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(54) **Improvements relating to coupling devices.**

(57) A coupling device, for a freight container provided at each of its four corners with a mounting plate (40) having an aperture (42) therein. The device comprises a body (6), comprising a flat base plate (10) and a mounting ring (12) with an aperture (14), and an integral head (8) having a portion (20) spaced from the body (6) by a stem portion (18). The head portion (20) has a cross-sectional dimension which enables it to be inserted through the aperture (42) in the mounting plate (40) in one orientation but not in an orientation significantly displaced therefrom. Mounted on the body (6) is a locking member (28, 30) movable between a retracted position and an advanced position. In its advanced position, the locking member (30) lies alongside the stem portion (18), being partially located within a groove (22), and rotation of the device into a position in which the head portion (20) is in alignment with the aperture (42), and thus may retract from the mounting plate (40), is prevented.

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Title: "Improvements relating to Coupling Devices"

This invention is concerned with improvements relating to coupling devices, and particularly with coupling devices of the kind used in the handling of (for example) freight containers.

A conventional freight container is provided, at each of four corners thereof, with a mounting plate comprising a generally ovoid aperture which lies generally in a vertical plane. A conventional coupling device comprises a head comprising a stem portion of generally circular cross-section, of dimensions slightly smaller than that of the minor diameter of the aperture, and a head portion of a shape such as to enable the head portion to be passed through the aperture in one orientation but not in an orientation significantly displaced therefrom (e.g. by more than about 20^{o}). Thus the head portion usually has one dimension which is similar to the diameter of the stem portion, and a dimension at 90^{o} which is larger than the diameter of the stem portion.

Conventionally, the coupling device comprises means to enable it to be attached to a lifting sling, whereby on attachment of a coupling device to each corner of the container, the container may be lifted by a crane.

Conventional coupling devices suffer from (inter alia) some at least of the following disadvantages:-

(a) they tend to be heavy;

(b) it is necessary to provide two types of coupling device for each container;

(c) difficulty is encountered in attaching the coupling device when the container is standing on a flat surface; and

(d) the attachment means is oriented such that the device is, in use, subjected to high loads.

Since the concept of using freight containers is based on factors of speed and ease of handling, the disadvantages (a) to (c) above are in themselves significant, and the disadvantage (d) requires the coupling device to be manufactured more robustly than would otherwise be necessary.

According to this invention, there is provided a coupling device for a freight container comprising a body and a head projecting from the body, the head comprising a stem portion having a cross-sectional dimension which enables it to be inserted through the aperture of a mounting plate of a freight container and rotated therein, and a head portion on the stem portion having

a cross-sectional dimension which enables it to be inserted through said aperture in one orientation but not at an orientation significantly displaced therefrom, wherein there is mounted on the body a locking member which is movable between a retracted position and an advanced position, in which advanced position it lies alongside the stem portion and restricts rotation of the stem portion in said aperture.

According to this invention, there is also provided a coupling device for a freight container comprising a body and a head projecting from the body, the head comprising a stem portion having a cross-sectional dimension which enables it to be inserted through the aperture of a mounting plate of a freight container and rotated therein, and a head portion on the stem portion having a cross-sectional dimension which enables it to be inserted through said aperture in one orientation but not at an orientation significantly displaced therefrom, wherein there is mounted on the body a locking member which is movable between a retracted position and an advanced position, in which advanced position the locking member restricts rotation of the stem portion in said aperture, some at least of the forces acting on the locking member in the use of the coupling device being transmitted directly to the stem portion.

Thus, by the use of the device, with the locking member in its retracted position, the head portion is oriented into alignment with the aperture, and is passed through the aperture and the stem portion into the aperture. The device is rotated through a significant angle (e.g. more than about 20°), engagement between the underside of the head portion with margins of the mounting plate bounding the aperture preventing withdrawal of the head portion. The locking member is then moved to its advanced position in which it prevents such rotation of the device relative to the mounting plate as would be necessary to bring the head portion into alignment with the aperture, and thus the locking member whilst in its advanced position retains the coupling device in position on the mounting plate.

Preferably the locking member, when in its advanced position, is in operative contact with the stem portion, and thus the stem portion is advantageously provided with a groove or channel and the locking member, when in its advanced position, lies within said groove or channel.

The locking member may be mounted for arcuate or pivotal movement between its retracted and advanced positions, but is advantageously mounted for linear movement, advantageously in a direction parallel to the longitudinal axis of the stem portion.

Advantageously the locking member is spring urged into its advanced position.

Preferably the body comprises a base plate with which the head is integral. Thus the head and base plate may be manufactured by a forging process, such as from steel, providing a high inherent strength.

There will now be given a detailed description to be read with reference to the accompanying drawings, of a coupling device which is a preferred embodiment of this invention, and which has been selected for the purposes of illustrating the invention by way of example. In the accompanying drawings:-

FIGURE 1 is a perspective view of the preferred embodiment;

FIGURE 2 is a side elevation of the preferred embodiment;

FIGURE 3 is a cross-sectional view taken on the line A-A of Figure 2;

FIGURE 4 is a plan view of the preferred embodiment, viewed in the direction of arrow B of Figure 2; and

FIGURE 5 is a schematic view illustrating the mounting of the coupling device in a corner container fitting.

The preferred embodiment of this invention is specifically a coupling device for a freight container of the kind which is provided, at each of four corners thereof, with a mounting plate 40 (Figure 5) comprising a generally ovoid aperture 42 which lies generally in a vertical plane, the major diameter of the aperture 42 being conventionally vertical.

The coupling device comprises a body 6 and integral head 8, produced by forging from steel. The body 6 comprises a flat base plate 10, a mounting ring 12 provided with an aperture 14, and a web 16 extending on the underside of the base plate 10.

Projecting from the base plate 10 is a stem portion 18 of circular cross-section of a diameter slightly smaller than the minor diameter of the aperture 42. It will of course be appreciated that whilst the stem portion 18 of the preferred embodiment is of circular cross-section, this is not necessarily the case. Integral with the stem portion 18 is a head portion 20, having a flat underside 21, the periphery of the head portion 20 being similar to the outline of the aperture 42 enabling the head portion 20 to be passed through the aperture 42.

Provided in an outer face of the stem portion 18 is a groove or channel 22, and extending through the base plate 10 adjacent to said groove 22 is an aperture 24. Provided in the web 16 is a channel 26, within which a locking

member 28 is mounted, the locking member 28 comprising a stem 30 of circular cross-section, and a head 32 so shaped as to enable it to be grasped by two fingers of one hand.

A bolt 34 passes through the web 16, around which bolt 34 a spring 36 is wound, the end portions of the spring 36 passing through apertures in the head 32 on respective opposite sides of the head 32 (see Figures 1 and 4).

In the use of the coupling device which is the preferred embodiment of this invention, the head portion 20 is passed through the aperture 42 and the stem portion 18 into the aperture 42, the locking member 28 at this stage being held in its retracted position, as shown in Figure 1. The coupling device is then rotated through a significant angle (through about 90° if desired, but in any event preferably through more than about 20°), the underside 21 of the head portion 20 engaging with the mounting plate 40 to prevent retraction of the head portion 20 through the aperture 42, and the locking member 28 is then released so as to be allowed to move, under action of the spring 36, to its advanced position wherein the stem 30 of the locking member 28 projects into a position alongside the stem portion 18 (as shown in Figure 5) in which position the stem 30 is partially located within the groove 22. When the locking member 28 is in this advanced position, rotation of the coupling device into a position in which the head portion 20 is in alignment with the aperture 42 is prevented by engagement of the stem 30 of the locking member 28 with the wall of the mounting plate 40 bounding the aperture 42.

In this condition, the coupling device may be allowed to fall without any possibility of it becoming free from the mounting plate 40. In due course, a lifting sling (such as a shackle) may be attached to the mounting ring 12 through the aperture 14 thereof, causing the coupling device to adopt typically an orientation similar to that shown in Figure 5, but with the stem portion 18 located in an upper part of the aperture 42. The lifting force F applied to the coupling device is generally aligned with the base plate 10, with little or no bending force on the coupling device, and the force is applied by the stem portion 18 to the mounting plate 40 and hence to the freight container.

It will be appreciated that under normal conditions, there will not at this stage be load applied to the stem 30 of the locking member 28. However, should there be any such load so transmitted, some at least of the

load will be transmitted from the locking member 28 to the stem portion 18 of the head, by virtue of the stem 30 being partially located within the groove 22 so as to be in operative contact with the stem portion 18.

In this manner, any tendency for the stem 30 to shear off will be reduced and thus the locking member 28 as a whole may be reduced in size and complexity.

Additionally, as shown in Figure 3, the channel 22 may be extended so as to pass through the head portion 20, so reducing the possibility of dirt being trapped in said channel.

As will be appreciated, the coupling device which is the preferred embodiment of this invention may be used in either a "left-hand" or "right hand" orientation, obviating the requirement for "left-hand" and "right-hand" coupling devices. By virtue of the simplicity of construction (the device may be made relatively simply by a forging operation, of a material such as alloy steel) together with the low bending forces as previously mentioned, the coupling device which is the preferred embodiment of this invention may be made lighter than conventional coupling devices.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, or a class or group of substances or compositions, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A coupling device for a freight container comprising a body (6) and a head (8) projecting from the body (6), the head (8) comprising a stem portion (18) having a cross-sectional dimension which enables it to be inserted through the aperture (42) of a mounting plate (40) of a freight container and rotated therein, and a head portion (20) on the stem portion (18) having a cross-sectional dimension which enables it to be inserted through said aperture (42) in one orientation but not at an orientation significantly displaced therefrom, wherein there is mounted on the body (6) a locking member (28, 30) which is movable between a retracted position and an advanced position, in which advanced position it lies alongside the stem portion (18) and restricts rotation of the stem portion (18) in said aperture (42).

2. A coupling device for a freight container comprising a body (6) and a head (8) projecting from the body (6), the head (8) comprising a stem portion (18) having a cross-sectional dimension which enables it to be inserted through the aperture (42) of a mounting plate (40) of a freight container and rotated therein, and a head portion (20) on the stem portion (18) having a cross-sectional dimension which enables it to be inserted through said aperture (42) in one orientation but not at an orientation significantly displaced therefrom, wherein there is mounted on the body (6) a locking member (28,30) which is movable between a retracted position and an advanced position, in which advanced position the locking member (30) restricts rotation of the stem portion (18) in said aperture (42), some at least of the forces acting on the locking member (28) in the use of the coupling device being transmitted directly to the stem portion (18).

3. A coupling device according to one of Claims 1 and 2 wherein the locking member (30), when in its advanced position, is in operative contact with the stem portion (18).

4. A coupling device according to any one of the preceding claims wherein the stem portion (18) is provided with a groove or channel (22) and the locking member (30), when in its advanced position, extends into said groove or channel (22).

5. A coupling device according to any one of the preceding claims wherein the locking member is mounted for arcuate or pivotal movement between its retracted and advanced positions.

6. A coupling device according to any one of Claims 1 to 4 wherein the locking member (28, 30) is mounted for linear movement between its retracted and advanced positions.

7. A coupling device according to Claim 6 wherein the locking member (28,30) is mounted for movement in a direction parallel to the longitudinal axis of the stem portion (18).

8. A coupling device according to any one of the preceding claims wherein the locking member (28,30) is spring urged into its advanced position.

9. A coupling device according to any one of the preceding claims wherein the body (6) comprises a base plate (10) with which the head (8) is integral.

10. A coupling device according to Claim 9 wherein the locking member (28,30) is mounted beneath the base plate (10) and extends into an aperture (24) in the base plate (10).

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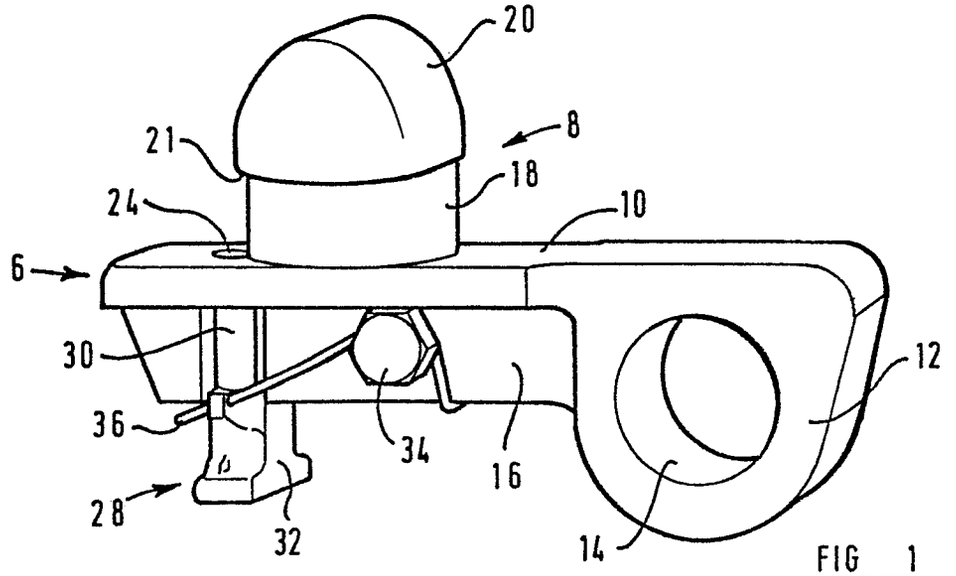

FIG 1

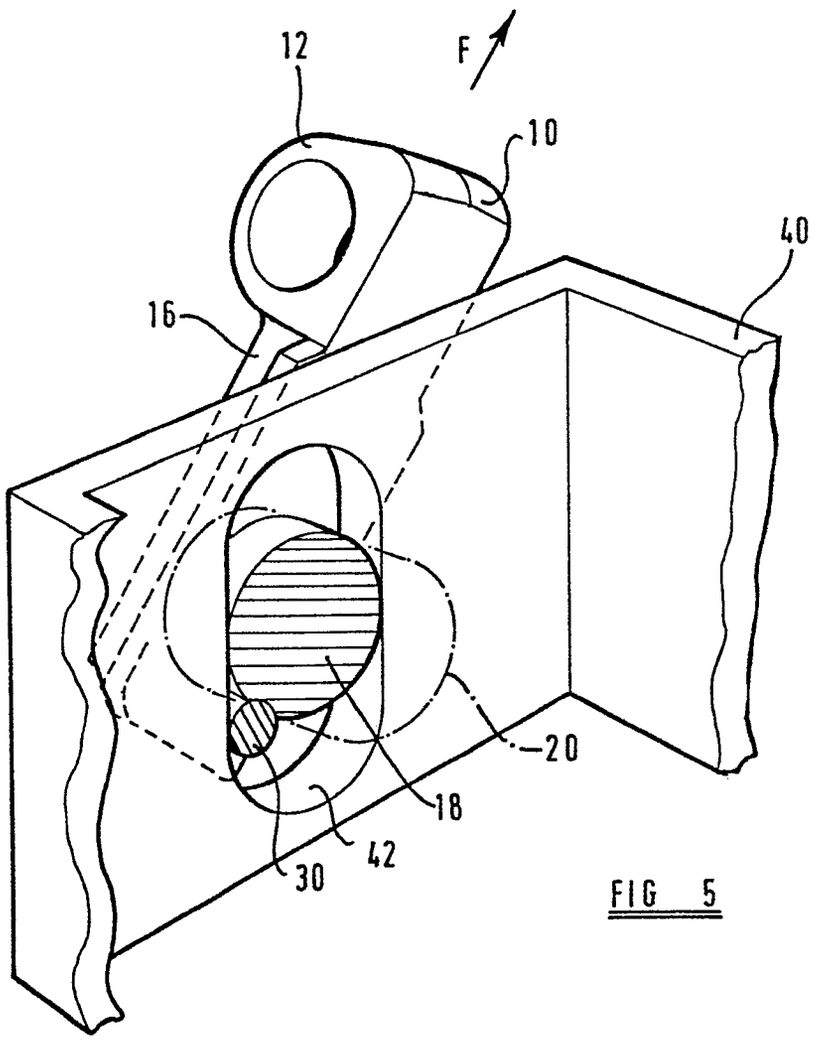

FIG 5

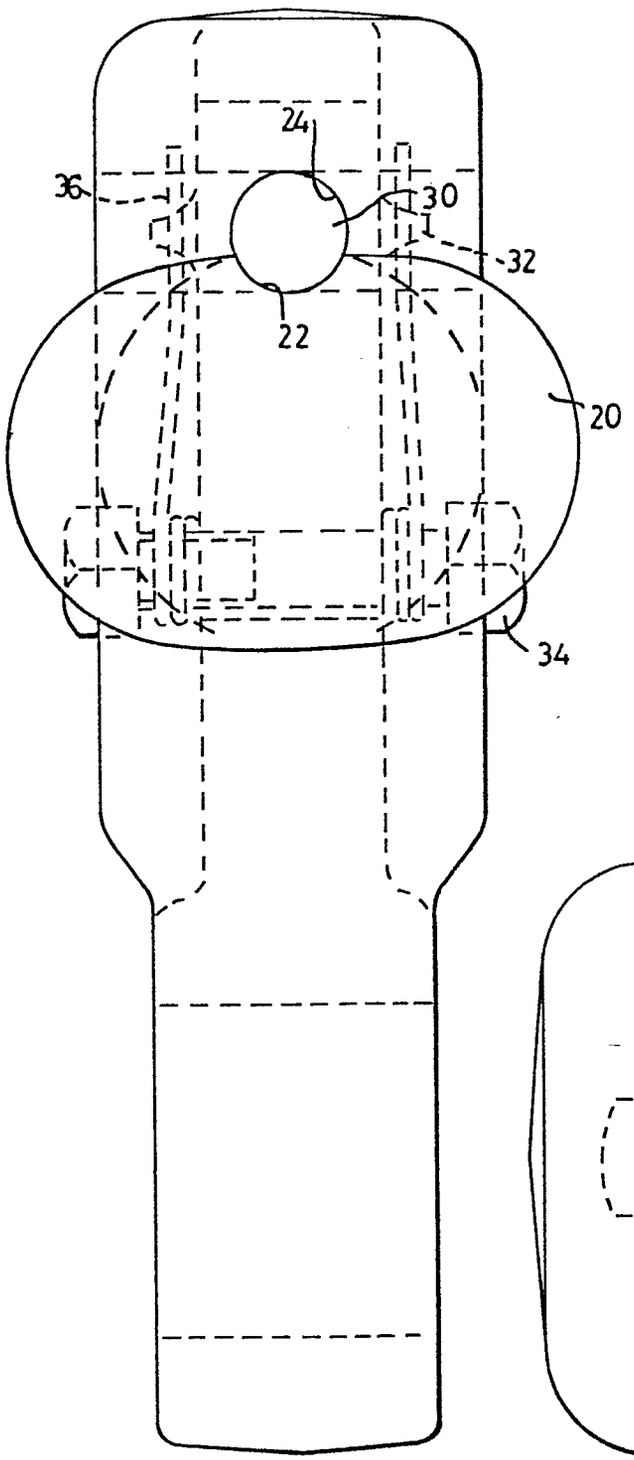

FIG 4

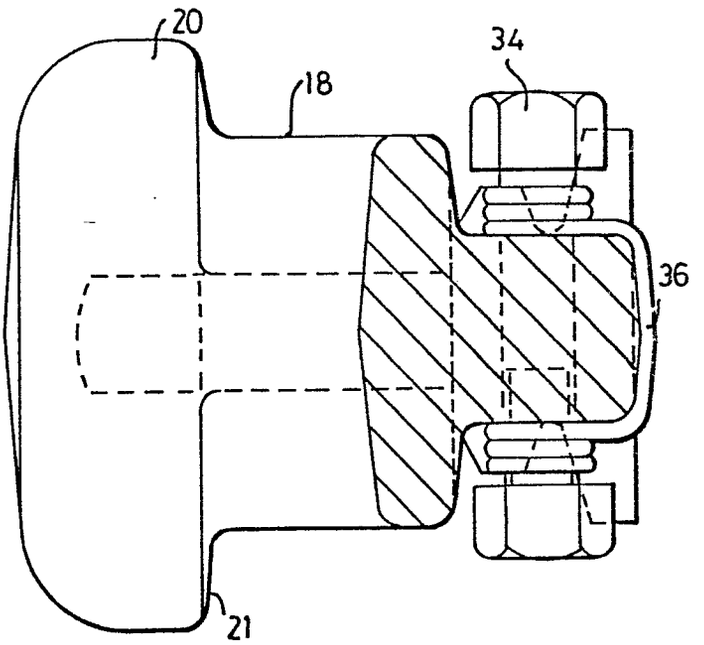

FIG 3

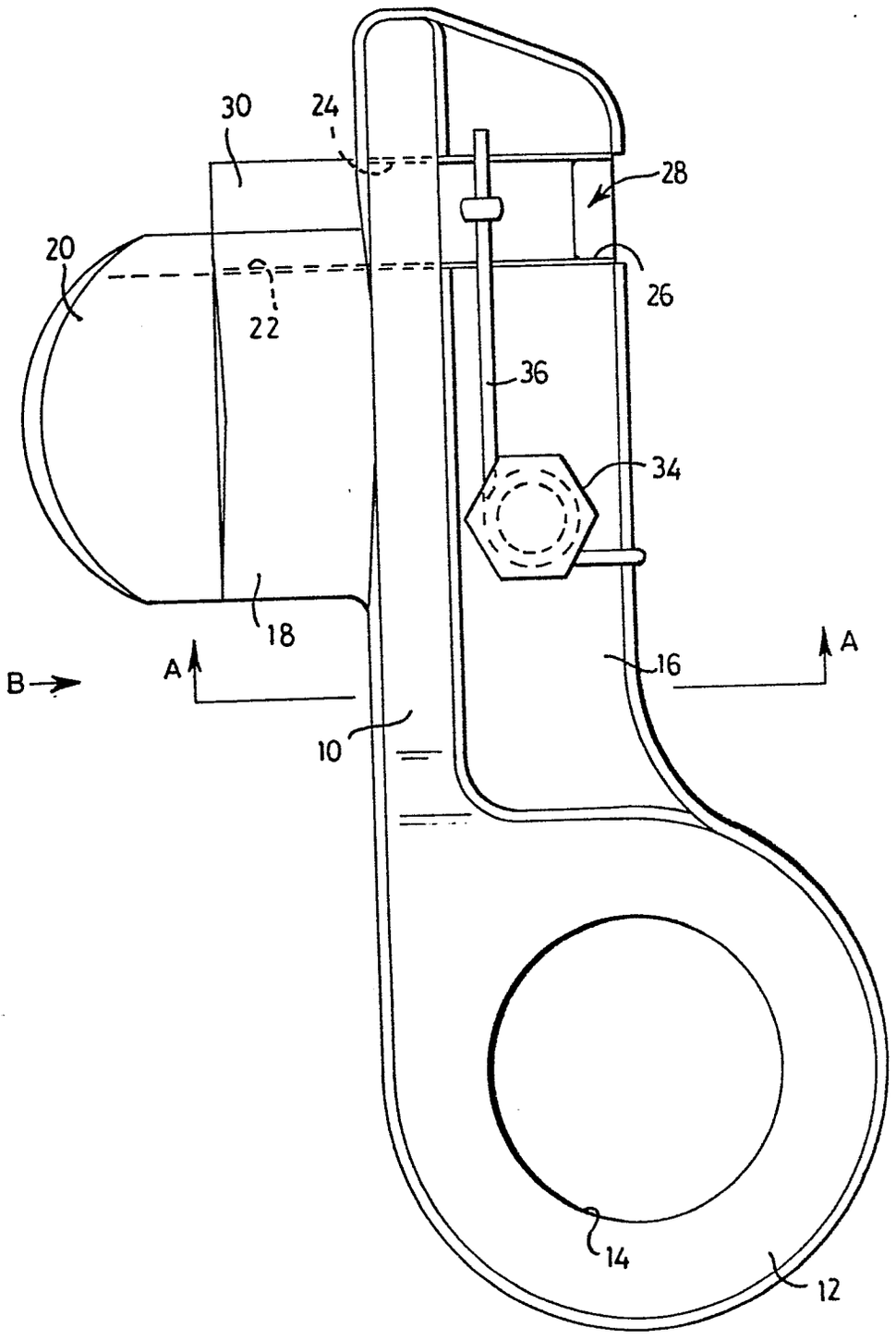

FIG 2