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(54) Load-carrying apparatus.

(57) A flat comprising a load-carrying platform of generally rectangular configuration and having stacking members which are releasably engaged with the platform and which, when engaged with the platform, are pivotably mounted on the platform for movement between an inoperative position in which the members are collapsed and an operative position in which the members are upstanding and are adapted at their upper ends to engage and support a similar flat.

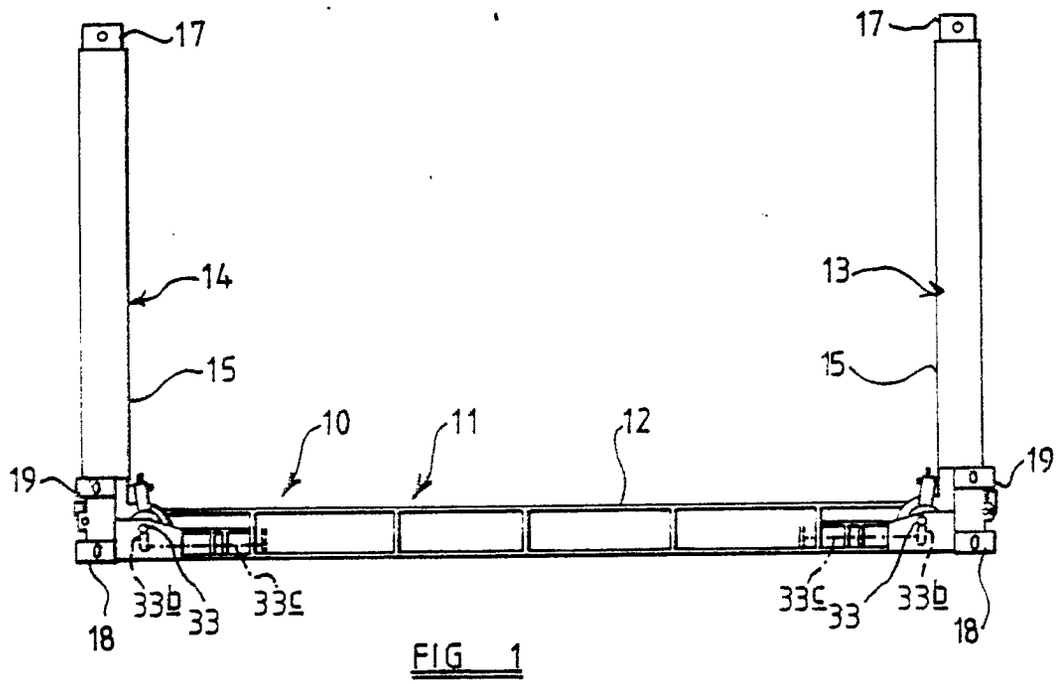

FIG 1

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LOAD-CARRYING APPARATUS

This invention relates to a load-carrying apparatus and in particular that commonly referred to as a "flat" having a load supporting platform and stacking members which, in use, extend upwardly to facilitate stacking.

An object of the invention is to provide a new and improved flat.

According to the invention we provide a flat comprising a load-carrying platform of generally rectangular configuration and having stacking members which are releasably engaged with the platform and which, when engaged with the platform, are pivotably mounted on the platform for movement between an inoperative position in which the members are collapsed and an operative position in which the members are upstanding and are adapted at their upper ends to engage and support a similar flat.

The stacking members may have, at their upper ends, a first connecting means adapted to engage

a) with a lifting means whereby the flat can be lifted, e.g. by a crane, with the stacking members in said operative position or

b) with co-operating connecting means of another flat whereby a plurality of flats stacked one upon another with the stacking members in said operative position can be inter-connected.

The platform may have a second connecting means adapted to engage with

a) a lifting means, whereby the flat can be lifted, e.g. by a crane, with the stacking members in said inoperative position or, with the stacking members disengaged from the platform, or

b) co-operating connecting means of another flat whereby a plurality of flats stacked one upon another with the stacking members in said inoperative position or with the stacking members disengaged from the platform, can be inter-connected.

The first connecting means carried by the stacking members may be provided at the upper end of each stacking member and the second connecting means may be carried by the platform at corresponding positions which are disposed beneath the connecting means of an associated stacking member when the stacking member is in an upright position.

The platform may be provided with a third connecting means disposed on the platform above the second connecting means and adapted to be connected to the second connecting means of a similar platform when a plurality of similar platforms are stacked one above another with the stacking members in a collapsed position or with the stacking members disengaged from the platforms.

The first and/or second and/or third connecting means may comprise "ISO" sockets or boxes.

The platform may have a first engagement means and each stacking member may have a second engagement means, the first and second engagement means being releasably engageable with each other as the or each stacking member and platform are moved relatively towards each other.

The engagement means may comprise bearing means to permit of said pivotal movement of the stacking member.

The first engagement means may comprise a first engagement member mounted on the platform by bearing means for pivotal movement relative to the platform, the second engagement means comprising a second engagement member, fixed relative to the stacking member and releasably engageable with the first member.

The first member may be a male member and the second member a female member.

Securing means may be provided to secure the first and second engagement means in inter-engagement whilst permitting pivotal movement of the stacking members between said operative and inoperative positions.

The securing means may comprise an abutment member engageable with a part of the second engagement means to prevent movement of the second engagement means transversely away from the axis of pivot of the stacking member and mounted for pivotal movement about said axis of pivot for pivotal movement with the stacking member.

Fastener means may be provided between the abutment member and the stacking member to retain the abutment member in said operative position.

The abutment member may be pivotable about said axis independently of pivotal movement of the stacking member for movement into and out of abutting engagement with the stacking member.

The first engagement member may be of non-circular cross-section and mounted for pivotal movement on said bearing means, which extends between a pair of spaced parallel wall of an open-topped socket provided on the platform.

The second engagement member may comprise a generally transversely extending arm provided at or adjacent the lower end of the stacking member and having a downwardly open recess therein in which the first engagement member is received with at least part of the arm being disposed between the walls of the socket.

The arm may have a peripheral surface which partly encompasses the recess and which is generally circular having a centre of curvature which, when the first and second engagement members are inter-engaged, is coincident with the axis of pivot of the first engagement member and said abutment member being movable from an inoperative position in which it is disposed at a level below said peripheral surface to permit engagement and disengagement of the first and second engagement members, to an operative position in which it is disposed above said surface and substantially opposite the open mouth of the recess so that the abutment member engages said peripheral surface to prevent movement of the second engagement member to disengage the first engagement member from said recess.

Locking means may be provided to lock the stacking member in said operative position.

The locking means may comprise an abutment adjacent the lower end of the stacking member and a latch member mounted on the platform for movement into and out of abutting relationship with the abutment.

The latch member may be mounted for pivotal movement into and out of said abutting relationship about an axis parallel to the axis of pivot of the stacking member.

A bolt may be provided to maintain the latch member in said abutting relationship.

The bolt may be slidable into its operative position in a direction parallel to the axis of pivot of the associated stacking member.

The platform may have two pairs of stacking members, one pair disposed at one end of the platform and the other pair disposed at the other end of the platform, each at or adjacent a corner of the platform.

The stacking members of each pair may comprise corner posts inter-connected by transversely extending members and each corner post having a second engagement means to engage with a respective first engagement means provided on the platform.

The or each stacking member may be engageable with the platform by undergoing a movement relative to the platform in a direction generally perpendicular to the platform, i.e. generally vertically.

An embodiment of the invention will now be described with reference to the accompanying drawing in which:-

FIGURE 1 is a side view of a flat in accordance with the invention;

FIGURE 2 is an enlarged fragmentary perspective view of part of the flat of Figure 1:

FIGURE 3 is an enlarged fragmentary perspective view similar to that of Figure 2 but showing a stage during engagement of a stacking member with the platform; and

FIGURE 4 is another enlarged fragmentary perspective view, taken from a different viewpoint, showing a later stage in said inter-engagement.

Referring to the drawings, a flat 10 comprises a generally rectangular platform 11 which, in use, supports a load above upper decking 12 thereof. The flat preferably comprises a coil carrier and in this case the decking 12 comprises three transversely adjoining zones, the two outer zones being conventionally covered with suitably planar or substantially planar decking, whilst the central zone comprises a trough having inclined side walls and which can be closed by closure members which are pivotably connected to the platform at the side edges of the trough and have a dividing line centrally of the trough. The closure members can be moved between a closure position in which they overlie the trough section to form a surface continuous with the outer zone or can be positioned in an inverted position in which they rest on the surface of the outer zone of the platform so that they are the then uppermost surfaces which are inclined to form continuations of the inclined surfaces of the trough section and thus, in combination with the trough section, provides supports for coils of wire, sheet or the like which can be carried on end within the trough section. When it is not desired to transport coils the closure members can be pivoted so that their inclined surfaces lie within the trough and their then uppermost surfaces provide a planar or substantially planar decking with the outer zones.

The platform 11 may be loaded onto the bed of a lorry or trailer and transported on the roads or may be loaded onto a ship or other mode of transport.

Particularly when a platform is carried on a ship, it is desirable to be able to stack the platform with a plurality of similar platforms and accordingly at each of the two opposite, shorter, sides of the platform 11 an upstanding frame member 13, 14 is provided. Each frame member comprises a pair of upstanding stacking members 15 inter-connected by transversely extending members 16.

The stacking members 13, 14 carry at their upper ends first connecting means 17 which in the present example comprise ISO boxes which are adapted to engage with corresponding connecting means of a flat stacked above as hereinafter to be described.

The platform 11 has second connecting means 18 also in the form of ISO boxes disposed so as to be directly below the position occupied by the first connecting means 17 when the stacking members 13, 14 are in an upright position which is shown in Figure 1.

The platform 11 is also provided with a third connecting means 19 at each corner disposed directly above the second connecting means 18 and again essentially in the form of an ISO box but modified, as best shown in Figure 3, by virtue of the uppermost opening 20 being in the form of an open-ended slot to receive an extension part 21 at the end of an associated stacking member 15.

The extension part 21 has a generally transversely extending arm 22 formed integrally therewith which has a downwardly opening slot or recess 23 therein. The recess 23 has an inner part 24 of rectangular configuration and an outer part 25 of tapered configuration.

Adjacent each corner the platform 11 is provided with a socket 30 comprising a pair of spaced parallel limbs 31 between which a first engagement member 32 is mounted for pivotal movement. The member 32 comprises a square cross-sectional part of a pivot pin 33 which is journalled in suitable bearing means 33 a provided as desired. The pivot pin 33 has a radial arm 33 b fixed thereto which is attached to one end of a coil tension spring 33 c or other resilient biasing means, which is also engageable with the platform and serves to bias the pin 33 in a direction to aid movement of the stacking members 13, 14 from a lowered position to an upright position.

The first engagement member 32 is dimensioned so as to inter-engage in the inner part 24 of the recess 23. The member 32 is disposed between a pair of circular disc-shaped guide members 34 which are pivotally mounted on the pivot pin 33 and which bear against the opposed side surfaces 35 of the arm 22.

The first engagement member 32, discs 34 and plate 31 together provide a first engagement means provided on the platform whilst the recess 23 provides a second engagement member and together with the arm 22 provides a second engagement means which can be resiliently inter-engaged with the first engagement means by lowering the stacking member 15 in a generally vertically downward direction towards the platform 11.

The first and second engagement means are disposed laterally outwardly of the underside of the stacking member 15.

Projecting radially from each guide disc 34 is a lever 35 and the levers 35 are inter-connected adjacent their free end by an abutment member 36. An apertured lug 37 is mounted on the abutment member 36 to receive a toggle fastener 38 when the levers 35 and abutment member 36, which together comprise a securing means, have been pivoted from the inoperative position shown in Figures 3 and 4 to the operative position shown in Figures 1 and 2.

To permit of such pivotal movement from the position shown in Figure 4 to the position shown in Figures 1 and 2 the arm 22 has a peripheral surface 39 which partially encompasses the recess 23 and in the present example is part circumferential having a radius which, when the first and second engagement members are engaged as shown in Figures 1 and 2, is centred on the axis of the pivot pin 33.

The extension part 21 has a nose part 40 which extends generally radially away from the axis of the pin 33 when the first and second engagement members are engaged and extends through an opening 42 provided between plates 43 extending between the second and third connecting means 18, 19.

A locking means comprising a latch member 45 is pivotably mounted on extensions 44 by means of a pivot pin 46 received in apertures 46 a 46 b in the extensions 44. The pivot pin 46 is slidable from the operative position shown in the drawings to an inoperative position in which it is withdrawn from the aperture 46 a and the locking member 45 but is retained in the aperture 46 b and a stirrup 46 c thereby permitting removal of the latch member 45 if desired. The pivot pin 46 has a lug 46 d which engages a pin 46 e projecting from the platform 11 and having a toggle fastener at the end thereof to retain the lug 46 d on the pin 46 e when the pin is in its operative position.

The latch member 45 can therefore be pivoted between an inoperative position, shown in Figure 3 to an operative position, shown in Figure 2, in which it overlies abutment surface 47 of the nose 40 to prevent movement of the stacking member 15 from its upright to its collapsed position.

The latch member 45 is retained in its operative position by means of a sliding bolt 50 mounted in the lug 51 and urged by a coil compression spring 52, which acts against one lug 51 and a transverse pin 53 through the bolt 50 so that a nose part 54 of the pin is normally biased into position to engage an aperture 55 provided in the latch member 45 to retain the latch member 45 in its operative position.

When it is desired to mount a stacking member on the platform 11, the stacking member or, in the present example the inter-connected pair of stacking members, are lowered generally vertically downwardly towards the platform 11, Figure 3 illustrating a stage towards the end of this operation. The securing means 34, 35, 36 are moved to their inoperative positions shown in Figure 4 at this stage. On continued downward movement the first engagement member 32 is caused to enter the second engagement member as illustrated in Figure 4 and the inclination of the side walls of the innermost parts of the recess 23 is such that the

final stage of movement causes downward and inward movement so as to pass the nose 40 beneath the end wall 47 of the ISO box constituting the third connecting means 19 and into position beneath the extensions 44. Levers 35 are then pivoted about the axis of the pin 33 from the position shown in Figure 4 to the position shown in Figures 1 and 2 and the toggle 38 engaged with the apertured lug 37 to retain the securing means in its operative position where it abuts the surface 39 to prevent movement of the mount 22 transversely away from the first engagement member 22.

If it is desired to maintain the stacking member 15 in the upright position shown in Figures 1 and 2, the latch member 45 is pivoted from its inoperative position shown in Figure 3 to the operative position shown in Figure 2 so as to abut the surface 47 and prevent pivotal movement of the stacking member 15 from the upright position. Since the locking means comprising the nose 40 and latch member 45 are disposed laterally outwardly of the stacking member 15 on the opposite side thereof to the first and second engagement menas a relatively long moment arm to prevent said pivotal movement from the upright position is provided.

When it is desired to move the stacking member 15 from the upright position shown in Figure 1 to a collapsed position in which it lies parallel to the platform 11, the bolt 50 is withdrawn from the latch member 45 and the latch member 45 is pivoted to its inoperative position shown in Figure 3 and the stacking member 15 is then pivoted through 90 until it lies parallel to the platform 11, such pivotal movement being permitted by virtue of the hereinbefore described bearing means provided between the first attachment member 22 and the platform 11.

Of course, the stacking member 15 may be returned to an upright position by reversing the above sequence of operation and the stacking member 15 can be disengaged from the platform 11 by reversing the above described sequence of events relating to engagement of the stacking member 15 with the platform 11.

When the stacking members 15 are engaged with the platform 11 and are locked in an upright position the platform may be lifted by engaging a lifting means, for example the lifting hooks of the crane sling for the twist locks of a lifting frame if appropriate ones of the openings of the ISO boxes which constitute the first connecting means 17.

In addition, the first connecting means 17 of a flat may be connected with the second connecting means of another flat stacked on top of the stacking members of a flat therebeneath. The connection may be effected by any suitable means or generally effected by twist locks in conventional manner.

When the stacking members 15 are in their collapsed position, or when the stacking members are disengaged from the platform '2, one platform may be stacked on another platform by resting the second connecting means 18 of an uppermost platform on the third connecting means 19 on a platform therebeneath and again suitable connecting means such as twist locks may be provided to inter-connect the platform. The twist locks 60 may be carried on a plate 61 pivotally mounted on the ISO box 19 for movement between operative and inoperative positions. In the operative position the twist lock is pivoted for engagement with the uppermost aperture in the ISO box 19 and the lowermost aperture in the ISO box 18 of an other flat stacked on top of the flat 10. In the inoperative position the twist lock lies in a recess 62. If desired, suitable lifting means similar to those described in connection with the first connecting means 17 may be engaged with the appropriate apertures of the ISO box of the third connecting means 19 to enable an individual platform or a stack of inter-connected platforms to be lifted.

Providing first, second and third connecting means are at positions which are directly beneath one another in their operative positions, then the above described stacking of flats with stacking members in their upright position or with stacking members in their collapsed position or with stacking members removed can be achieved, as can the lifting in any of the above described situations utilising for example the same lifting frame since all the said connecting means are correctly aligned.

Typically the flat may have a length lying in the range 6 metres to 13.5 metres, a width lying in the range 2.4 metres to 2.6 metres, and height lying in the range 2.6 metres to 2.9 metres.

It will be appreciated that substantially the whole of the load imposed by the platform on the stacking members when the flat is lifted using the first connecting means 17 is transmitted between the platform and the stacking member by the securing means and hence the securing means is made adequately strong to fulfil this function with an adequate safety margin.

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 flat comprising a load-carrying platform of generally rectangular configuration and having stacking members which are releasably engaged with the platform and which, when engaged with the platform, are pivotably mounted on the platform for movement between an inoperative position in which the members are collapsed and an operative position in which the members are upstanding and are adapted at their upper ends to engage and support a similar flat.

2. A flat according to Claim 1 wherein

i) the stacking members have, at their upper ends, a first connecting means adapted to engage

a) with a lifting means whereby the flat can be lifted with the stacking members in said operative position or

b) with co-operating connecting means of another flat whereby a plurality of flats stacked one upon another with the stacking members in said operative position can be inter-connected, and/or

ii) the platform has a second connecting means adapted to engage

a) a lifting means, whereby the flat can be lifted with the stacking members in said inoperative position or, with the stacking members disengaged from the platform, or

b) co-operating connecting means of another flat whereby a plurality of flats stacked one upon another with the stacking members in said inoperative position or with the stacking members disengaged from the platform, can be inter-connected.

3. A flat according to Claim 1 or Claim 2 wherein the platform has a first engagement means and each stacking member has a second engagement means, the first and second engagement means being releasably engageable with each other as the or each stacking member and platform are moved relatively towards each other.

4. A flat according to Claim 3 wherein the first engagement means comprises a first engagement member mounted on the platform by bearing means for pivotal movement relative to the platform, the second engagement means comprising a second engagement member, fixed relative to the stacking member and releasably engageable with the first member.

5. A flat according to Claim 3 or Claim 4 wherein securing means are provided to secure the first and second engagement means in inter-engagement whilst permitting pivotal movement of the stacking members between said operative and inoperative positions.

6. A flat according to Claim 5 wherein the securing means comprise an abutment member engageable with a part of the second engagement means to prevent movement of the second engagement means transversely away from the axis of pivot of the stacking member and mounted for pivotal movement about said axis of pivot for pivotal movement with the stacking member.

7. A flat according to Claim 6 wherein fastener means are provided between the abutment member and the stacking member to retain the abutment member in said operative position.

8. A flat according to any one of Claims 5 to 7 wherein the abutment member is pivotable about said axis independently of pivotal movement of the stacking member for movement into and out of abutting engagement with the stacking member.

9. A flat according to any one of Claims 4 to. 8 wherein the first engagement member is of non-circular cross-section and is mounted for pivotal movement on said bearing means which extends between a pair of spaced parallel wall of an open-topped socket provided on the platform.

10. A flat according to Claim 9 wherein the second engagement member comprises a generally transversely extending arm provided at or adjacent the lower end of the stacking member and having a downwardly open recess therein in which the first engagement member is received with at least part of the arm being disposed between the walls of the socket.

11. A flat according to Claim 10 wherein the arm has a peripheral surface which partly encompasses the recess and which is generally circular having a centre of curvature which, when the first and second engagement members are inter-engaged, is coincident with the axis of pivot of the first engagement member and said abutment member being movable from an inoperative position in which it is disposed at a level below said peripheral surface to permit engagement and disengagement of the first and second engagement members, to an operative position in which it is disposed above said surface and substantially opposite the open mouth of the recess so that the abutment member engages said peripheral surface to prevent movement of the second engagement member to disengage the first engagement member from said recess.

12. A flat according to any one of the preceding claims wherein locking means are provided to lock the stacking member in said operative position.

13. A flat according to Claim 12 wherein the locking means comprises an abutment adjacent the lower end of the stacking member and a latch member mounted on the platform for movement into and out of abutting relationship with the abutment.

14. A flat according to Claim 13 wherein the latch member is mounted for pivotal movement into and out of said abutting relationship about an axis par-

allel to the axis of pivot of the stacking member.

15. A flat according to Claim 13 or Claim 14 wherein a bolt is provided to maintain the latch member in said abutting relationship.

16. A flat according to any one of the preceding claims wherein the or each stacking member is engageable with the platform by undergoing a movement relative to the platform in a direction generally perpendicular to the platform, i.e. generally vertically.

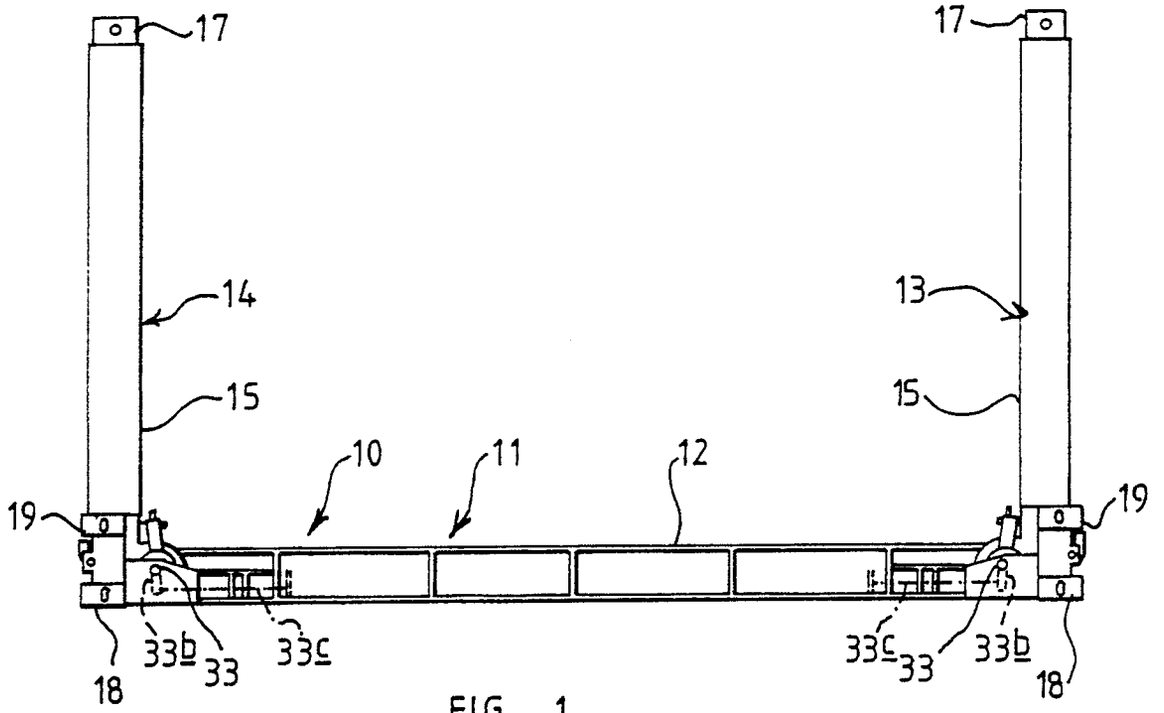
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FIG 1

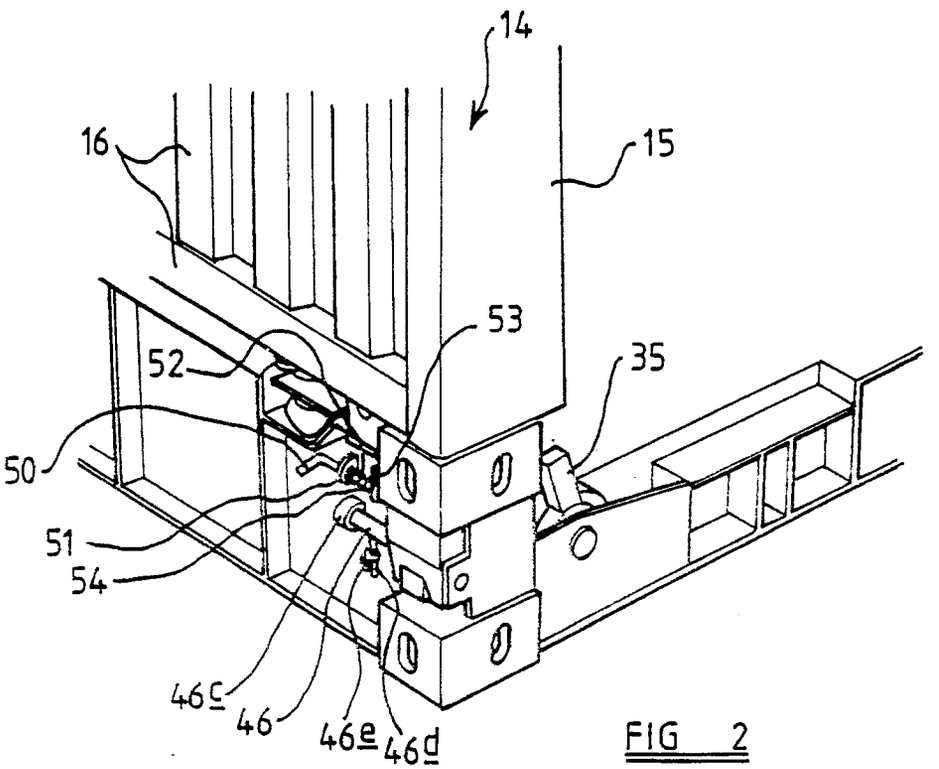
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FIG 2

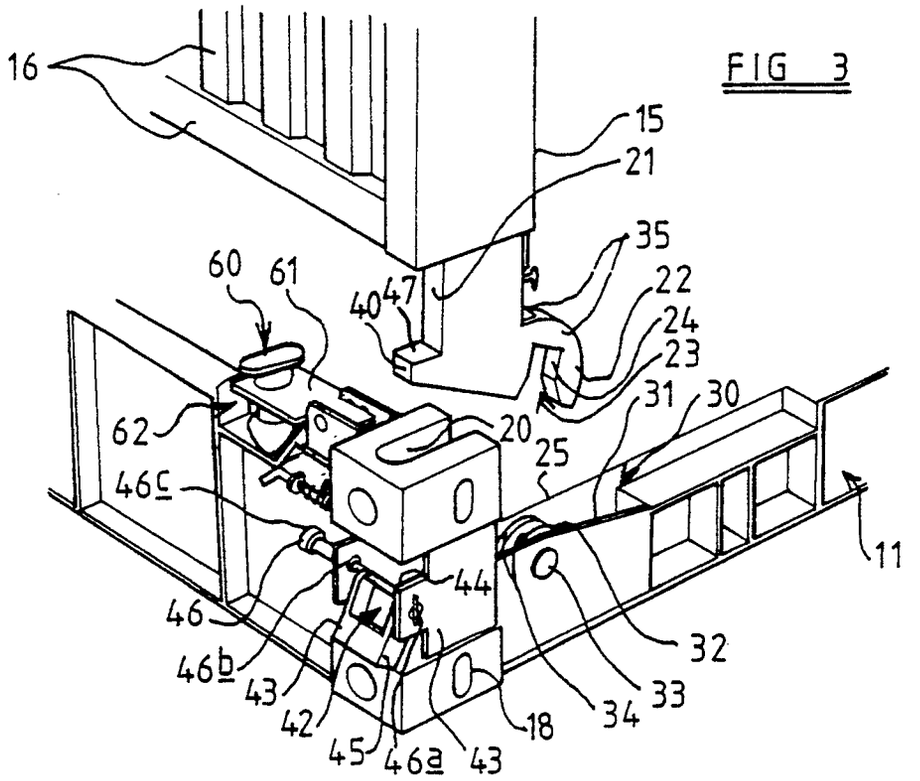
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FIG 3

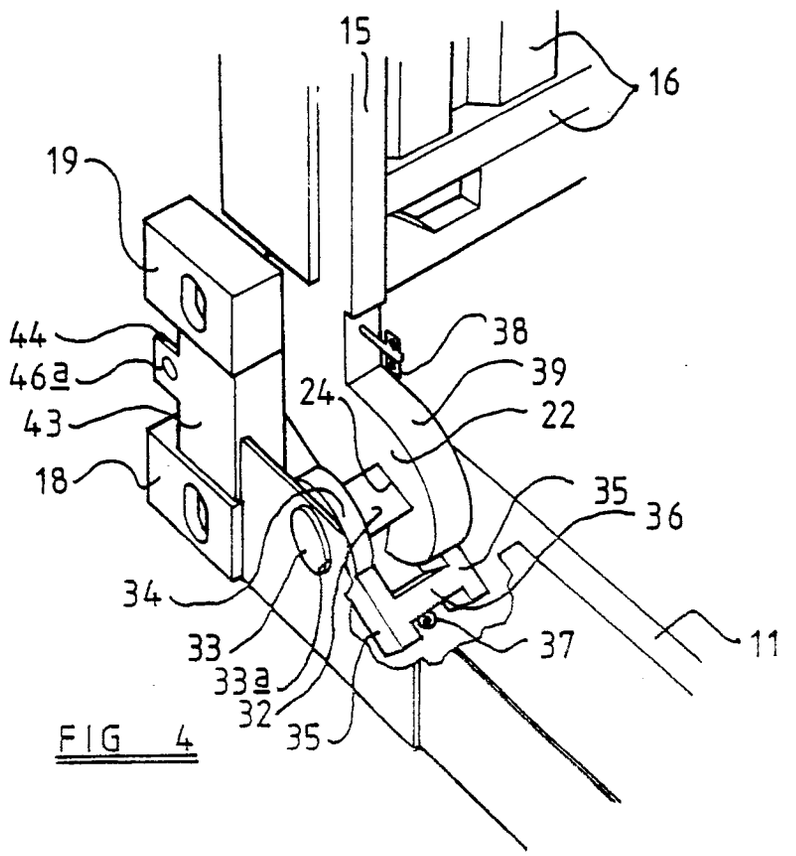
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FIG 4