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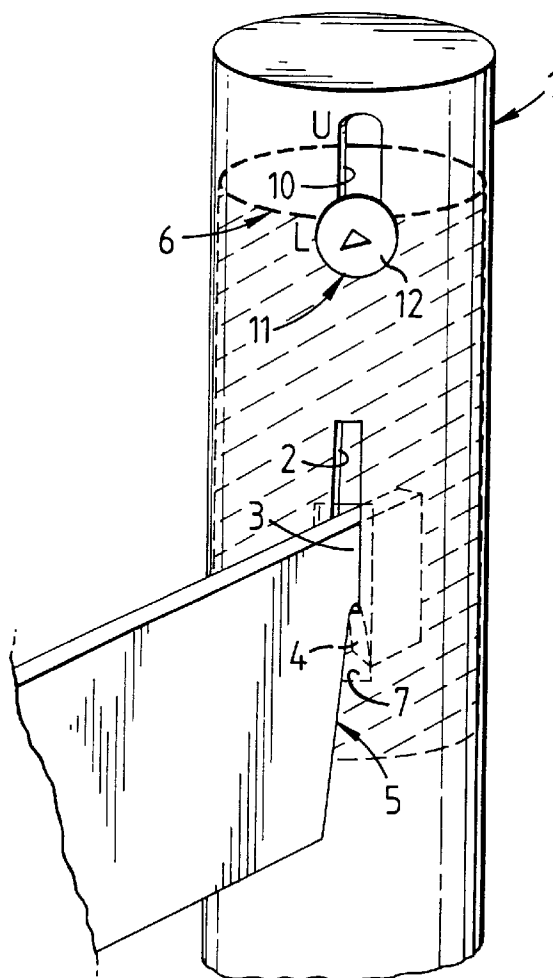
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(54) **Lockable linkage assembly**

(57) A lockable linkage assembly, for use with road-side barrier and/or signage systems comprises a first linkage member (1) having a first aperture (2) and a second linkage member (3) having an engagement member for insertion in the aperture. The first member is preferably a post having a locking means (6) which can be operated either to inhibit or allow removal of the inserted engagement member therefrom, the locking means generally being provided in the interior of the post.

FIG.1



Description

The present invention relates to a lockable linkage assembly of a general type particularly suited for use with temporary traffic signs and traffic barriers, although the lockable linkage assembly in accordance to the present invention has many uses as will be apparent to those skilled in the art.

Temporary traffic barriers and traffic signs are well known features of road maintenance and have become progressively more sophisticated as traffic speeds increase and road and motorway maintenance becomes more complex. Temporary traffic barriers are utilised to denote the edge of works on the motorway, but are also used by public utilities to prevent the public from inadvertently falling into holes, and during exhibitions, festivals etc to denote the edges of public access.

Such temporary barriers should be readily erected and dismantled, and provide a suitable barrier which it is relatively difficult to cross and prevents at least inadvertent access to an area.

A problem in connection with temporary signage and barrier arrangements is that it is the conventional practice to provide such barriers and signs in metal for durability. The difficulty with such arrangements is that the parts are heavy to carry and if hit by a car or moving machinery can fly about and cause serious injury. More particularly such metal signs and barriers are customarily formed of aluminium, because of its advantageous anti-corrosion and low weight properties. Aluminium is however a relatively expensive metal, it being a known problem that such signs are stolen from their location and melted down for resale of the metal. This unlawful removal of signs and barriers is dangerous in that, for example, their function to alert and possibly divert pedestrians and road users is no longer provided. Replacing the signs and barriers is moreover costly.

What is required is a sign and/or barrier system which is light, stable, and which is difficult to tamper with so as to prevent undesired disassembly, but which is also sufficiently resilient such that blows, from for example wayward vehicles, can be absorbed without disassembly or destruction of the parts.

In one form of known prior art linkages for temporary traffic barriers, post and rail arrangements have been provided with a beaded cord linkage to locate the rail upon a post. After a short while such arrangements tend to disassemble and the beaded cord tends to break if hit and to be readily removed by unauthorised personnel.

Another type of prior art linkage is a button and slot arrangement wherein a pair of buttons are located in a spaced relation at the end of a hollow extruded rail member, said buttons engaging in elongate slots in the post. The rail is retained in the slot by its own weight. It will be immediately apparent that especially after a little wear the rail may be inadvertently removed from the post, may be readily disassembled on being hit by ma-

chinery, and is open to ready vandalism.

The present invention seeks to provide a cheap and readily utilisable solution to at least some of these problems to provide an improved post assembly particularly for supporting traffic signs and barriers.

According therefore to an aspect of the present invention there is provided a lockable linkage assembly comprising;

- a) a first linkage member comprising a first aperture,
- b) a second linkage member comprising an engagement member for insertion in the aperture,

wherein said first linkage member further comprises a post member having a locking means which can be operated either to inhibit or allow removal of an inserted engagement member from the first linkage member, the locking means being provided in the interior of the post.

By housing the locking means within the interior of the post it is difficult to access thereby reducing the likelihood of vandalism. The assembly arrangement is moreover compact and aesthetically pleasing.

The locking means preferably comprises a locking member which is movable relative to the post to a position where it impedes movement of an inserted engagement member that would allow its removal.

Such an arrangement provides a reliable mechanism for locking an inserted engagement member in place in the post.

Conveniently, the locking member comprises an inner sleeve provided within the post. A sleeve is preferred in that it offers the advantage of strength and if used with a circular cross-sectioned post is naturally axially aligned within the post.

In preferred embodiments, the inner sleeve has a sleeve aperture, the sleeve being movable from an unlocked position, where the sleeve aperture is aligned with the first aperture to allow insertion of the engagement member, to a locked position, where the sleeve aperture and the first aperture are not aligned to thereby inhibit removal of an inserted engagement member. By providing an aperture in the inner sleeve, its strength characteristics are not overly compromised.

Preferably, the locking member is slidably movable relative to the post. In this way, the assembly can be kept simple and compact, the sliding relative surfaces of the post and inner sleeve having a self aligning function.

Conveniently, the locking member is rotatably mounted within the post. By rotatably mounting the locking member, the locking means can be made more compact in the axial direction of the post. Consequently the first aperture of the post can be placed higher in the post, whilst still retaining the antitampering advantages of the assembly. Also, since the area of contact surfaces between the post and inner sleeve is reduced, the locking means is less likely to jam should dirt enter the post.

In preferred embodiments, the engagement mem-

ber is provided with an enlarged end. The end section of the engagement member may comprise a ball fastened to a rope section, a planar tongue member having a recess, or a button member formed at the end of an arm portion.

For extra security the end section of the engagement member may comprises a tongue having an aperture which can receive a locking element provided on the locking member.

The second linkage member may comprise a traffic barrier, or an information display means, such as a sign.

The invention will now be described by way of illustration only, with reference to the accompanying drawings, wherein:-

Figure 1 shows in perspective a lockable linkage assembly in accordance with a first embodiment of the present invention;

Figures 2 and 3 show diagrammatically the functioning of the assembly of Figure 1;

Figure 4 shows in perspective a lockable linkage assembly in accordance with a second embodiment of the present invention;

Figures 5 and 6 show diagrammatically the functioning of the assembly of Figure 4;

Figure 7 shows in perspective a lockable linkage assembly in accordance with a third embodiment of the present invention;

Figures 8 and 9 show diagrammatically the functioning of a lockable linkage assembly according to a third embodiment of the present invention;

Figure 10 shows in perspective a lockable linkage assembly of a fourth embodiment of the present invention;

Figure 11 shows in perspective a lockable linkage assembly of a fifth embodiment of the present invention;

Figures 12 and 13 show cross-sectional views of the locked lockable linkage post assembly of Figure 9;

Figures 14 and 15 show cross-sectional views of lockable linkage assemblies of sixth and seventh embodiments of the present invention;

Figures 16 and 17 show cross-sectional views of a lockable linkage assembly of an eighth embodiment of the present invention; and

Figure 18 shows in part cross-section a post assem-

bly in accordance with the present invention.

With reference to Figure 1, the upper section of a post 1 is of a generally cylindrical configuration and formed of high density polyethylene. Whilst a circular configuration is preferred for strength, alternative sections of post may be employed. In use, the post is located in a base member 25, as shown in Figure 18, the base member being generally circular in cross-section and weighted to provide a measure of stability to the post located thereby.

The post is adapted to support, for example, a traffic barrier rail or perhaps a sign. For this purpose, the post is provided about its circumferential surface with one or more apertures in the form, for example, of a slot or slots 2.

Each such slot is arranged to receive an engagement member 3 formed at the end of a sign or barrier rail. For example, in Figure 1, the engagement member takes the form of a vertically disposed tongue 3 of planar configuration. The end of the tongue has a height which approximates to the height of the slot 2 in the post so that the tongue can be readily inserted into the post. To assist in the stability of the connection between the post and the barrier or sign, an identical or a similar lower tongue may be used in connection with a lower vertical slot, as shown in Figure 18. The barrier is intended to extend in a generally normal direction to a tangent at the point of connection to the post.

The tongue 3 comprises at its lower portion a recess 4 and below the recess a cutaway portion 5. By virtue of the cutaway, the tongue can pivot about the contacting surfaces of the slot and recess so as to swing in the vertical plane whilst the lower tongue still cooperates in the lower vertical slot to retain the vertical orientation. Similarly the tongue can move downwardly at the end remote from the linkage assembly by virtue of the cutaway portion. On assembly the tongue portion can be introduced into the slot, following which it is then moved relatively downwardly with respect to the post thereby positioning the recess 4 in the bottom portion of the vertical slot.

The slot 2 has a width just larger than the tongue so as to prevent undue lateral movement of the tongue when inserted. In this way the rigidity of the assembly is increased.

A locking means for releasably locking the engagement member in the post is provided on the post. In the embodiments of Figures 1 to 8, the locking means takes the form of an inner sleeve 6 arranged within the post 1 for slidable movement substantially in the direction of the longitudinal axis of the post, namely in a vertical direction with the post upright. The inner sleeve 6 shown in hatching is provided with an aperture or cut-out portion 7 which in an unlocked position "U" of the assembly is aligned with the aperture 2 in the post to allow the engagement member of the tongue to be inserted in and retracted from the post. This is shown particularly in Fig-

ure 2. On sliding the locking sleeve downwardly to a "locked" position, the size of the effective opening to the interior of the post, made up of the respective overlapped apertures in the post and sleeve, 2 and 7, is reduced to thereby prevent the engagement member from being moved upwardly and then retracted from the post.

Whilst any suitable means may be used for locking the inner sleeve in position within the post, the post preferably includes a second aperture 10 in the form of a vertically arranged slot in which slidably receives a locking bolt 11 threadedly attached to the inner sleeve. The bolt 11 can be tightened to clamp and lock the inner sleeve 6 in position relative to the post 1. In this manner, the cut-out portion 7 in the inner sleeve can be secured in locked "L" and unlocked "U" positions to prevent or allow movement of the engagement member into and out from the post. Rather than a locking bolt, the inner sleeve may, for example, include a locking ring which projects therefrom in the slot and which can be aligned with a similar ring on the post such that the two rings can receive, for example a padlock, thereby locking the two together in the locked position.

The slot 10 and bolt arrangement also serves to guide the movement of the inner sleeve within the post. The head 12 of the bolt 11 is relatively large and/or the bolt may include a washer, thereby preventing damage to the post on tightening of the bolt.

Locked positions of the locking means are shown in Figures 1, 3, 4, 6, 7 and 9 whereas unlocked positions are shown in Figures 2, 5 and 8.

The engagement member can take on different forms, for example a planar tongue as described above in relation to the embodiment of Figures 1 to 3, a ball 8 and rope 9 arrangement as in the embodiment of Figures 4 to 6 or a T-bar type of arrangement as in the embodiment of Figures 7 to 9. In these preferred embodiments, it is however a feature that the end of the engagement member has an enlarged portion which is trapped within the post and locked in a trapped position once the effective post aperture has been reduced.

Rather than varying the size of the aperture in the first linkage member, the orientation or shape thereof may be varied to inhibit removal of the engagement member once inserted in the first linkage member aperture.

The inner sleeve 6 itself is shown as a complete inner tube section. This tubular nature is advantageous as it offers high strength and rigidity and also assists in ensuring a correct sliding movement of the locking means with respect to the post. However, alternatives to the tubular shape may be used, for example the locking member may be provided as a planar or curved strip, which is movable to affect the reduction in size of the aperture in the post. The post itself need not be of a circular cross-section, although this is preferred, particularly for its strength and self alignment advantages in relation to an arcuate locking means. A square, hexagonal or elliptical section may for example be used as an

alternative.

In the embodiments of Figures 10 to 15 an alternative arrangement for the locking means is shown. In particular and as shown in Figure 10, the locking means again takes the form of an inner sleeve 6 provided within the post 1, but in these embodiments the sleeve is arranged to rotate within the post about the axis thereof. The inner sleeve 6 in each of these embodiments includes a "L-shaped" cut-out portion 13, the sleeve being movable between an unlocked position "U", where the cut-out portion 13 is aligned with the aperture 2 in the post, so as to allow movement of the sign or barrier engagement member into or out of the post, and a locked position "L" where the sleeve 6 is moved to cover up part of the aperture thereby reducing the effective size thereof and thus consequently preventing insertion or retraction of the engagement member 3.

The rotatable inner sleeve 6 is completely housed within the post 1 whereby unauthorised access thereto is severely restricted. A cap (not shown) may be secured on to the top of the post 1 to further inhibit access to the locking means. The rotational action of the locking sleeve allows the post aperture 2 to be placed at a relatively high position on the post, without the locking means being accessible at the top of the post, again inhibiting possible tampering.

The rotatable inner sleeve is also less likely to jam due to an ingress of dirt between the relative moving surfaces of the inner sleeve and post since the area of contact of such surfaces is reduced.

An edge 14 of the cut-out portion 13 in the inner sleeve 6 may be inclined or radiussed to ease the engagement member into the locked position on rotating the inner sleeve.

The inner sleeve 6 may include a threaded or camming section on its exterior for engagement with a corresponding threaded or camming section provided on an inner surface of the post 1. With such an arrangement, a movement applied to the inner sleeve can be translated into an accurate relative locking or unlocking movement between the inner sleeve and post. A large key inserted, for example, longitudinally into the top of the post, may be utilised in such an arrangement to apply a suitable rotational movement to the inner sleeve. A catch, for example a spring clip arrangement or a rib and groove arrangement, may be provided between the inner sleeve and post to enhance the locking action therebetween.

A further type of engagement member is shown in Figure 11 comprising a button ended rod 15, which is receivable in a suitably shaped aperture 2 in the post.

Clearly the various engagement member arrangements described above in relation to the vertical movement locking means of the previous embodiments are equally applicable with rotatable movement embodiments and vice versa, with suitably modified locking means.

In the rotatable movement locking means embodi-

ments, as with the vertical movement embodiments, a further aperture is provided in the form of a slot 10 in which is received a bolt 11 having an enlarged head 12. The bolt is threadedly fixed to the inner sleeve 6.

Figures 12 and 13 show cross-sectional views of the embodiment of Figure 10. As shown bolt 11 is threadedly received in inner sleeve 6 and is slidably received in slot 10 in the wall of post 1. The bolt head 12 has a shouldered portion 16.

In an unlocked position of the assembly as marked "U" (shown in Figure 10) on the post adjacent the slot 10, the bolt is in a leftward position of the slot 10 so that the cut out portion 13 in the inner sleeve is aligned with the post aperture 2 to allow engagement member 3 access into the post or retraction therefrom. However, when the bolt is slid to the right to a locked position "L", the effective area of the post aperture is reduced thus preventing removal of the engagement member. The slot 10 includes a recess at the right extent thereof to take the shoulder provided on the bolt. In this way correct positioning of the bolt in the locking position can be easily established.

The bolt itself includes a suitable recess 17 in its head as shown in Figure 10 so that it can only readily be fastened and more importantly unfastened with an appropriate tool, e.g. an allen key.

In this manner opportunist theft of, for example, signs and barrier components can be prevented and undesirable disassembly of the post assembly can be hindered.

Figures 14 and 15 show further embodiments in locked positions. In Figure 14, the contours of the engagement member 3 and the openings 2 and 7 afford the engagement member increased pivotal movement relative to the axis of the post whilst remaining locked thereto.

This is particularly important, for example, with barrier applications where the barriers are placed on uneven terrain.

In the embodiment of Figure 15, the enlarged end of the engagement member is provided by forming a recess 18 in the upper edge thereof. The phantom lines shown indicate the large range of pivotal movement of the engagement member permitted by the locking means whilst preventing removal of the engagement member.

In the embodiment of Figures 16 and 17, the engagement member 3 is itself formed with an aperture 19 which receives a locking element 20 formed in the cut-out portion of the inner sleeve 6. The locking element is shown integrally formed although any suitable locking element may be used.

Figure 18 shows a post 1 which can be used with all embodiments of the present invention, where a single inner sleeve 6 is used to releasably lock in position four engagement members 3 either by rotational or vertical movement of the sleeve.

Of course, different forms of the locking assembly

may be used at different areas of the post. For example, vertical movement arrangements as shown in Figure 1, may be used in combination with rotational movement arrangements, as shown in Figure 10, on the same post but at different areas thereof.

Since the post rails and base are all formed of a resilient plastics material such as HDPE, and since the locking assembly makes it difficult for the engagement members and post to separate, barrier and sign systems in accordance to the present invention are particular resistant to sideways thrusts since they are strong, resilient and do not disassemble on impact. However, the plastics portions are light enough such that if hit by a car at speed, for example, they may separate but will do little damage.

The arrangements in accordance to the present invention are particular suited to temporary traffic barriers, barriers for exhibitions and shows, and barriers for incidental small works, but the linkage itself is of wider applicability for use for other purposes than temporary motorway barriers. As discussed it is also possible to use the post assembly to support motorway signage such as speed limits, hazard warnings etc.

The assemblies described herein may also be applied to permanent road signage arrangements where the secure locking nature of the various assemblies can be advantageous in preventing tampering and theft of, for example, large signs formed of expensive materials such as aluminium. Where security is not a prime requirement, the locking sleeve may be provided on the exterior of the post.

Claims

1. A lockable linkage assembly comprising;

- a) a first linkage member (1) comprising a first aperture (2),
- b) a second linkage member (3) comprising an engagement member for insertion in the aperture,

wherein said first linkage member further comprises a post member having a locking means (6) which can be operated either to inhibit or allow removal of an inserted engagement member from the first linkage member, the locking means being provided in the interior of the post.

2. An assembly according to claim 1 wherein the locking means (6) comprises a locking member which is movable relative to the post (1) to a position where it impedes movement of an inserted engagement member (3) that would allow its removal.

3. An assembly according to claim 2 wherein the locking member comprises an inner sleeve provided

within the post (1).

4. An assembly according to claim 3 wherein the inner sleeve (6) has a sleeve aperture (7), the sleeve being movable from an unlocked position, where the sleeve aperture is aligned with the first aperture (2) to allow insertion of the engagement member (3), to a locked position, where the sleeve aperture and the first aperture are not aligned to thereby inhibit removal of an inserted engagement member. 5
10
5. An assembly according to any one of claims 2 to 4 wherein the locking member (6) is slidably movable relative to the post (1). 15
6. An assembly according to any one of claims 2 to 5 wherein the locking member (6) is rotatably mounted within the post (1).
7. An assembly according any preceding claim wherein the engagement member is provided with an enlarged end. 20
8. An assembly according to any preceding claim wherein an end section of the engagement member comprises a ball (8) fastened to a rope section (9). 25
9. An assembly according to any of claims 1 to 7 wherein an end section of the engagement member (3) comprises a planar tongue member having a recess (4). 30
10. An assembly according to any of claims 1 to 7 wherein an end section of the engagement member comprises a button member (15) formed at the end of an arm portion. 35
11. An assembly according to any of claims 1 to 7 wherein an end section of the engagement member comprises a tongue (3) having an aperture (19) which can receive a locking element (20) provided on the locking member. 40
12. An assembly according to any preceding claim wherein the second linkage member (3) comprises a traffic barrier. 45
13. An assembly according to any of claims 1 to 11 wherein the second linkage member (3) comprises an information display means. 50
14. A lockable linkage assembly comprising;
 - a) a first linkage member comprising a first aperture, 55
 - b) a second linkage member comprising an engagement member for insertion in the aperture,

wherein said first linkage member further comprises locking means which can be operated either to inhibit or allow removal of an inserted engagement member from the first linkage member.

FIG. 1

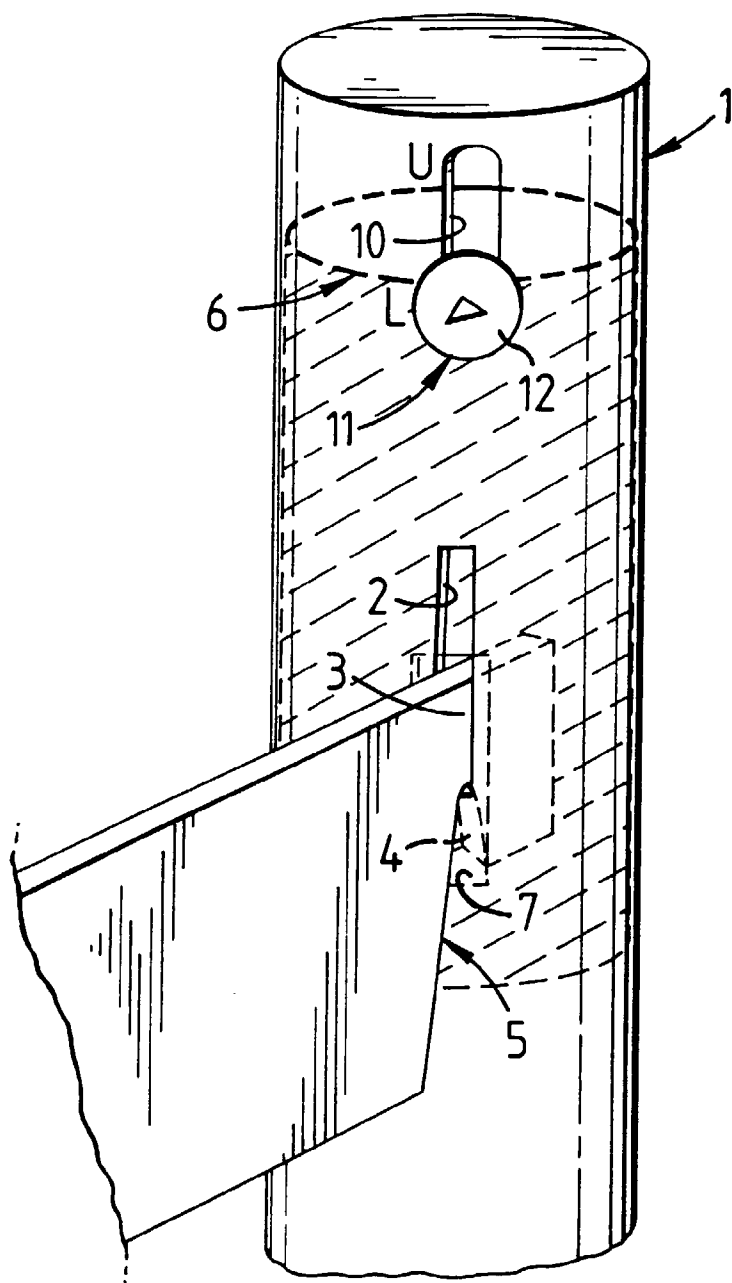


FIG. 2

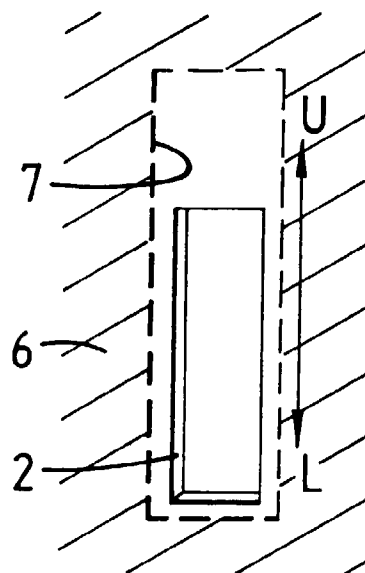


FIG. 3

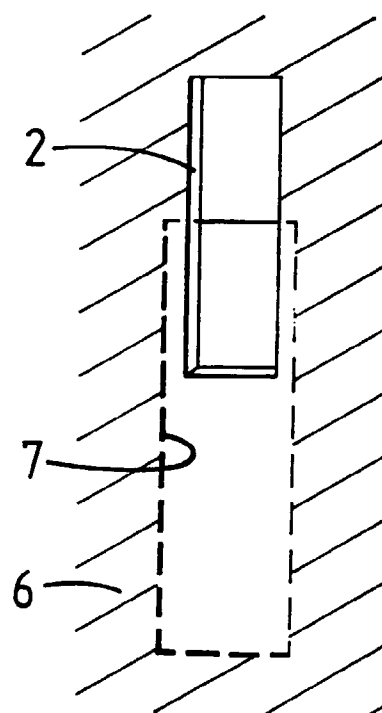


FIG. 4

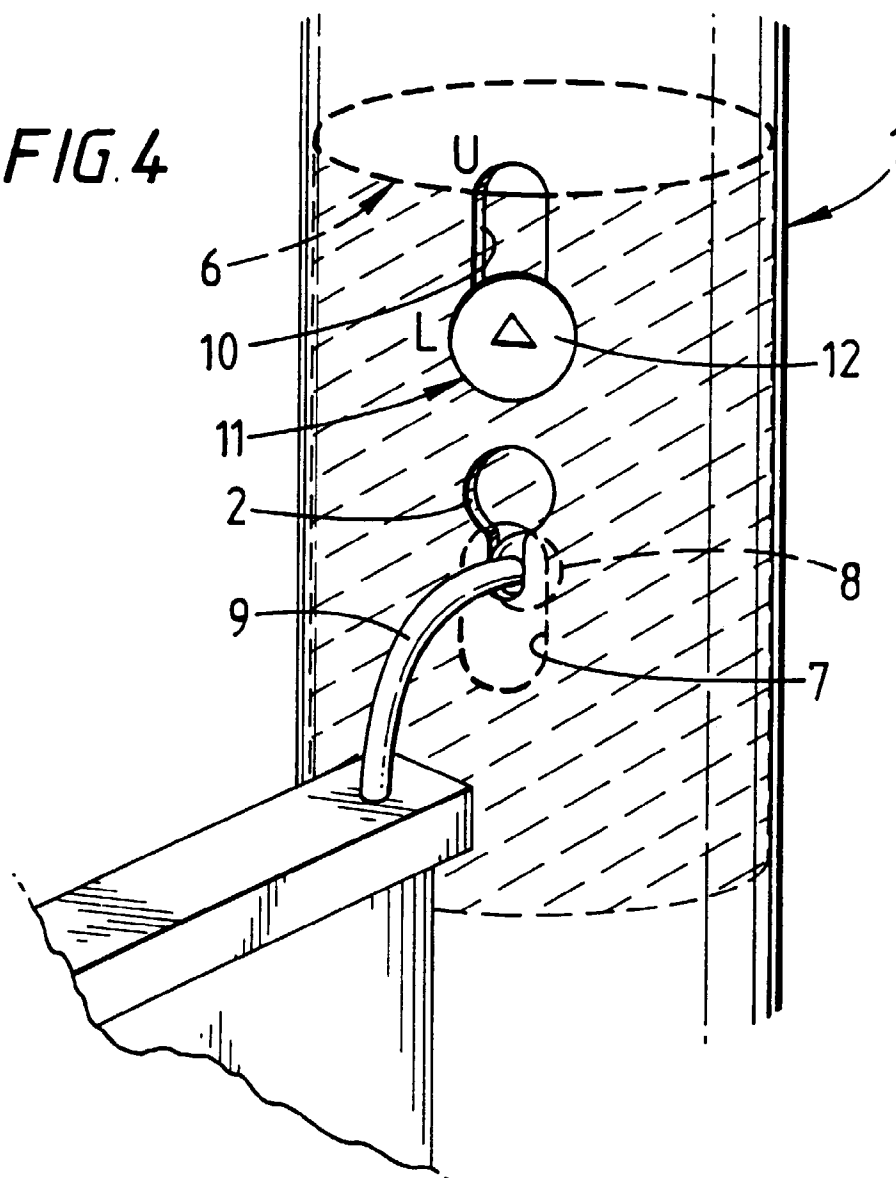


FIG. 5

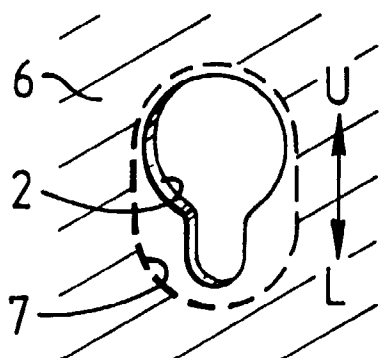


FIG. 6

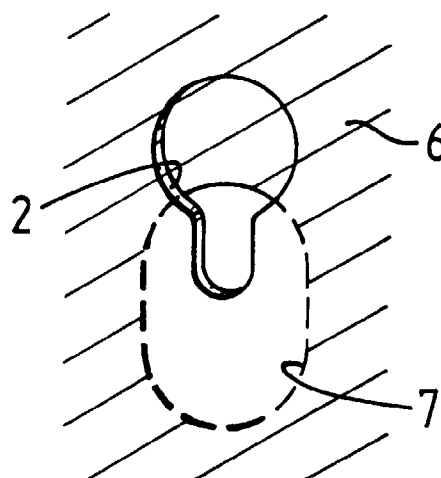


FIG. 7

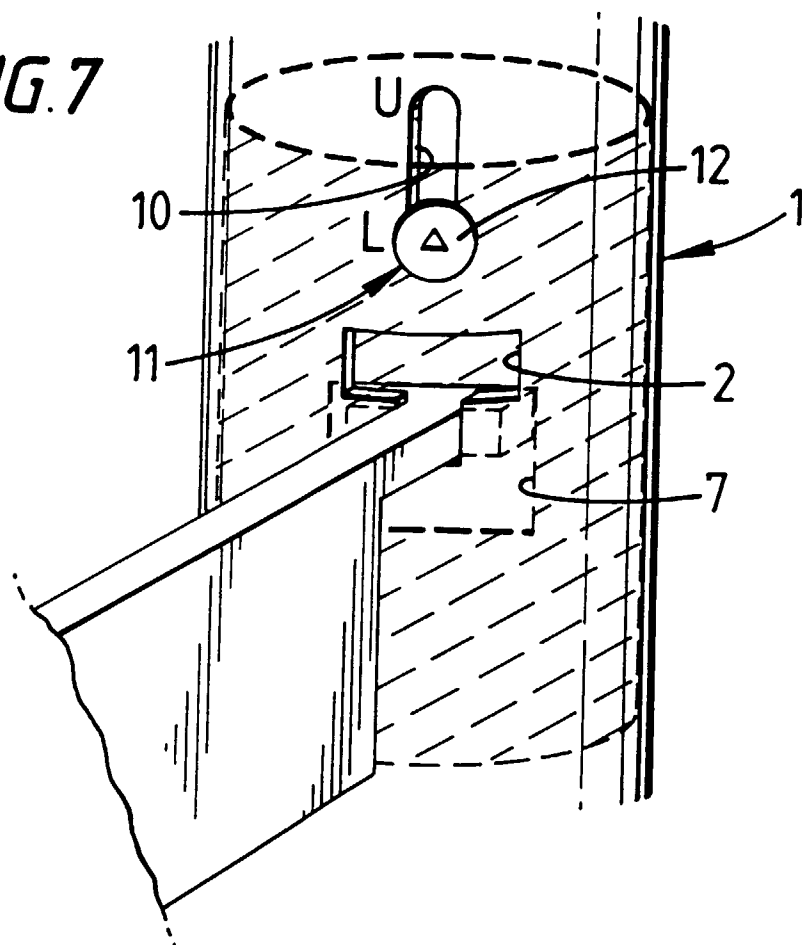


FIG. 8

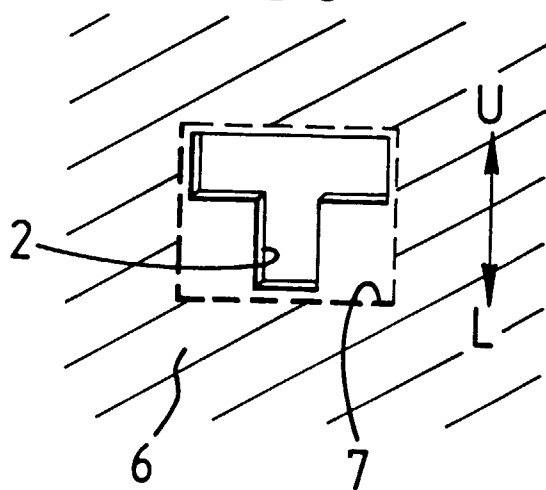


FIG. 9

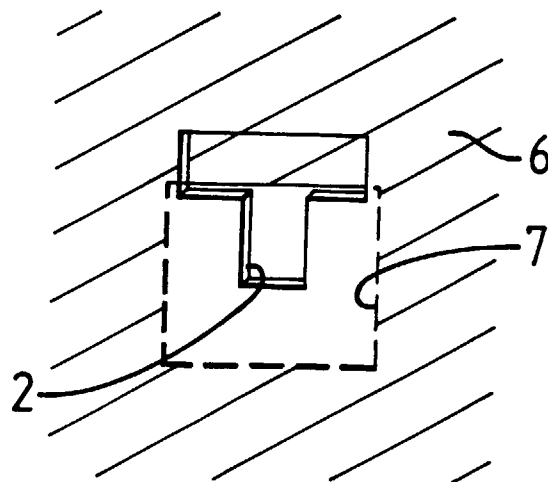


FIG. 10

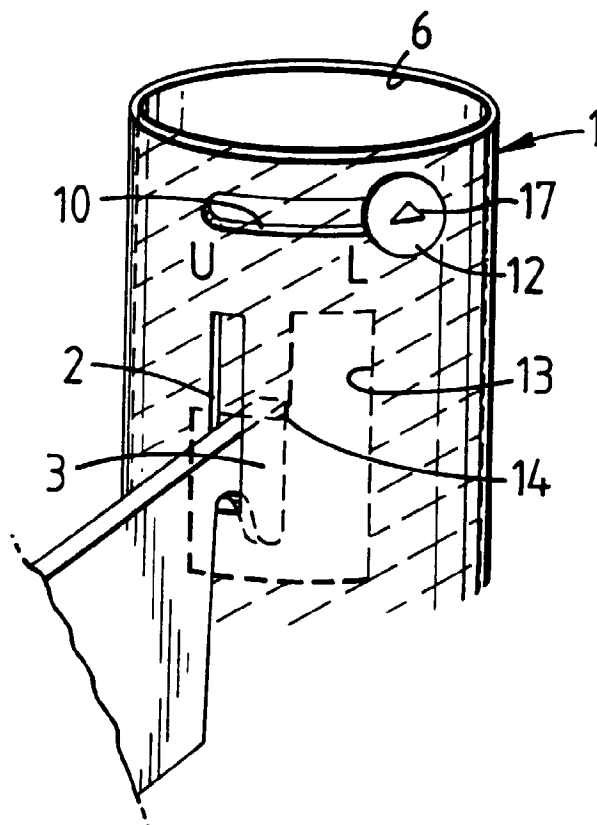


FIG. 11

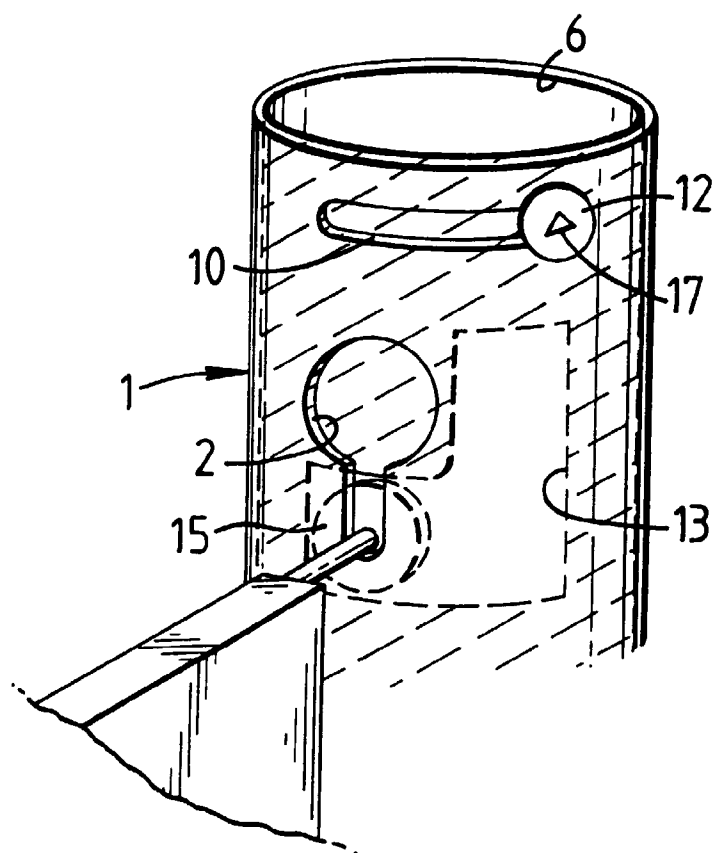


FIG. 12

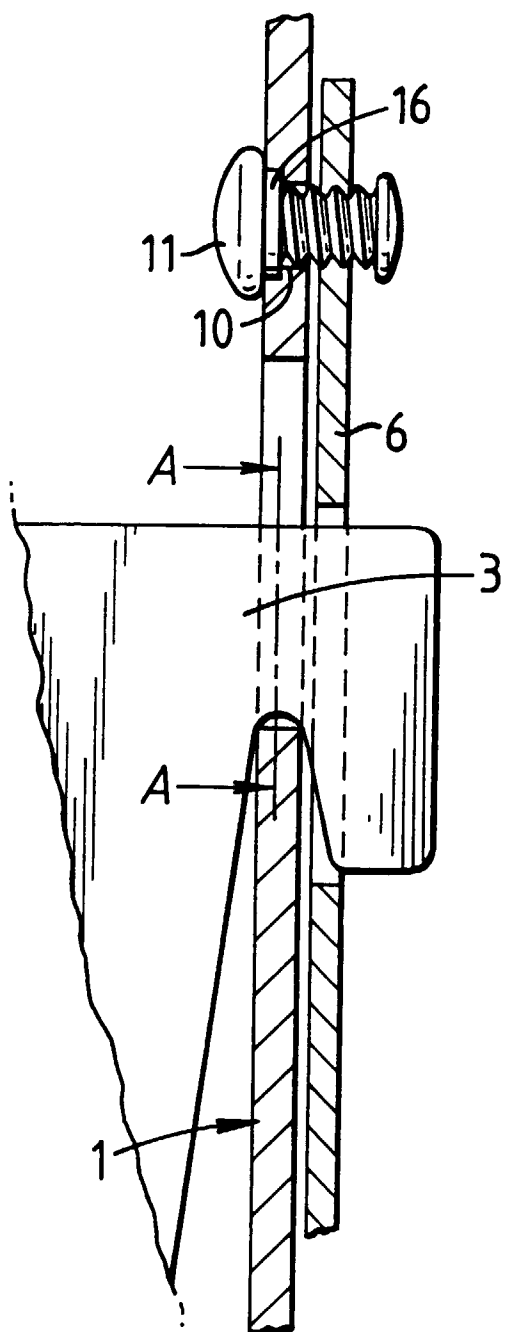


FIG. 13

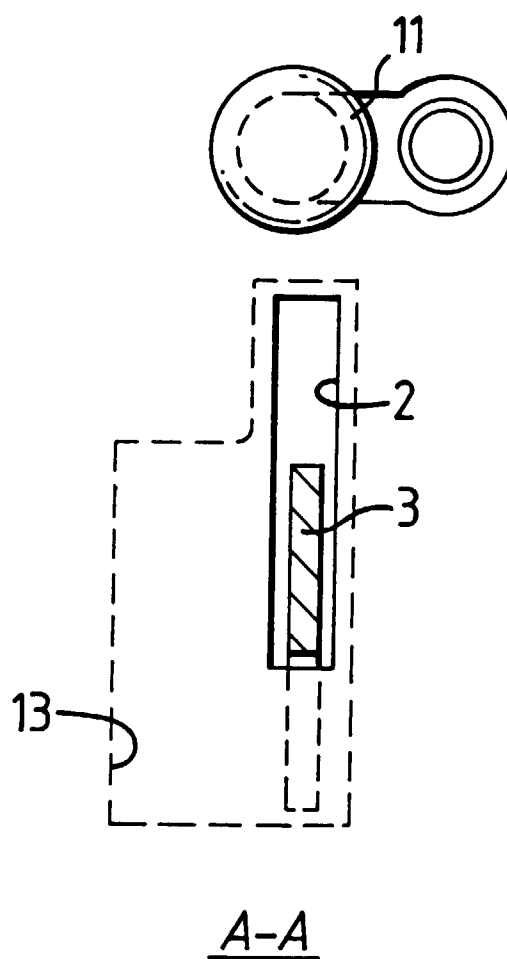


FIG. 14

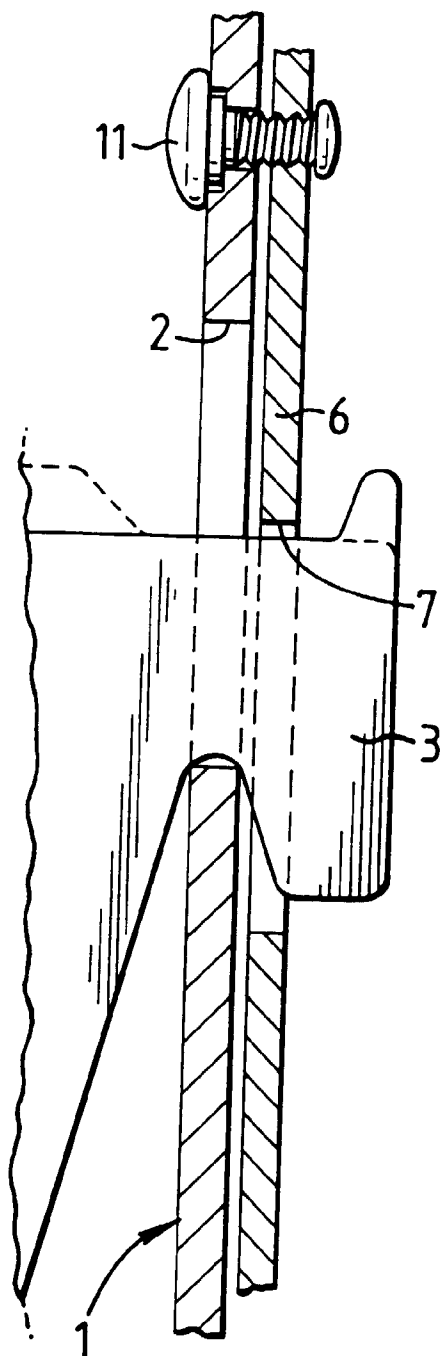


FIG. 15

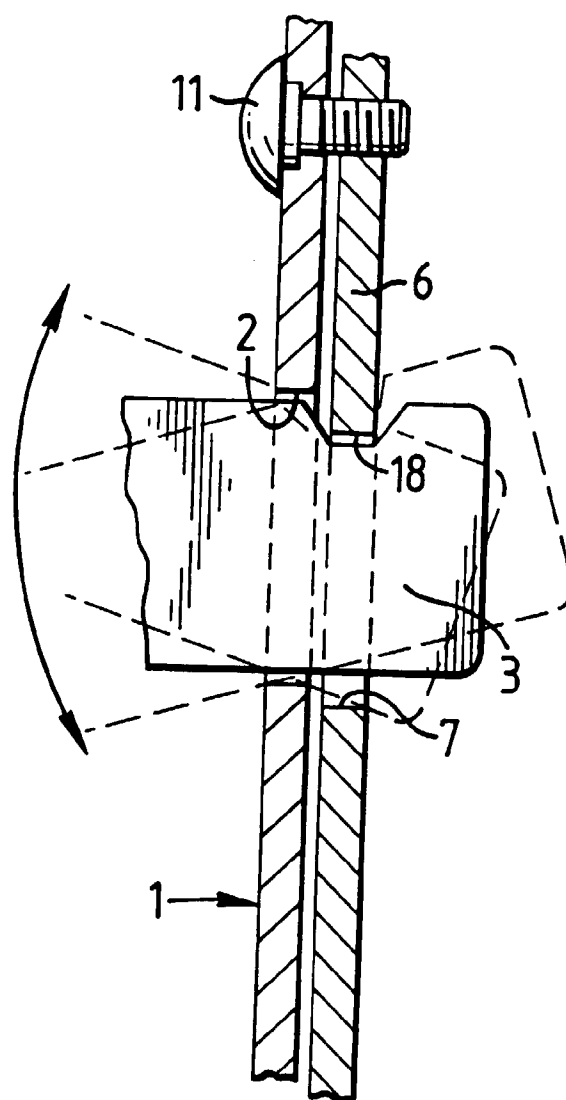


FIG. 16

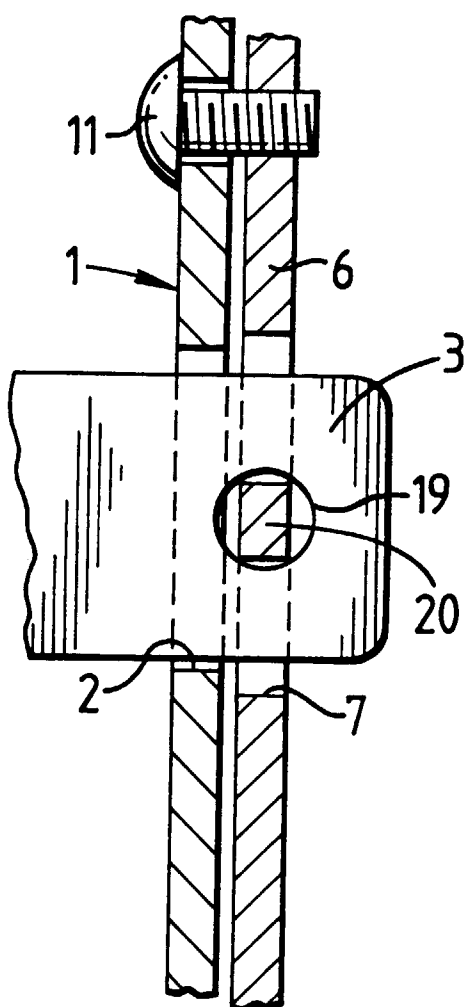


FIG. 17

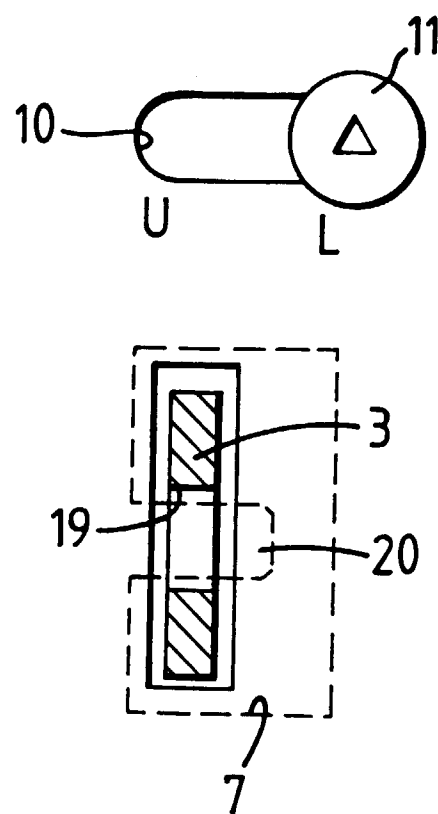


FIG. 18

