(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 906 240 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
21.08.2002 Bulletin 2002/34

(21) Application number: **97918297.9**

(22) Date of filing: **09.05.1997**

(51) Int Cl.[7]: **B65H 75/40**

(86) International application number:
PCT/IB97/00536

(87) International publication number:
WO 97/043201 (20.11.1997 Gazette 1997/50)

(54) **APPARATUS FOR CARRYING CABLES WINDING DRUMS**

TRANSPORTVORRICHTUNG FÜR KABELTROMMELN

APPAREIL POUR TRANSPORTER DES TAMBOURS ENROULEURS DE CABLES

(84) Designated Contracting States:
AT BE DE DK ES FR GB GR IT NL

(30) Priority: **10.05.1996 IT BO960077 U**

(43) Date of publication of application:
07.04.1999 Bulletin 1999/14

(73) Proprietor: **REFERENCE LABORATORY S.r.l.**
60027 Osimo (Ancona) (IT)

(72) Inventor: **TORDINI, Angelo**
I-60020 Ancona (IT)

(74) Representative: **Lanzoni, Luciano et al**
c/o BUGNION S.p.A.
Via Cairoli, 107
47900 Rimini (Forli) (IT)

(56) References cited:
DE-C- 918 237
FR-A- 984 281
GB-A- 840 530

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 906 240 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Technical Field

[0001] The present invention relates to an apparatus for carrying cables winding drums. The invention refers to devices for carrying winding drums for signal cables in audio systems and relative sound generating equipment, including, for example, but not limited to, the equipment used by music and theatre groups.

Background Art

[0002] In the field of audio equipment, in particular of the kind employed in tours and itinerant shows, there is a large need of equipment with limited dimensions, safe and easy to operate, which, at the same time, have a satisfactory degree of protection against possible mechanical damages due to bumps, entanglments, and/or cuts, deriving from repeated transportation, loading, unloding and stocking operations.

[0003] In order to meet these requirements, from FR -A -984281 is already known an apparatus for carrying a cable winding drum, where a reticular frame includes structure elements, fits in such a way, said structural elements are inter-connected to form a geometrical solid, within which the winding drum revolves around a horizontal axis, completely contained within the frame itself.

[0004] Such frames show a high degree of protection for the cables housed inside and, furthermore, are totally without parts sticking out, which may be dangerous elements even for the people assigned to their operation, also taking under consideration the fact that usually, the storage of the above equipment for example within trucks or monitor rooms takes place in narrow places.

[0005] Such frame, although granting a satisfactory solution for the above mentioned problems, is not without disadvantages.

[0006] Starting from the assumption that signal cables for audio equipment are, in most of the cases, intrinsecally heavy, the main disadvantage is represented by its own weight that, when added to the cable weight, results in a load which is in general not easy to carry by a person alone. Therefore, for the operation of winding devices of the above mentioned type, two people are generally required.

[0007] This factor, beside increasing staffing costs, lengthens and makes more difficult the operations for loading, unloading, positioning and storing in trucks, especially when we consider the narrow places where these people move.

[0008] From DE-C-918237 is already known an apparatus for carrying cables winding drums, comprising a reticular frame including structure elements fitted in such a way to define a geometrical solid supporting the winding drum revolving around a horizontal axis of rotation, within the overall own dimensions of the frame. The apparatus is provided with two wheels to permit the horizontal translation of the apparatus, which are mounted on the reticular frame in such a way to project from and outside the frame, parallel to drum axis rotation. The purpose of this invention is to provide a device for carrying cables winding drums, especially signal cables employed in sound generating equipment, which allows to eliminate the above described disadvantages.

Disclosure of the Invention

[0009] According to the invention, such problems are solved by means of at least onewheel mounted on the reticular frame, with its rotation spin parallel to the axis of rotation of the winding drum for cables, and contained within the overall dimensions of the solid delimited by the reticular frame.

[0010] The main advantage of the invention is represented by the possibility of translation insted of picking it up, thus requiring just one person. This largely decreases physical effort, costs and oprational times of the staff assigned to the device operation. Also, the operations when working or storing in narrow places are easier and faster.

[0011] In particular, the wheel, or each one of them, is fastened to the frame in acorner formed by the intersection between a base and a lateral side of the frame.

[0012] Furthermore, the wheel is supported by two elements forming one enveloping body, that are rigidly fastened to two frame elements.

[0013] Because of the position and rigidity of the support, the wheel has the advantage of having a spin axis with a small diameter, thus allowing the wheel diamter itself to be accordingly small, without taking useful space; the wheel is on the other hand able to support large weights.

[0014] One further advantage of the invention is therefore represented by dimensional compactness, low cost and high reliability.

[0015] An extensible handle, on the side of the wheels, makes it easy to translate the device, with the advantage of reducing physical effort and helping the assigned person to position or store it for transport.

[0016] The handle too, when not needed, may be housed within the frame dimensions.

[0017] The invention, therefore, has no part sticking out of the reticular frame. Besides keeping unchanged the characteristic degree of safety and protection of the known frames, it allows the device to be piled up and gives it a pleasant aspect.

[0018] Further technical characteristics of the invention, according to the abovementioned purposes, are clearly stated in the claims below mentioned, and its advantages will be clearly outlined in the following detailed description.

[0019] This invention will be now described with reference to the attached drawings, which show. without limitation. an example of use, where:

- Figure 1 and Figure 2 are comprehensive perspective views of the device, represented as a whole, both in operational and non-operational condition.
- Figures 3 and 4 show, respectively, the device in condition of use different from the previous pictures, and a construction feature of the above device.

[0020] Referring to the enclosed herewith figures, with **1** it is indicated, as a whole, an apparatus used to transport cable-winding drums **2**, in particular cables for audio signal conduction in sound generation systems.

[0021] The apparatus **1** includes a reticular frame **3** constituted of structural elements **21** spatially oriented and interconnected between them to generate a geometrical solid which contains and carries the winding drum **2** enabling, at the same time, a rotation of the drum **2** around its horizontal axis.

[0022] The winding drum **2** is completely contained within the reticular frame **3** which, in this manner, acts as a mechanical shock protection for the cable in addition to its function of structural support for the winding drum **2.**

[0023] The reticular frame **3** is provided, in its lower part, with two small diameter little thickness wheels **5,** beared, substantially, in correspondence of a corner which is rounded in the figures defined by the ideal intersection of the base plane **9** with the lateral face plane **10** of the reticular frame **3.**

[0024] Each of the two wheels **5** is beared in correspondence of the opposite ends of its spin axis **6** by the supports **12,13** realized as a whole support-body **14** that, with its shape, acts as an envelope for the wheels **5.** This support-body **14** hides the wheel from the inside of the reticular frame **3** and, most importantly, has the function of a safety screen for the operators. as well as avoiding any interference of the cable with the wheels **5,** preventing cable damaging.

[0025] As it can be seen from the figures 1,2 and 3, the support-body **14** is rigidly connected, through welding, with two structure elements **21** subtantially concurrent to a point corresponding to one of the corners **8** of the geometrical solid defined by the reticular frame **3.**

[0026] This support-body **14** arrangement gives an elevate rigidness to the support itself, enabling the mounting of small diameter and little thickness wheels **5** supported by a very thin axle **22,** although the wheel **5** has to carry the high weight of the winding drum **2** with the cable rolled up around it. This support-body **14** also gives the advantage of letting the use of the trasversal encumbrance referred to the rotation axis **4** of the winding drum **2** of the corners **8** defined by the structure elements **21** to mount the wheel **5,** avoiding any withdrawing of space useful for the cable movement inside the overall volume **7** occupied by the reticular frame **3.**

[0027] The apparatus **1** includes also a handle for an ease of movement of the reticular frame **3.**

[0028] The slinding handle **11** is fitted on a guide bar **17,** composed of a tubolar element **18** contained on a face **9** or **10** of the reticular frame **3.** The abovementioned handle **11** has an 'operative' stable position where is completely extracted from the guide bar **17,** outside from the reticular frame **3,** and a second, 'non-operative', position where is completely contained inside the overall volume **7** of the reticular frame **3** itself.

[0029] The handle **11** is provided with a well shaped end **15** which is going to be completely contained in the lateral surface **16** of the reticular frame **3** once the handle **11** is in its non-operative position.

[0030] The apparatus **1** includes also some relevant means to allow the rigid connection of the guide **17** to the handle **11** which are activated in the operative position of the apparatus **1.**

[0031] This means (Fig. 4) include, in particular, a peg **19** pushed by an elastic antagonist action from the handle **11** into a corresponding hole **20** realized on the tubolar element **18** which implements the guide bar **17.** The function of this peg is to make the handle **11** and the guide bar **17** mutually solid.

[0032] To avoid the possibility of a complete extraction from the guide bar **17,** it is possible to relalize a slit **23,** of adequate lenght, along the tubolar element **18;** this slit **20,** coupled with a pin fixed on the handle **11,** limits the extension of the handle **11** when pulled outwards from the reticular frame **3.**

[0033] Referring to the Figure 3 it is evident that the apparatus **1,** using the handle **11,** can be moved and loaded with very little space needed, rapidly and easily by one single operator.

[0034] The invention described above is susceptible of many modifications without changing the original concept as claimed.

Claims

1. Apparatus **(1)** for carrying cables winding drums **(2)** comprising a reticular frame **(3)** including structure elements **(21)**, the elements **(21)** being fitted in such a way to define a geometrical solid supporting the winding drum **(2)**, said drum **(2)** revolving around a horizontal axis **(4)** of rotation, within the overall own dimensions of the frame **(3)**; at least one wheel **(5)** mounted on the reticular frame **(3)** with its spin axis **(6)** parallel to the drum **(2)** axis of rotation **(4)**, **characterized in that** said reticular frame **(3)** contains inside the whole drum **(2)** and supports said at least one wheel **(5)** for apparatus translation, said at least one wheel **(5)** being supported by the reticular frame **(3)** substantially in correspondence of a corner defined by the intersection of one base face **(9)** with a side face **(10)** of the reticular frame **(3)** and being contained substantially within the overall transversal dimension of the said solid, the wheel **(6)** having its spin axis **(6)** contained within the overall volume of said geometrical solid, so as to have minimum withdrawing of useful space, at least out-

side the overall volume **(7)** occupied by the reticular frame **(3)**.

2. Apparatus, as in claim 1, **characterized in that,** said reticular frame **(3)** is shaped as a truncated pyramidal solid having two different sized parallel base face **(9)** said frame **(3)** being suitable to be piled upon another reticular frame **(3)** with an own base face **(9)** put against an opposed base face **(9)** of the other, said at least one wheel **(5)** remaining outside of the contact area of said base faces **(9)** when two apparatus are piled each other.

3. Apparatus, as in claim 1 or 2, **characterized in that,** the, or each, wheel **(5)** is supported in correspondence of the spin axis **(6)** ends by support elements **(12,13)** which are solidly interconnected with the reticular frame **(3)**.

4. Apparatus, as in claim 3, **characterized in that,** the, or each, support element **(12,13)** is realized as a whole support-body **(14)** rigidly connected to the reticular frame **(3)** through two, substantially concurrent elements **(21)** of the frame **3.**

5. Apparatus, as in claim 4, **characterized in that** the, or each support-body **(14)** has a wheel enveloping shape to hide the wheel **(5)** from the inside of the reticular frame .

6. Apparatus, as in claims 1, **characterized in that** it comprises a sliding handle **(11)** for ease of operation, which is contained within one face of the reticular frame **(3)**.

7. Apparatus, as in claim 6, **characterized in that** the sliding handle **(11)** is mounted on a tubular guide **(17)** bar realized within one face **(9** or **10)** of the reticular frame **(3)**, this sliding handle **(11)** has a stable position, for the operation of the apparatus **(1)**, where is completely extended out from the guide **(17)**, and a non-operative position where the handle **(11)** is completely contained within the overall volume **(7)** of the reticular frame **(3)**.

8. Apparatus, as in claim 7, **characterized in that** the handle **(11)** is fitted with a shaped end **(15)** that improves the compactness of the system handler **(11)** lateral surface **(16)** of the frame **(3)** when the handle **(11)** is in the non-operating position.

9. Apparatus, as in claim **6** or **7**, **characterized in that** it comprises relevant means to allow the rigid connection of the guide **(17)** to the handle **(11)** which are activated in the operative position of the apparatus **(1)**.

10. Apparatus, as in claim **7, characterized in that** the guide **(17)** includes a tubular element **(18)** that has the function to couple the guide **(17)** to the handle **(11)**; a peg **(19)** pushed by an elastic antagonist action from the handle **(11)** into a corresponding hole **(20)** realized on the tubular element **(18)** making the handle **(11)** and the guide bar **(17)** mutually solid.

Patentansprüche

1. Transportvorrichtung (1) für Kabeltrommeln (2), enthaltend einen Gitterrahmen (3) mit Strukturelementen (21), wobei die Elemente (21) auf solche Weise angeordnet sind, dass sie einen die Kabeltrommel (2) tragenden geometrischen Körper bilden, wobei sich die genannte Kabeltrommel (2) um eine horizontale Drehachse (4) dreht, und zwar innerhalb der Gesamtabmessungen des Rahmens (3); wenigstens ein Rad (5), montiert an dem Gitterrahmen (3) und mit seiner Umdrehungsachse (6) parallel zu der Drehachse (4) der Kabeltrommel (2) ausgerichtet, **dadurch gekennzeichnet, dass** der genannte Gitterrahmen (3) in seinem Inneren die gesamte Kabeltrommel (2) enthält und das genannte wenigstens eine Rad (5) zum Verfahren der Vorrichtung trägt, wobei das genannte wenigstens eine Rad (5) von dem Gitterrahmen (3) im wesentlichen an einer Ecke getragen wird, die durch eine Schnittlinie einer Basisfläche (9) mit einer Seitenfläche (10) des Gitterrahmens (3) beschrieben ist und im wesentlichen innerhalb der gesamten Querabmessung des genannten Körpers gehalten ist, und wobei das Rad (5) seine Umdrehungsachse (6) innerhalb des Gesamtvolumens des genannten geometrischen Körpers liegen hat, so dass man eine minimale Einschränkung des nutzbaren Platzes hat, wenigstens ausserhalb des von dem Gitterrahmen (3) belegten Gesamtvolumens (7).

2. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** der genannte Gitterrahmen (3) in Form einer Stumpfpyramide ausgebildet ist, welche zwei verschieden bemessene parallele Basisflächen (9) aufweist, wobei der genannte Gitterrahmen (3) geeignet ist, auf einem anderen Gitterrahmen (3) gestapelt zu werden, und zwar mit einer eigenen Basisfläche (9) einer gegenüberliegenden Basisfläche (9) des anderen zugewandt, wobei wenigstens ein Rad (5) ausserhalb des Kontaktbereiches der genannten Basisflächen (9) bleibt, wenn die Vorrichtungen aufeinander gestapelt sind.

3. Vorrichtung nach Patentanspruch 1 oder 2, **dadurch gekennzeichnet, dass** das oder jedes Rad (5) an den Enden der Umdrehungsachsen (6) durch Halteelemente (12, 13) getragen wird, welche fest mit dem Gitterrahmen (3) verbunden sind.

4. Vorrichtung nach Patentanspruch 3, **dadurch gekennzeichnet, dass** das oder jedes Halteelement (12, 13) aus einem Haltekörper (14) in einem Stück hergestellt ist, fest verbunden mit dem Gitterrahmen (3) durch zwei im wesentlichen gleichverlaufende Elemente (21) des Gitterrahmens (3).

5. Vorrichtung nach Patentanspruch 4, **dadurch gekennzeichnet, dass** der oder jeder Haltekörper (14) eine das umfassende Form aufweist, um das Rad (5) zum Inneren des Gitterrahmens zu verdekken.

6. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** sie einen ausziehbaren Griff (11) enthält, um die Bedienung zu erleichtern, welcher in einer Fläche des Gitterrahmens (3) enthalten ist.

7. Vorrichtung nach Patentanspruch 6, **dadurch gekennzeichnet, dass** der ausziehbare Griff (11) an einer innerhalb einer Fläche (9 oder 10) des Gitterrahmens (3) hergestellten rohrförmigen Führung (17) montiert ist, wobei dieser ausziehbare Griff (11) eine stabile Position zur Bedienung der Vorrichtung (1) einnimmt, wenn er vollkommen aus der Führung (17) herausgezogen ist, sowie eine Ruhestellung, in welcher der Griff (11) vollkommen in dem Gesamtvolumen (7) des Gitterrahmens (3) enthalten ist.

8. Vorrichtung nach Patentanspruch 7, **dadurch gekennzeichnet, dass** der Griff (11) mit einem geformten Ende (15) versehen ist, das die Bündigkeit das Griffes (11) mit der Seitenfläche (16) des Gitterrahmens (3) verbessert, wenn der Griff (11) sich in der Ruhestellung befindet.

9. Vorrichtung nach Patentanspruch 6 oder 7, **dadurch gekennzeichnet, dass** sie entsprechende Mittel zur starren Verbindung der Führung (17) mit dem Griff (11) enthält, welche in der Betriebsposition der Vorrichtung (1) aktiviert werden.

10. Vorrichtung nach Patentanspruch 7, **dadurch gekennzeichnet, dass** die Führung (17) ein rohrförmiges Element (18) enthält, welches die Aufgabe hat, die Führung (17) mit dem Griff (11) zu koppeln, sowie einen Stift (19), der durch eine elastische Gegenwirkung von dem Griff (11) in eine entsprechende Bohrung (20) einrastet, die in das rohrförmige Element (18) eingearbeitet ist, was den Griff (11) und die Führung (17) gegenseitig fest miteinander verbindet.

Revendications

1. Dispositif (1) pour transporter des tambours (2) enrouleurs de cables comprenant un cadre réticulaire (3) formé d'éléments structurels (21), ces derniers étant disposés de manière à définir un solide géométrique supportant le tambour enrouleur (2), ledit tambour (2) pivotant autour d'un axe horizontal (4) de rotation, à l'intérieur des propres dimensions du cadre (3); au moins une roue (5) montée sur le cadre réticulaire (3) et possédant un axe de rotation (6) parallèle à l'axe de rotation (4) du tambour (2), **caractérisé en ce que** ledit cadre réticulaire (3) contient en son intérieur tout le tambour (2) et supporte ladite roue (5) pour la translation du dispositif, ladite roue (5) étant supportée par le cadre réticulaire (3) substantiellement en correspondance d'un coin défini par l'intersection d'une face de base (9) et d'une face latérale (10) du cadre réticulaire (3) et étant substantiellement contenue dans la dimension transversale totale dudit solide, la roue (5) ayant son axe de rotation (6) contenu dans le volume total dudit solide géométrique, de manière à limiter l'utilisation d'espace utile, au moins au dehors du volume total (7) occupé par le cadre réticulaire (3).

2. Dispositif selon la revendication 1, **caractérisé en ce que** ledit cadre réticulaire (3) est conformé en tronc de pyramide ayant deux faces de base (9) parallèles et de dimensions différentes, ledit cadre (3) pouvant être empilé sur un autre cadre (3) avec sa face de base (9) contre une face de base (9) opposée de l'autre cadre, ladite roue (5) restant en dehors de la zone de contact desdites faces de base (9) lorsque deux dispositifs sont empilés l'un sur l'autre.

3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** la ou les roues (5) sont supportées en correspondance des extrémités de l'axe de rotation (6) par des éléments de support (12, 13) reliés de manière solidaire au cadre réticulaire (3).

4. Dispositif selon la revendication 3, **caractérisé en ce que** le ou les éléments de support (12, 13) sont réalisés sous la forme d'un corps de support unique (14) rigidement relié au cadre réticulaire (3) par l'intermédiaire de deux éléments (21) du cadre (3) concourants.

5. Dispositif selon la revendication 4, **caractérisé en ce que** le ou les corps de support (14) présentent une forme d'enveloppe pour cacher la roue (5) de l'intérieur du cadre réticulaire.

6. Dispositif selon la revendication 1, **caractérisé en ce qu'**il comprend une poignée coulissante (1) pour

faciliter les opérations, contenue dans une face du cadre réticulaire (3).

7. Dispositif selon la revendication 6, **caractérisé en ce que** la poignée coulissante (11) est montée sur un guide tubulaire (17) réalisé avec une face (9 ou 10) du cadre réticulaire (3), cette poignée coulissante (11) ayant une position stable, pour les manoeuvres du dispositif (1), dans laquelle elle est complètement extraite au dehors du guide (17), et une position de repos dans laquelle la poignée (11) est complètement contenue à l'intérieur du volume total (7) du cadre réticulaire (3).

8. Dispositif selon la revendication 7, **caractérisé en ce que** la poignée (11) est pourvue d'une extrémité courbée (15) améliorant la compacité de la surface latérale (16) du cadre (3) lorsque la poignée (11) est dans la position de repos.

9. Dispositif selon la revendication 6 ou 7, **caractérisé en ce qu'**il comprend des moyens permettant la liaison rigide du guide (17) à la poignée (11), ces moyens étant activés dans la position opérative du dispositif (1).

10. Dispositif selon la revendication 7, **caractérisé en ce que** le guide (17) comprend un élément tubulaire (18) ayant la fonction d'accoupler le guide (17) à la poignée (11); une goupille (19), poussée par une force antagoniste, se projetant hors de la poignée (11) dans un orifice (20) correspondant réalisé sur l'élément tubulaire (18), en rendant la poignée (11) et le guide (17) mutuellement solidaires.

FIG 1

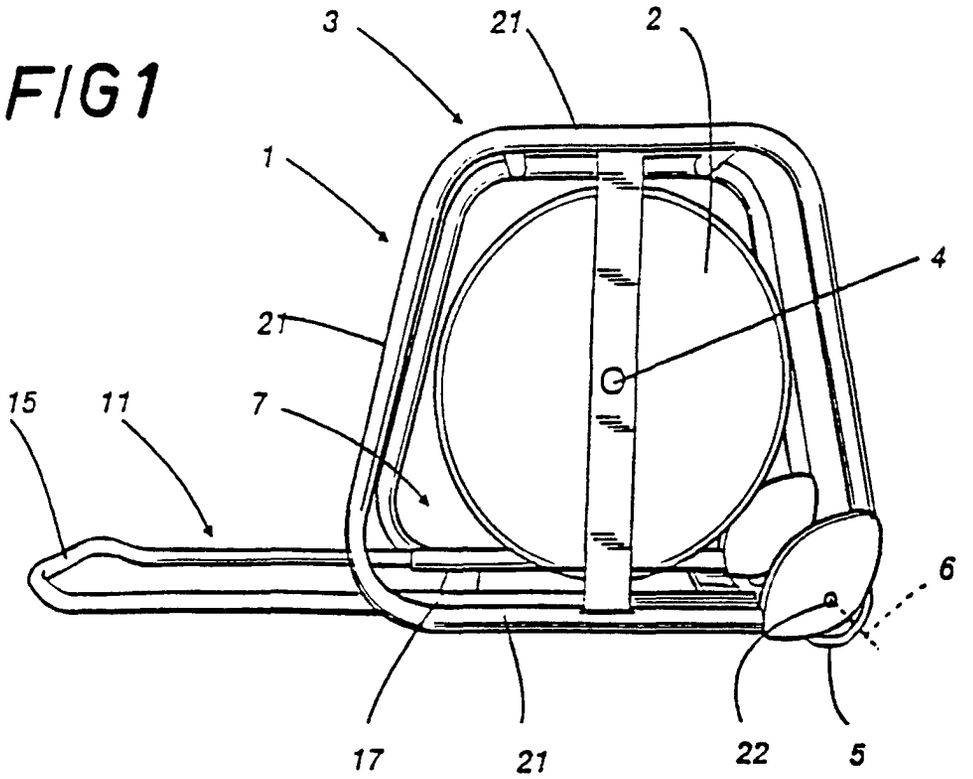


FIG 4

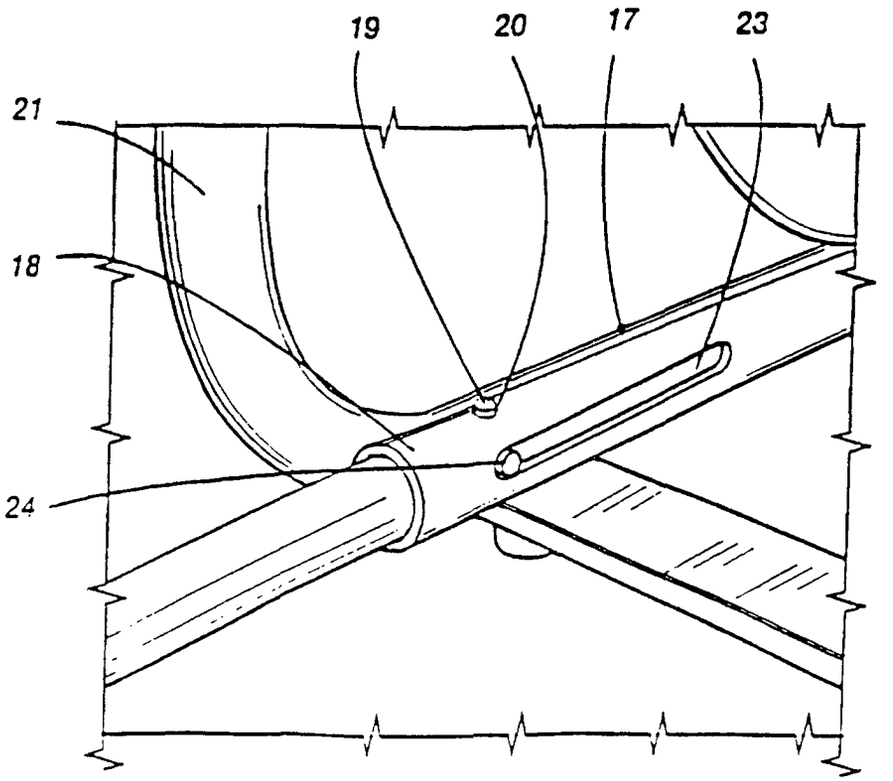


FIG3

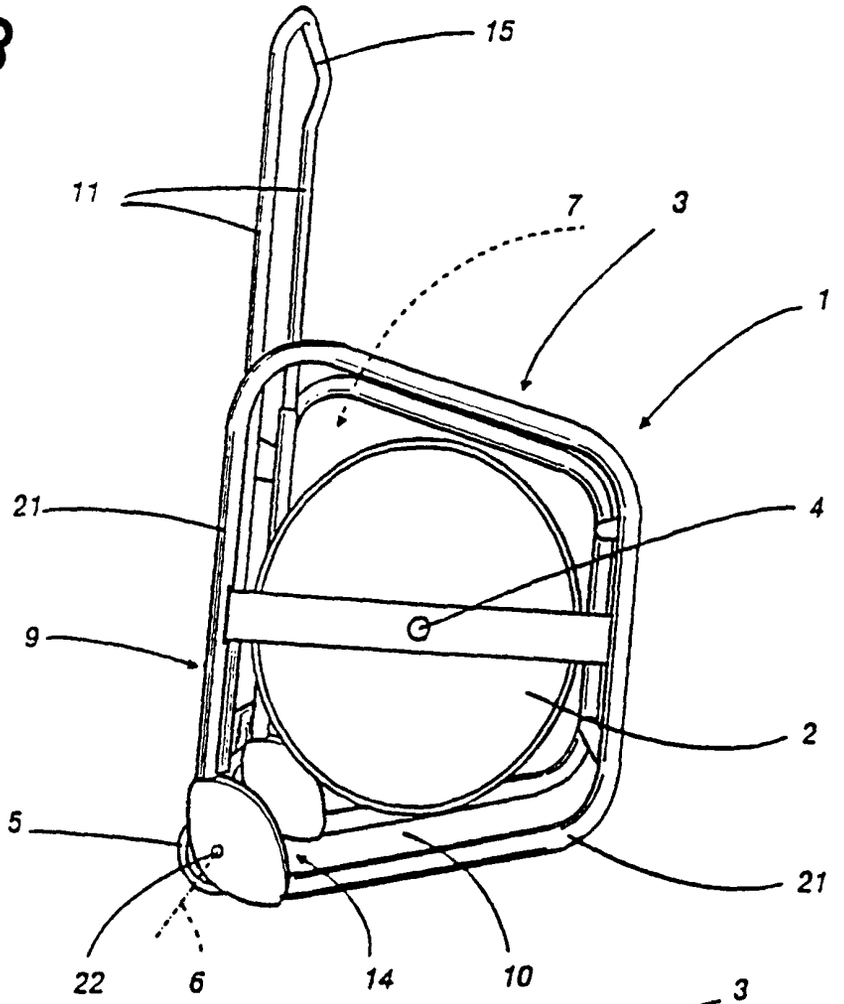


FIG2

