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(54) **DEVICE FOR A MECHANISM FOR HATCH COVER SECTIONS OF A SHIP**

VORRICHTUNG FÜR EINEN MECHANISMUS FÜR LUKENDECKELABSCHNITTE EINES SCHIFFS
DISPOSITIF POUR LE MECANISME DES SECTIONS D'ECOUTILLE D'UN BATEAU

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Description

[0001] The present invention relates to an arrangement for a mechanism for the actuation of movable hatch cover sections of a ship respectively between the closed and open position and the open and closed position, which also comprises pivoting link elements movably attached to the respective hatch cover section that are capable of being influenced by force by means of an actuating cylinder hydraulic jack.

[0002] Mechanisms for respectively opening and closing and locking hatch cover sections of the kind in question on board ships customarily consist of hydraulically actuated piston cylinder jacks or hydraulic motors and chains. The aforementioned hatch cover sections are caused in this way to be displaced on wheels to the desired positions along tracks intended for the purpose.

[0003] Previously disclosed solutions for effecting the actual opening and closing and locking of the hatch cover sections comprise pivoting link arms which are connected together and actuated by a common jack in such a way, with the help of gripping devices, as to cause the hatch cover sections to be displaced respectively in a direction away from one another and in a direction towards one another for the purpose of opening and closing access to a lockable cargo space of the kind in question on board. A separate locking arrangement needs to be provided in this case.

[0004] Also previously disclosed through WO 02/090175 A1 representing the closest prior art as stated by the preamble of claim 1, for example, is a mechanism for actuating hatch cover sections on board a ship. Pairs of gear segments are utilized for this purpose, which are capable of being actuated by a jack causing them to pivot to intended positions. A special locking arrangement is required, however, in order to retain the hatch cover sections in place in the closed position, although the aforementioned locking arrangement is connected in such a way as to act between the jack and the gear segment.

[0005] Previously disclosed solutions require complicated manufacturing of constituent parts and do not permit simple installation as a common unit which does not need to be specially adapted between the deck and the frame in order for the mechanism to function reliably.

[0006] The principal object of the present invention is thus, in the first instance, to solve the aforementioned problems, among others, in a simple and effective fashion.

[0007] The aforementioned object is achieved by means of an arrangement in accordance with the present invention, which is characterized essentially in that pairs of pivoting link arms, which are mounted on a common part of the ship, are each attached at their respective one end, preferably via claw connections, to a corresponding hatch cover section, and are attached at their respective other end to a divided link connection that is capable of being influenced by force by an aforementioned jack, and in that both link arms are attached to one another by

means of a distance piece, whereby the application of force by means of the jack causes the link arms, by the forced interaction of the link connection parts, to pivot from the lowered and retracted locked position to the open position, in which position the respective attached hatch cover section is retained in the raised and parted position.

[0008] The invention is described below as a number of preferred illustrative embodiments, in conjunction with which reference is made to the accompanying drawings, in which:

Figures 1 and 1A show the arrangement with its associated mechanism with associated hatch cover sections held in the open position viewed respectively from the side and directly from above;

Figures 2 and 2A show the mechanism in the open position with hatch cover sections held in the parted position at a distance from one another and viewed in perspective and from one end;

Figures 3-3C show the mechanism in the closed and locked position with the hatch cover sections held together and viewed both in perspective from one end and from the side, and directly from above; and Figure 4 shows the function of the locking mechanism in detail in order to achieve self-locking.

[0009] The function of this mechanism is to lift/operate and lower/operate the two hatch cover sections respectively from the closed to the open position and vice versa, when the hatch cover sections are simultaneously battened down and locked in their closed position. This new solution is a further development of previously disclosed solutions. Its characteristics compared with previously disclosed solutions are: the links are equivalent to the gear segments, although they require simpler manufacturing. The mechanism consists of a number of links and involves a saving in weight compared with gear rack segments. The entire mechanism can be built and installed as a unit without the need for adaptation between the deck and the frame.

[0010] An arrangement 1 for a mechanism 2 for effecting the actuation of the movable hatch cover sections 3,4 of a ship respectively between the closed position A and the open position B and between the open position B and the closed position A, which also comprises pivoting link elements 5,6 movably attached to the respective hatch cover sections 3,4 that are capable of being influenced by force by means of an actuating cylinder hydraulic jack 7, exhibits pivoting link arms 8,9 capable of interacting in pairs. Quite small parts of the respective intended hatch cover sections 3,4 are illustrated only schematically in the drawings, because such hatch cover sections normally cover the entire cargo width and longitudinal extent of the ship. The aforementioned link arms 8,9 are supported on a common part 10 of the ship and are each attached at their respective one end 8A,9A to their corresponding hatch cover section 3,4, preferably via so-

called claw connections. The link arms 8,9 are attached at their respective other end 8B,9B to a divided link connection 11. The aforementioned link connection 11 is influenced by force FF,FB by an aforementioned jack 7.

[0011] Both link arms 8,9 are also attached to one another by means of a distance piece 12. The link arms 8,9 are caused to pivot in this way, when force is applied by means of the jack 7, by the forced interaction of the link connection parts 13,14, from the lowered and retracted locked position C to the open position D. In the aforementioned open position, the respective attached hatch cover section 3,4 is retained in the raised and parted position B.

[0012] The aforementioned divided link connections 11 are formed, as shown in the drawings, by pairs of interacting articulated arms 13,14, which are attached to one another in an articulated fashion at their respective one end 13A,14A via a common articulation 15. At a distance from the aforementioned common articulation 15, each of the two articulated arms 13,14 is attached in an articulated fashion to its corresponding link arm 5,6 via articulations 16,17.

[0013] The aforementioned common articulation 15 is so arranged as to be capable of passing an imaginary straight line 18, which runs between the articulations 16,17 belonging to the respective link arm 8,9, at a given angle X in order to achieve so-called over-centre locking of the two links 8,9 in conjunction with passing the aforementioned imaginary line 18 and in order to permit the release of the locking in conjunction with the return of the aforementioned common articulation 15 past the aforementioned imaginary line 18.

[0014] Both of the respective link arms 8,9 are pivotally mounted via articulations 19,31 and are supported by a common supporting part 10 on the ship. An aforementioned supporting part 10 is preferably formed by an elongated beam and/or plate 23, by which the mechanism 2 is supported as a unit 24, which can easily be transported and securely mounted rapidly and simply on the deck of the ship on the frame 21 of the opening alongside its frame top 22 without the need for complicated operations.

[0015] One articulated arm 13 exhibits an angled pivot arm 25, which is directly or indirectly attached to an aforementioned jack 7. The aforementioned angled pivot arm 25 is so arranged as to extend at an obtuse angle Z from the remaining part 20 of the associated articulated arm 13, preferably between 100° and 140°. The articulation 16 between the aforementioned articulated arm 13 and one of the link arms 8 is situated for this purpose in the area of both pivot arms 20,25 of the aforementioned articulated arm 13, whereby the desired locking and unlocking of the mechanism 2 can be effected simply by respectively retracting and extending the jack 7.

[0016] The two link arms 8,9 are also attached to one another via a rigid arm 12, which functions as a distance piece and is attached in an articulated fashion to fixing lugs 27,28 on the respective link arm 8,9 at its respective one end 8B,9A, as illustrated by way of example in Fig. 4.

[0017] The link arms 8,9 preferably exhibit triangular form with the articulations 29,30; 16,17 for the hatch cover sections 3,4 and the articulated arm 13 situated at its respective extremities.

5 [0018] As can be clearly appreciated from the perspective views in Figs. 2 and 3, the link attachment parts 13,14 are double, with a pair of links each situated on its own side I, II of the two link arms 8,9.

10 [0019] In order to permit simple installation of the mechanism, the aforementioned mechanism 2 is constructed as a common unit which is so arranged as to be capable of being installed in the position intended for its use simply by being attached to the ship by means of welding and/or bolted joints. The aforementioned jack 7 is supported by the aforementioned unit 24 and is pivotally attached at its one end 7A to a pivot 32 that is supported by the aforementioned plate 23 and/or beam 10 and is pivotally attached at its other opposing end 7B to a pivot 26.

20 [0020] The invention is naturally not restricted to the embodiments described above and illustrated in the accompanying drawings. Modifications are possible, in particular with regard to the nature of the various parts, or by the use of equivalent technology, but without departing from the area of protection afforded to the invention, as defined in the appended Claims.

Claims

- 30
1. Arrangement (1) for a mechanism (2) for the actuation of movable hatch cover sections (3,4) of a ship respectively between the closed and open position (A,B) and the open and closed position (B,A), which also comprises pivoting link elements (5,6) movably attached to the respective hatch cover section (3,4) that are capable of being influenced by force by means of an actuating cylinder hydraulic jack (7), **characterized in that** pairs of pivoting link arms (8,9), which are mounted on a common part (10) of the ship, are each attached at their respective one end (8A,9A), preferably via claw connections, to the corresponding hatch cover section (3,4), and are attached at their respective other end (8B,9B) to a divided link connection (11) that is capable of being influenced by force (FF,FB) by an aforementioned jack (7), and **in that** both link arms (8,9) are attached to one another by means of a distance piece (12), whereby the application of force by means of the jack causes the link arms (8,9), by the forced interaction of the link connection parts (13,14), to pivot from the lowered and retracted locked position (C) to the open position (D), in which position (D) the respective attached hatch cover section (3,4) is retained in the raised and parted position (B).
- 40
2. Arrangement in accordance with claim 1, **characterized in that** divided link connections (11) are
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formed by pairs of interacting articulated arms (13,14), which are attached to one another in an articulated fashion at their respective one end (13A, 14A) via a common articulation (15) and are each attached in an articulated fashion to their corresponding link arm (5,6) at a distance from the aforementioned common articulation (15).

3. Arrangement in accordance with claim 2, **characterized in that** the aforementioned common articulation (15) is so arranged as to be capable of passing an imaginary straight line (18), which runs between the articulations (16,17) belonging to the respective link arm (8,9) in order to achieve so-called over-centre locking of the two links (8,9) in conjunction with passing the aforementioned imaginary line (18), and in order to permit the release of the locking in conjunction with the return of the aforementioned common articulation (15) past the aforementioned imaginary line (18). 5
4. Arrangement in accordance with one or other of claims 2-3, **characterized in that** one articulated arm (13) exhibits an angled pivot arm (25), which is directly or indirectly attached to an aforementioned jack (7). 25
5. Arrangement in accordance with claim 4, **characterized in that** the aforementioned angled pivot arm (25) extends at an obtuse angle (Z) from the remaining part (20) of the associated articulated arm (13), preferably between 100° and 140°. 30
6. Arrangement in accordance with one or other of claims 4-5, **characterized in that** the aforementioned one articulated arm (13) is attached to the jack (7) via its angled pivot arm (25). 35
7. Arrangement in accordance with one or other of the foregoing claims, **characterized in that** the two link arms (8,9) are attached to one another via a rigid arm (12), which is attached in an articulated fashion to fixing lugs (27,28) on the respective link arm (8,9) at its respective one end (8B,9A). 40
8. Arrangement in accordance with one or other of the foregoing claims, **characterized in that** the link arms (8,9) exhibit triangular form with the articulations (29,30; 16,17) for the hatch cover sections (3,4) and the articulated arm (13) situated in its respective tip areas. 50
9. Arrangement in accordance with one or other of the foregoing claims, **characterized in that** the link connection parts (13,14) are double with a pair of links each situated on its own side (I,II) of the two link arms (8,9). 55

10. Arrangement in accordance with one or other of the foregoing claims, **characterized in that** the aforementioned mechanism (2) is constructed as a common unit (24), which is so arranged as to be installed in the position intended for its use simply by being attached to the ship.

Patentansprüche

1. Anordnung (1) für einen Mechanismus (2) für die Betätigung von beweglichen Lukendeckelabschnitten (3, 4) eines Schiffes zwischen der geschlossenen und offenen Position (A, B) bzw. der offenen und geschlossenen Position (B, A), der auch Schwenkverbindungselemente (5, 6) umfasst, die beweglich an dem jeweiligen Lukendeckelabschnitt (3, 4) angebracht sind und durch eine Kraft mittels einer Betätigungs-Hydraulikzylinderhebevorrichtung (7) beeinflusst werden können, **dadurch gekennzeichnet, dass** Paare von Schwenkverbindungssarmen (8, 9), die an einem gemeinsamen Teil (10) des Schiffes befestigt sind, jeweils an ihrem jeweiligen einen Ende (8A, 9A), vorzugsweise über Zahnverbindungen, an dem entsprechenden Lukendeckelabschnitt (3, 4) angebracht sind und an ihrem jeweiligen anderen Ende (8B, 9B) an einem geteilten Verbindungsanschlussstück (11) angebracht sind, das durch eine Kraft (FF, FB) durch eine vorstehend erwähnte Hebevorrichtung (7) beeinflusst werden kann, und dass beide Verbindungsarme (8, 9) aneinander mittels eines Abstandsstückes (12) angebracht sind, wobei die Aufbringung einer Kraft mittels der Hebevorrichtung bewirkt, dass die Verbindungsarme (8, 9) durch die erzwungene Wechselwirkung der Verbindungsanschlussteile (13, 14) von der abgesenkten und zurückgezogenen verriegelten Position (C) in die offene Position (D) verschwenken, in welcher Position (D) der jeweilige angebrachte Lukendeckelabschnitt (3, 4) in der angehobenen und getrennten Position (B) festgehalten ist. 10
2. Anordnung nach Anspruch 1, **dadurch gekennzeichnet, dass** geteilte Verbindungsanschlussstücke (11) durch Paare von in Wechselwirkung stehenden angelenkten Armen (13, 14) gebildet sind, die aneinander auf eine angelenkte Weise an ihrem jeweiligen einen Ende (13A, 14A) über eine gemeinsame Anlenkung (15) angebracht sind und jeweils auf eine angelenkte Weise an ihrem entsprechenden Verbindungsarm (5, 6) in einem Abstand von der vorstehend erwähnten gemeinsamen Anlenkung (15) angebracht sind. 20
3. Anordnung nach Anspruch 2, **dadurch gekennzeichnet, dass** die vorstehend erwähnte gemeinsame Anlenkung 30

(15) derart angeordnet ist, dass sie eine imaginäre gerade Linie (18) passieren kann, die zwischen den Anlenkungen (16, 17), die zu dem jeweiligen Verbindungsarm (8, 9) gehören, verläuft, um eine sogenannte Sprungverriegelung der beiden Verbindungsstücke (8, 9) in Verbindung mit dem Passieren der vorstehend erwähnten imaginären Linie (18) zu erreichen, und um das Lösen der Verriegelung in Verbindung mit der Rückkehr der vorstehend erwähnten gemeinsamen Anlenkung (15) über die vorstehend erwähnte imaginäre Linie (18) hinweg zuzulassen.

4. Anordnung nach einem der Ansprüche 2 bis 3, **dadurch gekennzeichnet, dass** ein angelenkter Arm (13) einen abgewinkelten Schwenkarm (25) aufweist, der direkt oder indirekt an der vorstehend erwähnten Hebevorrichtung (7) angebracht ist.
5. Anordnung nach Anspruch 4, **dadurch gekennzeichnet, dass** der vorstehend erwähnte angelenkte Schwenkarm (25) sich unter einem stumpfen Winkel (Z) von dem restlichen Teil (20) des zugehörigen angelenkten Arms (13), vorzugsweise zwischen 100° und 140°, erstreckt.
6. Anordnung nach einem der Ansprüche 4 bis 5, **dadurch gekennzeichnet, dass** der vorstehend erwähnte eine angelenkte Arm (13) an der Hebevorrichtung (7) über seinen abgewinkelten Schwenkarm (25) angebracht ist.
7. Anordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die beiden Verbindungsarme (8, 9) aneinander über einen starren Arm (12) angebracht sind, der auf eine angelenkte Weise an Fixieransätzen (27, 28) an dem jeweiligen Verbindungsarm (8, 9) an seinem jeweiligen einen Ende (8B, 9A) angebracht ist.
8. Anordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsarme (8, 9) eine dreieckige Form aufweisen, wobei die Anlenkungen (29, 30; 16, 17) für die Lukendeckelabschnitte (3, 4) und den angelenkten Arm (13) in ihren jeweiligen vorderen Bereichen gelegen sind.
9. Anordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsanschlussteile (13, 14) doppelt vorliegen, wobei jeweils ein Paar Verbindungsteile auf seiner eigenen Seite (I, II) von den beiden Verbin-

dungsarmen (8, 9) gelegen ist.

10. Anordnung nach einem der vorhergehenden Ansprüche,

dadurch gekennzeichnet, dass der vorstehend erwähnte Mechanismus (2) als eine gemeinsame Einheit (24) aufgebaut ist, die derart eingerichtet ist, dass sie in der für ihre Verwendung vorgesehenen Position eingebaut werden kann, indem sie einfach an dem Schiff angebracht wird.

Revendications

1. Dispositif (1) pour un mécanisme (2) d'actionnement de parties mobiles d'écoutille (3, 4) d'un bateau respectivement entre une position fermée et ouverte (A, B) et entre une position ouverte et fermée (B, A), qui comprend également des éléments pivotants de liaison (5, 6) reliés de manière mobile à la partie d'écoutille respective (3, 4) qui sont susceptibles d'être actionnés de force au moyen d'un vérin hydraulique d'actionnement (7), **caractérisé en ce que** des paires de bras pivotants de liaison (8, 9), montés sur une partie commune (10) du bateau, sont chacun raccordés au niveau d'une première extrémité respective (8A, 9A), de préférence par l'intermédiaire de connexions à serrage, à la partie d'écoutille correspondante (3, 4), et sont fixés au niveau de leur autre extrémité (8B, 9B) à un raccordement de liaison divisée (11) qui est susceptible d'être actionné de force (FF, FB) par le vérin (7) susmentionné, **et en ce que** les deux bras de liaison (8, 9) sont fixés l'un à l'autre au moyen d'une pièce d'écartement (12), par laquelle l'application de la force par le vérin provoque, par l'interaction forcée des pièces de raccordement de liaison (13, 14), le pivotement des bras de liaison (8, 9) depuis une position abaissée et verrouillée rétractée (C) vers une position d'ouverture (D), position (D) dans laquelle la partie correspondante de l'écoutille (3, 4) est maintenue dans la position relevée et séparée (B).
2. Dispositif selon la revendication 1, **caractérisé en ce que** les raccordements de liaison divisée (11) sont constitués d'une paire de bras articulés (13, 14) interagissant l'un avec l'autre, qui sont fixés l'un à l'autre de manière articulée au niveau d'une de leur extrémité respective (13A, 14A) par l'intermédiaire d'une articulation commune (15) et sont chacun fixés de manière articulée au bras de liaison correspondant (5, 6) à distance de l'articulation commune (15) susmentionnée,
3. Dispositif selon la revendication 2, **caractérisé en ce que** l'articulation commune (15) susmentionnée est prévue pour pouvoir franchir une ligne droite imaginaire (18), qui court entre les articulations (16, 17)

- appartenant au bras de liaison respectif (8, 9) afin de réaliser un verrouillage excentré des deux raccords (8, 9) en même temps que le franchissement de la ligne imaginaire (18) susmentionnée, et afin de permettre le relâchement du verrouillage en même temps que le retour de l'articulation commune (15) susmentionnée au-delà de la ligne imaginaire (18). 5
4. Dispositif selon l'une quelconque des revendications 2 à 3, **caractérisé en ce qu'un** bras articulé (13) comprend un bras de pivotement coudé (25), raccordé directement ou indirectement au vérin (7) susmentionné. 10
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5. Dispositif selon la revendication 4, **caractérisé en ce que** le bras de pivotement coudé (25) susmentionné se prolonge selon un angle obtus (Z) à partir de la partie restante (20) du bras articulé (13) associé, de préférence compris entre 100° et 140°. 20
6. Dispositif selon l'une quelconque des revendications 4 à 5, **caractérisé en ce que** le bras articulé (13) susmentionné est fixé au vérin (7) par l'intermédiaire de son bras de pivotement coudé (25). 25
7. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les deux bras de liaison (8, 9) sont fixés l'un à l'autre par l'intermédiaire d'un bras rigide (12) qui est fixé de manière articulée à des pattes de fixation (27, 28) sur le bras de liaison respectif (8, 9) au niveau de sa première extrémité respective (8B, 9A). 30
8. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les bras de liaison (8, 9) présentent une forme triangulaire avec les articulations (29, 30 ; 16, 17) pour les parties d'écouille (3, 4) et le bras articulé (13) situé au niveau de sa zone d'extrémité respective. 35
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9. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les pièces de raccordement de liaison (13, 14) sont doubles comprenant une paire de liens situés chacun de son propre côté (I, II) des deux bras de liaison (8, 9). 45
10. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le mécanisme (2) susmentionné est construit en tant qu'unité commune (24) pour être installée dans la position d'utilisation prévue en étant simplement fixée au bateau. 50
55

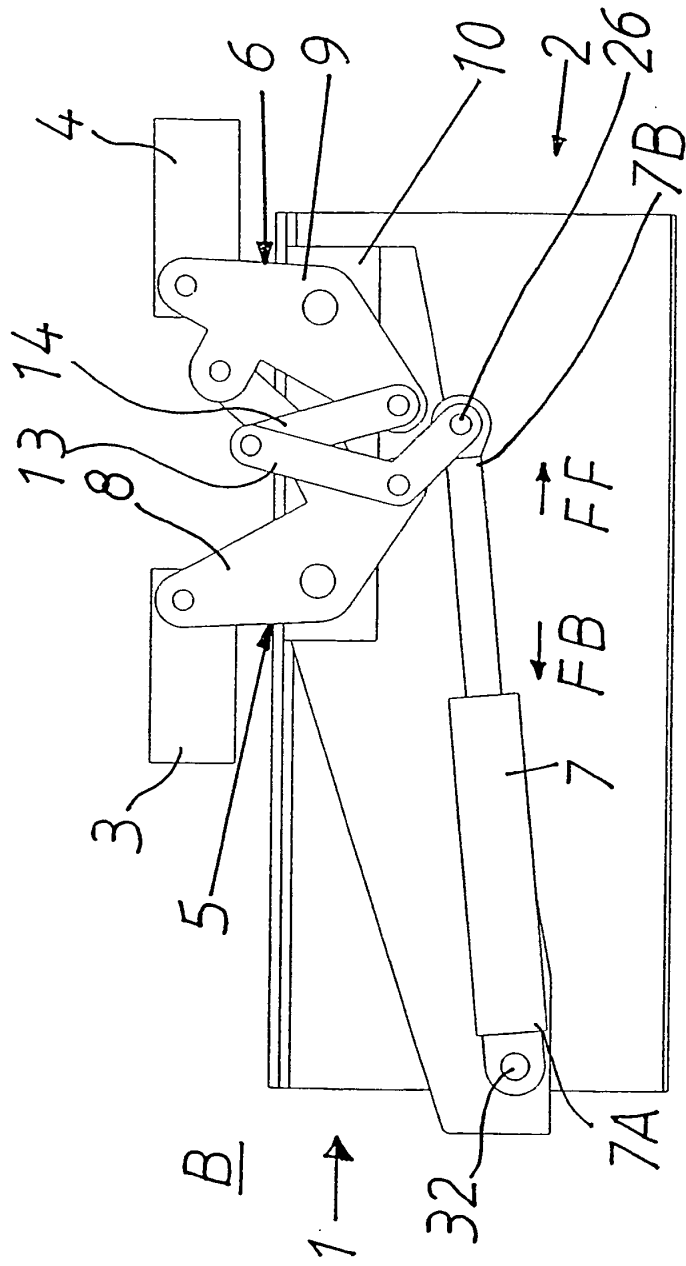


FIG. 1

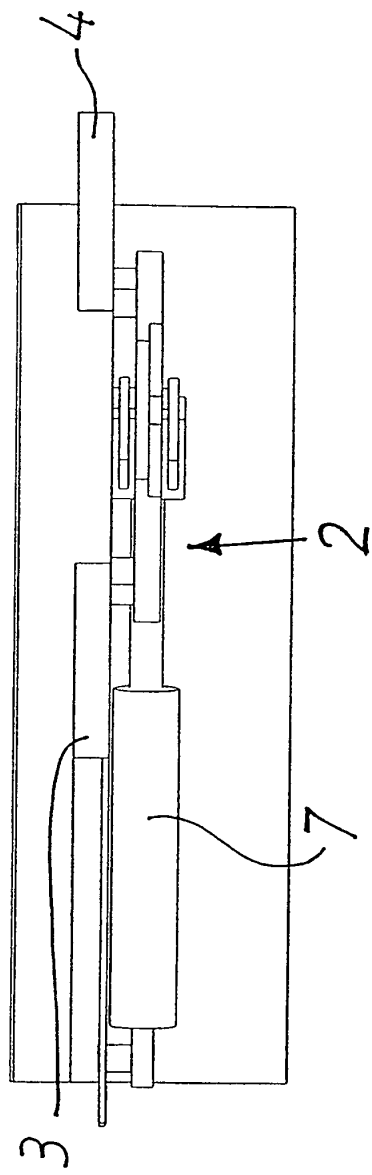


FIG. 1A

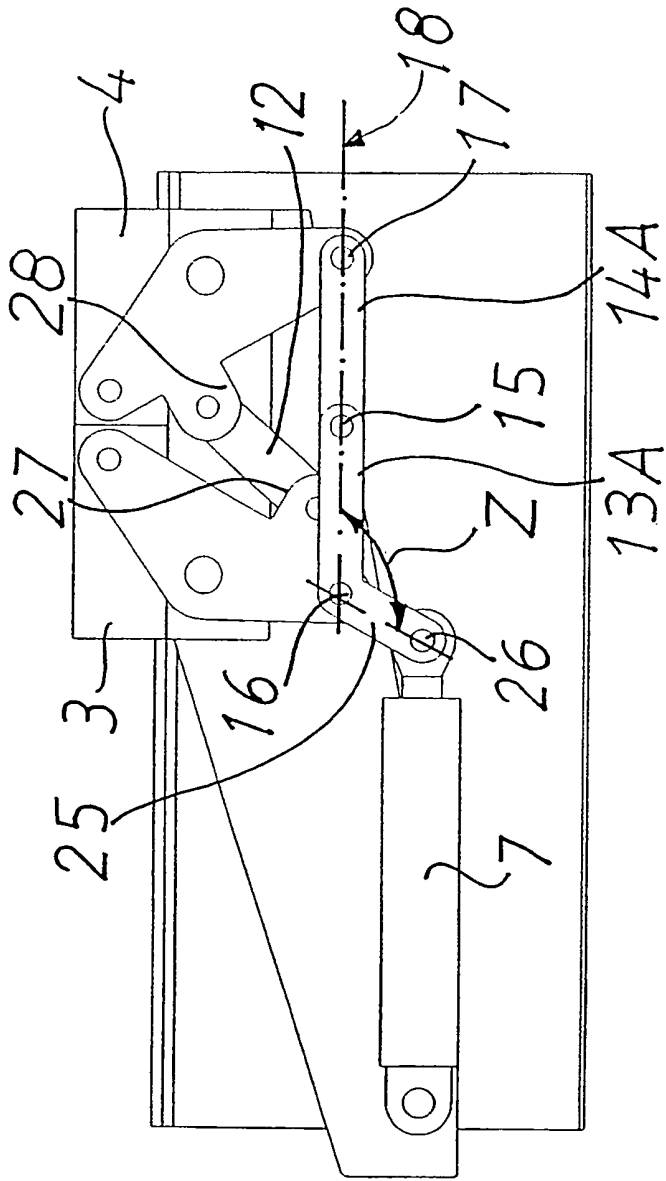


FIG. 3B

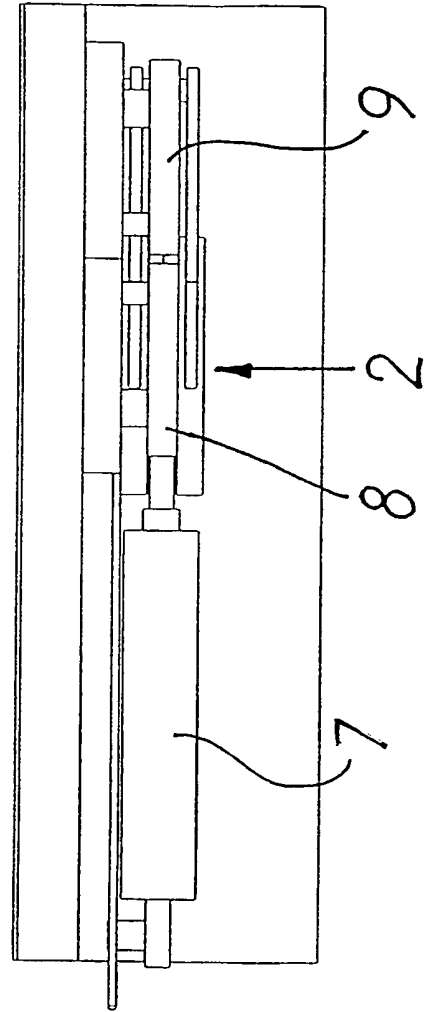


FIG. 3C

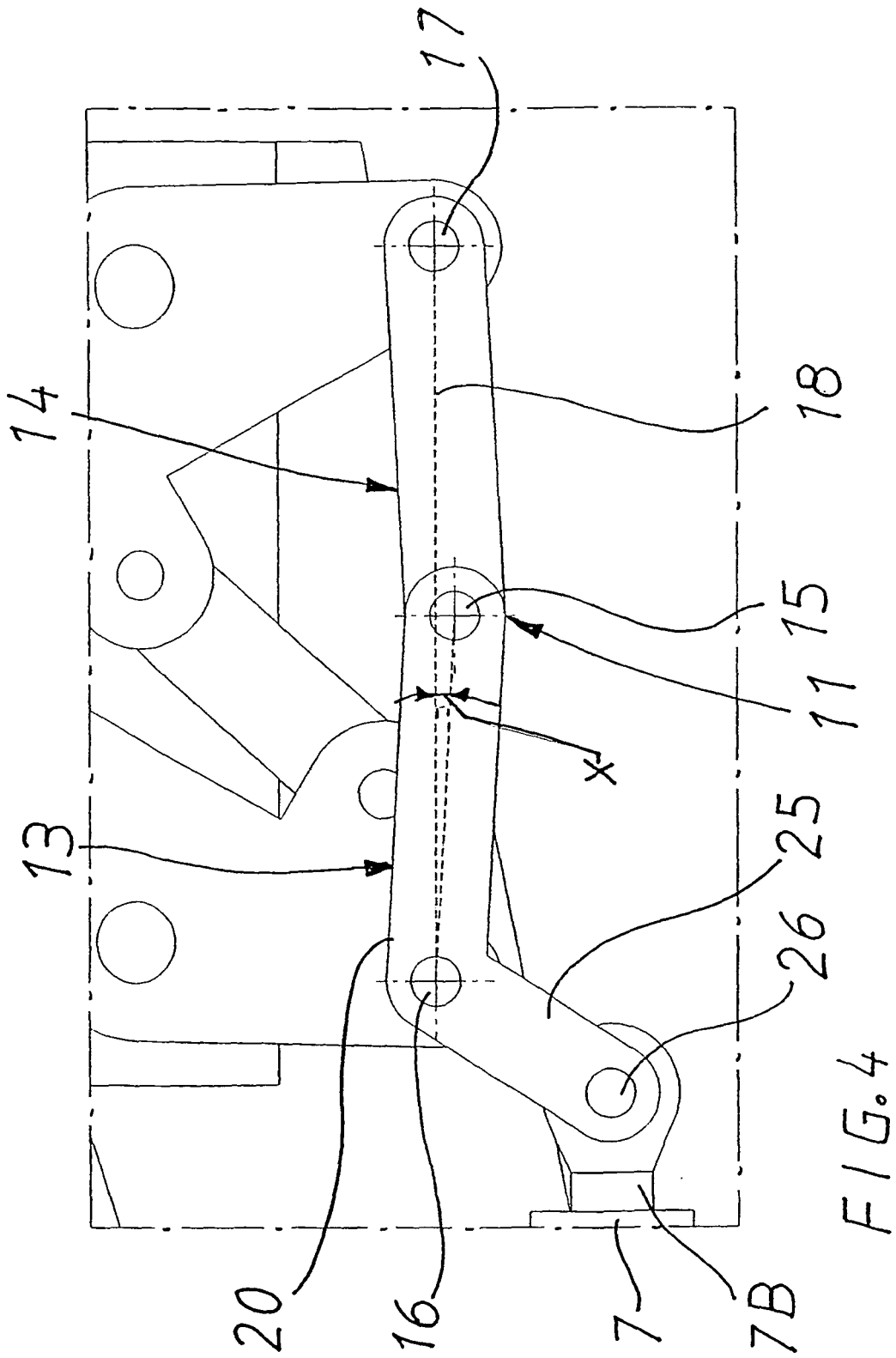


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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