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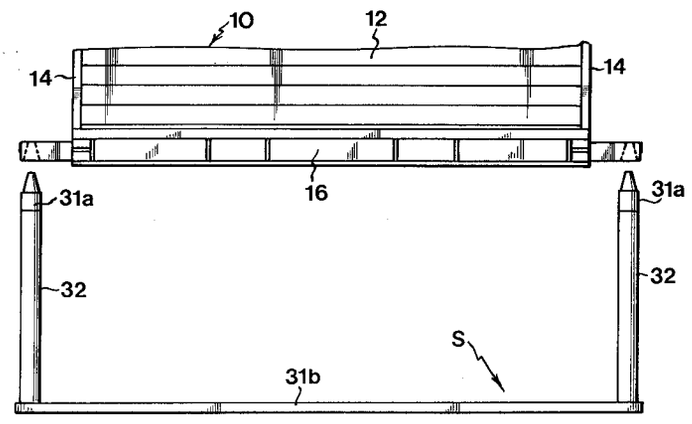
(54) Apparatus for the placement of load carriers.

(57) The invention relates to a device for the placement of a load carrier (10), such as a container, a loading platform or the like, at a distance above a placement surface. The device comprises a number of legs which in the position of placement of the load carrier (10) rest on the placement surface and are vertically extended at a horizontal distance laterally outwards from opposite sides (14) of the load carrier (10). The invention is characterised in that each leg comprises an arm (18) accompanying the load carrier (10) and movable between a transport position and a projecting position in which the arm (18) is projecting laterally from the load carrier (10) and in which it is prevented from being rotated about its longitudinal axis, as well as a vertical support (32) separate from the load carrier (10) and adapted to be connected at the top to an end (30) of the arm (18) remote from the load carrier when the arm is in its projecting position, and that with a view to bringing about the connection between the arm (18) and the vertical support (32) in a detachable, yet stable manner, each leg further comprises a cone joint consisting of a female member and a male member and having a vertical centre axis, one of the female member and the male member being supported by the arm (18) and the other by the vertical support (32), the cone joint having a vertex angle exceeding a locking angle at which the male and female members would be locked to each other when loaded.

FIG.6



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The present invention relates to a device for the placement of a load carrier, such as a container, a loading platform or the like, at a distance above a placement surface, the device comprising a number of legs which in the position of placement of the load carrier rest on the placement surface and are vertically extended at a horizontal distance laterally outwards from opposite sides of the load carrier.

Devices of the above-mentioned type are today used for the placement of many different types of load carriers or transport boxes, such as containers, loading platforms, loading platforms with canvas covers etc, for example when such load carriers are delivered and taken away in connection with transportation by rail, ship or air.

There are on the market so-called ISO containers provided with parking legs which are integrated in the bottom frame and which in use are first drawn out horizontally and thereafter swung down to a vertical position, whereupon the legs in some cases can be stabilised and locked by means of an oblique strut. This and other known solutions for the placement of load carriers however suffer from several shortcomings. The overall weight of the placement device accompanying the load carrier and including both the legs and optional stabilising and locking devices associated therewith, is considerable and, hence, an undesirable factor irrespective of the mode of transportation. Another shortcoming is that placement devices of this type increase manufacturing costs for the load carrier. Moreover, the placement device is used only during the relatively short parking period of the load carrier.

The object of the invention therefore is to provide a device of the type described by way of introduction, which does not have the shortcomings inherent in the prior art.

More specifically, the object of the invention is to provide a placement device which, at least partly, does not accompany the load carrier, yet ensuring a stable placement, with a view to reducing the weight of the load carrier during transportation as well as reducing costs, in that the parts of the device which do not accompany the load carrier can be used for other load carriers.

A particular object of the invention is to provide a placement device which for reasons of safety does not have any protruding parts during transportation, and which is of lightweight design and, hence, easy to handle.

To achieve these objects, the device according to the invention is characterised in that each leg comprises an arm accompanying the load carrier and movable between a transport position and a projecting position in which the arm projects laterally from the load carrier and in which it is prevented from being rotated about its longitudinal axis, as well as a vertical support separate from the load carrier and adapted to be connected at the top to an end of the arm remote from the load carrier when the arm is in its projecting position, and that, with a view to bringing about the connection between the arm and the vertical support in a detachable, yet stable manner, each leg further comprises a cone joint consisting of a female member and a male member and having a vertical centre axis, one of the female member and the male member being supported by the arm and the other by the vertical support, said cone joint having a vertex angle which is greater than a locking angle at which said male and female members would be locked to each other when loaded.

A distinctive feature of the invention is that the cone joint ensures, despite the fact that each leg is easily retractable and dividable by means of the cone joint, an extremely stable connection between the arm and the vertical support. Another, equally essential feature of the cone joint is that its stability increases as the vertical load on it increases. Yet another essential feature of the cone joint is that it is non-locking irrespective of the size of the vertical load, thanks to its vertex angle being selected to exceed the locking angle. The maximum permissible vertex angle of the cone joint depends on the desired stability but, generally speaking, the smaller the vertex angle of the cone joint, the greater the stability. Also other factors are of importance here, such as the vertical length of the cone joint and the friction between the engagement surfaces of the male and female members.

The vertical support, which is to be connected detachably, yet stably to each arm, may be designed, depending on the field of use, either as separate support legs for each arm or as a continuous frame. In the case where the vertical support is designed as separate support legs, these legs may suitably be temporarily lockable to the respective arm after the parts of the cone joint have been assembled, so that the separate support legs can be "hung on to" the extended arms of a hoisted load carrier, whereupon the load carrier can be lowered with the thus-mounted support legs.

These and other features of the invention are recited in the appended claims.

The invention will now be described in more detail in some embodiments with reference to the accompanying drawings.

Fig. 1 is a front view showing a load carrier in the form of a container designed in accordance with the invention.

Fig. 2 shows the container in Fig. 1 seen from the side.

Fig. 3 is a cutaway side section of a leg for the placement of the container in Fig. 1.

Fig. 4 is an end view of an arm being part of the leg in Fig. 4.

Figs 5 and 6 show, respectively, from the side and from in front a leg frame for the placement of the container in Fig. 1.

Fig. 7 shows from two sides a separate leg support for the placement of the container in Fig. 1.

Fig. 8 shows a number of separate support legs according to Fig. 7 placed on a transport unit.

Fig. 9 is a cutaway side section on a larger scale of a lockable cone joint.

Fig. 10 is a top view of the lockable cone joint seen in the direction of the arrows in Fig. 9.

The load carrier shown in Figs 1 and 2 consists of a container 10, which is defined by an upwardly openable panel 12, a rear wall 13, optionally also openable, two opposed, fixed side walls 14, a top 15, and a bottom frame 16. To enable the placement of the container 10 on and at a distance above a placement surface, the container is provided in each corner of its bottom frame 16 with a horizontal arm 18. As indicated by the double arrows in Fig. 1, each arm 18 is displaceable linearly and horizontally at right angles towards and away from the side walls 14 between a transport position (shown by full lines in Fig. 3), in which the arm 18 is located substantially completely inwardly of the boundary plane P of the side wall 14, and a projecting position shown in Fig. 1 (indicated by dash-dot lines in Fig. 3), in which the arm 18 protrudes laterally from the container 10. The protruding length of the arm 18 can be varied depending on the size and the weight of the container or other factors, such as the width of a vehicle platform or the like, which should have such a width that it can be moved in underneath the container 10 when this is in its position of placement. In the illustrated example, the arms 18 are provided with abutment and locking means for defining a predetermined distance the arms are to be extended, and for locking the arms in this predetermined position.

Reference numeral 19 in Figs 1 and 2 designate openings known per se, which are provided in the four sides of the bottom frame 16 for receiving the fork of a fork-lift truck.

Reference is now made to Figs 3 and 4 which show an arm 18 in more detail on an enlarged scale. In Fig. 3, the arm 18 is shown in full lines in its retracted transport position, and in dash-dot lines in its extended position of use. The arm 18 is supported by and displaceable in the direction of the double arrow in a horizontal guide beam 20, which is integrated with and fixedly connected to the bottom frame 16 and formed in its bottom with a longitudinal groove 22 (Fig. 4). When the arm 18 is in its projecting position, it cannot be rotated about its longitudinal axis thanks to the engagement between the fixed guide beam 20 and the non-projecting part of the arm 18. When the arm 18 is extended, a stop screw 24 fixed to the inner end of the arm is moved in the groove 22 into abutment against a stop 26 blocking the groove 22, with a view to ensuring that a sufficient part of the arm 18 is located in the guide beam 20 also in the projecting position of use of the arm, and to defining the above-mentioned predetermined length the arm 18 should be extended in the position of placement.

At its upper end, the screw 24 is articulated (at 25a) to one end of a rod 25b which is extended substantially horizontally within the arm 18, and which is provided at its opposite end (indicated by dash-dot lines in the extended position of the arm 18) with two downwardly-directed pins 25c and 25d which can project through corresponding openings in the underside of the arm 18. When the arm 18 is in its retracted transport position, the pin 25d rests on the member 26 so that the pin 25c is prevented from falling down so as to lock the arm 18 against extension. When the arm 18 is extended, the pin 25c will occupy the position indicated by dash-dot lines, in which it engages the bottom frame 16, whereby to prevent the arm 18 from moving inwards. In this extended position, the arm 18 is also locked in the other direction by means of the screw 24.

When the arm 18 is again to be retracted, the pin 25d is pressed upwards manually so as to undo the engagement of the pin 25c with the element 16.

In the illustrated example, the arm 18 can be operated manually, for which purpose a handle 28 is arranged at the extendable end 30 of the arm 18.

Reference numeral 41 in Fig. 3 designates a rotatable plate or the like for retaining the arm 18 in the transport position. When the arm 18 is to be extended, this plate is swivelled aside.

According to the invention, each arm 18 is intended to be connected to a vertical support 32 resting on the placement surface, in order to form therewith a complete, load-carrying "leg" for the placement of the container 10. The vertical support 32 can be designed in many different ways within the scope of the invention, the accompanying drawings illustrating two main variants. Thus, Figs 5 and 6 show a first variant where all the vertical supports 32 are interconnected by means of horizontal elements 31a and 31b as well as oblique struts 33, so as to form a continuous placement frame S. However, the horizontal elements 31a and 31b have no load-carrying function but merely serve to maintain the vertical supports 32 upright and at a predetermined mutual distance before the container 10 is placed on the frame S.

Figs 7-10 show another variant in which each vertical support 32 consists of a separate support

leg. In the illustrated embodiment, each separate support leg 32 has two handles 35 for manually handling the support legs. Fig. 8 schematically illustrates at 37 a vertical surface which is disposed, for example, immediately behind the driver's cabin on a transport vehicle, on which containers according to Fig. 1 are to be carried. At the lower end of the surface 37, two apertured holders 39 are provided, in which the individual support legs 32 can be placed and stored on the vehicle.

Irrespective of which embodiment is chosen for the vertical support 32, this can be detachably connected to the free end 30 of the projecting arm 18 in order, together with the arm 18, to form a stable right-angled joint. This stable, yet dividable joint is achieved according to the invention by means of a cone joint having a vertical centre axis C and comprising a male member 34 and a female member 36. As illustrated, the male members 34 preferably are arranged on the vertical supports 32 while the female members 36 are arranged in the ends 30 of the arms 18 projecting from the container 10.

The male member 34 is in the form of an upwardly directed, straight, cylindrical truncated cone, half the vertex angle of which is about 10° in the illustrated example. The female member 36 is in the form of a downwardly divergent cone which is open at the bottom and has a vertex angle matching that of the male member 34. The two parts 34 and 36 are made of a hard material, such as steel. Especially in the alternative using separate support legs according to Figs 7-10, it is advantageous to keep the weight of the legs 32 low, since these legs are handled manually. Therefore, the support leg 32 shown in Fig. 9 consists of a relatively light aluminium tube 32a which extends throughout substantially the entire height of the support leg and which at the top supports a relatively short male insert 32b of steel, which is cylindrical at the bottom.

Because of the great vertical loads which the cone joint should be able to withstand, it is important that the vertex angle of cone joint exceeds the locking angle, i.e. exceeds the angle which would have brought about mutual locking of the male and female members when subjected to load. On the other hand, it is also vital that the joint is stable, i.e. that the right angle between the arm 18 and the vertical support 32 is safely maintained upon loading and also if the container 10, when in its position of placement, is subjected to lateral forces. The smaller the vertex angle is, the more stable to stresses becomes the cone joint. Therefore, the vertex angle is preferably selected to be close to (suitably within 30° of) the locking angle, but yet greater than the latter. It is understood that also other factors, such as cone height and friction, are of importance for the stability of the joint when under load.

Although the conicity of the parts 34 and 36 contributes to facilitate positioning the male member 34 in the female member 36, especially in the embodiment of Figs 5 and 6, where the load carrier 10 is to be lowered on to a frame S already in place, it should be emphasised that the primary purpose of the cone joint is not to facilitate positioning but to provide a joint between the arm 18 and the vertical support 32 which is completely stable when subjected to load. In the position of placement, the female member 36 is resting directly on the male member 34. The greater the load, the more stable the joint.

When using separate support legs 32 as in Figs 7 and 8, the device according to the invention is preferably provided with locking means making it possible to temporarily lock the cone joint 32, 34. It thus becomes possible to lift the load carrier or the container 10, extend the arms 18, lift the support legs 32 one at a time and fit the male member 34 into the corresponding female member 36, whereupon this support leg 32 is locked to the arm 18 with the aid of the above-mentioned locking means before the next support leg 32 is mounted. When all the support legs 32 are thus mounted, the container 10 can be lowered. However, the locking means do not contribute to the stability of the cone joint, which is achieved only by the mutual engagement between the male and female members.

The locking means can be designed in many different ways, the embodiment shown in Figs 9 and 10 being only one among several conceivable alternatives. In the illustrated embodiment, the male member 34 is provided with a horizontal, circular top plate 42 fitted in an internal cylindrical channel 43 of the male insert 32b. The top plate 42 has a rectangular through groove or slot 44 and a fixed pin 46 projecting downwards from its underside (not shown in Fig. 9). At its upper or inner end, the female member 36 is provided with a downwardly directed locking member 48 which matches the groove 44 and substantially is in the form of a flat arrow rigidly connected to the arm 18. As seen from the top view of Fig. 10, the locking member 48 can be inserted unimpededly through the slot 44 of the top plate 42 when the support leg 32 is lifted up towards the arm 18, whereupon the support leg 32 can be rotated 90° about the centre axis C of the cone joint until the locking member 48 is brought into abutment against the pin 46, as indicated by dash-dot lines in Fig. 10. In this locking position, the male member 34 is prevented from leaving the female member 36, and it is understood that if the container 10 with the thus-locked support legs 32 is held in a raised position, then each support leg 32 will rest via its top plate

44 on the locking member 48. However, Fig. 9 shows an instance where the container is in its position of placement with the male member 34 and the female member 36 engaging each other.

Placement frames according to the principle in Figs 5 and 6 are especially usable on placement surfaces which are frequently used for accommodating load carriers 10. Several such frames can then be interconnected, if desired. One advantage of this frame design, as compared with separate support legs according to Figs 7-10, is that the horizontal element 31a, combined with the diagonal struts 33, improves the stability of the device against tilting in the direction of the element 31a. This is advantageous, for example, if a vehicle is to be reversed in underneath in load carrier 10 between the vertical supports 32.

Fig. 6 shows how a container according to Figs 1 and 2 is brought into position, for instance, by means of a fork-lift truck (not shown) with its arms 18 extended, on the frame S composed of four vertical supports 32. The frame S in Figs 5 and 6 can also be used for narrower containers whose width, and hence the distance between the arms 18, is substantially half the width of the container 10 of Fig. 2. To this end, the frame in Figs 5 and 6 is provided with extra male members 40, such that the frame can simultaneously carry two such narrower containers beside each other.

The embodiments of the invention described above can be modified in several different ways within the scope of the invention. For example, the parts of the coin joint may change places, so that the male member is arranged on the arm and the female member on the vertical support, although the variant illustrated in the drawings is preferable. Moreover, the arm may execute a non-linear movement instead of a linear one, for example a horizontal outward pivotal movement from a transport position parallel to the corresponding side of the load carrier to a swung-out operative position.

Claims

1. A device for the placement of a load carrier (10), such as a container, a loading platform or the like, at a distance above a placement surface, comprising a number of legs which in the position of placement of the load carrier (10) rest on said placement surface and are vertically extended at a horizontal distance laterally outwards from opposite sides (14) of the load carrier (10), **characterised** in

   that each leg comprises an arm (18) accompanying the load carrier (10) and movable between a transport position and a projecting position in which the arm (18) projects laterally from the load carrier (10) and in which it is prevented from being rotated about its longitudinal axis, as well as a vertical support (32) separate from the load carrier (10) and adapted to be connected at the top to an end (30) of the arm (18) remote from the load carrier when the arm (18) is in its projecting position, and

   that, with a view to bringing about the connection between the arm (18) and the vertical support (32) in a detachable, yet stable manner, each leg further comprises a cone joint consisting of a female member (36) and a male member (34) and having a vertical centre axis (C), one of the female member (36) and the male member (34) being supported by the arm (18) and the other by the vertical support (32), said cone joint having a vertex angle which is greater than a locking angle at which said male and female members would be locked to each other when loaded.

2. A device as claimed in claim 1, **characterised** in that the vertex angle of the cone joint (34, 36) is close to, but exceeds said locking angle, preferably being within 30° of the locking angle.

3. A device as claimed in any one of the preceding claims, **characterised** in that the male member (34) of the cone joint is a straight, cylindrical, preferably truncated cone.

4. A device as claimed in any one of the preceding claims, **characterised** in that the male member (34) of the cone joint is arranged on the vertical support (32) and that the female member (36) of the cone joint is arranged on the arm (18).

5. A device as claimed in any one of the preceding claims, **characterised** in that each support (18, 32) of the legs further comprises a locking means (42, 44, 46, 48) for temporary locking the male member (34) to the female member (36).

6. A device as claimed in claim 5, **characterised** in that the locking means (42, 44, 46, 48) is so designed that the temporary locking takes place by fitting together the male and female members (34, 36) of the cone joint and subsequently rotating said members relative to each other about the centre axis (C) of the cone joint.

7. A device as claimed in any one of the preceding claims, **characterised** in that the arm (18) is linearly, horizontally displaceable between its transport position and its projecting position.

8. A device as claimed in any one of the preceding claims, **characterised** in that each support (18, 32) of the legs further comprises a means (25a-d) in order, in the position of placement of the load carrier, to lock the arm (18) in its projecting position.

9. A device as claimed in any one of the preceding claims, **characterised** in that the arm (18), when in its transport position, is located substantially completely inwardly of the boundary plane (P) of the corresponding side (14) of the load carrier (10).

10. A device as claimed in any one of the preceding claims, **characterised** in that the movable arms (18) of the legs are mounted in the vicinity of a bottom portion (16) of the load carrier (10).

FIG.2

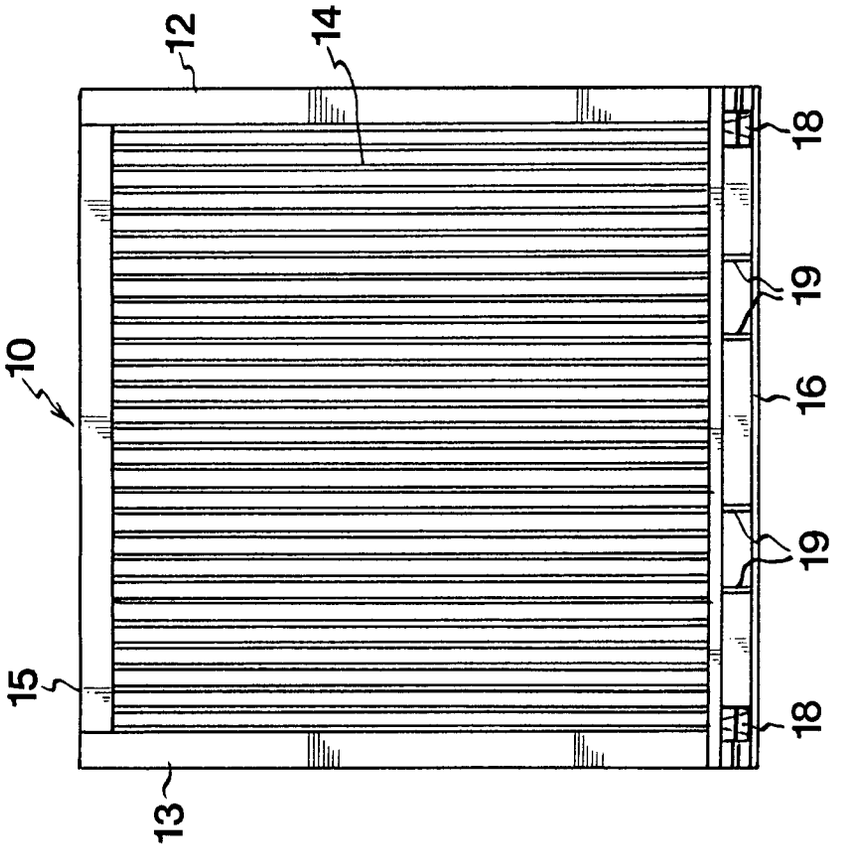
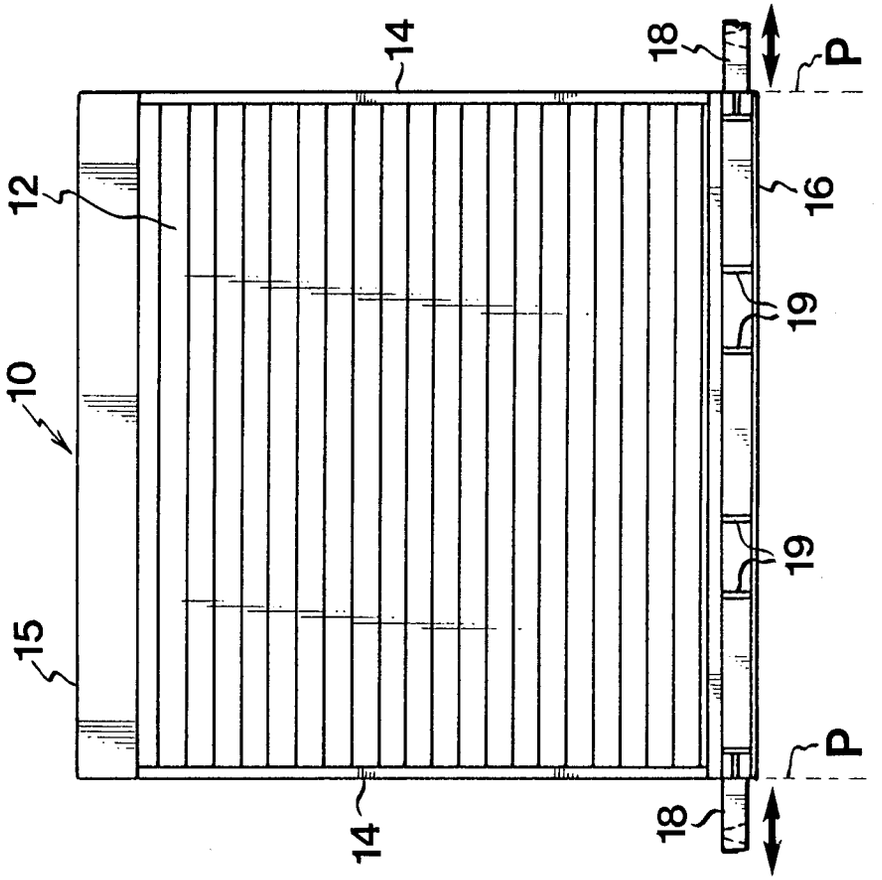


FIG.1



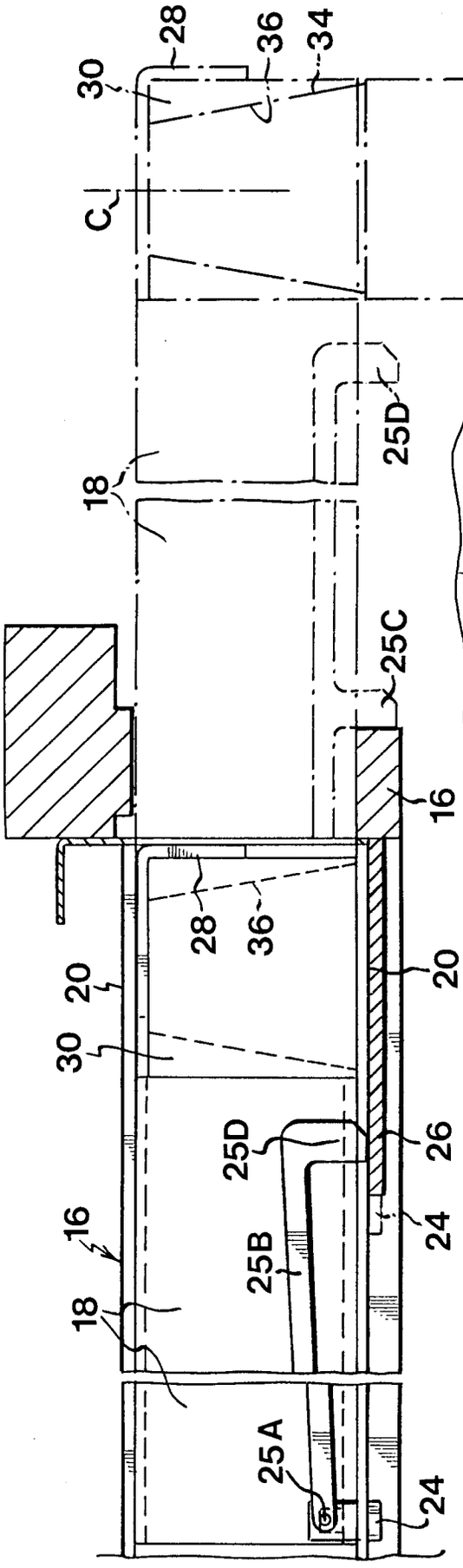

28
36
34
32
30
C
25D
18
25C
16
28
36
20
20
30
25D
26
24
16
25B
18
25A
24

FIG 3

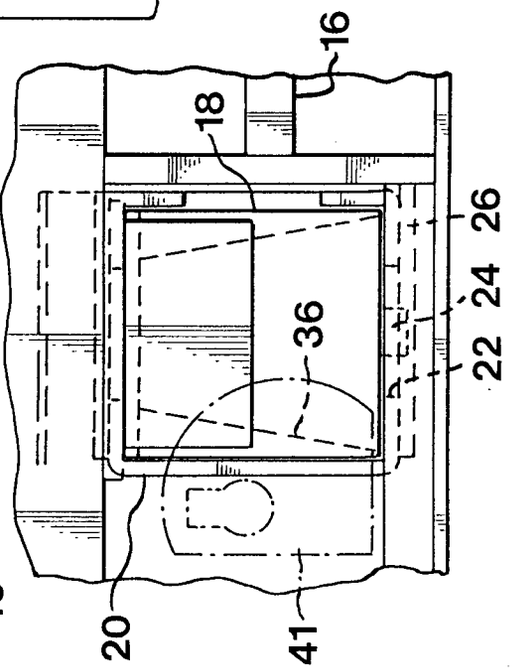

16
18
26
24
36
22
20
41

FIG.4

FIG.5

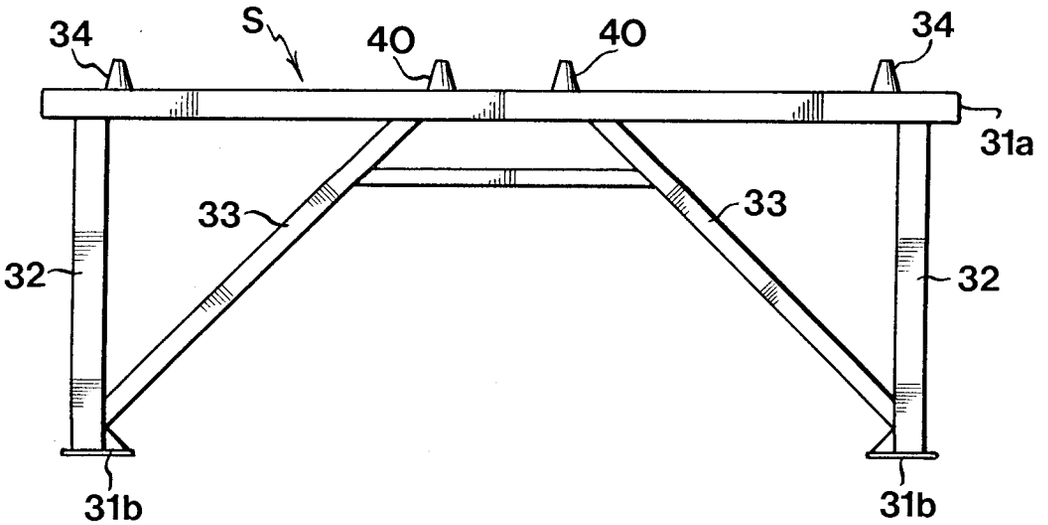

34
S
40
40
34
31a
33
33
32
32
31b
31b

FIG.6

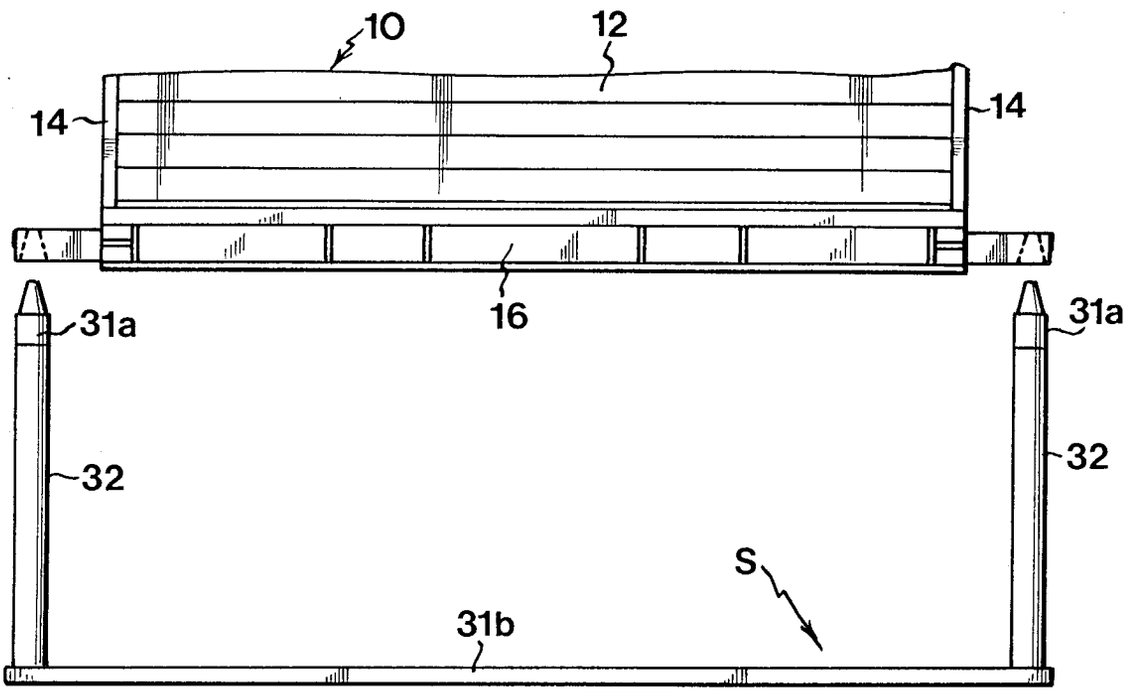

10
12
14
14
16
31a
31a
32
32
S
31b

FIG 7

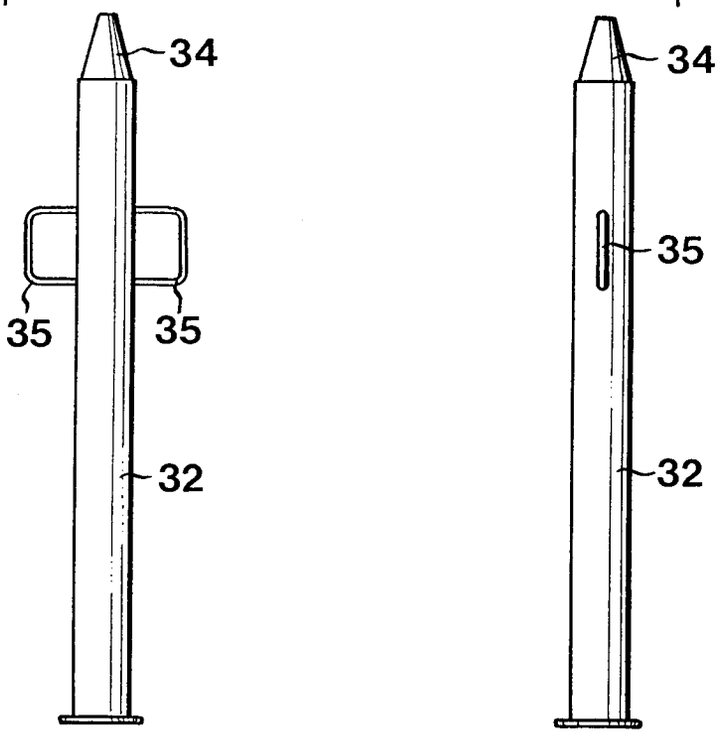


FIG.8

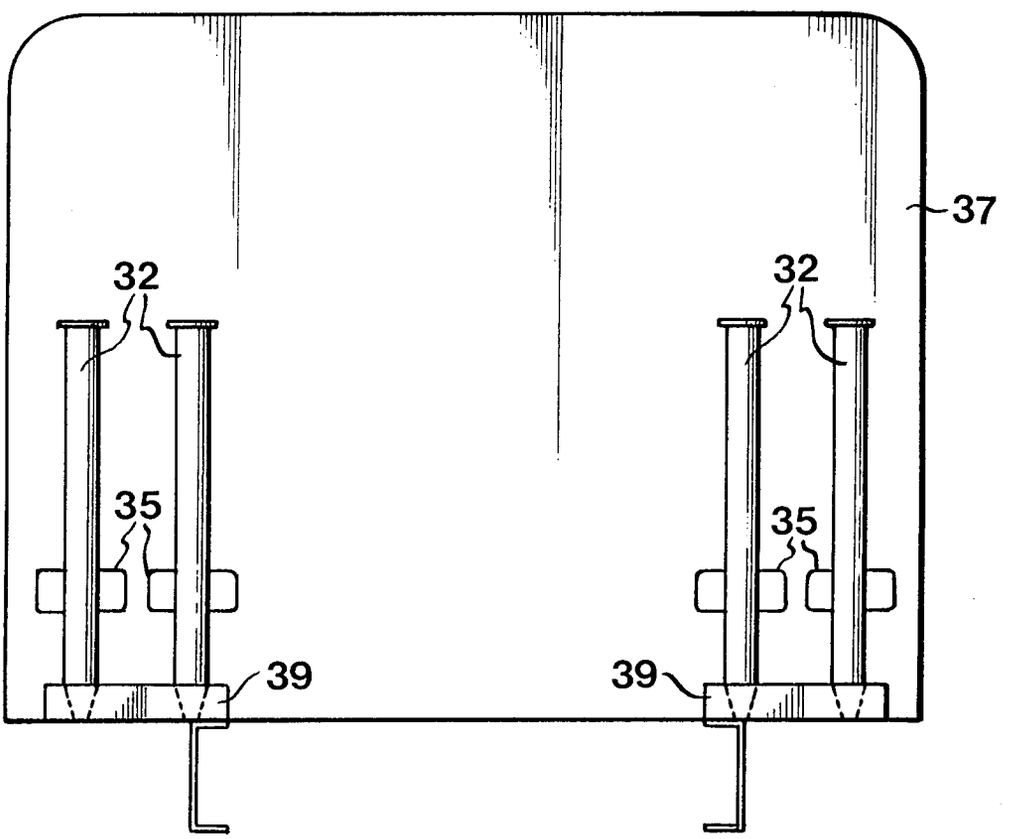


FIG.9

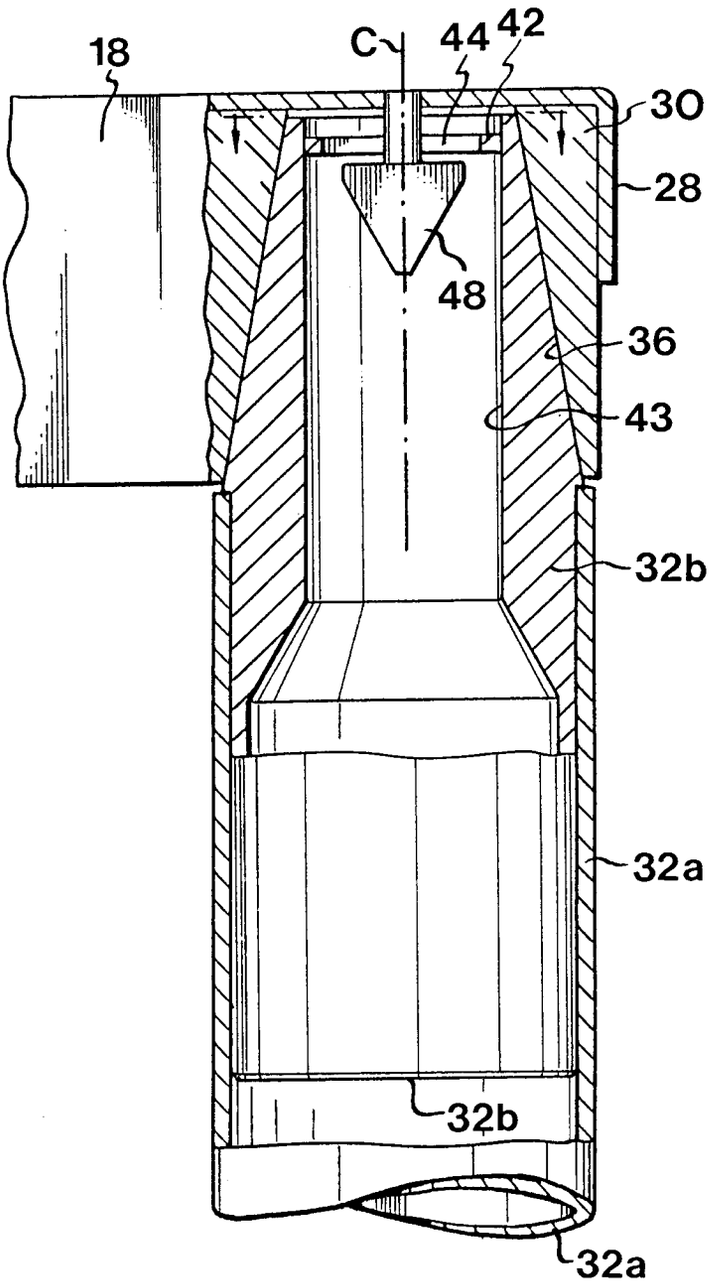
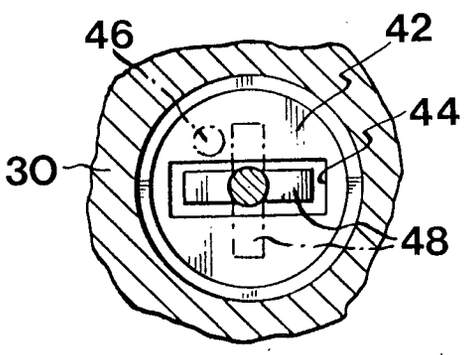


FIG.10



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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 0379

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y A	DE-C-840 527 (EMIL OTTO) * the whole document * ---	1 9,10	B65D90/00 B65D90/14
Y A	FR-A-2 071 371 (MEILLEURAT HENRI) * page 2, line 1 - line 30; claims; figures * ---	1 2-4	
A	FR-A-2 497 182 (MARQUET) * claims; figures * ---	7,8	
A	US-A-3 173 562 (W.D. STEADMAN) * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D
B60P
B65G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 June 1994	Van Rolleghem, F

CATEGORY OF CITED DOCUMENTS

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