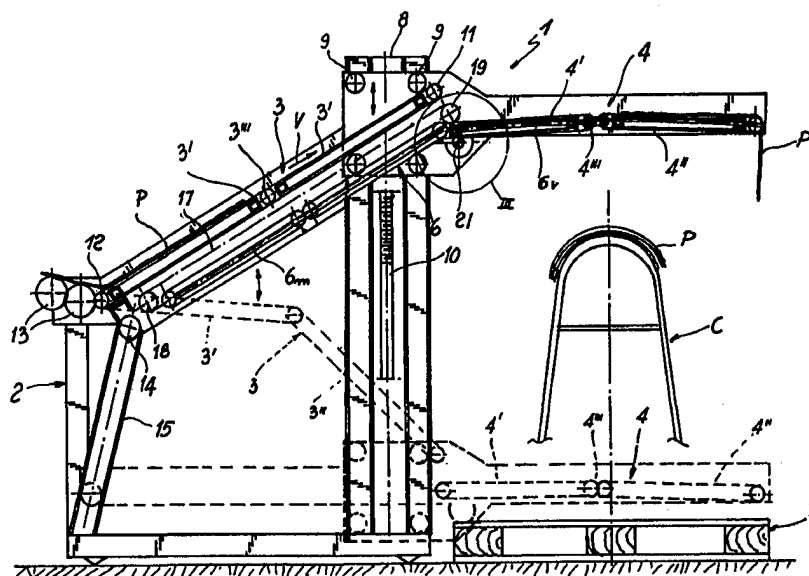


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(54) Title: APPARATUS FOR STACKING FLEXIBLE SHEET-LIKE PRODUCTS, SUCH AS INDUSTRIAL HIDES

**(57) Abstract**

An apparatus for stacking flexible sheet-like products, such as industrial hides and similar objects, comprises a bearing frame (2) which supports a first movable surface (3) for the advancement of the products along a generally inclined direction (V), and a second movable surface (4) arranged at least partially under the first surface (3) for handling and unloading the products (P) on a gathering support (C, T). The second movable surface (4) is slidably mounted on a carriage (7) vertically movable from a minimum height from the ground, while the first movable surface (3) is oscillably mounted on said frame structure (11) with its downward end connected to said carriage.

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Description

APPARATUS FOR STACKING FLEXIBLE SHEET-LIKE PRODUCTS, SUCH AS INDUSTRIAL HIDES

5

Technical Field

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

15 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
20 second surface serving also to provide the side of deposition of the products on the support placed downwards.

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

One of the most felt problems in the modern industry is that relating to space, insofar as the industrial apparatuses should have as much reduced overall dimension as possible both in the
30 assembly phase and in the operative conditions.

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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
5 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.

10 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
15 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.

20 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
25 capability of unloading the products at a minimum height.

Disclosure of Invention

In accordance with a preferred aspect of the invention, there
30 is provided an apparatus for stacking flexible sheet-like

products, such as industrial hides and similar objects, which in accordance with the independent claim comprises a bearing frame structure which supports a first movable surface for the advancement of the products along a generally inclined
5 direction, and a second movable surface arranged at the forward end of said first surface, characterized in that said second movable surface is slidably mounted on a carriage which is vertically movable from a minimum height from the ground, and in that said first transport surface is
10 oscillably mounted on said frame structure with its forward end connected to said carriage.

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

15

Brief Description of Drawings

Further characteristics and advantages of the present invention will be more clearly apparent from the description of a
20 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
25 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
30 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

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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.

15 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.

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.

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.

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.

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.

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.

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.

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 generally inclined direction (V), and a second movable surface (4) arranged at least partially forward of said first surface (3) for handling and unloading products (P) on a gathering support (C, T), characterized in that said second movable surface (4) is slidably mounted on a carriage (7) which is in turn movable in a vertical direction from a minimum height from the ground, said first movable surface (3) being oscillably mounted on said frame (11) with its forward end connected to said carriage (7).

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 2, characterized in that said second movable surface (4) is mounted on rollers (5) sliding along lateral guides (6) mutually parallel and anchored to said carriage (7).

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

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

7. Apparatus according to claim 5, 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
15 between an upper end position and a lower end position.

8. Apparatus according to claim 7, characterized in that said pair of lateral stationary guides (15) is inclined in such a way that when the backward end of said second
20 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).

25

9. 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).

30

10. Apparatus according to claim 9, 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
5 which (17') is anchored to said second movable surface (4).

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

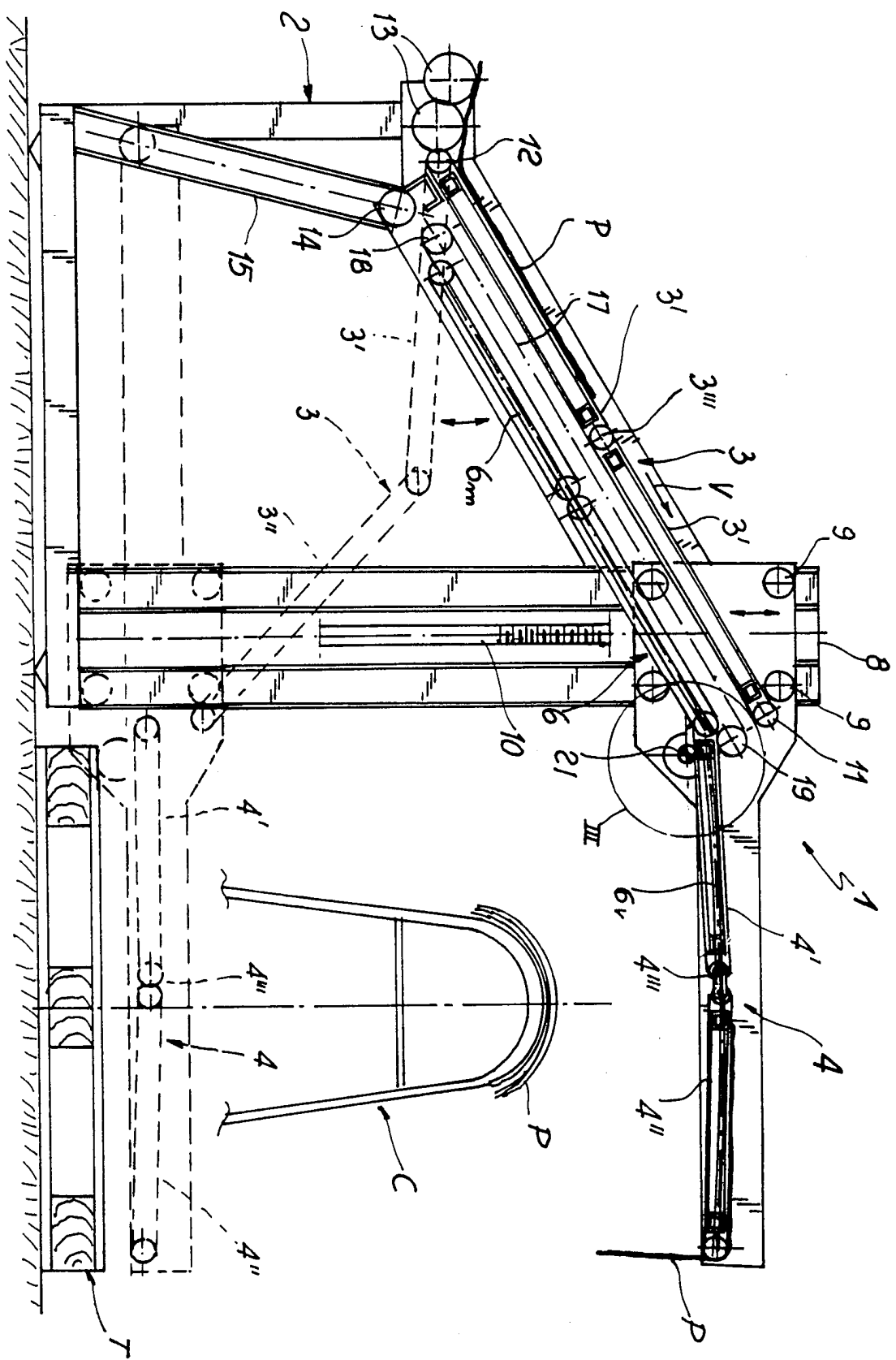


Fig. 1

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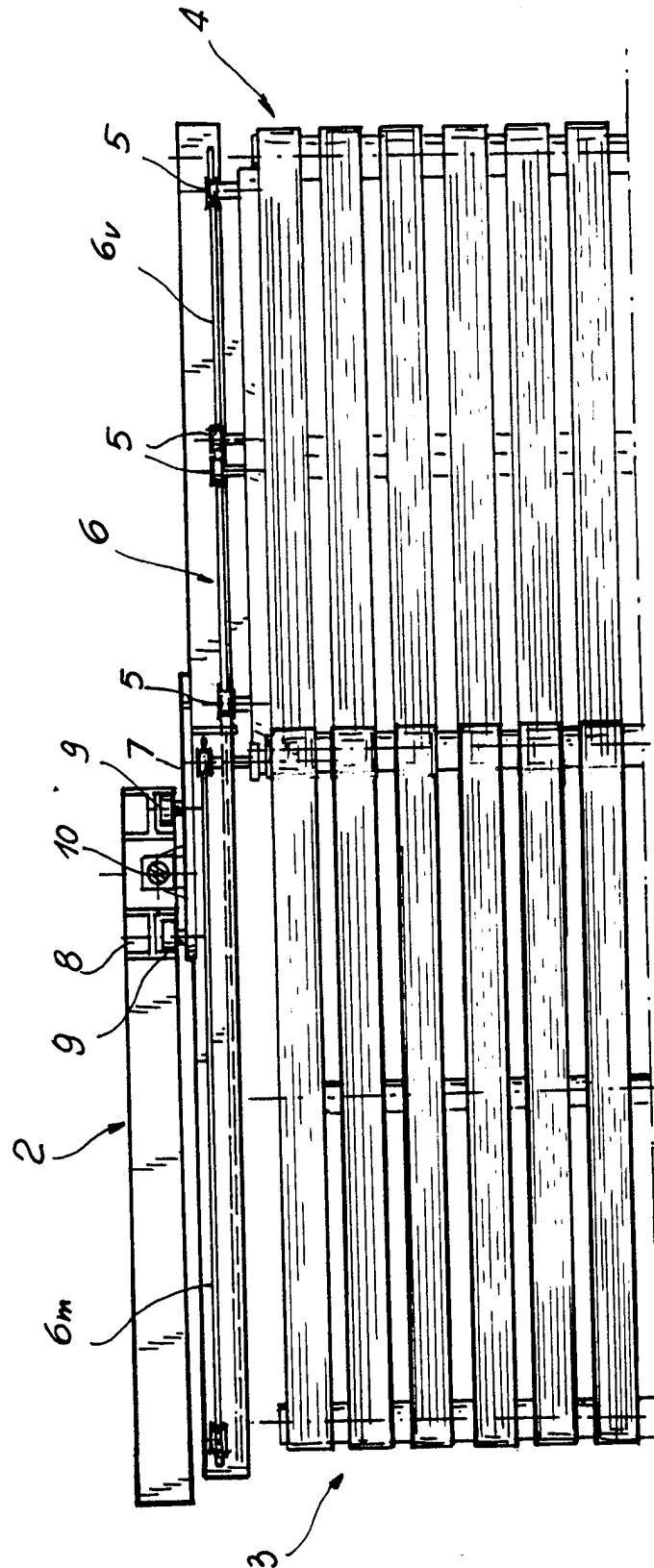
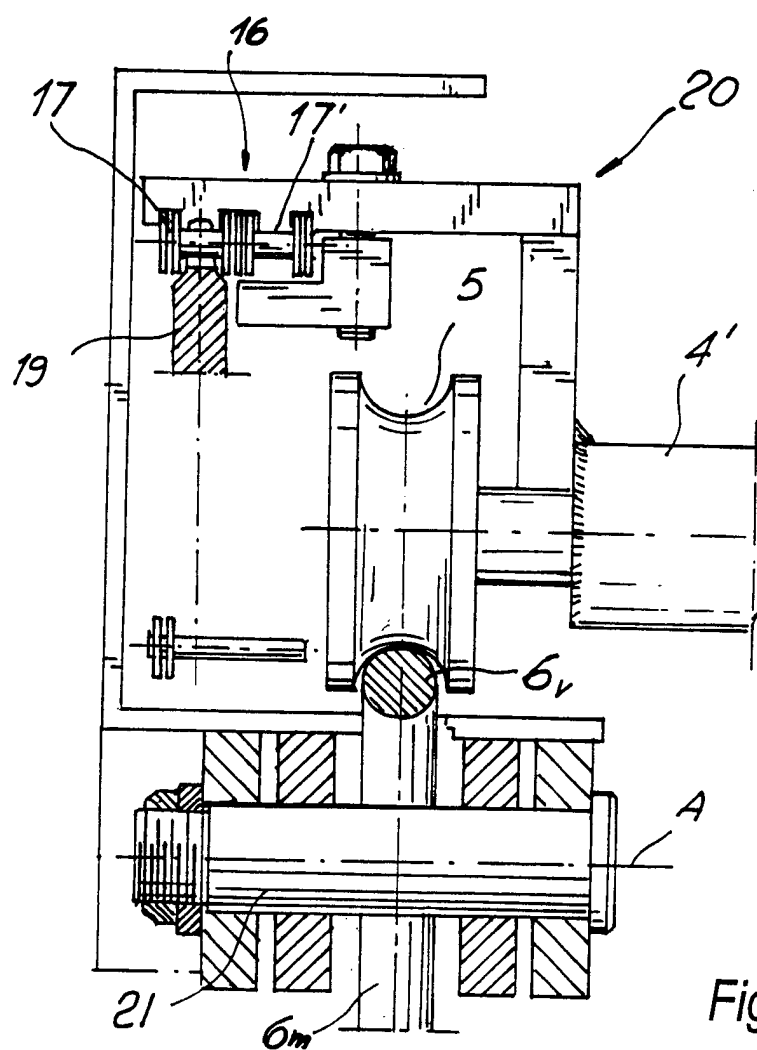
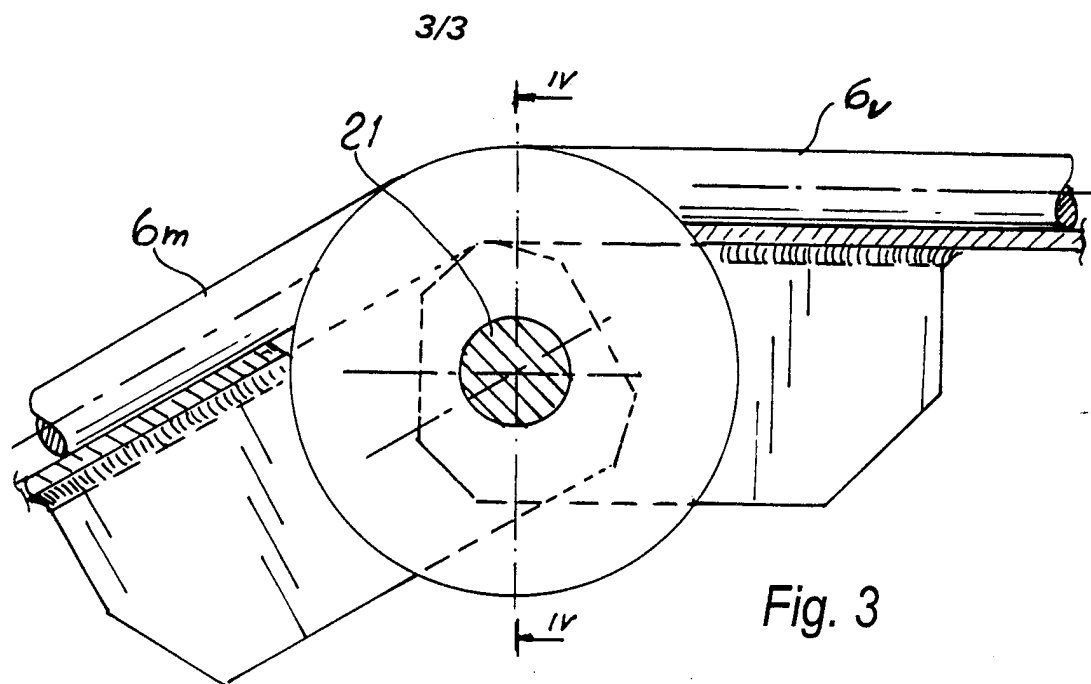


Fig. 2



INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 98/00068

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B65H29/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 38 20 201 A (RATIONALISIERUNGSMITTELBETRIEB) 26 January 1989	1-3
A	see the whole document ---	4-11
X	WO 94 16980 A (CARTIGLIANO OFF SPA ; CORNER ANTONIO (IT)) 4 August 1994	1-3
A	see page 12, line 12 - line 29; figure 1 ---	4-11
A	EP 0 331 863 A (NUOVA CETASS S P A) 13 September 1989 see the whole document ---	1-11
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Information on patent family members

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