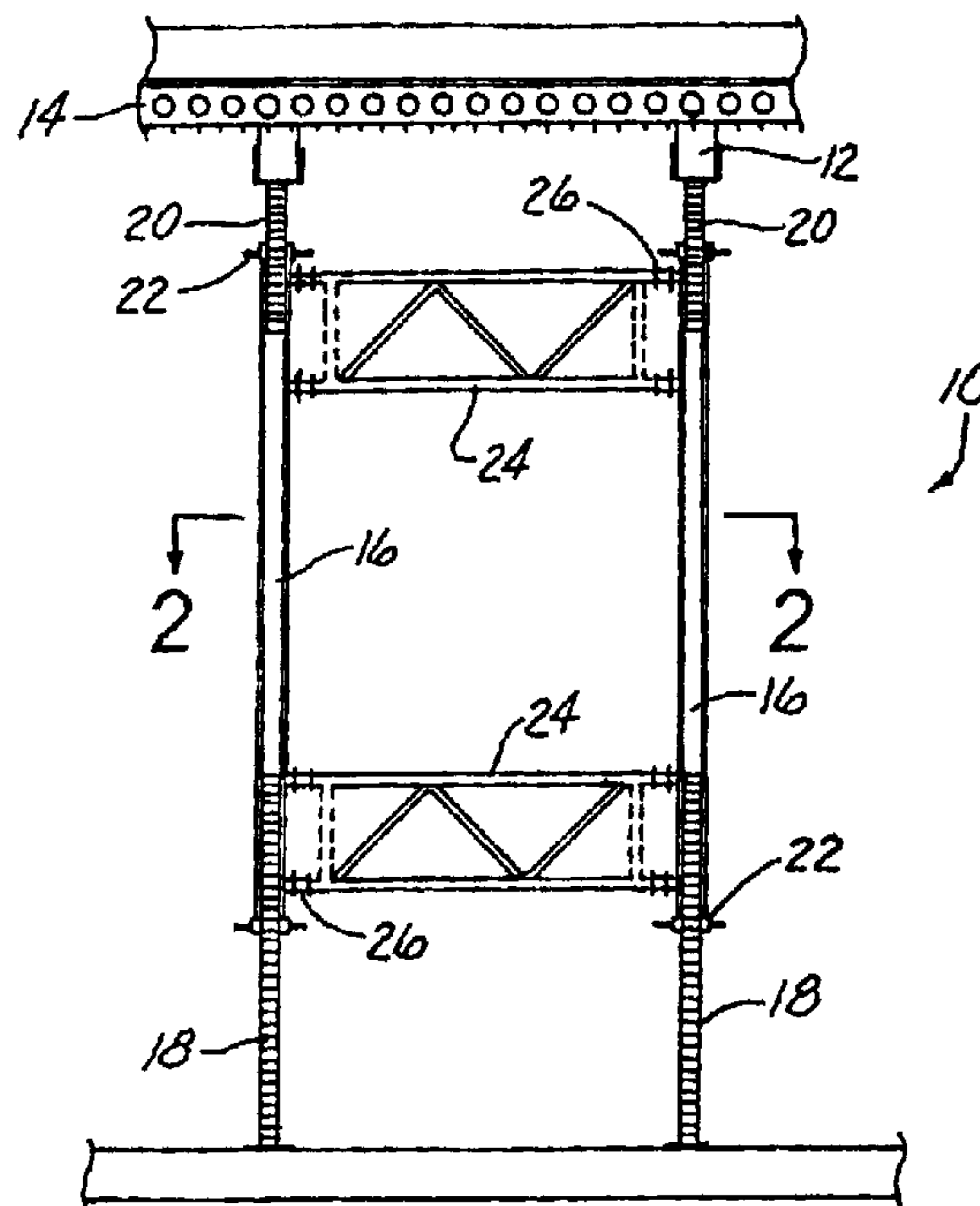
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(54) Titre : PROFILE POUR POTEaux D'EPONTILLAGE

(54) Title: SHORING POST EXTRUSION



(57) Abrégé/Abstract:

A shoring post for a support apparatus includes an extruded hollow tubular body member having a longitudinal axis and a first, longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom. The projection includes a profile having a clamping engagement channel running longitudinally on a first side thereof. A second longitudinally extended projection is integrally formed with the body member and projects generally radially outwardly therefrom and is spaced from a second side of the first projection. It also has a profile that is symmetrically reversed from the profile of the first projection about a plane of symmetry that is defined by the longitudinal axis of the body member and a midline between said projections thereby also forming a clamping engagement channel running longitudinally along a first side. A channel that is generally C-shaped in transverse cross-section is formed between the projections by the symmetrically reversed profiles of the projections along second sides thereof.

Abstract

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SHORING POST EXTRUSION

Background of the Invention

1. Field of the Invention

The invention relates generally to shoring apparatus used in forming concrete structures and, more specifically, to an extruded post having a profile which makes it adaptable for use in a variety of shoring apparatus.

2. Background of the Prior Art

Concrete forming apparatus is in wide use in the construction of buildings, bridges, and other concrete structures. The formwork against which the concrete is formed is often held in place by shoring apparatus. In creating shoring apparatus having the desired configuration, it is beneficial to be able to interconnect various components of the shoring apparatus in a wide variety of adjusted positions and to be able to quickly and easily connect, disconnect, and adjust the positions of the components. Further, it is advantageous to have the ability to interconnect the various components of the shoring apparatus in a wide variety of configurations without unduly multiplying the number of distinct components that are required to assemble the shoring apparatus of the desired diversity.

One of the important components of shoring apparatus having the desired flexibility and diversity of configuration is a shoring post which has a profile that includes channels or the like which may be engaged by clamps or other engagement apparatus associated with other shoring apparatus components. An engagement apparatus of this type is described in United States Patent No. 5,713, 687, which also shows but does not describe a shoring post

which presents a profile that is adapted for clamping engagement by the coupling which is the subject of the patent.

Another clamp assembly is described in United States Patent Applications Serial No. 09/524,480, entitled "Clamp for Interconnecting Components of Shoring Apparatus" filed of
5 even date herewith.

In addition to having a design which is adaptable to the wide variety of configurations required of the shoring apparatus, it is also advantageous that the shoring posts be strong yet light in weight so they are easily transportable and positionable by workers in assembling, moving, and disassembling the shoring apparatus. Another demand is that the shoring posts
10 be inexpensive to manufacture yet durable so that they are economical to use.

Summary of the Invention

The invention consists of an extrusion having a particular profile useful as shoring posts in the assembly of shoring apparatus. The extrusion is of a generally hollow, tubular shape and includes at least a pair of mirrored projections that extend from the outer periphery of the
15 extrusion over a substantial length of the extrusion. The mirrored projections form a central channel that is of a generally C-shape in transverse cross-section. The outer periphery of the extrusion between the projections is substantially planer and forms the web of the C-shaped channel. A substantially planer section of each of the projections extends generally radially at either side of the web portion. An in-turned lip of each of the projections completes the
20 generally C-shaped channel of the extrusion.

The projections also form a pair of opposing clamping channels on the side of each projection outside of the C-shaped channel formed between the projections. The clamping

channel has three sections, a base section which is the outer circumferential periphery of the extrusion in the area of the base of the projection, a primary engagement surface that slopes radially outwardly and at the same time generally inwardly toward the C-shaped channel at the base of the projection adjacent the base portion, and a retaining lip which extends from said engagement surface generally outwardly away from the interior C-shaped channel.

The C-shaped channel is adapted to receive the head of a bolt that is commonly used in the construction of the shoring apparatus so that the bolt is constrained to move within the channel along a line parallel to the longitudinal axis of the shoring post and which can be releasably secured at any desired position by a suitable nut. The C-shaped channel further is adapted to receive the head of a lock bolt which may be introduced into the channel when in its unlocked orientation but, once positioned, can be pivoted to its locked position wherein it securely engages the sides of the C-shaped channel whereupon it is locked into place. The clamping channels are adapted to receive the jaws of a clamp that is used for interconnecting other components of the shoring apparatus at adjusted positions along the length of the shoring post. In the preferred embodiment of the invention, the extrusion is formed with eight of the projections arranged in four pairs that are symmetrically placed about the circumferential periphery of the extrusion.

According to an aspect of the present invention, there is provided a shoring post for a support apparatus, comprising: (a) an extruded hollow tubular body member having a longitudinal axis; (b) a first longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom, and comprising a profile having a clamping engagement channel running longitudinally on a first side thereof; (c) a second longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom and spaced from a second side of the first projection, and comprising a profile that is symmetrically

reversed from the profile of the first projection about a plane of symmetry that is defined by the longitudinal axis of the body member and a midline between said projections thereby also forming a clamping engagement channel running longitudinally along a first side thereof; and (d) a channel having a longitudinally extended slot that is generally C-shaped in transverse cross-section formed
 5 between the projections by the symmetrically reversed profiles of the projections along second sides thereof, wherein the transverse dimension of the channel is greater than the transverse dimension of the slot.

An embodiment of the invention may provide an extruded shoring post that is adapted to serve as a means of attachment of various components of a shoring apparatus.

10 An embodiment of the invention may provide an extruded shoring post having a profile which is suitable for engagement by both clamping-type connectors as well as bolt-type connectors.

An embodiment of the invention may provide an extruded shoring post that is strong, lightweight, durable, and economical to manufacture.

15 These and other embodiments of the invention will be made apparent to those skilled in the art upon a review and understanding of this specification, the associated drawings, and the appended claims.

Brief Description of the Drawings

Fig. 1 is an elevational view of a shoring apparatus incorporating shoring posts of the present invention and being used to support concrete forming apparatus.

20 Fig. 2 is a cross-sectional view taken along line 2-2 of Fig. 1.

Figs. 3a-3b are sectional views of the shoring post of the present invention and a clamp for engaging the shoring post shown in a locked and unlocked position.

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Fig. 4 is an enlarged detailed view of a cross-section of the shoring post showing the extrusion profile.

Fig. 5 is an enlarged detailed view of a portion of Fig. 4.

10 Fig. 6 is an enlarged, detailed view of the generally C-shaped channel formed between a co-acting pair of projections of the extrusion and showing a bolt head received within the channel.

Detailed Description of Preferred Embodiments

15 Referring to the drawings, there is illustrated in Fig. 1, generally at 10, a shoring apparatus for supporting concrete forms such as the beams 12 and 14. The shoring apparatus 10 includes a plurality of shoring posts 16, each of which is supported on a bottom jack 18 and has extended from its upper end section a top jack 20. The shoring posts 16 are of a fixed length but

the total height of the shoring apparatus 10 is adjustable by rotation of a plurality of wing nuts 22 that are threaded about the bottom jacks 18 and top jacks 20 and which abut against the ends of the shoring posts 16.

One or more horizontally disposed panels 24 may be interconnected between adjacent
5 shoring posts 16 to provide added strength to the shoring apparatus 10 and also to provide means for supporting a platform or the like upon which workers who assemble the shoring apparatus 10, the associated concrete forming apparatus, pouring of concrete contained by the forms, and stripping of the forms after the concrete has set. As illustrated in Fig. 2, a common configuration uses four shoring posts 16 that are interconnected by four panels 24. Because of the need to
10 adapt the various components of the shoring apparatus 10 to assemble shoring systems to support concrete forms in the wide variety of configurations demanded by architects and building contractors, it is very desirable to be able to interconnect the shoring apparatus components at adjusted positions and to be able to do so quickly and reliably without a sacrifice in strength.

The panels 24 are interconnected with the vertical shoring posts 16 at any desired position
15 along the length of the shoring posts 16 by a plurality of clamping members 26. The clamping members 26 are secured to the ends of the crossbars of the panels 24 and are adapted to be releasably clamped at adjusted positions on the shoring posts 16.

The shoring post 16 is formed by extrusion and has the profile shown in detail in Figs. 3-
6. The extrusion includes a plurality of projections that are arranged in co-acting pairs about the
20 circumferential periphery of the extrusion, one co-acting pair of which is projection 30 and 32. In the preferred embodiment, four pairs of co-acting projections are arranged about the circumferential periphery of the shoring post 16 at right angles to each other (Fig. 4). Each of

the projections runs parallel to the longitudinal axis of the shoring post 16 and extends substantially the entire length of the shoring post 16.

As best illustrated in Figs. 3a and 3b, projection 30 forms a clamping channel 34 which may be engaged by a fixed jaw 37 or a moveable jaw 50 of the clamp 26. The projection 32 is a mirror image of the projection 30, i.e., the profile of projection 30 forms the profile of projection 32 when it is reflected about the plane common to the central longitudinal axis of the shoring post 16 and a point midway between any corresponding points of the projections 30 and 32. Accordingly, projection 32 includes a clamping channel 38 that is identical to but reversed in orientation to the clamping channel 34 of the projection 30. Clamping channel 38 is adapted to receive in clamping engagement therewith a fixed jaw 37 or a movable jaw 50 of the clamp 26.

The co-acting pairs of projections 30 and 32 also form a central channel 42 that is of a generally C-shape in transverse cross section. The central channel 42 is sized to accept for longitudinal sliding movement therein the head of a bolt 44 (Fig. 6) such as that which is commonly used in the assembly of shoring apparatus. The head of the bolt 44 is inserted into the central channel 42 at the opening thereto that is at either end of the shoring post 16. The bolt 44 may then be slid to any desired position within the central channel 42 and then releasably secured into place by the attachment of a nut (not shown) in the conventional manner. Alternatively, the head of a locking bolt (not shown) may be aligned with the opening between the in-turned flanges of the central channel 42 and then pivoted to its locked position wherein it engages the sidewalls of the central channel 42 in the usual fashion.

The details of the profile of projection 30 will be described, it being understood that the profile of projection 32 is identical thereto but reflected about the radial plane that passes

midway between the two projections. Primes will be used to indicate the corresponding elements of the profile of projection 32 where needed for clarity in this description. When used in describing the profiles of the projection 30, the term “inward” will refer to the direction toward the plane of symmetry shared with the projection 32 while the term “outward” will refer to the direction away from the plane of symmetry.

The projection 30 includes a substantially flat central channel surface 51 that is disposed parallel to the line of symmetry and extends from a base or web portion 52 formed in the outer periphery of the extrusion. An inward-turned flange 54 is positioned at the outer end portion of the wall 50 and includes a lip portion 56 that is substantially parallel with the base 52. A terminal face 58, which is also substantially parallel to the base 52, extends outwardly from the inner surface of the flange 54.

The outer profile of the projection 30 includes a clamping engagement surface 60 that extends from the outer circumferential periphery of the extrusion inwardly and radially outwardly. An outwardly-turned flange 62 is formed at the upper end of the clamping engagement surface 60. The flange 62, the clamping engagement surface 60 and the outer periphery of the extrusion combine to form the clamping channel 34. Due to the mirror symmetry of the projections 30 and 32, the base portions of 52 and 52' are co-planar and form the web section of the central channel 42. Accordingly, the interior surface of the substantially C-shaped central channel 42 is formed by the surfaces 56, 51, 52, 52', 51' and 56'.

In the preferred embodiment, the shoring post 16 has an inner diameter of 3.6 inches and a mean outer diameter measured between co-acting pairs of projections 30 and 32 of 3.931 inches. The total width of the shoring post 16, that is the distance between opposing pairs of the

terminal faces 58 and 58' is 4.9 inches. The length of faces 50 and 50' are 0.375 inches and the web of the central channel 52 has a width of 0.75 inches. The lip 56 extends inwardly by a distance of 0.0935 inches. The clamping engagement surface 60 has a width of 0.020 inches and is disposed at an angle of 70 degrees relative to the plane of symmetry between co-acting pairs of
5 projections 30 and 32.

The shoring post 16 is formed of extruded 6005-T5 aluminum alloy and includes a series of three grooves separated by two lands which run parallel between each co-acting pair of projections, with each land and groove subtending an angle of 7 degrees and the grooves being 0.016 inches lower than the lands (Fig. 5).

10 Although the invention has been described with respect to a preferred embodiment thereof, it is to be also understood that it is not to be so limited since changes and modifications can be made therein which are within the full intended scope of this invention as defined by the appended claims.

CLAIMS:

1. A shoring post for a support apparatus, comprising:
 - (a) an extruded hollow tubular body member having a longitudinal axis;
 - (b) a first longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom, and comprising a profile having a clamping engagement channel running longitudinally on a first side thereof;
 - (c) a second longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom and spaced from a second side of the first projection, and comprising a profile that is symmetrically reversed from the profile of the first projection about a plane of symmetry that is defined by the longitudinal axis of the body member and a midline between said projections thereby also forming a clamping engagement channel running longitudinally along a first side thereof; and
 - (d) a channel having a longitudinally extended slot that is generally C-shaped in transverse cross-section formed between the projections by the symmetrically reversed profiles of the projections along second sides thereof, wherein the transverse dimension of the channel is greater than the transverse dimension of the slot.

2. A shoring post as defined in claim 1, wherein a plurality of the first and second projections are arranged in pairs that are symmetrically distributed about the circumferential periphery of the tubular body member.
3. A shoring post as defined in claim 2, wherein there are four pairs of the first and second projections.
4. A shoring post as defined in claim 1, wherein the support apparatus includes a clamp having a pair of opposing jaws, and wherein the clamping engagement channel of the first projection is adapted to be engaged by a first of the jaws of the clamp and the clamping engagement channel of the second projection is adapted to be engaged by the second of the jaws whereby the clamp is releasably securable to the pair of projections at any point along their length.
5. A shoring post as defined in claim 1, wherein the support apparatus includes a bolt having a head and a stem projected from one side thereof, and wherein the bolt head is received for sliding movement inside the C-shaped channel with the stem extending through the opening between the legs of the channel.
6. A shoring post as defined in claim 5, wherein the stem is threaded and wherein the support apparatus includes a mating nut which is threaded onto the stem and tightened to engage

the pair of projections to thereby releasably secure the bolt in any selected location along the length of the channel.

7. A shoring post as defined in claim 1, wherein the support apparatus includes a locking bolt having a shaped head adapted to pass into the C-shaped channel between the legs thereof when in a first orientation and to releasably engage the C-shaped channel when pivoted to a locking orientation.

8. A shoring post for a support apparatus, comprising:

- (a) an extruded hollow tubular body member having a longitudinal axis;
 - (b) a first longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom, and comprising a profile having a clamping engagement channel running longitudinally on a first side thereof;
 - (c) a second longitudinally extended projection integrally formed with the body member and projecting generally radially outwardly therefrom and spaced from a second side of the first projection, and comprising a profile that is symmetrically reversed from the profile of the first projection about a plane of symmetry that is defined by the longitudinal axis of the body member and a midline between said projections thereby also forming a clamping engagement channel running longitudinally along a first side thereof;
- and

(d) a channel that is generally C-shaped in transverse cross-section formed between the projections by the symmetrically reversed profiles of the projections along second sides thereof, wherein the support apparatus includes a clamp having a pair of opposing jaws, and wherein the clamping engagement channel of the first projection is adapted to be engaged by a first of the jaws of the clamp and the clamping engagement channel of the second projection is adapted to be engaged by the second of the jaws whereby the clamp is releasably securable to the pair of projections at any point along their length.

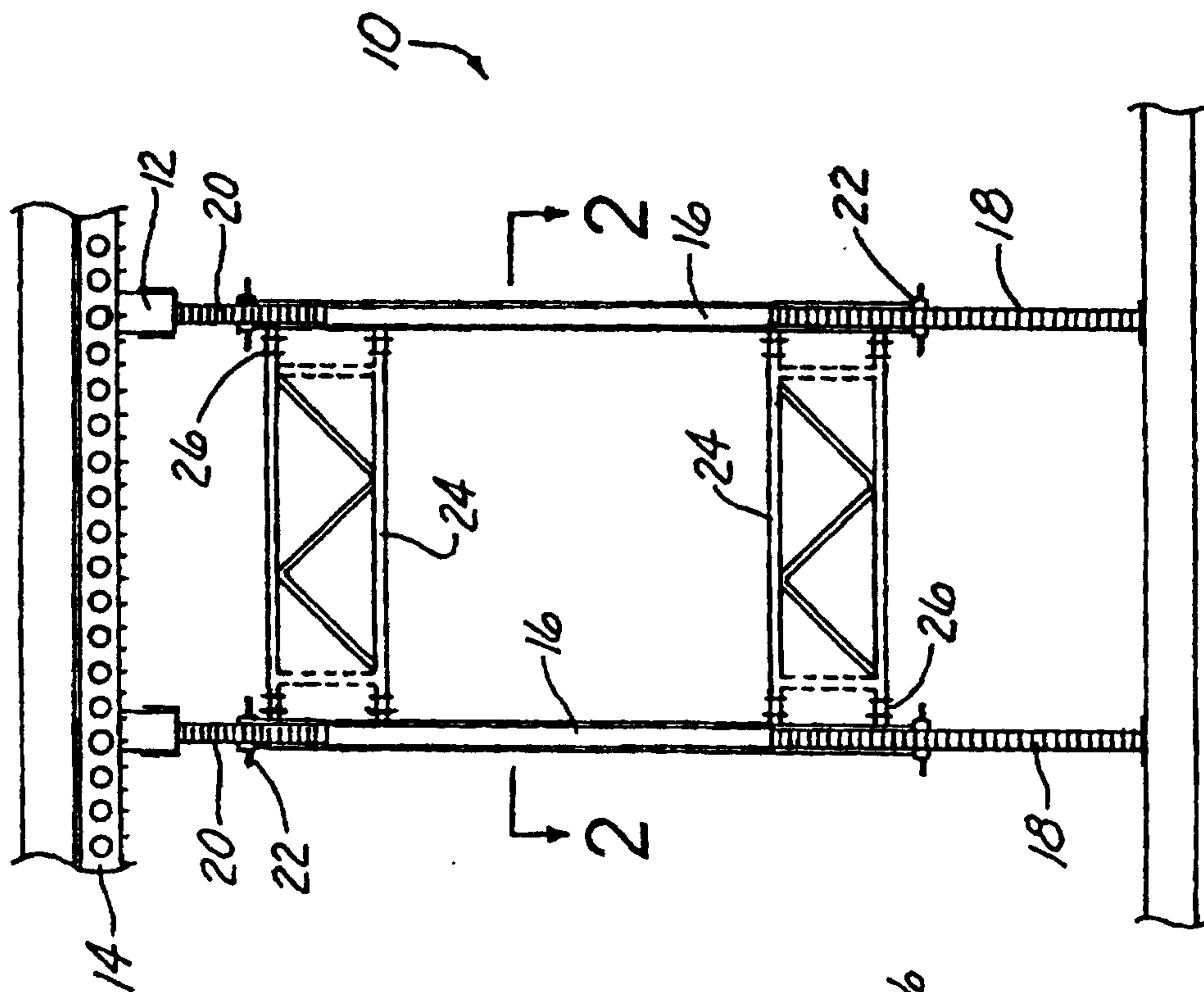


Fig. 1

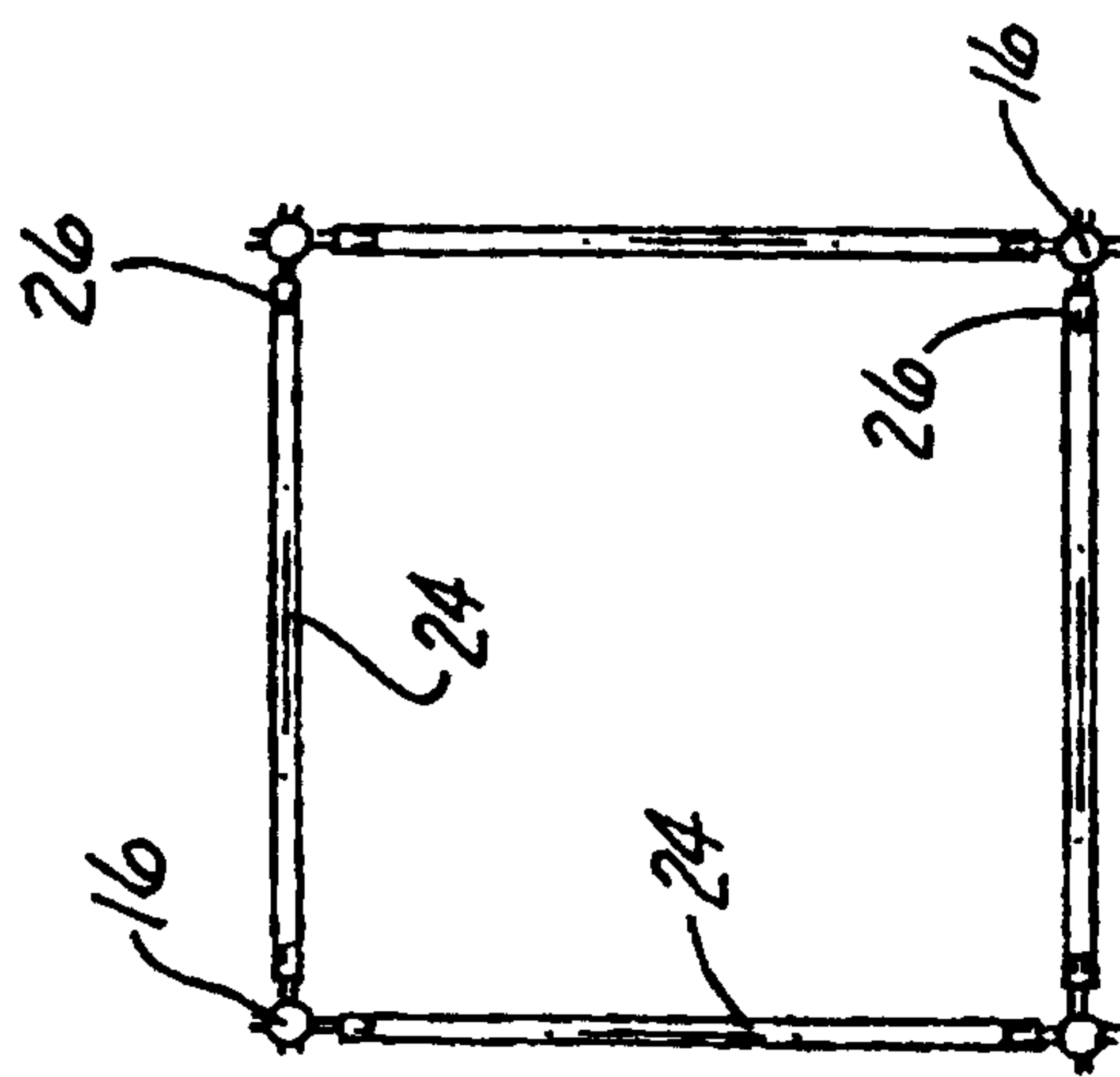


Fig. 2

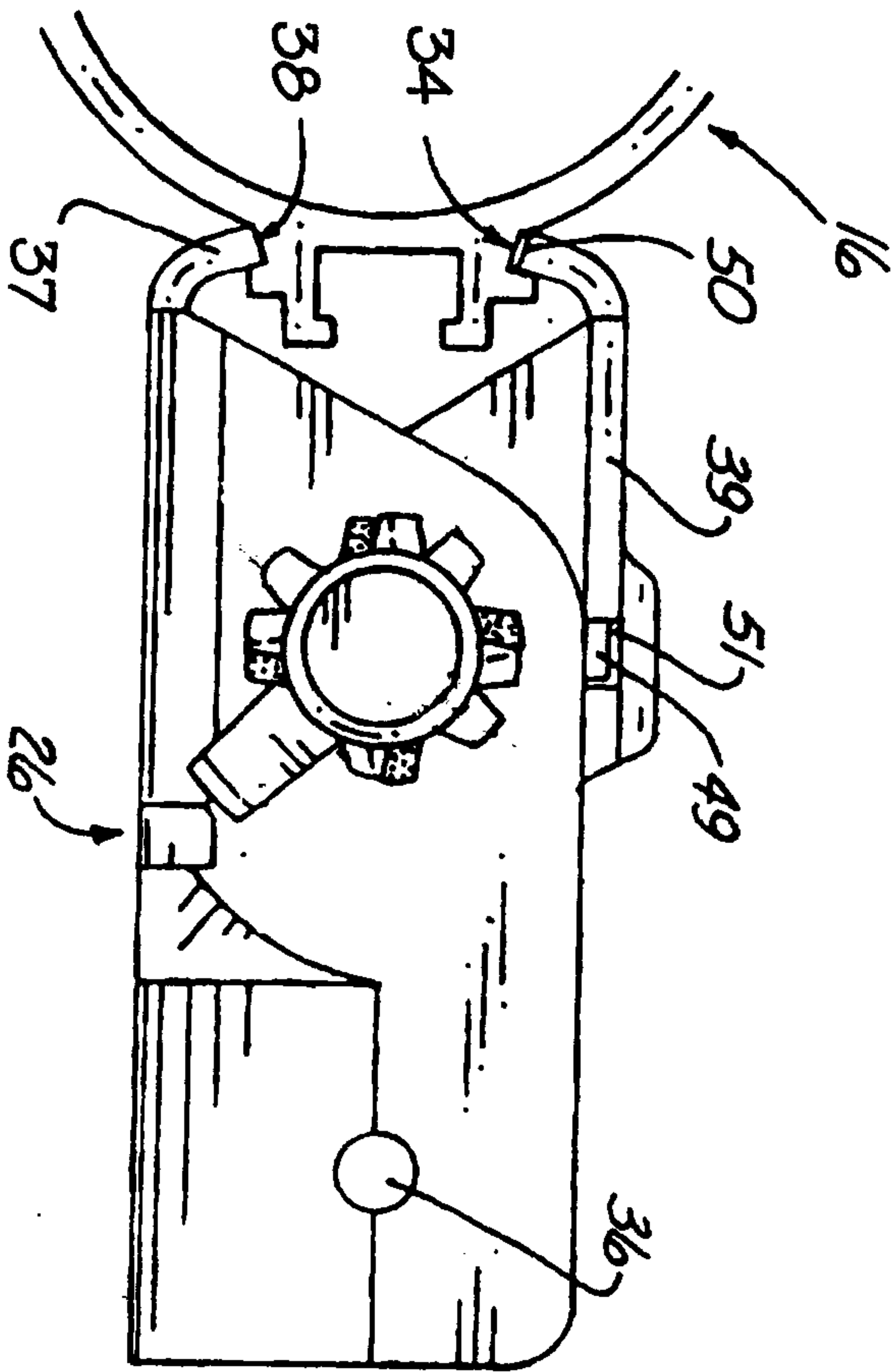


Fig. 3a

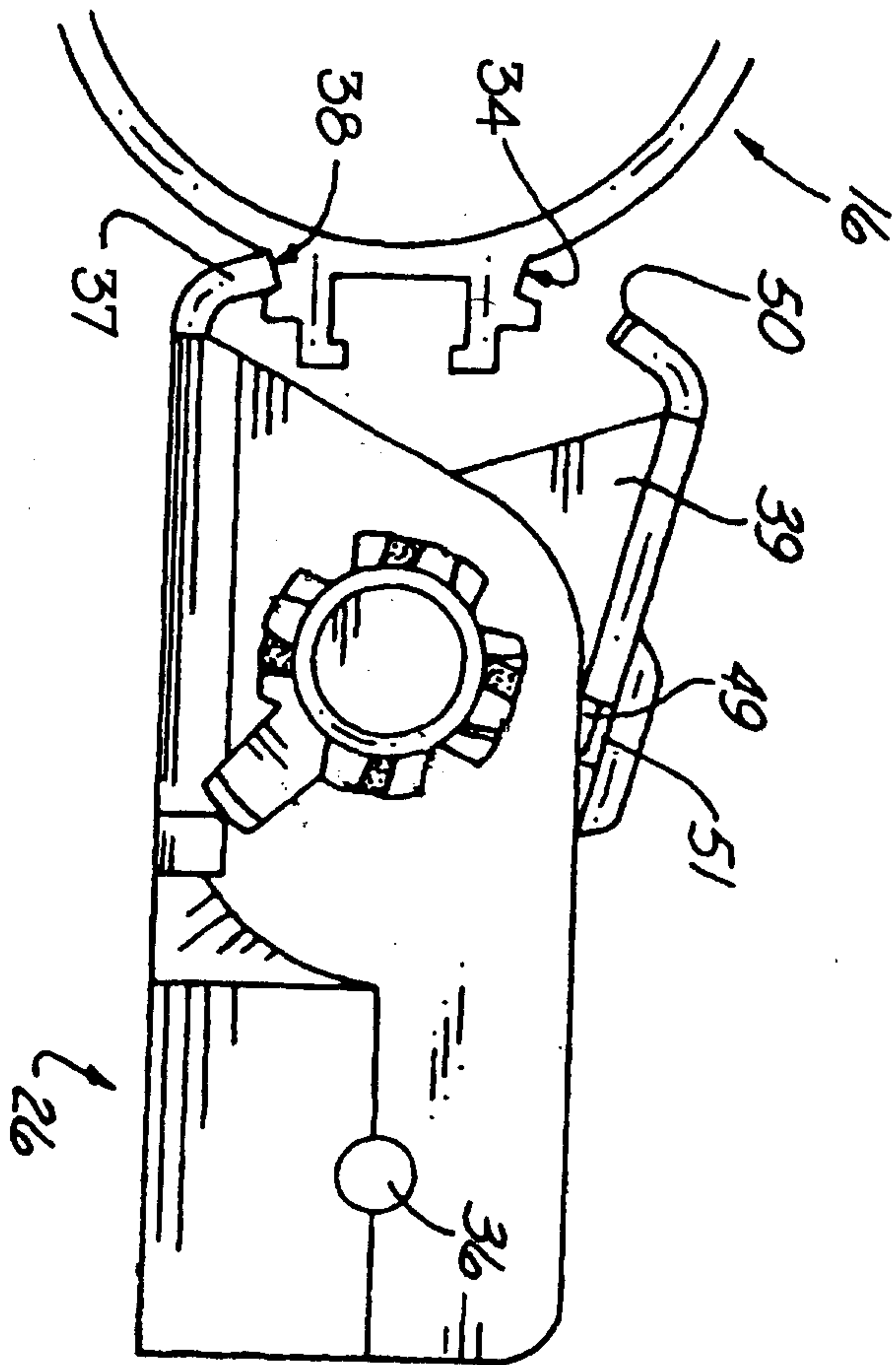


Fig. 3b

