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(54) **APPARATUS FOR STACKING FLEXIBLE SHEET-LIKE PRODUCTS, SUCH AS INDUSTRIAL HIDES**

EINRICHTUNG ZUM STAPELN VON FLEXIBLEN BOGENFÖRMIGEN PRODUKTE, SOWIE
INDUSTRIELLE HÄUTEN

APPAREIL DESTINE A EMPILER DES PRODUITS DU TYPE FEUILLE FLEXIBLE, TELS QUE LES
FEUILLES BRUTES INDUSTRIELLES

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EP 0 971 853 B1

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Description

Technical Field

[0001] The present invention relates to an apparatus for stacking flexible sheet-like products, such as for example industrial hides and similar objects, on rigid supports like trestles or pallets located downstream in the feeding line of the products.

Background Art

[0002] A large number of apparatuses of the above mentioned type are known that essentially comprise a generally inclined surface on which the products are loaded and which defines a first movable ramp to which at least a second movable surface is associated for handling and unloading the products, said second surface serving also to provide the side of deposition of the products on the support placed downwards.

[0003] As it is known, particularly in the tanning industry it may be necessary to stack the hides with the "flower" or "flesh" layer on the same or on opposite sides.

[0004] From DE-A-38202301 is known an apparatus for stacking sheet-like products which can be adapted to various heights of the product staples.

[0005] This apparatus is not conceived to stack properly flexible sheet-like products such as hides.

[0006] The international patent application WO 94/16980 discloses a stacking apparatus which is particularly adapted to stack properly hides, however it has the disadvantage of a relative complexity of the mechanism necessary to stack hides on the right side.

[0007] Another problem of the known stacking apparatus is the limitation to the minimum unloading height of the products that in several cases it is useful to stack on very low platforms, pallets or even on crossbars laid on the ground. Heretofore, owing to such limitation it was necessary to arrange the platforms or the pallets on additional supports, possibly adjustable in height to allow to start the stacking operation.

[0008] Another problem of the known stacking apparatuses resides in the driving mechanism of the movable loading and unloading surfaces, which mechanism is normally formed by a simple chain or toothed belt driven by a motor and coupled to the movable surface, for example a conveyor belt or a series of annular bands, by means of side clamps. Such a coupling arrangement must be enclosed in a very limited space and therefore reduces the effectiveness and the reliability of the driven system.

[0009] A principal aim of the present invention is to solve the above mentioned problems by means of an apparatus for stacking flexible sheet-like products which has a simplified construction, a reduced size, high reliability and capability of unloading the products at a minimum height.

Disclosure of Invention

[0010] In accordance with a preferred aspect of the invention, there is provided an apparatus for stacking flexible sheet-like products, such as industrial hides and similar objects, in accordance with claim 1.

[0011] The dependent claims define particular embodiments of the stacking apparatus according to the invention.

Brief Description of Drawings

[0012] Further characteristics and advantages of the present invention will be more clearly apparent from the description of a preferred embodiment of the stacking apparatus according to the invention illustrated by way of a non limiting example with reference to the attached drawings, in which:

FIG. 1 shows a schematic lateral view of a stacking apparatus according to a preferred aspect of the invention coupled to a trestle and to a storage pallet; FIG. 2 shows a schematic elevation view of the apparatus of Fig. 1;

FIG. 3 shows an enlarged scale a detail of the apparatus of Fig. 1 enclosed within the circle III;

FIG. 4 shows an enlarged view of the detail of Fig. 3 partially sectioned along the vertical plain IV-IV.

Best mode of carrying out the invention

[0013] With reference to the cited figures, an apparatus for stacking flexible sheet-like products according to the invention, generally indicated with the reference numeral 1, comprises a supporting frame structure 2 formed by metallic profiles and plates supporting a first movable surface 3 for loading and move forward the products P along the direction V and a second movable transport surface 4 for handling and unloading products P on a gathering trestle C or on pallet T.

[0014] The movable surfaces 3, 4 are preferably made by conveyor belts or bands which continuously rotate and are tensioned by end rollers, at least one of which is driven to promote advancement of the products P.

Both first and second surface 3, 4 are formed by at least two sections respectively indicated 3', 3" and 4', 4" which are mutually hinged and arranged to contact each other.

[0015] According to the invention, the second movable surface 4 is mounted on rollers 5 sliding along lateral rod-like guides 6. Each guide 6 is supported by a lateral carriage 7 which is mounted on rollers 9 to move along vertical uprights 8. Each lateral carriage 7 is coupled to a vertical screw 10 which is in its turn driven by an eternal motor so as to move between an upper end position, as depicted in Fig. 1 with a continuous line, and a lower end position, as depicted in Fig. 1 with a phantom line, approximately superposed to pallet T.

[0016] According to the invention, the first feeding surface 3 has a forward end 11 hinged to the carriage 7 around axis H which is substantially normal to the advancement direction V of products P, so as to overlap the second movable surface 4 even when this latter is in its fully extended forward position. The backward end of the first movable surface 3 is hinged to a fixed point 12 placed forward to the tensioning rollers 13 of products P.

[0017] According to a peculiar aspect of the invention, the side guides 6 of the second movable surface 4 are formed by two separate and adjacent portions indicated 6m and 6v, arranged respectively backward and forward of the articulation axis A affixed to carriage 7.

[0018] The backward guide portion 6v is substantially horizontal, while the forward guide portion 6m is swingable since it is supported proximate to its upward end by a roller 14 sliding along an inclined stationary guide 15 between an upper end position and a lower end position. When roller 14 is in its upper end position and carriage 7 is in its upper position, the guide portion 6m is substantially parallel to the first movable surface 3 and accordingly the second movable surface 4 can be displaced underneath the first movable surface 3 as is depicted in Fig. 1 with a continuous line.

[0019] When roller 14 is in its lower position along guide 15 and carriage 7 is in its lower position, as depicted in Fig. 1 with a phantom line, the backward guide portion 6m is approximately horizontal and in line with the guide portion 6v.

[0020] A further peculiar aspect of the present invention resides in the driving mechanism of the second movable surface 4, generally indicated with the reference numeral 16. Such a mechanism is essentially formed by a pair of belts or chains 17, 17', of identical shape, arranged in side-by-side relationship, mutually coupled to a common shaft and further wound on pinions 18, 19.

[0021] In order to reduce the overall dimensions of the mechanism and to increase reliability thereof, chain 17 is only designed to be driven by pinion 18, while chain 17' is designed to be coupled to section 4' of the movable surface 4 by means of clamp 20.

Fig. 4 further shows the structure of the articulation joint 21 between the guide portions 6v and 6m of each lateral guide 6.

Claims

1. Apparatus for stacking flexible sheet-like products, such as industrial hides and similar products, comprising a bearing frame (2) that supports a first movable surface (3) for the advancement of the products along a direction (V), a second movable surface (4) mounted on a carriage (7) by means of rollers (5) sliding along lateral guides (6), parallel to said direction (V) and anchored to said carriage (7),

wherein said first movable surface (3) is oscillably mounted on said frame (2) with its forward end connected to said carriage (7) and wherein said second movable surface (4) is able to slide between a first position, substantially under said first surface (3), and a second position, forward of said first surface (3), for handling and unloading products (P) on a gathering support (C, T) and wherein said carriage (7) is in turn movable in a vertical direction from a minimum height from the ground.

2. Apparatus according to claim 1, **characterized in that** the downward end (11) of said first movable surface (3) is hinged to said carriage (7) on an axis (H) substantially normal to said advancement direction (V).

3. Apparatus according to claim 1, **characterized in that** both said first surface (3) and second surface (4) are formed by at least two sections (3', 3"; 4', 4") mutually hinged and continuously movable in the same direction.

4. Apparatus according to claim 3, **characterized in that** said lateral guide (6) comprises two separate portions (6m, 6v) which can be mutually inclined, and arranged respectively backwards and forwards with respect to a common articulation axis (A) affixed to said carriage (7).

5. Apparatus according to claim 4, **characterized in that** said forward guide portion (6v) is substantially straight and horizontal.

6. Apparatus according to claim 4, **characterized in that** said backward guide portion (6m) has a forward end hinged to said carriage (7) and a backward end (14) sliding mounted on a pair of lateral stationary guides (15) to move between an upper end position and a lower end position.

7. Apparatus according to claim 6, **characterized in that** said pair of lateral stationary guides (15) is inclined in such a way that when the backward end of said second movable surface (4) is in its upper end position, said backward guide portion (6m) is substantially parallel to said first movable surface (3) while when said backward guide portion (6m) is in its lower position it is substantially horizontal and in line with said forward guide portion (6m).

8. Apparatus according to claim 1, **characterized in that** it is provided with a belt or chain mechanism (16) for driving said second movable surface (4) along said lateral guides (6).

9. Apparatus according to claim 8, **characterized in that** said belt or chain mechanism comprises at

least a pair of chains (17, 17') in side-by-side relationship, one of which (17) is cooperating with a toothed pinion (18) and the other of which (17') is anchored to said second movable surface (4).

10. Apparatus according to claim 1, **characterized in that** all said movable surfaces (3, 4) are endless belt conveyors or annular bands.

Patentansprüche

1. Einrichtung zum Stapeln von flexiblen, bogenförmigen Produkten, sowie industriellen Häuten und ähnlichen Produkten mit

einem tragenden Rahmen (2), der eine erste bewegliche Fläche (3) trägt zum Fördern der Produkte entlang einer Richtung (V), einer zweiten beweglichen Fläche (4), die auf einem Wagen (7) montiert ist mittels Rollen (5), die entlang seitlicher Führungen (6) gleiten parallel zu der Richtung (V) und befestigt sind an dem Wagen (7),

wobei die erste bewegliche Fläche (3) so auf den Rahmen (2) montiert ist, dass sie oszillieren kann und mit ihrem vorderen Ende verbunden ist mit den Wagen (7) und

wobei die zweite bewegliche Fläche (4) gleiten kann zwischen einer ersten Position, im wesentlichen unter der ersten Fläche (3) und einer zweiten Position vor der ersten Fläche (3), zum Handhaben und Entladen der Produkte (P) auf einen Sammelträger (C, T), und wobei der Wagen (7) seinerseits in eine senkrechte Richtung beweglich ist von einer minimalen Höhe vom Boden.

2. Einrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das nach unten gerichtete Ende (11) der ersten beweglichen Fläche (3) schwenkbar ist zum Wagen (7) um eine Achse (H), die im wesentlichen senkrecht ist zu der Förderrichtung (V).

3. Einrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** beide, sowohl die erste Fläche (3) als auch die zweite Fläche (4), zumindest durch zwei Abschnitte (3', 3'', 4', 4'') gebildet sind, die gegenseitig schwenkbar und kontinuierlich beweglich in die gleiche Richtung sind.

4. Einrichtung gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die seitliche Führung (6) zwei getrennte Bereiche (6m, 6v) umfaßt, die gegenseitig geneigt werden können und jeweils nach hinten und vorn gesetzt werden können mit Bezug auf eine gemeinsame Gelenkachse (A), die an dem Wagen (7) befestigt ist.

5. Einrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** der vordere Führungsbereich (6v) im wesentlichen gerade und horizontal ist.

6. Einrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** der hintere Führungsbereich (6m) ein vorderes Ende aufweist, das schwenkbar an dem Wagen (7) befestigt ist und ein hinteres Ende (14), das gleitend montiert ist auf einem Paar seitlicher, stationärer Führungen (15), um sich zwischen einer oberen Endposition und einer unteren Endposition zu bewegen.

7. Einrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** das Paar seitlicher, stationärer Führungen (15) so geneigt ist, dass wenn das hintere Ende der zweiten beweglichen Fläche (4) in seiner oberen Endposition ist, der hintere Führungsbereich (6m) im wesentlichen parallel ist zu der ersten beweglichen Fläche (3), wohingegen wenn der hintere Führungsbereich (6m) in seiner unteren Position ist, dieser im wesentlichen horizontal und in einer Linie mit dem vorderen Führungsbereich (6v) ist.

8. Einrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** dieser mit einem Riemen- oder einem Kettenmechanismus (16) versehen ist zum Antrieb der zweiten beweglichen Fläche (4) entlang der seitlichen Führungen (6).

9. Einrichtung gemäß Anspruch 8, **dadurch gekennzeichnet, dass** der Riemen- oder Kettenmechanismus mindestens ein Paar, Seite an Seite angeordneter Ketten (17, 17') umfaßt, von denen der eine (17) zusammen wirkt mit einem Ritzel (18) und der andere (17') befestigt ist an der zweiten beweglichen Fläche (4).

10. Einrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** all die beweglichen Flächen (3, 4) endlose Förderbänder oder ringförmige Bänder sind.

Revendications

1. Appareil pour empiler des produits souples en forme de feuilles tels que des peaux industrielles ou des produits analogues comprenant un bâti porteur (2) qui supporte une première surface mobile (3) destinée à faire avancer les produits selon une direction (V) et une deuxième surface mobile (4) montée sur un chariot (7) au moyen de galets (5) qui coulisent le long de guides latéraux (6), parallèles à ladite direction (V) et ancrés audit chariot (7), dans lequel ladite première surface mobile (3) est montée de façon oscillante sur ledit bâti (2), avec son

- extrémité avant reliée audit chariot (7), et dans lequel ladite deuxième surface mobile (4) est capable de coulisser entre une première position, située sensiblement sous ladite première surface (3), et une deuxième position, située en avant de ladite première surface (3), pour manipuler et décharger des produits (V) sur un support collecteur (C, T) et dans lequel ledit chariot (7) peut à son tour se déplacer dans une direction verticale en partant d'une hauteur minimum au-dessus du sol. 5
2. Appareil selon la revendication 1 **caractérisé en ce que** l'extrémité aval (11) de ladite première surface mobile (3) est articulée à charnière audit chariot (7) sur un axe (H) sensiblement normal à ladite direction d'avance (V). 10
3. Appareil selon la revendication 1 **caractérisé en ce que** ladite première surface (3) et ladite deuxième surface (4) sont toutes deux formées d'au moins deux sections (3', 3"; 4', 4") articulées à charnière l'une par rapport à l'autre et qui sont mobiles en mouvement continu dans la même direction. 20
4. Appareil selon la revendication 3 **caractérisé en ce que** ledit guide latéral (6) comprend deux parties séparées (6m, 6v) qui peuvent s'incliner l'une par rapport à l'autre et qui sont agencées respectivement en amère et en avant par rapport à un axe d'articulation commun (A) fixé audit chariot (7). 25 30
5. Appareil selon la revendication 4 **caractérisé en ce que** ladite partie avant (6v) du guide est sensiblement rectiligne et horizontale. 35
6. Appareil selon la revendication 4 **caractérisé en ce que** ladite partie arrière (6m) du guide possède une extrémité avant articulée à charnière audit chariot (7) et une extrémité arrière (14) qui est montée coulissante sur une paire de guides fixes latéraux (15) pour se déplacer entre une position extrême supérieure et une position extrême inférieure. 40
7. Appareil selon la revendication 6 **caractérisé en ce que** ladite paire de guides fixes latéraux (15) est inclinée de telle manière que, lorsque l'extrémité arrière de ladite deuxième surface mobile (4) est dans sa position extrême supérieure, ladite partie arrière (6m) du guide soit sensiblement parallèle à ladite surface mobile (3), et que, lorsque ladite partie arrière (6m) du guide est dans sa position inférieure, elle soit sensiblement horizontale et en ligne avec ladite portion avant (6m) du guide. 45 50
8. Appareil selon la revendication 1 **caractérisé en ce qu'il** est muni d'un mécanisme à courroie ou à chaîne (16) destiné à entraîner ladite deuxième surface mobile (4) le long desdits guides latéraux (6). 55
9. Appareil selon la revendication 8 **caractérisé en ce que** ledit mécanisme à courroie ou à chaîne comprend au moins une paire de chaînes (17, 17') disposées côte à côte, dont l'une (17) coopère avec un pignon denté (18) et dont l'autre (17') est ancrée à ladite deuxième surface mobile (4).
10. Appareil selon la revendication 1 **caractérisé en ce que** toute lesdites surfaces mobiles (3, 4) sont des transporteurs à courroie sans fin ou des bandes annulaires.

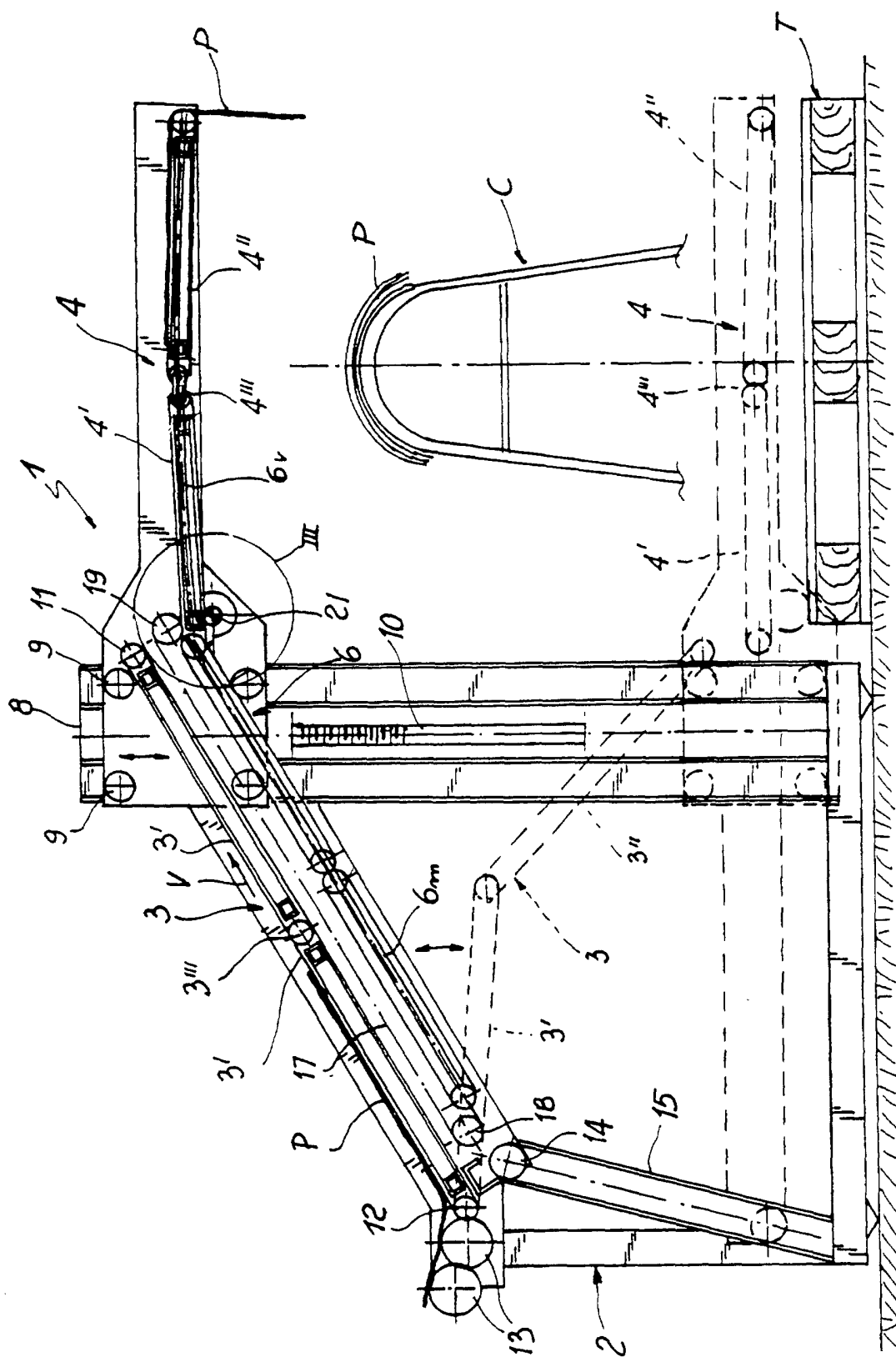


Fig. 1

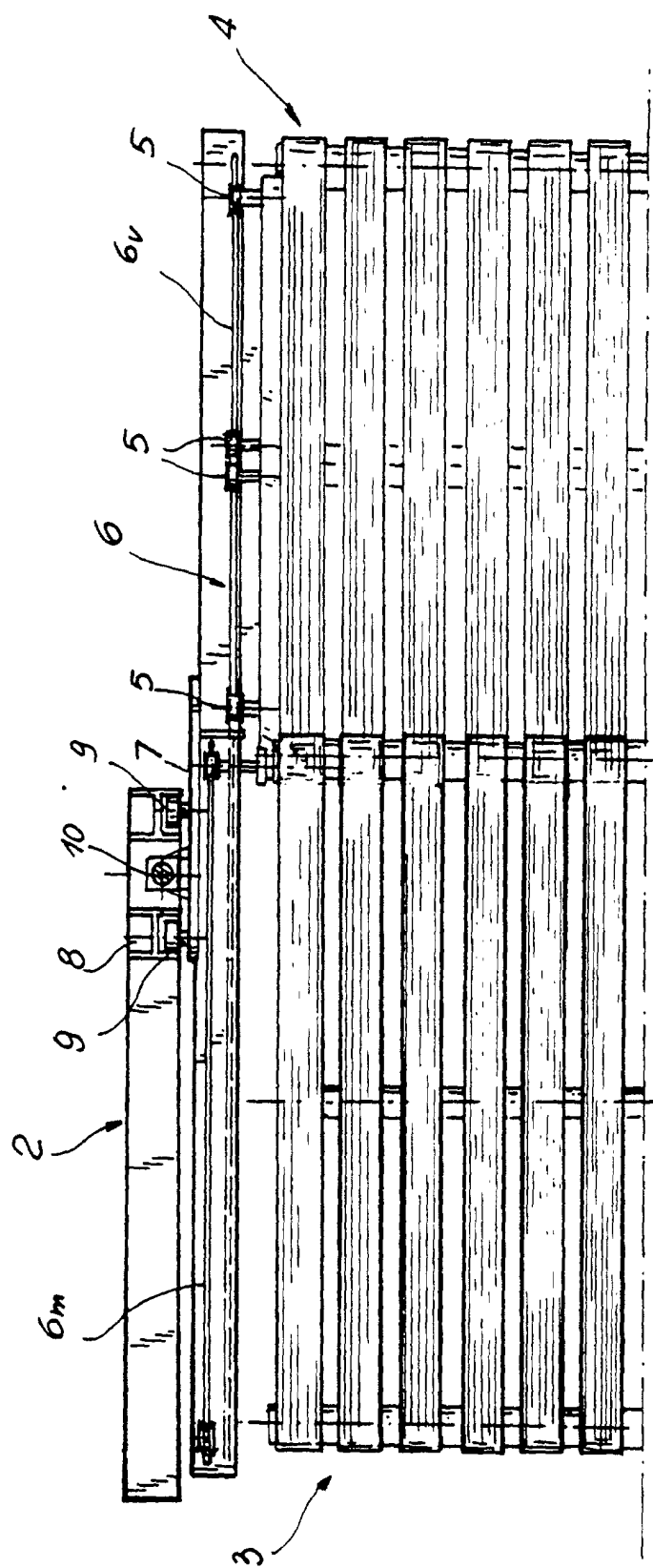


Fig. 2

