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(54) **TRANSPORT PROTECTION DEVICE**

TRANSPORTSCHUTZVORRICHTUNG

DISPOSITIF DE PROTECTION POUR LE TRANSPORT

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Description

[0001] This invention concerns a transport protection device according to the preamble of claim 1.

[0002] Such a device is previously known from US-A-4 771 293. Hereby a satellite communication assembly comprises a box having a base surface which forms the support structure for the active antenna. Means are arranged for providing adjustment of the antenna and the reflector with respect to the body portion. By folding the antenna with the reflector downwards against the body portion, the system may be stored adjacent to the body portion and lids belonging to the box are brought to enclose the system during transport.

[0003] Mobile satellite communication systems should meet demands of being transportable and easily erected. Further they must provide very good direction stability for the antenna lobe in an active position. The directional stability demand is nowadays very strict for equipment belonging to the area of the invention, and at present, when effected by wind at a wind force of 15 m/s, the antenna lobe is allowed to deviate maximally 0.4°. This makes it clear that the support needed for a satellite communication system of this kind necessarily has to provide considerable stability.

[0004] In order for the device according to said US patent to adequately fulfil its task, the body portion and thereby the storage box as a whole needs to have considerable dimensions. This would, however, bring along drawbacks with respect to handling and transportability of the device.

[0005] It is therefore an aim of this invention to provide a device according to the above wherein said drawbacks are avoided.

[0006] This aim is obtained in the said device through the features of the characterizing portion of claim 1.

[0007] By, thus, the two parts of the support structure in the stand position being fixed along each other or one after the other and, further, a portion of at least the one main portion, and thereby the protective structure itself being outwardly displaceable for forming a support portion, the possibility is ensured to obtain a considerable support surface as well as an easy handled, and easily transportable protective structure. The dimensions of the protective structure as such may be minimized in the transport position for obtaining very good transportability, which in practical use is very important in the open field when accessibility to the most varying environments is necessary and wherein vehicle transport can not always be counted upon. Because of the possibility of designing the container slim, such that it is optimized for its containing function in the transport position, its weight may also be held low.

[0008] The feature of claim 2 ensures possibility of fast and convenient transfer to the stand position. The feature in claim 3 is preferred, since it brings about symmetrical stable support of the structure at the same time as a preferred double use of the parts included is obtained, which is accentuated through the feature of claim 4, wherein further support action from the free ends of the support portions is made possible with great reliability and in an easy manner.

[0009] The feature of claim 5 ensures possibility of tree-point support, which enhances stability also when erected on an uneven surface.

[0010] It is preferred that the support structure is manufactured as a cage construction and in particularly that the cage construction is comprised of a body of pipes. This accentuates the advantages of low weight and makes it possibility to make a strong structure. Besides, it gives the possibility of achieving simple fixing between the main portions also in case the parts have been subjected to a certain deformation, since with this construction fastenings are easily made on meeting pipe elements. Such a fixation is functioning also if there has been a certain displacement between the pipe elements. Fixing may be made with fastening elements of a per see known kind acting on the pipe elements.

[0011] The cage construction thus gives possibility of stability and rigidity in the transport position as well as in the stand position, but it is not excluded that the structure is built as a panel construction, for example of pressed sheet metal details, for example comprising stiffening ridges in different directions. Also such a construction may be made sufficiently rigid for most applications of the invention.

[0012] The feature of claim 13 result on the one hand in accentuated easily handling of the system, on the other hand of increased stability of the structure in the stand position. The feature of claim 14 results in that the structure may be transported as an ordinary hand trolley of a sack trolley type on the two wheels, whereby handles for the operator are arranged at that end of the structure being opposite to the wheels.

[0013] Further advantages are obtained through the further features and are explained in the following detailed description of a preferred embodiment and with reference to the annexed drawings, wherein,

Fig. 1 shows, in a perspective view, a device for transport protection according to the invention with the protective structure in a transport position,

Fig. 2 shows, in a perspective view, the structure in a stand position with a satellite communication unit in an active position,

Figs. 3a, b, c and d show diagrammatically the procedure of manual transport and erection of the structure into the stand position in a diagrammatic sequence,

Fig. 4 shows the device of Fig. 1 without contents,

Fig. 5 shows a preferred construction of the means for fixing the folded-out main portions, and

Fig. 6 shows a preferred construction of the means for fixing the support portions.

[0014] In Fig. 1 reference 1 concerns a device for transport protection including a cage-shaped pipe construction 2, which comprises a first main portion 3, which is pivotally attached to a second main portion 4 at L. The pivot joint L may be arranged differently, but is for example arranged as a piano hinge. 5' indicates a first support portion (a second support portion is indicated at 5"). The support portion 5' is connected to the remaining part of the second main portion 4 over a pivot shaft 6, being arranged at an angle, and is thus outwardly pivotable essentially in the direction of the arrow P_1. A wheel 7 of one pair is shown on the Figure (the other one is covered), with the aid of which the device with its contents may be drawn mainly as a sack trolley, whereby the operator grips the handle portion 9 (see also Fig. 3a). There is also a second pair of wheels, whereby 8 indicates one of two wheels, being foldable downwards, with the aid of which the whole arrangement may be rolled on a (an even) surface with the aid of all wheels 8 and 7, for example by a pulling line 20, which is attached to the cage construction.

[0015] Essentially inside the cover of the first main portion 3, which, as is shown in the Figure, comprises essentially a basket shape, there is a container 10, which in this case is produced from a rigid textile material, and which is arranged to store for transport purposes in a buffering manner i.a. antenna reflector segments. Preferably the container 10 is constructed as a rigid, relatively form-stable sack, which may be opened with a zipper, when the first main portion 3 has been folded upwards with respect to the second main portion 4. A support panel is indicated with 32. 11 indicates storage boxes for various accessories of the communication unit. At the outermost central part of the first main portion 3 opposite to the pivot joint L, the cage is constructed with a centrally protruding portion 12, which in the stand position, which will be shown in more detail below, will comprise one of three support points for the structure.

[0016] A device according to the invention with the protective structure in the stand position is shown in Fig. 2. Hereby the main portions 3 and 4 are fixed rigidly attached to each other through on the one hand the crossing elongated pivot joint L and on the other hand means at 16 for fixing meetings stays on the respective main portion to each other (will be described below). Further, the support portion 5' and 5" are folded outwards over their respective pivot joints 6 and are fixed for obtaining two widely separated support points in the respective lower outer free end of the support portions 5', 5". The means for fixing the support portions are also described below. At the opposite end of the structure, the central protruding portion 12 comprises the third support point of the device. Through its construction, in the shown position the main portions are essentially open upwards and in case of the main portion 3 being like a basket, wherein is inserted as ballast a container 14 containing electronic equipment such as antenna power supply. This container 14 will thereby comprise very effective ballast with typically a weight of up to 40 kilograms, ensuring stability for the device. 17 concerns a support panel included in the second main portion, which panel in the stand position being pivotable at L_2 so that its free end rests against the ground. The support panel 17 carries storage boxes 11 for accessories of the satellite communication system, resulting in further ballast. 13 indicates a paraboloid, which comprises a reflector for the satellite antenna said paraboloid in a per see known manner being fastened while allowing adjustment along different pivoting shafts over different stays, one of which being shown at 15.

[0017] Fig. 3a shows diagrammatically the position of a device according to the invention when using the wheels (7 in Fig. 1) in order to transport it essentially as a sack trolley. In Fig. 3b, the device is shown lying on the ground, wherein in this position the main portions 3, 4 are unlocked with respect to each other at 21 so that an upwards pivoting movement of the main portion 3 in the direction of arrow P_2 may be carried out. Thereafter the device is in the position shown in Fig. 3c, whereby the main portions 3 and 4 are locked at 22 for fastening to each other. Thereafter the device is lifted at the right part, as seen on the Figure, so that the support portions 5', 5" may be pivoted outwardly, in the Figure 3d, 5' in the direction upwardly from the paper, around the pivot shaft 6 and be fixed, whereby a downward displacement is obtained of the free end of the said support portion 5', which ensures safe support abutment of the free end portion of the support portion 5'. Three-point support is ensured through the support portions 5', 5" (not shown here) and portion 12. Locking of the support portion in the transport position is ensured with the aid of suitable not shown means. In the position in Fig. 3e, the wheel 8 is moved downwards, which results in that the device may roll on a relatively even surface on the wheels 7 and 8, where preferably the wheels 8 are swivelling. The holder for the wheels 8 is preferably constructed to also lock the support panel 17 in the transport position.

[0018] Through the invention, there is provided a device for transport protection having very good transportability at the same time as stability and rigidity is achieved in the transport position, through the great support area with three points, also with possibility of resisting hard winds with minimal effect on the antenna. The device may, however, be modified within the scope of the following claims. The main portions may also be made as closed panel structures of materials such as pressed metal sheet material. In order to ensure further enhanced stability of the device further ballast may easily be put in the main portions, which are formed as boxes or baskets, and through the described construction, ground anchors, which are driven into the ground, may easily be connected to the structure in different positions.

[0019] From Fig. 4 the cage construction is seen clearer since in this case it lacks contents. Here the antenna support is shown at 23. Further, the extension is shown of the support panel 17, which also may comprise a sliding surface in case the device is transported drawn as a wide ski over snow covered surfaces. In the front portion (at the right in the Figure) the panel is provided with an upward bend, as a ski, in order to enhance movability.

[0020] Fig. 5 shows means for fixing the main portions, in particular the stays S1, S2 (see Fig. 4), which belong to a respective one of the main portions 3 and 4, whereby one means is indicated at position 16 in Fig. 2. With respect to these stays S1, S2, the fastening elements are arranged such that when they meet, at folding out to the position in Fig. 3c, the screw in the element 25 may be brought to co-operate with the screw hole 27' in the element 26. Tightening is achieved with the aid of the knob 24. In the resting position, the screw is spring biased in the direction to the right in the Figure into protective position inside the element 25. For allowing the screw 27 to easily find the hole 27', it is received with very great play in the hole in the element 25.

[0021] Fig. 6 shows a means for fixing the support portions, wherein the element 25 may be constructed according to the above. On the support portion 5', in region of the pivot shaft 6, there is attached a fixing plate 29, which in the transport position is positioned according to the full lines in Fig. 6, and which in the stand position is positioned according to the interrupted lines in Fig. 6. In the latter position, the screw may be drawn into a hole (indicated with 30) in the plate 29. In order to avoid squeeze injuries, a cover 31 is arranged surrounding the movement path of the plate 29.

Claims

1. Device for transport protection (1) of a unit for satellite communication, including a protective structure (2), which in a transport position is arranged to contain the communication unit and which in a stand position, in an active position of the communication unit, is arranged to comprise a stand therefor, **characterized in that** the protective structure (2) comprises two main portions (3,4), which each comprises an inside and an outside, and which in the transport position are assembled with the insides against each other to form essentially a box shape, and which in the stand position are connected fixed along each other for forming an enlarged support region, whereby at least one portion (5',5") of at least the one main portion (4) is outwardly displaceable sideways so as to form a stabilising support portion for acting on a support surface.

2. Device according to claim 1, **characterized in that** the two main portions (3,4) are pivoted (at L) with respect to each other.

3. Device according to claim 1 or 2, **characterized in that** one of the main portions (4) comprises two outwardly pivotable portions (5',5"), which in the transport position forms two opposite, essentially parallel parts of the support structure.

4. Device according to claim 1, 2 or 3, **characterized in that** each support portion (5',5") is connected to the respective main portion (4) over a pivot joint (6) with inclined pivot shaft with respect to the length direction of the main portion such that the free end of the support portion is given a displacement downwards when pivoting it outwards.

5. Device according to claim 3 or 3 and 4, **characterized in that** in the stand position the support portions (5',5") are at an end of the structure on each side of the corresponding main portion and that the other main portion comprises a centrally protruding portion (12) at the other end of the structure so that a three-point support against an essentially even surface is achieved in use in the stand position.

6. Device according to any of the previous claims, **characterized in that** the protective structure (2) essentially is comprised of a cage construction.

7. Device according to claim 6, **characterized in that** the cage construction is comprised of a body of pipes.

8. Device according to any of the claims 1 - 5, **characterized in that** the protective structure (2) is essentially a panel construction.

9. Device according to claim 8, **characterized in that** panels included in the panel construction are comprised of metal plate(s).

10. Device according to any of the previous claims, **characterized in that** the main portions (3,4) comprise portion (16), which are oriented perpendicular to their length direction, which are arranged to be fixed against each other in the stand position.

11. Device according to any of the previous claims, **characterized in that** the one of the main portions includes a holder means (23) in the active position of the communication unit to adjustably hold an antenna with preferably collapsible reflector (13), which in the transport position is arranged to be surrounded by the structure (2).

12. Device according to claim 11, **characterized in that** there is at least one fastening element for an adjustment stay (15) for the antenna with reflector (13) at

a distance from the holder means (23).

13. Device according to any of the previous claims, **characterized in that** it comprises a closed container (14) intended for electronic equipment, which is intended to comprise ballast together with its contents in the stand position.

14. Device according to any of the previous claims, **characterized in that** the structure comprises wheels (7) allowing it to be rolled manually.

15. Satellite communication equipment, including a device according to any of the claims 1 - 14.

Patentansprüche

1. Transportschutzvorrichtung (1) für eine Satellitenkommunikationseinheit mit einer Schutzstruktur (2), welche in einer Transportstellung zum Aufnehmen der Kommunikationseinheit und in einer Standstellung, einer aktiven Stellung der Kommunikationseinheit, zum Beinhalten eines Sockels hierfür eingerichtet ist, **dadurch gekennzeichnet, dass** die Schutzstruktur (2) zwei Hauptteile (3, 4) umfasst, von denen jedes eine Innenseite und eine Außenseite aufweist, und welche in der Transportstellung zur Bildung einer im wesentlichen boxförmigen Form mit den Innenseiten zueinander zusammengesetzt sind, und welche in der Standstellung zur Bildung eines vergrößerten Stützbereichs der Länge nach miteinander verbunden sind, und welche in der Standstellung fest aneinander, wobei mindestens ein Teil (5', 5") des mindestens einen Hauptteils (4) seitwärts nach auswärts versetzbar ist, um so ein auf eine Stützfläche einwirkendes stabilisierendes Stützteil zu bilden.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die zwei Hauptteile (3, 4) drehbar zueinander (um L) gelagert sind.

3. Vorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** eines der Hauptteile (4) zwei nach auswärts drehbar gelagerte Teile (5', 5") umfasst, welche in der Transportstellung zwei gegenüberliegende, im wesentlichen parallele Teile der Stützstruktur bilden.

4. Vorrichtung nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet, dass** jedes Stützteil (5', 5") mit dem jeweiligen Hauptteil (4) über ein Drehgelenk (6) mit einer bezüglich der Längsrichtung des Hauptteils geneigten Drehwelle verbunden ist, so dass das freie Ende des Stützteils beim auswärts Drehen nach unten versetzt wird.

5. Vorrichtung nach Anspruch 3 oder 3 und 4, **dadurch gekennzeichnet, dass** in der Standstellung die Stützteile (5', 5") sich an einem Ende der Struktur auf der jeweiligen Seite des entsprechenden Hauptteils befinden und dass das andere Hauptteil ein zentral hinausragendes Teil (12) am anderen Ende der Struktur aufweist, so dass eine Dreipunktstütze gegen eine im wesentlichen ebene Oberfläche in der Standstellung erreicht wird.

6. Vorrichtung nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Schutzstruktur (2) im wesentlichen aus einer Käfigkonstruktion besteht.

7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** die Käfigkonstruktion aus einem Körper von Rohren besteht.

8. Vorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Schutzstruktur (2) im wesentlichen eine Plattenkonstruktion ist.

9. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** die in der Plattenkonstruktion enthaltenen Platten aus Metallplatten bestehen.

10. Vorrichtung nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Hauptteile (3, 4) Teile (16) umfassen, welche senkrecht zu deren Längsrichtung orientiert sind und welche zum Aneinanderbefestigen in der Standstellung eingerichtet sind.

11. Vorrichtung nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** eines der Hauptteile ein Haltemittel (23) enthält, um in der aktiven Stellung der Kommunikationseinheit eine Antenne mit vorzugsweise zusammenlegbarem Reflektor (13) einstellbar zu halten, welche angeordnet ist, um in der Transportstellung von der Struktur (2) umgeben zu sein.

12. Vorrichtung nach Anspruch 11, **dadurch gekennzeichnet, dass** es mindestens ein Befestigungselement für eine Einstellstütze (15) der Antenne mit Reflektor (13) im Abstand von den Haltemitteln (23) gibt.

13. Vorrichtung nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** sie einen für elektronische Ausrüstungen vorgesehenen geschlossenen Behälter (14) umfasst, welcher zur Aufnahme von Ballast zusammen mit seinem Inhalt in der Standstellung vorgesehen ist.

14. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die

Struktur Räder (7) umfasst, um jene manuell rollen zu können.

15. Sattelitenkommunikationsausrüstung, die eine Vorrichtung nach einem der Ansprüche 1 bis 14 enthält.

Revendications

1. Dispositif de protection pour le transport (1) d'une unité de télécommunication par satellite, comprenant une structure de protection (2) qui, dans une position de transport, est agencée pour contenir l'unité de télécommunication et qui, dans une position érigée, dans une position active de l'unité de télécommunication, est agencée pour renfermer un support pour l'unité, **caractérisé en ce que** la structure de protection (2) comprend deux parties principales (3, 4) qui comprennent chacune un côté intérieur et un côté extérieur et qui, dans la position de transport, sont assemblées avec l'intérieur de l'une contre l'intérieur de l'autre pour former sensiblement une forme de boîte et qui, dans la position érigée, sont reliées en étant fixées l'une le long de l'autre pour former une région de support agrandie, de telle sorte qu'au moins une partie (5', 5") d'au moins la partie principale (4) est déplaçable latéralement vers l'extérieur afin de former une partie de support stabilisatrice pour agir sur une surface de support.

2. Dispositif selon la revendication 1, **caractérisé en ce que** les deux parties principales (3, 4) pivotent (en L) l'une par rapport à l'autre.

3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** l'une des parties principales (4) comprend deux parties pivotant vers l'extérieur (5', 5") qui, dans la position de transport, forment deux pièces sensiblement parallèles, opposées, de la structure de support.

4. Dispositif selon la revendication 1, 2 ou 3, **caractérisé en ce que** chaque partie de support (5', 5") est reliée à la partie principale respective (4) sur une articulation à pivot (6) à axe de pivot incliné par rapport à la direction longitudinale de la partie principale de telle sorte que l'extrémité libre de la partie de support est déplacée vers le bas lors de son pivotement vers l'extérieur.

5. Dispositif selon la revendication 3, ou 3 et 4, **caractérisé en ce que** dans la position érigée, les parties de support (5', 5") sont situées à une extrémité de la structure sur chaque côté de la partie principale correspondante et **en ce que** l'autre partie principale comprend une partie faisant saillie centralement (12) à l'autre extrémité de la structure de telle sorte qu'un support sur trois points contre une surface sensiblement régulière est réalisé en service dans la position érigée.

6. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la structure de protection (2) est composée principalement d'une construction de type cage.

7. Dispositif selon la revendication 6, **caractérisé en ce que** la construction de type cage est composée d'un corps de tubes.

8. Dispositif selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** là structure de protection (2) est sensiblement une construction à panneaux.

9. Dispositif selon la revendication 8, **caractérisé en ce que** les panneaux inclus dans la construction à panneaux sont composés d'une ou de plusieurs plaques de métal.

10. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les parties principales (3, 4) comprennent des parties (16), qui sont orientées perpendiculairement à leur direction longitudinale, qui sont agencées pour être fixées l'une contre l'autre dans la position érigée.

11. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'une des parties principales comprend un moyen de fixation (23) dans la position active de l'unité de télécommunication pour fixer, avec possibilité de réglage, une antenne avec un réflecteur de préférence démontable (13) qui, dans la position de transport, est agencé de manière à être entouré par la structure (2).

12. Dispositif selon la revendication 11, **caractérisé en ce qu'**il est prévu au moins un élément de fixation pour un étai de réglage (15) pour l'antenne à réflecteur (13) à distance du moyen de fixation (23).

13. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend un réceptacle fermé (14) destiné à du matériel électronique, qui est destiné à former du lest conjointement à son contenu dans la position érigée.

14. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la structure comprend des roues (7) permettant de la faire rouler à la main.

15. Equipement de télécommunication par satellite,

comprenant un dispositif selon l'une quelconque des revendications 1 à 14.

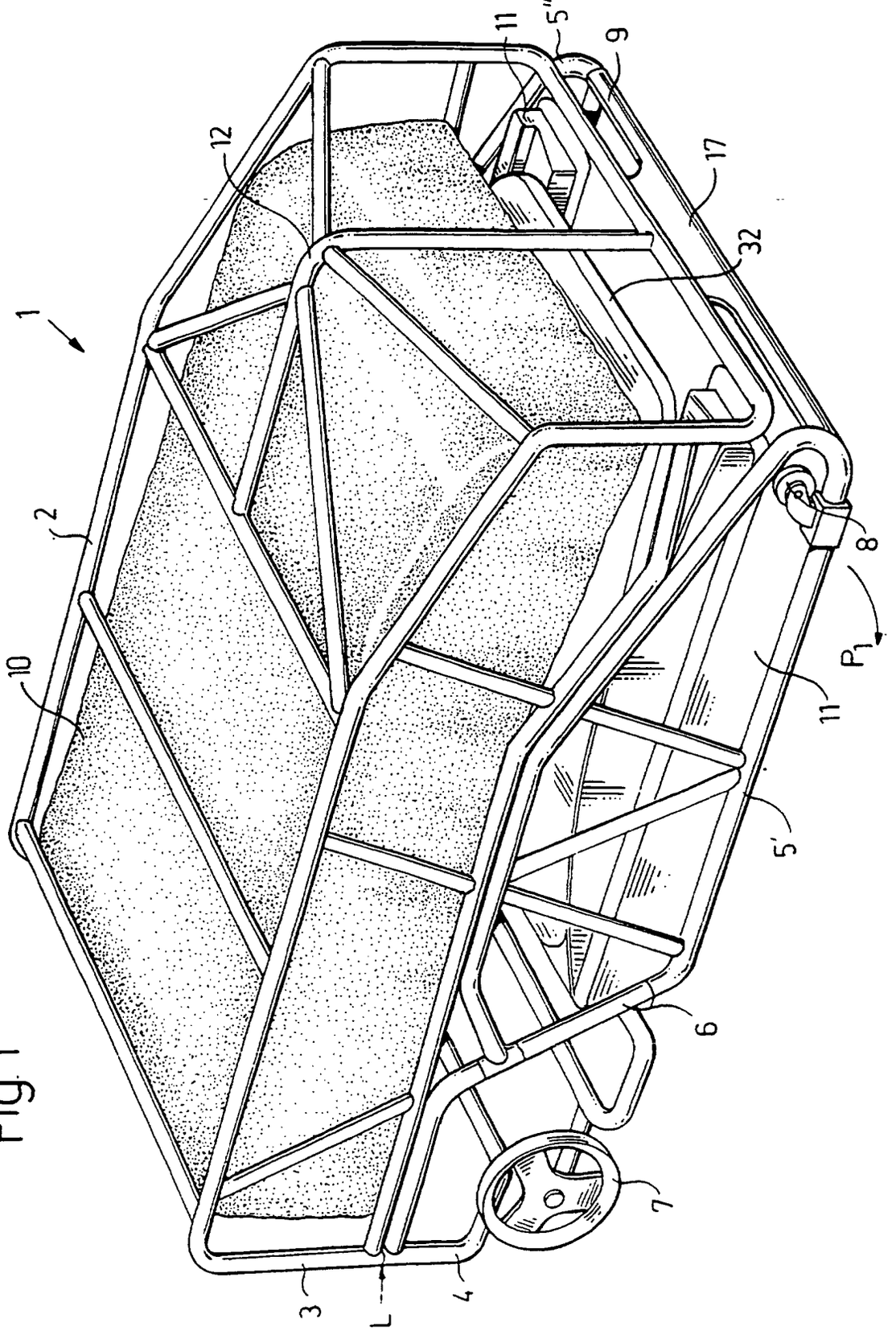

Fig.1

Fig.2

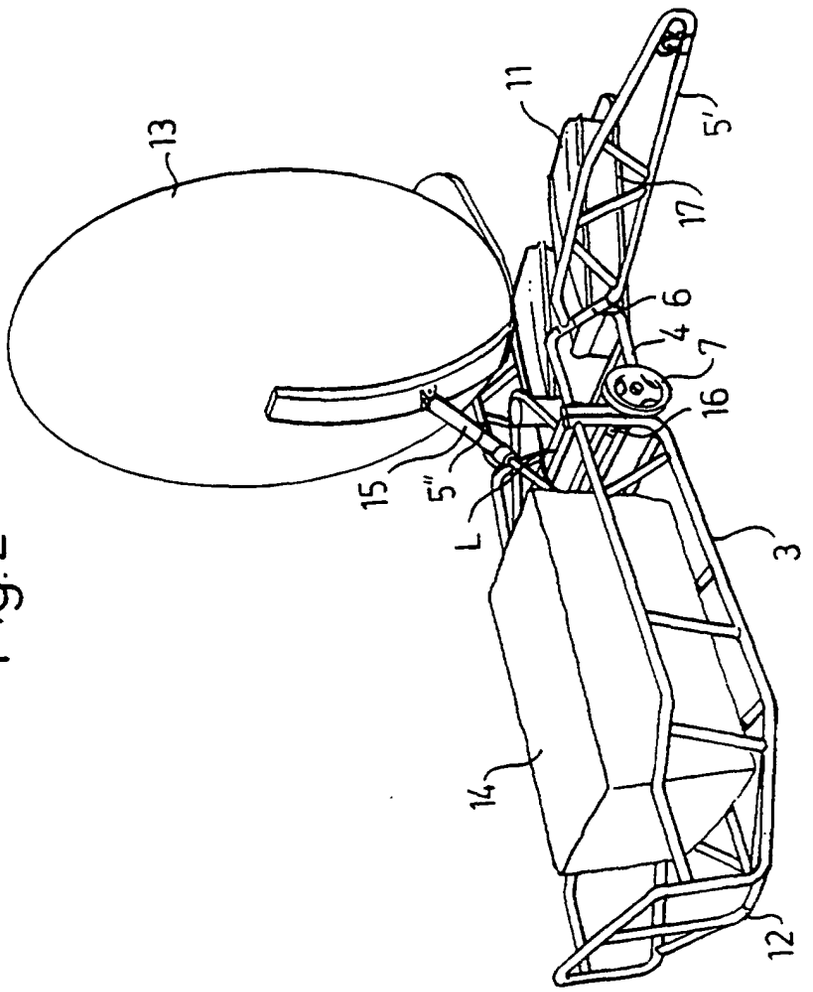

Fig. 3a

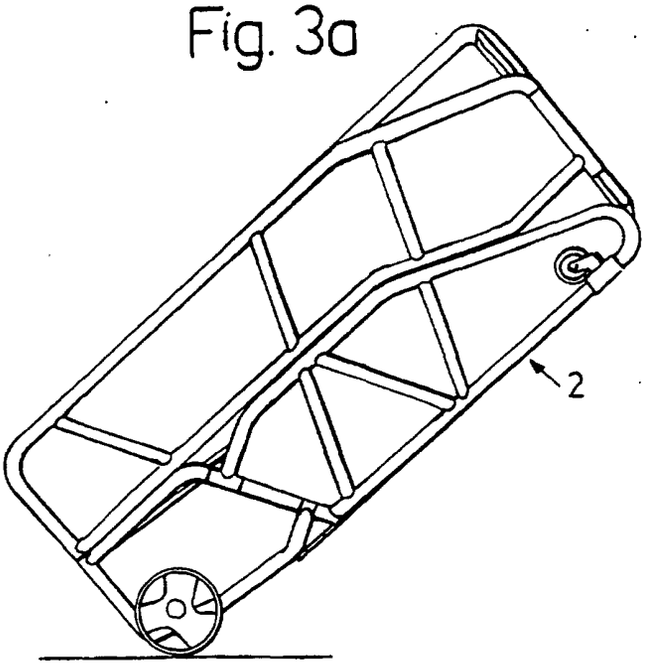

Fig. 3b

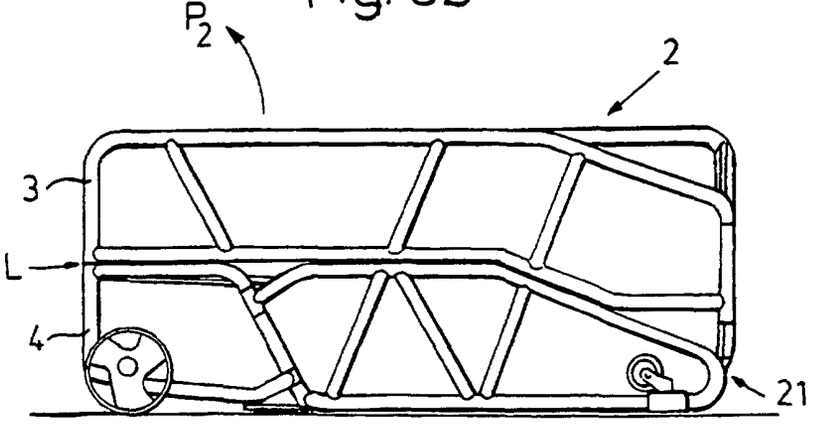

Fig. 3e

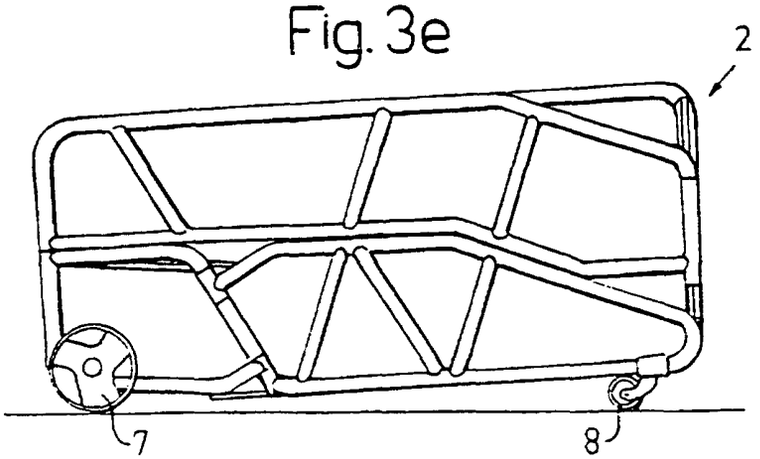

Fig. 3c

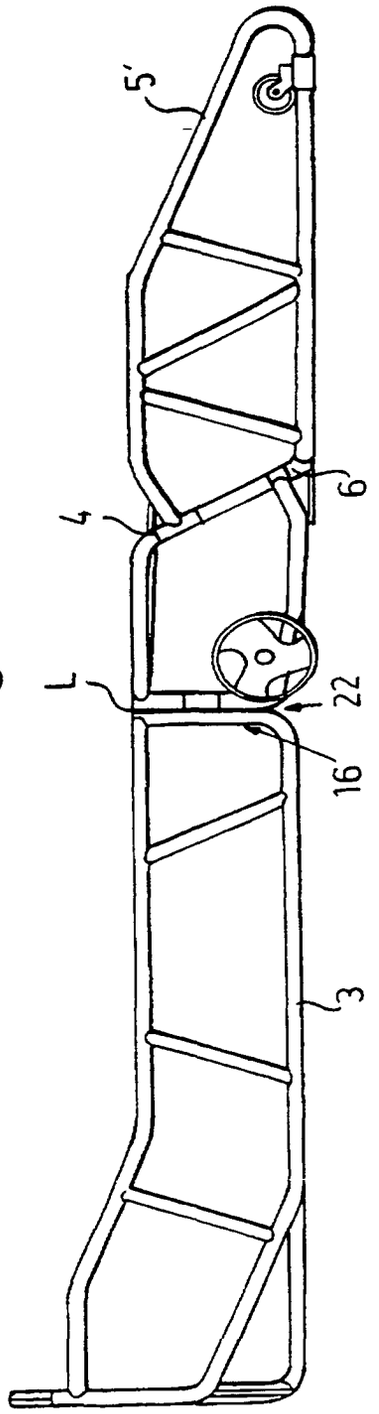

Fig.3d

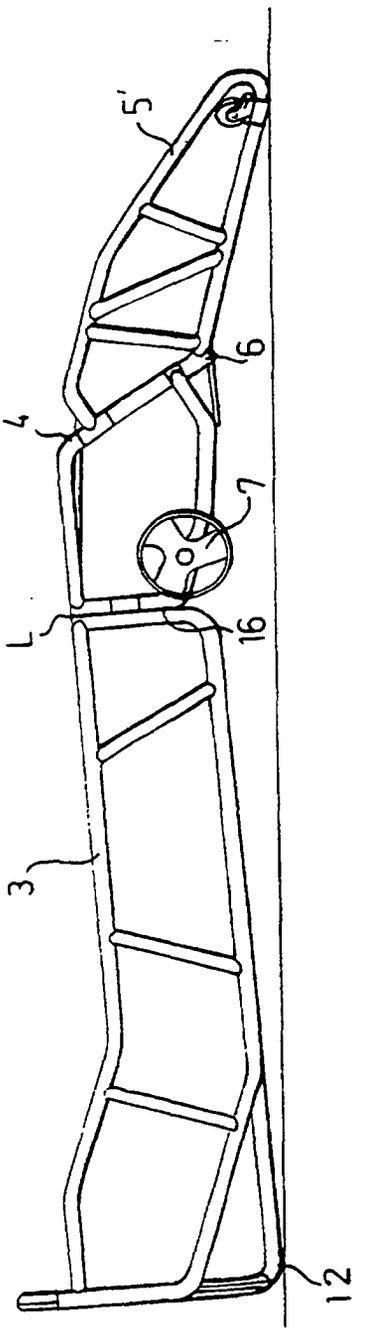

Fig. 4

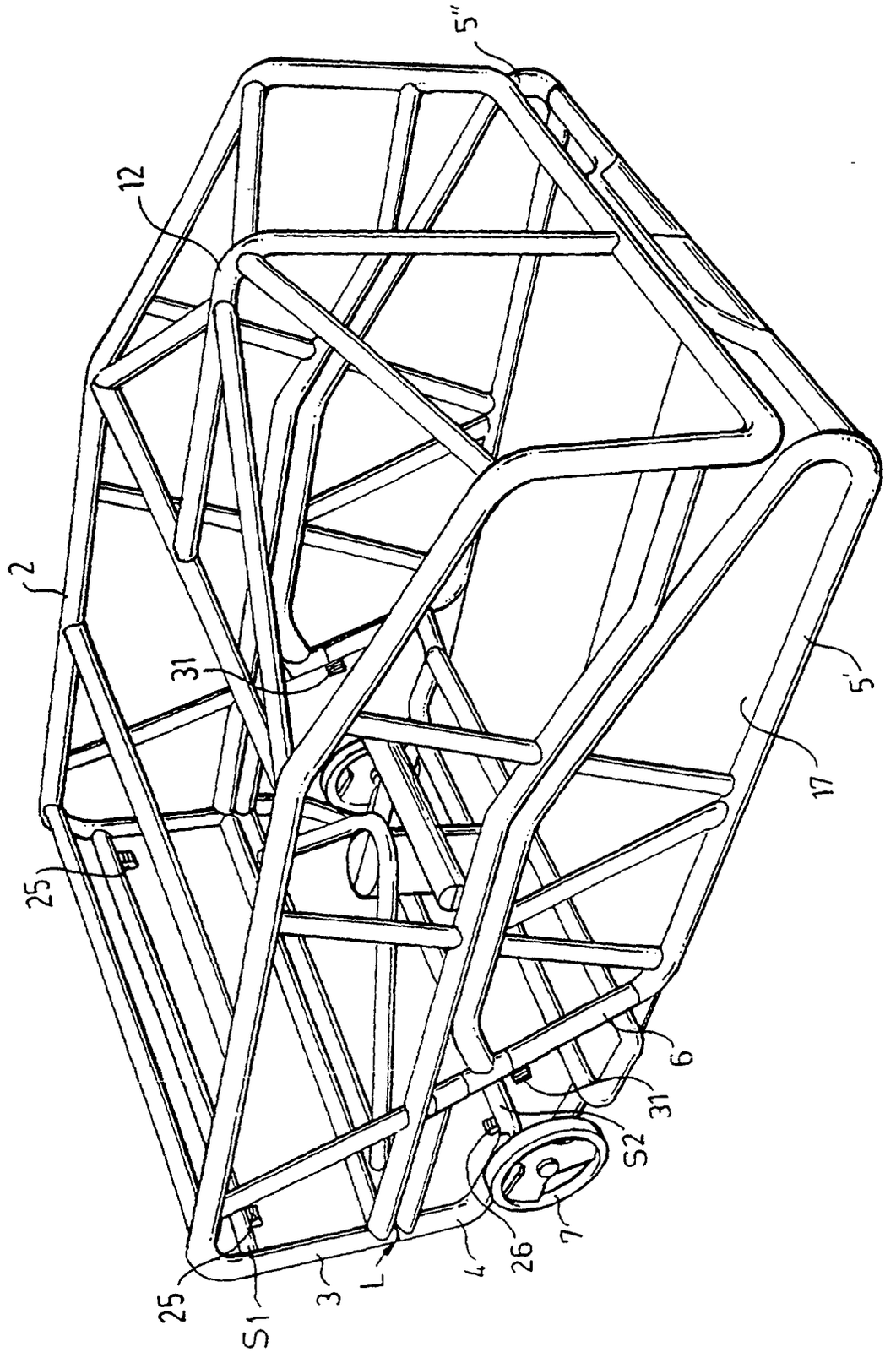

Fig. 5

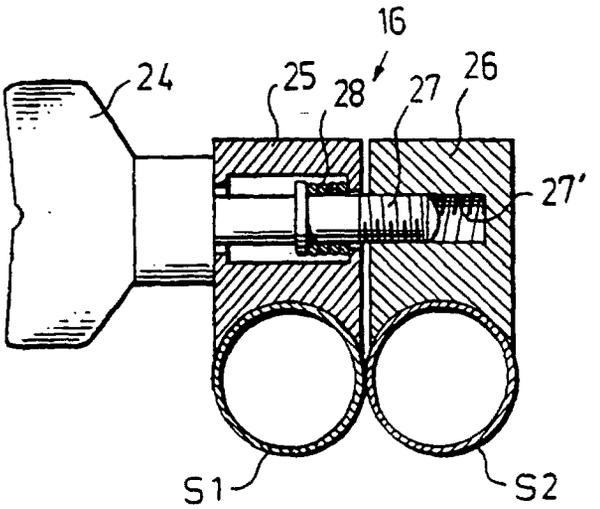
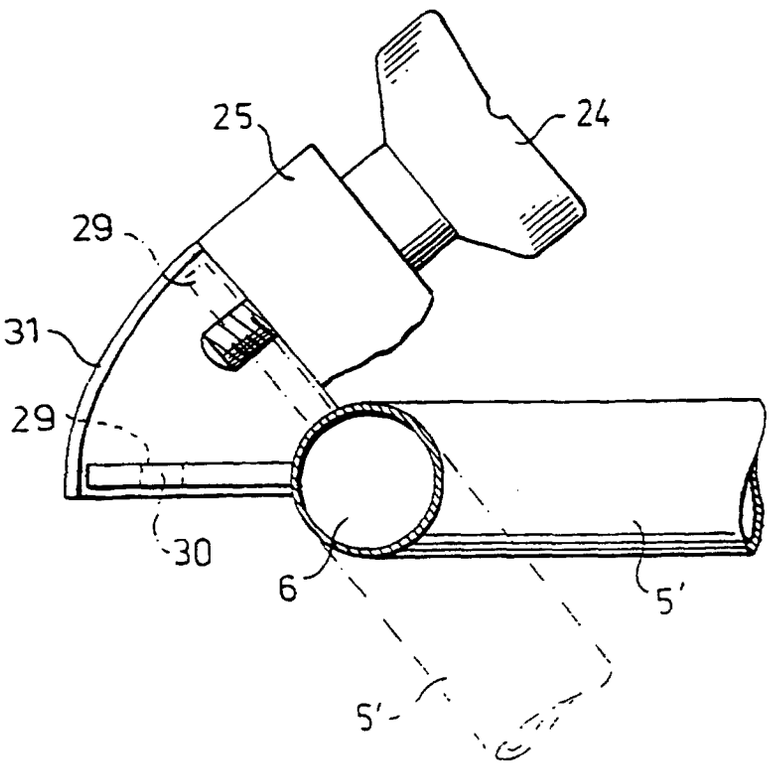
Fig. 6