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FREIGHT HOISTING ARRANGEMENT, ESPECIALLY FOR USE ON BOARD SHIPS.

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Description

The present invention relates to a hoisting arrangement, especially for use on board a ship in connection with a freight opening, especially a side port opening, comprising at least one hoist carriage which is moveable along a guide column in a hoist shaft which connects the freight opening or the side port opening to different decks of the ship, where the hoist carriage carries via a pair of support arms a loading platform pivotably mounted relative to the hoist carriage for movement of the loading platform horizontally from a fore-and-aft position from a position within the hoist shaft of the ship via the freight opening or the side port opening to a fore-and-aft position in a position outside the side of the ship, the loading platform being moveable in a horizontal direction relative to the hoist carriage by means of a power means, such as a pressure medium cylinder, which is preferably jointed to the hoist carriage.

The present invention is as mentioned especially designed for use on board ships, but will also be able to find application for other purposes, for example in connection with freight openings on land vehicles or in connection with freight openings in structure on land, and the like.

The freight hoisting arrangement as indicated above is usually employed together with fork lift trucks, that is to say with a set of fork lift trucks on board the ship and a set of fork lift trucks on land, for respective loading and unloading by the freight hoisting arrangement. If desired the loading and unloading can occur via extra equipment which is connected to the freight hoisting arrangement, such as various types of conveyor belts or similar transport means. In many instances the fork lift trucks place or fetch their respective unit of freight directly on the loading platform of the freight hoisting arrangement, in a position outside the side of the ship or in a position in the hoist shaft in the ship. When discussing fork lift trucks there is meant not only trucks with loading forks, but also trucks with other gripping or lifting means which are specifically adapted according to particular types of units of freight.

A freight hoisting arrangement is known from EP-A-0268575.

From NO patent 139,162 a system is known where a loading platform can be swung from a position within the ship to a position outside the side of the ship, so that a fork lift truck on the quay can place the freight directly on or fetch the freight directly from the loading platform. The known freight hoisting arrangement is arranged so that the hoist carriage by means of an outwardly projecting arm, which is revolvable about a first vertical axis on the hoist carriage, can swing the loading platform around about a second vertical axis. By this the loading platform can be swung around along an arc of a circle about the

said first axis. By employing a pair of parallel arms an arm system in the shape of a parallelogram can be formed between the hoist carriage and the loading platform, so that the loading platform during the swinging around along said arc of a circle is parallel displaced between a fore-and-aft position in a position in the hoist shaft and a fore-and-aft position in a position outside the side of the ship. As a consequence of the necessary movement along an arc of a circle the loading platform is subjected at the same time as it is moved transversely also to a certain fore-and-aft movement relative to the ship. This necessary fore-and-aft movement is undesired for several reasons. Such an undesired fore-and-aft movement makes difficult an effective utilisation of the length dimension of the freight opening or the side port opening. In addition such a swinging movement or such a fore-and-aft movement can create certain problems in controlling the freight during movements of the loading platform.

Another known construction is described in NO patent application 874624. In this construction the loading platform can be moved in a position in a hoist shaft within the ship and in a position outside the side of the ship by means of a guide column which is rotatable in the ship for swinging the loading platform around between said positions. The turning of the loading platform relative the guide column can occur by means of hydraulic-mechanical or electro-mechanical drive systems. Also in this instance the movement of the loading platform in a pivotal arc involves an undesired movement of the loading platform in the fore-and-aft direction.

With the present invention the aim is a solution with which a precisely rectilinear movement in perpendicular direction of the loading platform can be ensured with relatively simple means in a horizontal direction between the position in the hoist shaft and the position outside the side of the ship.

The freight hoisting arrangement according to the invention is characterised in that a first support arm is pivotably mounted at a first end about a first vertical axis on the hoist carriage and at a second end is pivotably mounted about a second vertical axis on first end of the second support arm, while second end of the second support arm is pivotably mounted about a third vertical axis on the loading platform, and that a first positive guide means connects first end of the second support arm to the hoist carriage, while a second positive guide means connects second end of the first support arm to the loading platform, for positively guiding the loading platform in a fore-and-aft position in a transverse movement in perpendicular direction between the position within the hoist shaft and the position outside the side of the ship.

In the afore-mentioned known constructions (NO patent 139,162 and NO patent application 874624) the undesired fore-and-aft movement of the loading

platform represents that one cannot employ two freight hoisting arrangements in parallel. Either this involves a poor utilisation of the area of the freight opening or the side port opening or alternatively it involves that one cannot operate two freight hoisting arrangements totally independently of each other, without their coming into conflict with each other. In addition - as a consequence of necessary relative movement between the loading platforms - one will certainly not be able to employ two loading platforms simultaneously for effective handling of an especially long and narrow freight. According to the present invention this problem can be easily avoided.

The objective is to be able to handle a freight jointly by the two loading platforms. In this connection the freight hoisting arrangement according to the invention is characterised in that the arrangement comprises a pair of hoist carriages which are separately movable along their respective guide column in hoist shaft and are separately revolvable about their respective pair of support arms for swinging the respective loading platform about between a position in the hoist shaft and a position outside the side of the ship, and that loading platforms of the hoist carriages are adapted to be coupled together hydraulically and/or mechanically for joint movement vertically in the hoist shaft or horizontally between a position in the hoist shaft and a position outside the side of the ship.

Further features of the present invention will be evident from the following description having regard to the accompanying drawings, which show a preferred embodiment, where:

Fig. 1 shows in plan elevation two hoist carriages in full lines in a position within the ship and in broken lines in a position outside the side of the ship.

Fig. 2 shows in plan elevation the one hoist carriage on a larger scale and with several details, illustrated in broken lines in a position within the ship and in full lines in a position outside the side of the ship.

Fig. 3 shows in side elevation a section of the hoist carriage according to Fig. 1 and 2.

Fig. 4 shows a detail of Fig. 3 with certain parts removed for the sake of simplicity.

In Fig. 1 there is shown a section of a ship, where there is illustrated just within the side 10 of the ship a hoist shaft 11 which at opposite ends carries a guide column 12 and 13 respectively for their respective hoist carriage 14 and 15. The hoist carriages 14, 15 are designed as mirror images and substantially identical and are adapted to function individually in an equivalent manner.

On a horizontal under member 16 of the hoist carriage 14 (or 15) there is fastened a turntable or a combined support and rotary bearing 17, with which the under member 16 is fastened to the one end 19 of a first support arm 20, for revolving the support arm 20 about a first vertical axis 19a (see Fig. 2). At a second

end 21 the support arm 20 is provided with a combined support and rotary bearing 22 with which the first support arm 20 is fastened at a first end 24 of a second support arm 25, so that these are pivotable relative to each other about a common, second vertical axis 24a. At a second end 26 of the support arm 25 there is fastened a support and rotary bearing 27 with which there is fastened a loading platform 29, for revolving the loading platform 29 about a third vertical axis 28a relative to the support arm 25.

A power means in the form of a hydraulic cylinder 30 has the one end 31a fastened to the hoist carriage 14 (or 15) and the opposite end 31b fastened to the first support arm 20. In the pushed out position of the power means the loading platform 29 assumes a position within the ship, such as shown by the full lines in Fig. 1, and in the retracted position of the power means the loading platform 29 assumes a position outside the side of the ship, such as shown by broken lines in Fig. 1.

As shown in Fig. 2 a first positive guide means 32 is arranged in the form of a piece of wire between the hoist carriage 14 and a guide and fastening means 33 on the said first end 24 of the second support arm 25. More specifically the wire extends from a first fastening point 34 on the hoist carriage 14 via a first guide means 35 on the hoist carriage 14, substantially parallel to the first support arm 20 to the guide and fastening means 33 on the second support arm 25 and further substantially parallel to the support arm 20 and via a second guide means 36 on the hoist carriage 14 back to a second fastening point 37 on the hoist carriage 14. The guide means 35 and 36 are arranged at a considerable radial distance from the first vertical axis 19a and are arranged on their respective mutually opposite sides of the hoist carriage 14. Correspondingly the guide and fastening means 33 is arranged at a considerable radial distance from the second vertical axis 24a on the support arm 25. By swinging the arm 20 about the axis 19a from the position shown in broken lines to that shown in full lines in Fig. 2, the second arm 25 is positively guided to swing an equivalently proportionate pivotal angle. By means of the positive guide means 32 one can ensure that the third vertical axis 28a is moved precisely rectilinearly and transversely of the freight opening or the port opening by said revolving of the arm 20 relative to the hoist carriage 14, such as shown by the line 18.

According to Fig. 2 a second positive guide means 38 is shown in the form of a piece of wire between the loading platform 29 and a guide means 23 and a fastening point 39 (Fig. 4) on the second end 21 of the first support arm 20. More specifically the wire extends from a first fastening point 40 on the loading platform 29 via a first guide means 41 on the loading platform 29, substantially parallel to the second support arm 25 to the guide means 23 and the

fastening point 39 on the first support arm 20 and further substantially parallel to the support arm 25 and via a second guide means 42 on the loading platform 29 back to a second fastening point 43 on the loading platform. By means of the positive guide means 32 and 38 one can ensure that with every angular movement of the first support arm 20 relative to the hoist carriage 14 one gets an equivalent angular movement of the second support arm 25 relative to the support arm 20 together with an equivalent angular movement of the loading platform 29 relative to the support arm 25. In this way one can ensure that, at the same time as the third vertical axis 28a of the loading platform 29 moves horizontally at right angles to the longitudinal direction of the ship, the loading platform 29 is moved in an intended fore-and-aft position displaced precisely parallel between the said inner and the said outer position.

In Fig. 1 there is shown a locking member 44 for mechanically locking together the two loading platforms 29 of the hoist carriages 14 and 15, so that the loading platforms can be moved jointly, towards and away from the two positions which are illustrated in Fig. 1 as well as towards and away from different vertical positions within the hoist shaft 11. Alternatively the two hoist carriages 14 and 15 and associated loading platforms can be moved jointly and in a correspondingly locked manner relative to each other, for corresponding linear movement and at corresponding speed, by means of a common control of the hydraulic control circuits for the two hoist carriages. By this one can for example handle a relatively large unit of freight jointly by the two hoist carriages and their associated loading platforms.

Without being shown specifically herein, it shall be emphasized that the support arms 20 and 25 in addition to the swinging movement from and to a position in the hoist shaft to and from a position outside the side of the ship can also be swung in an opposite direction from and to the position in the hoist shaft to and from a position further inwards in the ship. By this the freight on the loading platform can also be transported to a certain extent horizontally into the ship, where this is necessary.

If desired one can ensure by altering the geometry of the positive guide means under certain circumstances that the platform is moved in a deviating direction from said fore-and-aft position, for example 90° relative to the longitudinal direction of the ship, that is to say from the fore-and-aft direction to the transverse direction. For example this can be especially of significance on transportation internally in the ship.

Claims

1. Freight hoisting arrangement, especially for use

on board a ship in connection with a freight opening, especially a side port opening, comprising at least one hoist carriage (14, 15) which is moveable along a guide column (12, 13) in a hoist shaft (11) which connects the freight opening or the side port opening to different decks of the ship, where the hoist carriage (14, 15) carries via a pair of support arms (20, 25) a loading platform (29) pivotably mounted relative to the hoist carriage for movement of the loading platform horizontally from a fore-and-aft position from a position within the hoist shaft (11) of the ship via the freight opening or the side port opening to a fore-and-aft position in a position outside the side (10) of the ship, the loading platform (29) being moveable in a horizontal direction relative to the hoist carriage (14, 15) by means of a power means, such as a pressure medium cylinder (30), which is preferably jointed to the hoist carriage (14, 15), characterised in that a first support arm (20) is pivotably mounted at at first end (19) about a first vertical axis (19a) on the hoist carriage (14, 15) and at a second end (21) is pivotably mounted about a second vertical axis (24a) on first end (24) of the second support arm (25), while second end (26) of the second support arm (25) is pivotably mounted about a third vertical axis (28a) on the loading platform (29), and that a first positive guide means (32) connects first end (24) of the second support arm (25) to the hoist carriage (14, 15), while a second positive guide means (38) connects second end (21) of the first support arm (20) to the loading platform (29), for positively guiding the loading platform (29) in a fore-and-aft position in a transverse movement in perpendicular direction between the position within the hoist shaft (11) and the position outside the side (10) of the ship.

2. Freight hoisting arrangement in accordance with claim 1, characterised in that the first positive guide means (32) consists of a piece of wire two opposite ends of which are fastened to the hoist carriage (14, 15) and the middle portion of which is fastened via a fastening member (33) to first end (24) of the second support arm (25), and that the second positive guide means (38) consists of a piece of wire two opposite ends of which are fastened to the loading platform (29) and the middle portion of which is fastened via a fastening member (39) to second end (21) of the first support arm (20).

3. Freight hoisting arrangement in accordance with claim 2, characterised in that the first positive guide means (32) is supported just by the respective fastening (34, 37) on the hoist carriage against a stationarily arranged, arcuate guide

means (35, 36) which is arranged at a considerable radial distance from the first pivotal axis (19a), and that the second positive guide means (38) is supported just by the respective fastening (40, 43) on the loading platform (29) against a stationarily arranged, arcuate guide means (41, 43) which is arranged at a considerable radial distance from the third pivotal axis (28a), and a guide means (23) at another radial distance from the second pivotal axis (24a).

4. Freight hoisting arrangement in accordance with one of the claims 1-3, characterised in that the arrangement comprises a pair of hoist carriages (14, 15) which are separately moveable along their respective guide column (12, 13) in a hoist shaft (11) and are separately revolvable about their respective pair of support arms (20, 25) for swinging the respective loading platform (29) between a position in the hoist shaft (11) and a position outside the side (10) of the ship, and that loading platforms (29) of the hoist carriages (14, 15) are adapted to be coupled together hydraulically and/or mechanically (14, 15) for joint movement vertically in the hoist shaft (11) and horizontally between a position in the hoist shaft (11) and a position outside the side (10) of the ship.

Patentansprüche

1. Lasthebeanordnung, insbesondere zur Verwendung auf Schiffen in Verbindung mit einer Frachtöffnung, insbesondere einer seitlichen Ladeöffnung, umfassend mindestens einen Hubwagen (14, 15), der entlang einer Führungssäule (12, 13) in einem Hubschacht (11) bewegbar ist, der die Frachtöffnung oder die seitliche Ladeöffnung mit verschiedenen Decks des Schiffes verbindet, wobei der Hubwagen (14, 15) über zwei Tragarme (20, 25) eine Ladeplattform (29) trägt, die relativ zum Hubwagen zur Bewegung der Ladeplattform horizontal aus einer Stellung in Längsrichtung innerhalb des Hubschachtes (11) des Schiffes durch die Frachtöffnung oder die seitliche Ladeöffnung in eine Position in Längsrichtung des Schiffes an der Außenseite der Seitenwand (10) des Schiffes schwenkbar gehalten ist, wobei die Ladeplattform (29) in horizontaler Richtung bezüglich des Hubwagens (14, 15) mittels einer Antriebseinrichtung, wie etwa eines Druckmediumzylinders (30) bewegbar ist, der vorzugsweise mit dem Hubwagen (14, 15) gelenkig verbunden ist, **dadurch gekennzeichnet**, daß ein erster Tragarm (20) an einem ersten Ende (19) um eine erste vertikale Achse (19a) schwenkbar am Hubwagen (14, 15) gehalten ist und an einem zweiten Ende (21) schwenkbar um

eine zweite vertikale Achse (24a) am ersten Ende (24) des zweiten Tragarmes (25) gehalten ist, während ein zweites Ende (26) des zweiten Tragarmes (25) schwenkbar um eine dritte vertikale Achse (28a) an der Ladeplattform (29) gehalten ist, und daß ein erstes zwangsläufiges Führungsmittel (32) das erste Ende (24) des zweiten Tragarmes (25) mit dem Hubwagen (14, 15) verbindet, während ein zweites zwangsläufiges Führungsmittel (38) das zweite Ende (21) des ersten Tragarmes (20) mit der Ladeplattform (29) verbindet, um die Ladeplattform (29) in einer Position in Längsrichtung bei einer Querverschiebewegung in senkrechter Richtung zwischen der Position innerhalb des Hubschachtes (11) und der Position außerhalb der Seitenwand (10) des Schiffes zwangsläufig zu führen.

2. Lasthebeanordnung gemäß Anspruch 1, dadurch gekennzeichnet, daß das erste zwangsläufige Führungsmittel (32) aus einem Drahtstück besteht, dessen beide gegenüberliegenden Enden am Hubwagen (14, 15) befestigt sind und dessen Mittelabschnitt über ein Befestigungsglied (33) am ersten Ende (24) des zweiten Tragarmes (25) befestigt ist, und daß das zweite zwangsläufige Führungsmittel (38) aus einem Drahtstück besteht, dessen beide gegenüberliegenden Enden an der Ladeplattform (29) befestigt sind und dessen mittlerer Abschnitt über ein Befestigungsglied (39) am zweiten Ende (21) des ersten Tragarmes (20) befestigt ist.
3. Lasthebeanordnung gemäß Anspruch 2, dadurch gekennzeichnet, daß das erste zwangsläufige Führungsmittel (32) nur durch die jeweilige Befestigung (34, 37) am Hubwagen gegen ein feststehend angeordnetes, bogenförmiges Führungsmittel (35, 36) gehalten ist, das in einem beträchtlichen radialen Abstand von der ersten Schwenkachse (19a) angeordnet ist, und daß das zweite zwangsläufige Führungsmittel (38) nur durch die jeweilige Befestigung (40, 43) an der Ladeplattform (29) gegen ein feststehend angeordnetes, bogenförmiges Führungsmittel (41, 42), das in einem beträchtlichen radialen Abstand von der dritten Schwenkachse (28a) angeordnet ist, und ein Führungsmittel (23) in einem anderen radialen Abstand von der zweiten Schwenkachse (24a) gehalten ist.
4. Lasthebeanordnung gemäß einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Anordnung zwei Hubwägen (14, 15) umfaßt, die getrennt entlang ihrer jeweiligen Führungssäule (12, 13) in einem Hubschacht (11) beweglich sind und getrennt um ihre jeweiligen beiden Tragarme (20, 25) drehbar sind, um die jeweilige Ladeplatt-

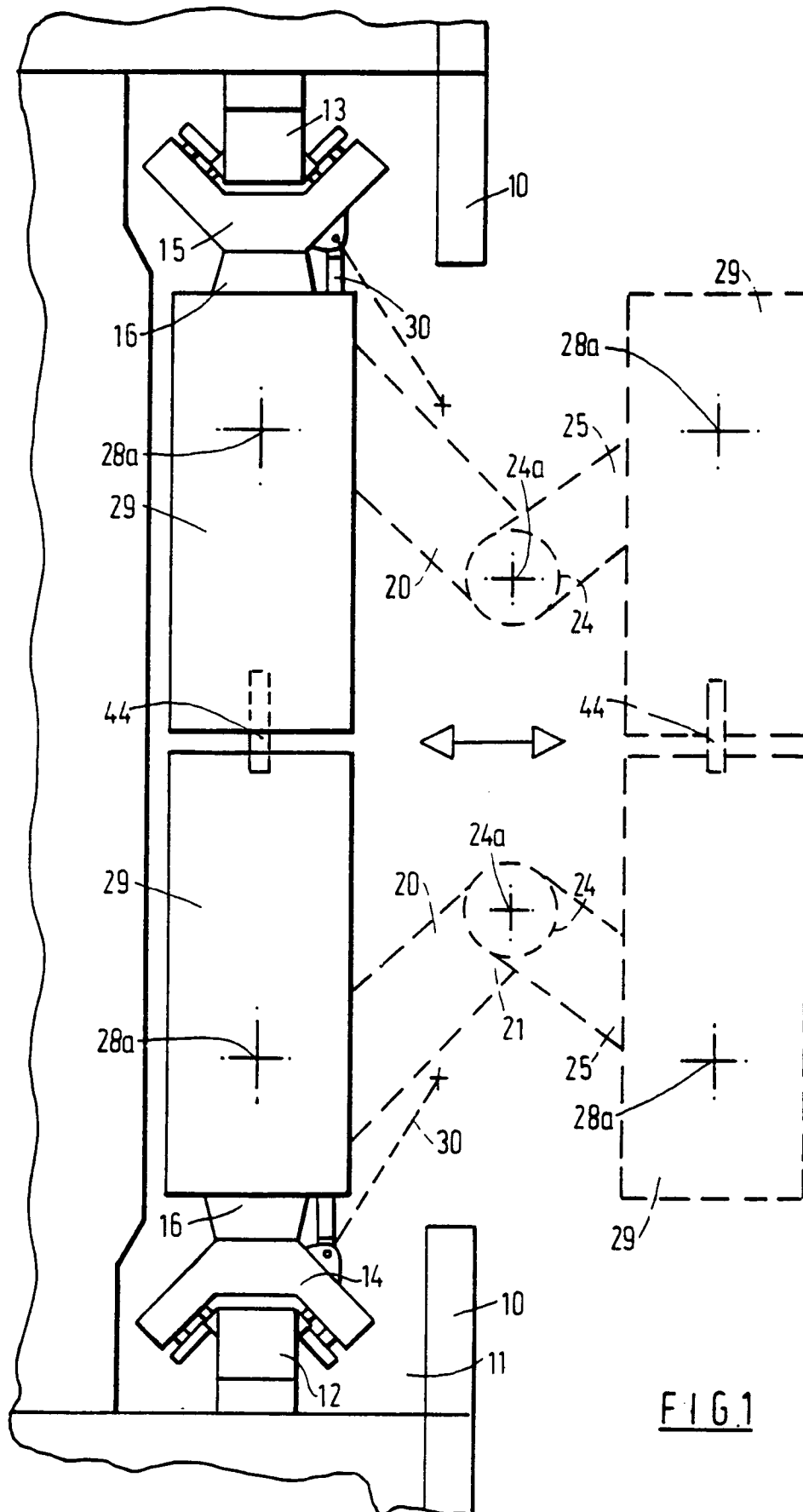
form (29) zwischen einer Position im Hubschacht (11) und einer Position außerhalb der Seitenwand (10) des Schiffes zu verschwenken, und daß die Ladeplattformen (29) der Hubwagen (14, 15) so eingerichtet sind, daß sie hydraulisch und/oder mechanisch (14, 15) zur verbundenen Vertikalbewegung im Hubschacht (11) und Horizontalbewegung zwischen einer Position im Hubschacht (11) und einer Position außerhalb der Seitenwand (10) des Schiffes gekoppelt werden können.

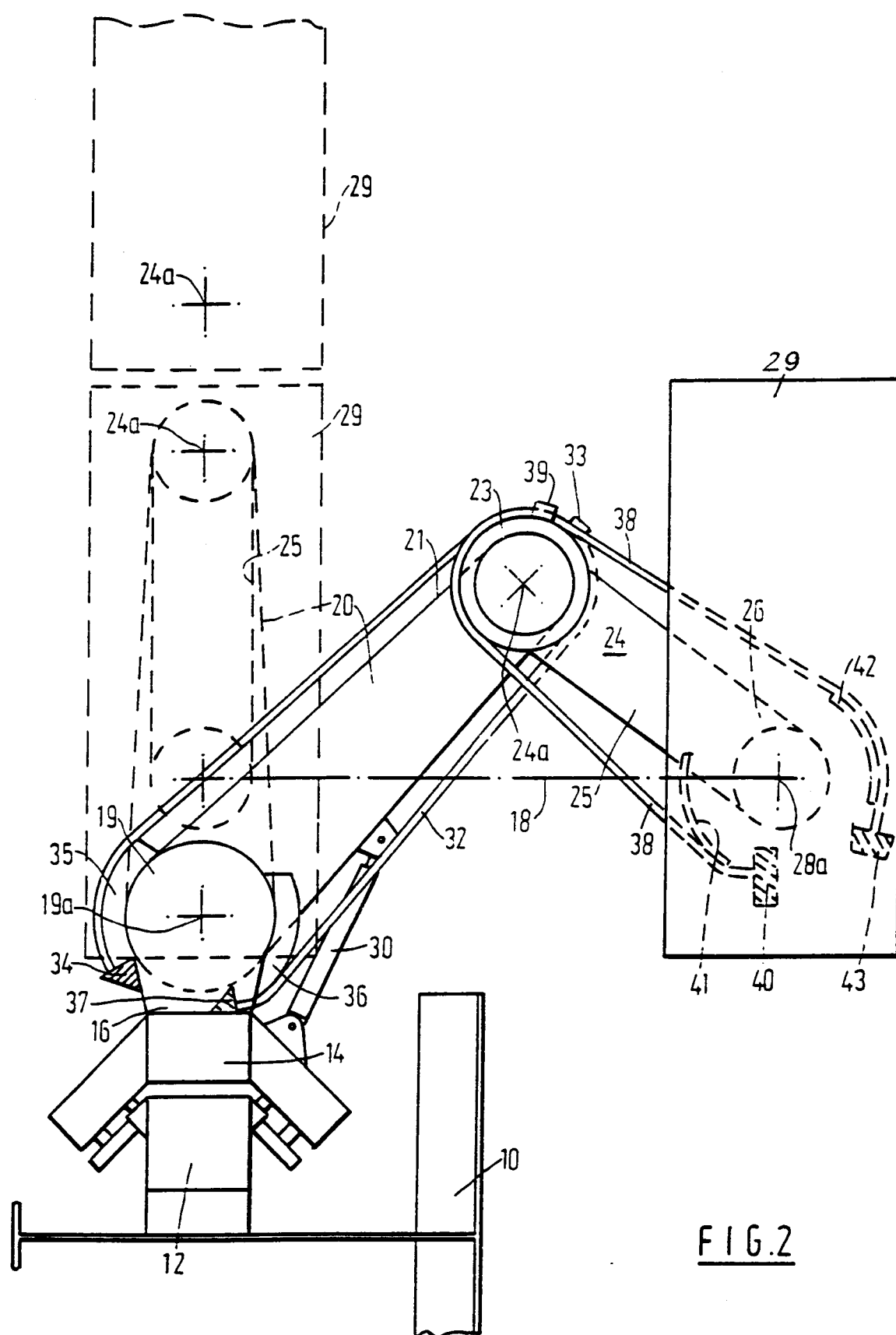
Revendications

1. Installation de levage d'un chargement, notamment destinée à être utilisée à bord d'un navire dans une ouverture de chargement, notamment une ouverture à orifice latéral, comportant au moins un chariot de levage (14, 15) qui est mobile le long d'une colonne de guidage (12, 13) dans une cage de levage (11) qui relie l'ouverture de chargement ou l'ouverture à orifice latéral aux différents ponts du navire, le chariot de levage (14, 15) portant, par l'intermédiaire d'une paire de bras de support (20, 25) une plate-forme de chargement (29) montée sous forme articulée par rapport au chariot de levage afin qu'elle puisse se déplacer horizontalement d'une position avant-arrière à partir d'un emplacement dans la cage de levage (11) du navire par l'ouverture de chargement ou l'ouverture à orifice latéral à une position avant-arrière à l'extérieur par rapport au côté (10) du navire, la plate-forme de chargement (29) étant mobile en direction horizontale par rapport au chariot de levage (14, 15) sous la commande d'un dispositif moteur, tel qu'un vérin (30) à moyenne pression, de préférence raccordé au chariot de levage (14, 15), caractérisée en ce qu'un premier bras de support (20) est articulé à une première extrémité (19) autour d'un premier axe vertical (19a) du chariot de levage (14, 15) et à une seconde extrémité (21), le bras est articulé autour d'un second axe vertical (24a) placé à une première extrémité (24) d'un second bras de support (25), alors que la seconde extrémité (26) du second bras de support (25) est montée de manière articulée autour d'un troisième axe vertical (28a) sur la plate-forme de chargement (29), et en ce qu'un premier dispositif de guidage positif (32) raccorde la première extrémité (24) du second bras de support (25) au chariot de levage (14, 15), alors qu'un second dispositif de guidage positif (38) raccorde la seconde extrémité (21) du premier bras de support (20) à la plate-forme de chargement (29) afin que la plate-forme de chargement (29) soit guidée positivement dans la direction avant-arrière lors d'un déplacement

transversal en direction perpendiculaire entre une position à l'intérieur de la cage de levage (11) et la position en dehors du côté (10) du navire.

2. Installation de levage de chargement selon la revendication 1, caractérisée en ce que le premier dispositif de guidage positif (32) est formé d'un tronçon de câble dont les deux extrémités opposées sont fixées au chariot de levage (14, 15) et dont la partie médiane est fixée par un organe (33) de fixation à la première extrémité (24) du second bras de support (25), et en ce que le second dispositif de guidage positif (38) est formé d'un tronçon de câble dont les deux extrémités opposées sont fixées à la plate-forme de chargement (29) et la partie médiane est fixée, par un organe (39) de fixation, à la seconde extrémité (21) du premier bras de support (20).
3. Installation de levage de chargement selon la revendication 2, caractérisée en ce que le premier dispositif de guidage positif (32) est juste supporté par le dispositif respectif de fixation (34, 37) sur le chariot de levage contre un dispositif courbe (35, 36) de guidage disposé de façon fixe et qui est à une distance radiale considérable du premier axe de pivotement (19a), et en ce que le second dispositif de guidage positif (38) est juste supporté par le dispositif respectif de fixation (40, 43) sur la plate-forme de chargement (29) contre un dispositif courbe (41, 43) de guidage disposé de manière fixe et qui est à une distance radiale considérable du troisième axe de pivotement (28a), et un dispositif de guidage (23) qui est à une autre distance radiale du second axe de pivotement (24a).
4. Installation de levage de chargement selon l'une des revendications 1 à 3, caractérisée en ce que l'installation comporte une paire de chariots de levage (14, 15) qui sont mobiles séparément le long de la colonne respective de guidage (12, 13) dans une cage de levage (11) et qui peuvent tourner séparément autour de leurs paires respectives de bras de support (20, 25) afin qu'ils fassent pivoter la plate-forme respective de chargement (29) entre une position à l'intérieur de la cage de levage (11) et une position à l'extérieur du côté (10) du navire, et en ce que les plates-formes de chargement (29) des chariots de levage (14, 15) sont destinées à être couplées hydrauliquement et/ou mécaniquement (14, 15) afin qu'elles se déplacent ensemble verticalement dans la cage de levage (11) et horizontalement entre une position à l'intérieur de la cage de levage (11) et une position à l'extérieur du côté (10) du navire.





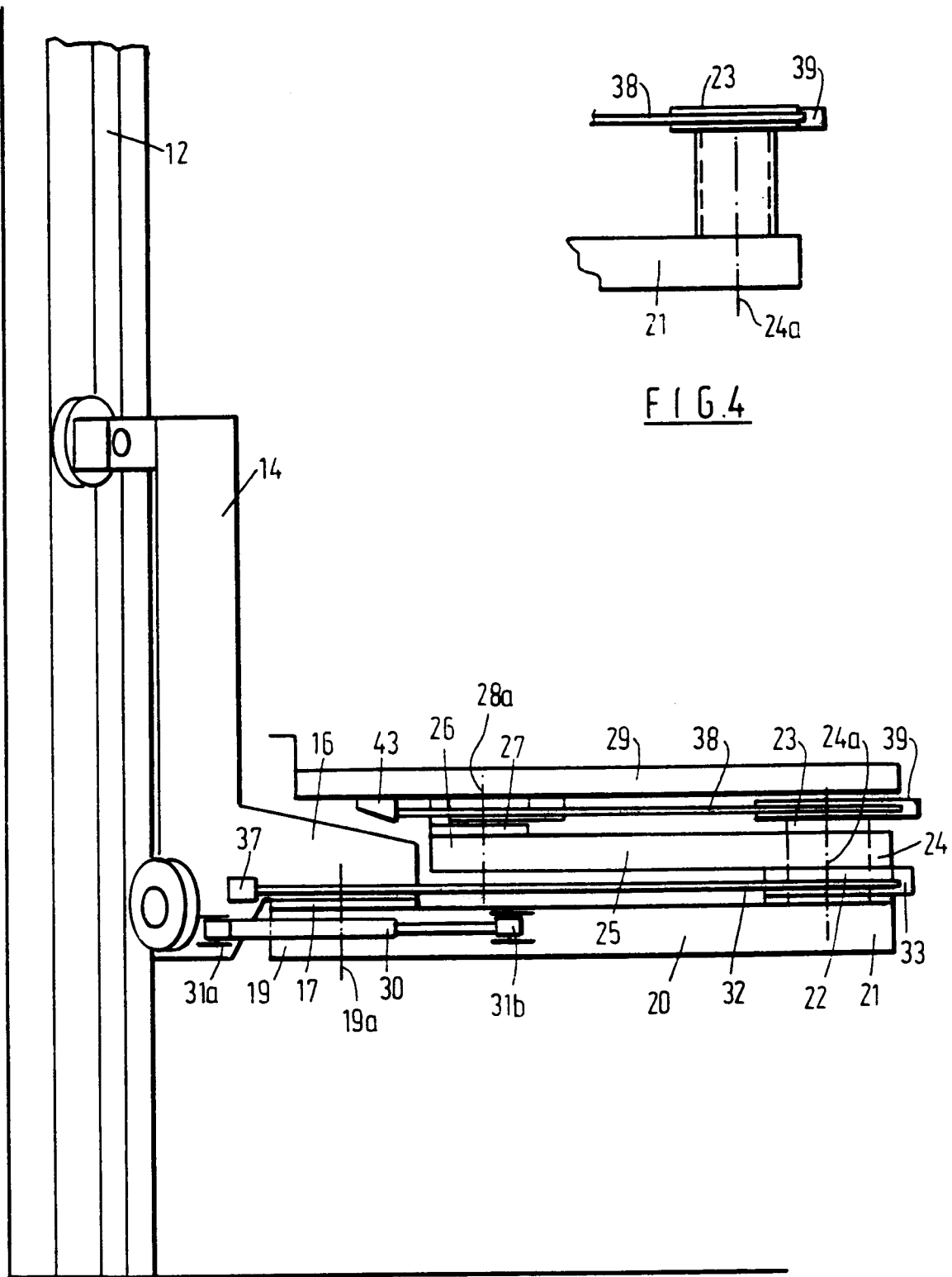


FIG. 3