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(54) Machine for wrapping products with plastic film

(57) A wrapping machine, for wrapping with plastic film (2) products arranged in a stack (3) on a stand (4), comprising a rotary platform (5), rotatable round a vertical axis (5a); a fixed supporting structure (6), comprising at least a vertical upright (7) next to the platform (5); a horizontal arm (8), supported by the upright (7), cantilever-style above the platform (5); and a presser (9), also supported by the horizontal arm (8), freely rotatable round a vertical axis (9a) of rotation, and movable between a first, operating position in which, associated with the stack (3), it helps to keep the products in the stack neat, and a second, non-operating position in which said presser (9) is distant from the stack (3). A sheet extender device (10) is integrated in the vertical structure (6) and is supported by it on the same side relative to the platform (5), for placing a sheet of plastic film (2) between the top of the stack (3) and the presser (9).

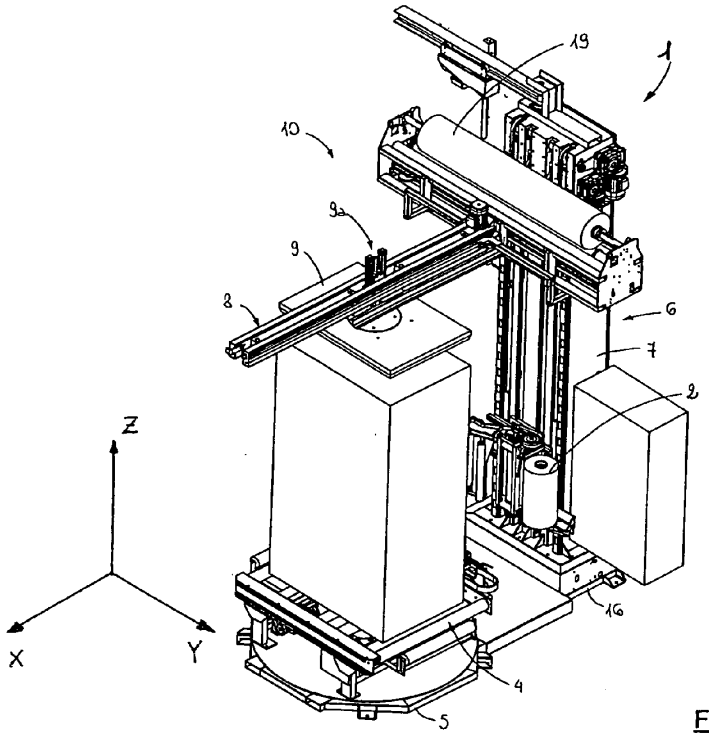

Fig. 1

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Description

[0001] This invention relates to the packaging sector and in particular relates to a wrapping machine for collective, group packaging of products stacked on a stand, by wrapping with plastic film.

[0002] For the collective packaging of a plurality of products arranged in a stack on a stand, special wrapping machines are widely used, an example of them described and illustrated in document GB 2192853, whose basic configuration essentially comprises: a horizontal platform, rotatable round a vertical axis; a fixed supporting structure provided with a single vertical upright; a horizontal arm projecting from the upright cantilever-style above the platform and sustaining a presser which makes contact with the stack from the top towards the platform, thereby ensuring that during rotation of the platform the stack does not lose its shape.

[0003] The plastic film for wrapping is supported by a reel sustained by a carriage which is motor-driven and movable in a guide along the vertical upright. While the platform rotates, a strip of film is unwound from the reel and, being simultaneously wound around the stack, creates a spiral due to the composition of the translating motion of the carriage and the rotating motion of the platform.

[0004] When the machine is designed to produce sealed packaging, or in any case able to protect the packaged products from dust, the wrapping of the products is obtained by producing two spirals: one ascending (which is formed for example during the carriage upstroke) and one descending (which is formed for example during the downstroke), as well as covering of the top of the stack by placing a sheet of polyethylene over it which, released after production of the ascending spiral, is then engaged and stabilised by the descending spiral which is superposed on it.

[0005] For positioning the polyethylene sheet, sheet extender devices are used which comprise a suitable reel of film and are equipped with mechanical actuators which: unwind the film, move it into position and cut it suitably synchronised with the steps of wrapping of the stack by the wrapping film. Such sheet extender devices usually have their own structure, independent of the structure of the wrapping machine, which in the overall configuration of the machine is located in a position diametrically opposed to that of the upright or uprights of the wrapping machine.

[0006] Such a configuration is the basic case of several disadvantages. The first of these entails-relative to a wrapping machine for producing traditional packaging without being sealed against water or dust - a significant increase in the overall dimensions of the machine structure.

[0007] A second disadvantage is that of requiring the presence of additional units for positioning at a predetermined height the actuators for unwinding and for depositing the sheet of packaging material on top of the stack. Disadvantageously, this involves: machine structural complexity, a parallel increase in machine costs; and also a cycle time needed for packaging each stack which is relatively long, since it disadvantageously includes significant unproductive times due to positioning of the sheet extender device at a predetermined height.

[0008] The aim of this invention is to overcome such disadvantages with a solution whose characteristics in accordance with the above-mentioned aims are clearly described in the claims below.

[0009] Said technical characteristics, together with the advantages of the invention are more apparent in the detailed description which follows, with reference to the accompanying drawings which illustrate an example, non-limiting embodiment of the invention, in which:

- Figure 1 is an axonometric assembly view of a wrapping machine in accordance with the invention;
- Figure 2 is an elevation view of the machine of Figure 1;
- Figures 3 to 8 are schematic views of an operating sequence of the wrapping machine.

[0010] With reference to the accompanying drawings, in Figure 1 the numeral 1 denotes a wrapping machine, designed for wrapping with plastic film 2 - in the form of collective packaging, which is sealed - a plurality of products arranged in a vertical stack 3 on a stand 4.

[0011] The machine 1 basically comprises [Figure 1]: a platform labelled 5; a fixed supporting structure labelled 6; and an arm 8 supported by the fixed structure 6.

[0012] More particularly [Figure 2], the platform 5 comprises a horizontal table, rotatable round a vertical axis 5a, and driven to rotate by the operation of suitably controlled drive means, labelled 15.

[0013] The fixed supporting structure 6 preferably comprises a single vertical upright 7, next to the platform 5, which supports the arm 8 horizontally, cantilever-style and above the platform 5.

[0014] The arm 8 in turn sustains a presser 9 which is freely rotatable round its own vertical axis 9a of rotation, coinciding with the axis 5a of rotation of the platform 5. The presser 9 can also translate longitudinally relative to said axis 9a, when subjected to suitable operating commands, between a first, forward limit operating position [Figure 4], and a fully retracted non-operating position [Figure 3].

[0015] To carry out packaging, the stack 3 of products is placed on top of the platform 5 and made to rotate round the vertical axis 5a, whilst the presser 9 is brought into its forward operating position and is placed in contact with the top of the stack 3. Acting on the stack 3, the presser 9 presses the stack into contact with the platform 5, thereby helping to stabilise the products and keep them in a neat condition, preventing the stack 3 from losing its shape during packaging.

[0016] More particularly, observing Figure 1, and Figures 3 to 8, it may be noticed that the machine 1 com-

prises a carriage 16 supporting a reel 17 of plastic film 2. The carriage 16 is constrained to the upright 7 and is motor-driven in such a way as to translate along the upright 7, in both directions along the vertical axis "Z", whilst the film 2 previously coupled to the stand 4 is unwound by the rotation of the platform 5 and is simultaneously rewound around the stack 3.

[0017] As a result of the composition of the vertical translating motion of the carriage 16 and the simultaneous rotation of the platform 5, in the horizontal plane in which it lies, as the film 2 is gradually unwound from the reel 17 and rewound around the stack 3, a surrounding and containing wrapping is produced around the stack 3 which retains the products and keeps them fixed together as one.

[0018] The machine 1 also comprises a sheet extender device 10 for placing a sheet 18 of plastic film 2 between the top of the stack 3 and the presser 9 for sealed wrapping (for example, sealed against water and/or dust), as explained in more detail below.

[0019] As is clearly shown in the accompanying drawings, the sheet extender device 10 is structurally integrated in the vertical structure 6 of the machine 1 and is supported, cantilever-style by the structure 6, or projecting horizontally, on one side, from the related upright 7. In other words, the sheet extender device 10 and the upright 7, that is to say, the fixed structure 6 which sustains it, are both on the same side relative to the platform 5.

[0020] The sheet extender device 10 is therefore supported fixed to the horizontal arm 8 and is movable with the latter relative to the upright 7, as well as parallel with itself, in the two directions of the vertical axis "Z".

[0021] As the Figures clearly show, the sheet extender device 10 requires the presence of a second reel 19 of plastic film 2 and of actuator means 11 which move alternately along the arm 8, substantially along the horizontal axis "Y" and by means of suitable supporting and guiding means 12 on the arm 8.

[0022] The actuators 11 of the sheet extender device 10, moving along the arm 8 and synchronised with the movement of the presser 9 between the forward and retracted positions, unwind a stretch of plastic film 2 from the reel 19, and by pulling it convey it beyond the top of the stack 3. Subsequent activation of cutting means associated with the sheet extender device 10 (being of the conventional type and therefore not illustrated in the drawings), allows cutting of the stretch of film 2 unwound from the reel 19 and allows a sheet 18 to be obtained from it which is released over and covering the top of the stack 3, as schematically illustrated in Figure 6.

[0023] In use, operation of the wrapping machine 1 can easily be described by observing an example of a possible operating sequence schematically illustrated in Figures 3 to 8.

[0024] Figure 3 shows how starting from an initial condition in which: the stack 3 and the related stand 4 are positioned on the platform 5; and after [Figure 4] the presser 9 has been associated with the stack 3 in the operating position and an edge of film 2 from the reel 17 has been coupled to the stand 4; starting rotation of the platform 5 and the simultaneous upstroke of the carriage 16 along the upright 7, a first, ascending, spiral wrapping band is produced around the stack 3.

[0025] Then [Figures 5, 6 and 7], having stopped the rotation of the platform 5 and stopped the upstroke of the carriage 16, and after the presser 9 has been brought to its retracted non-operating position, the actuator means 11, located next to the reel 19, or in the position closest to the upright 7, clamp an edge of the film 2 of the reel 19 and as they move away from the upright 7, unwind a stretch of it in such a way as to convey it between the top of the stack 3 and the presser 9 until it is beyond the stack 3.

[0026] Subsequent activation of the film 2 cutting means, on one side of the stack 3; and the release of the film 2 by the actuators 11, on the other side of the stack 3, cause the formation of a sheet 18 which is released to cover the top of the stack 3. After the return of the actuators 11 [Figure 8] close to the upright 7 and after the return of the presser 9 to the operating position, by restarting the drive unit of the platform 5 and commanding the carriage 16 downstroke towards the base of the upright, wrapping is continued, with wrapping of the stack 3 and the sheet 18 placed on top of it and with the formation of a second, descending spiral, superposed on the spiral formed during the upstroke of the carriage 16, which clamping and stabilising the interposed sheet 18, completes production of the packaging in the form of a sealed wrapper (sealed against water or dust) formed by the plastic film 2.

[0027] At the end of the carriage 16 downstroke, after removal of the packaged stack 3 and its substitution with a new stack 3 of products to be packaged, the sequence is repeated starting from Figure 3 and using the same methods described.

[0028] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all details of the invention may be substituted by technically equivalent elements.

Claims

1. A wrapping machine, for wrapping with plastic film (2) products arranged in a stack (3) on a stand (4), comprising

   - a rotary platform (5), rotatable round a vertical axis (5a), for supporting the stand (4);
   - a fixed supporting structure (6), comprising at least a vertical upright (7) next to platform (5);
   - a horizontal arm (8), supported by the upright (7), cantilever-style above the platform (5);
   - a presser (9) freely rotatable round its own ver-

tical axis of rotation (9a), and movable between a first, operating position in which the presser (9), associated with the top of the stack (3), keeps the stack (3) neat with the aid of the platform (5), and a second, non-operating position in which the presser (9) is distant from the stack (3);

- a sheet extender device (10); for placing a sheet of plastic film (2) between the top of the stack (3) and said presser (9); the machine (1) being **characterised in that** said sheet extender device (10) is integrated in the vertical structure (6), is supported by said structure (6) on the same side relative to the platform (5) and is supported by the arm (8) together with the presser (9), the sheet extender device (10) and the presser (9) being movable relative to said at least one upright (7) jointly with one another and fixed to said arm (10).

2. The machine according to claim 1, **characterised in that** the horizontal arm (8) comprises supporting and guiding means (12) for actuators (11) of the sheet extender device (10) which, moving along the arm (8), synchronised with the movement of the presser (9), unwind a plastic film (2) from a reel, convey it and release it over the top of the stack (3).

3. The machine according to any one of the preceding claims, **characterised in that** the fixed structure (6) comprises a single upright (7).

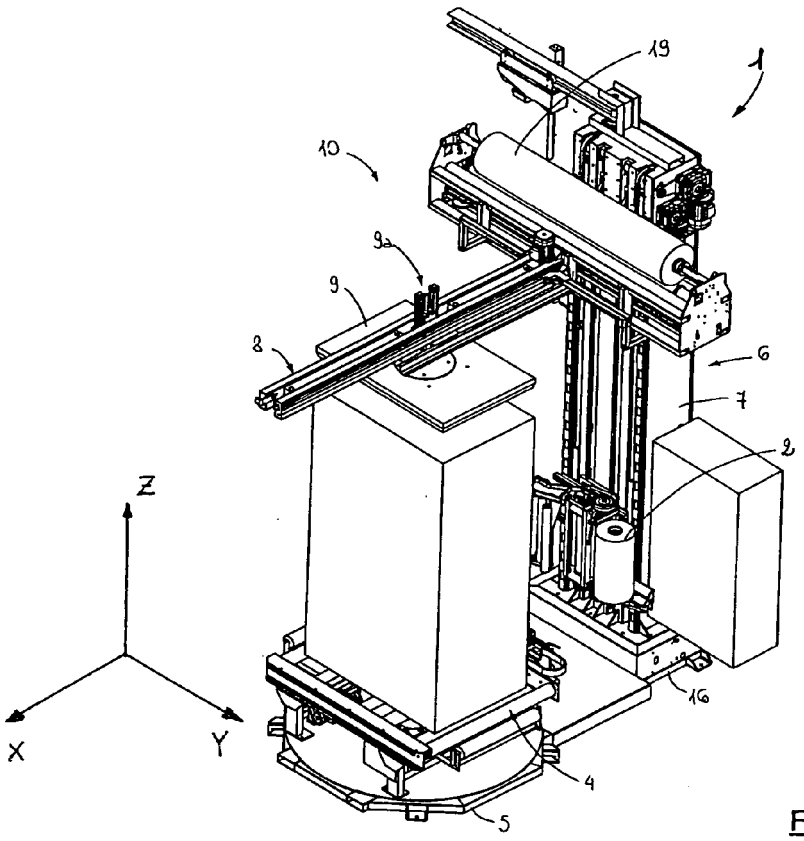

Fig. 1

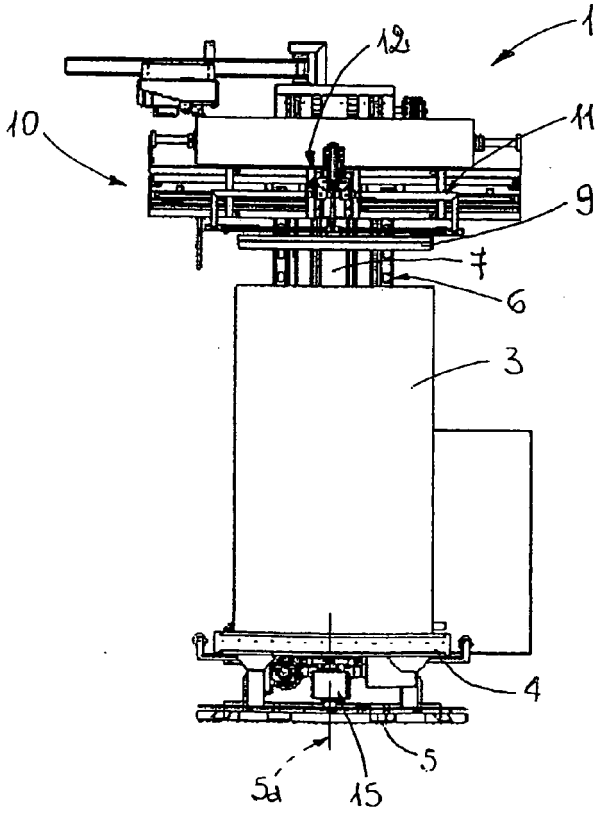

Fig. 2

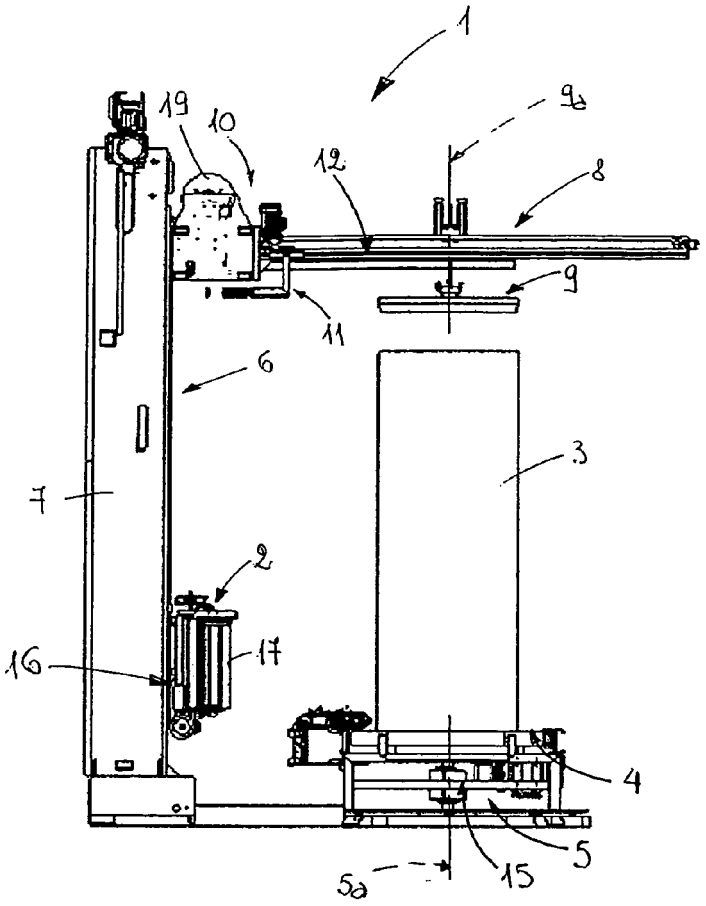
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Fig. 3

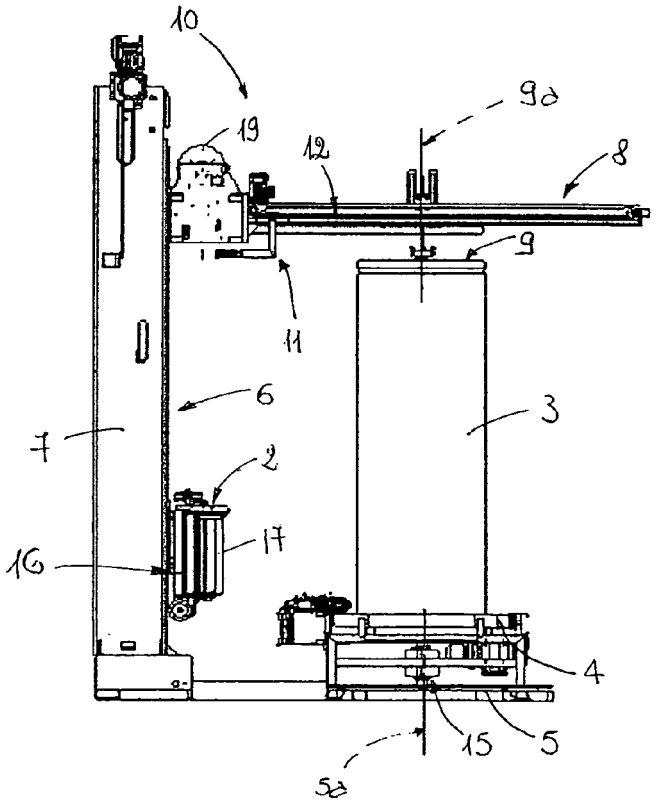
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Fig. 4

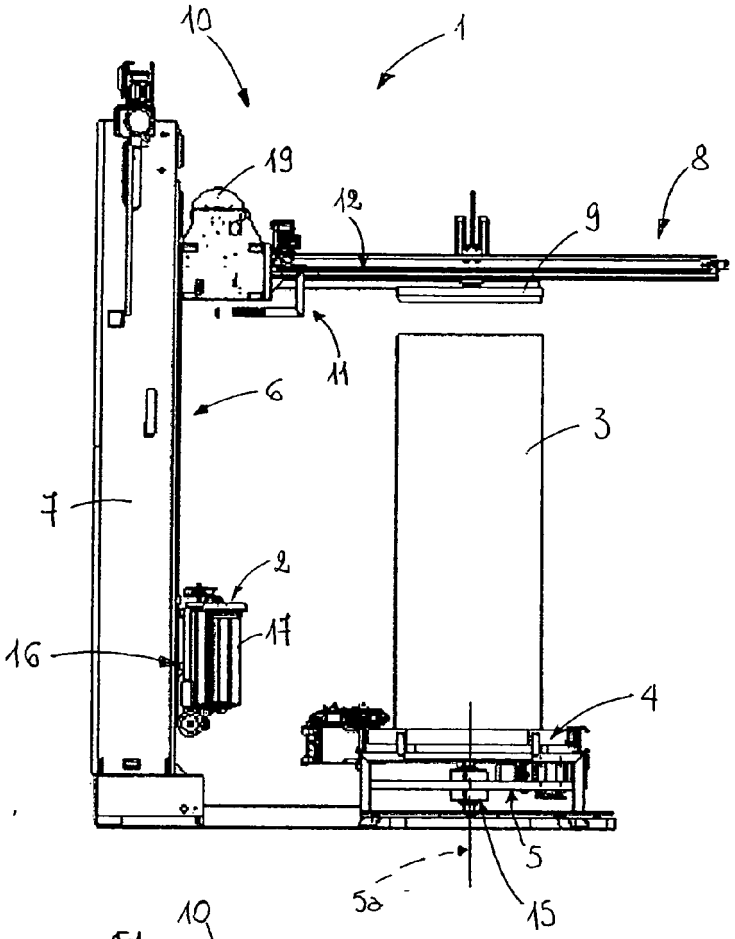
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Fig. 5

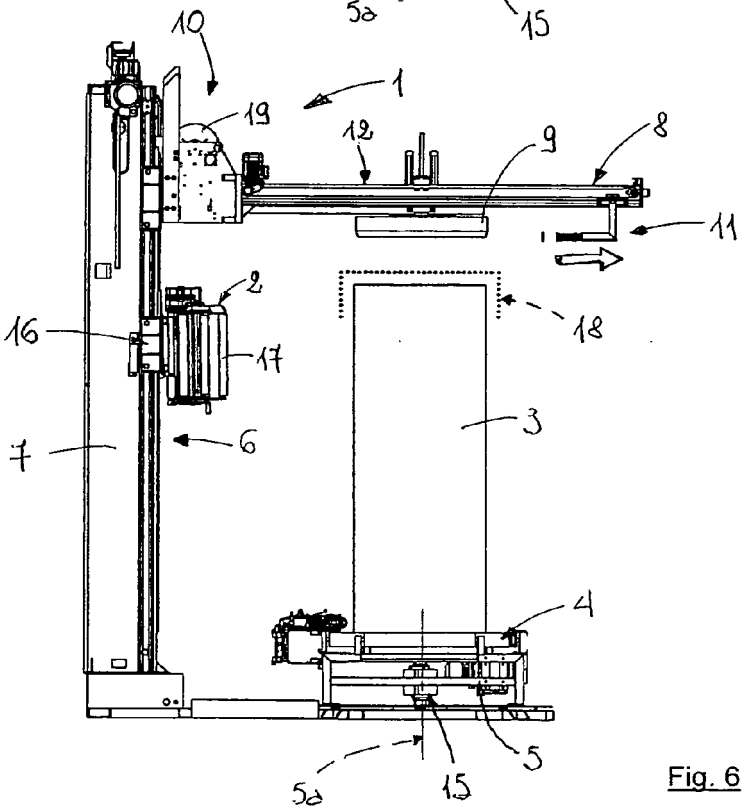
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Fig. 6

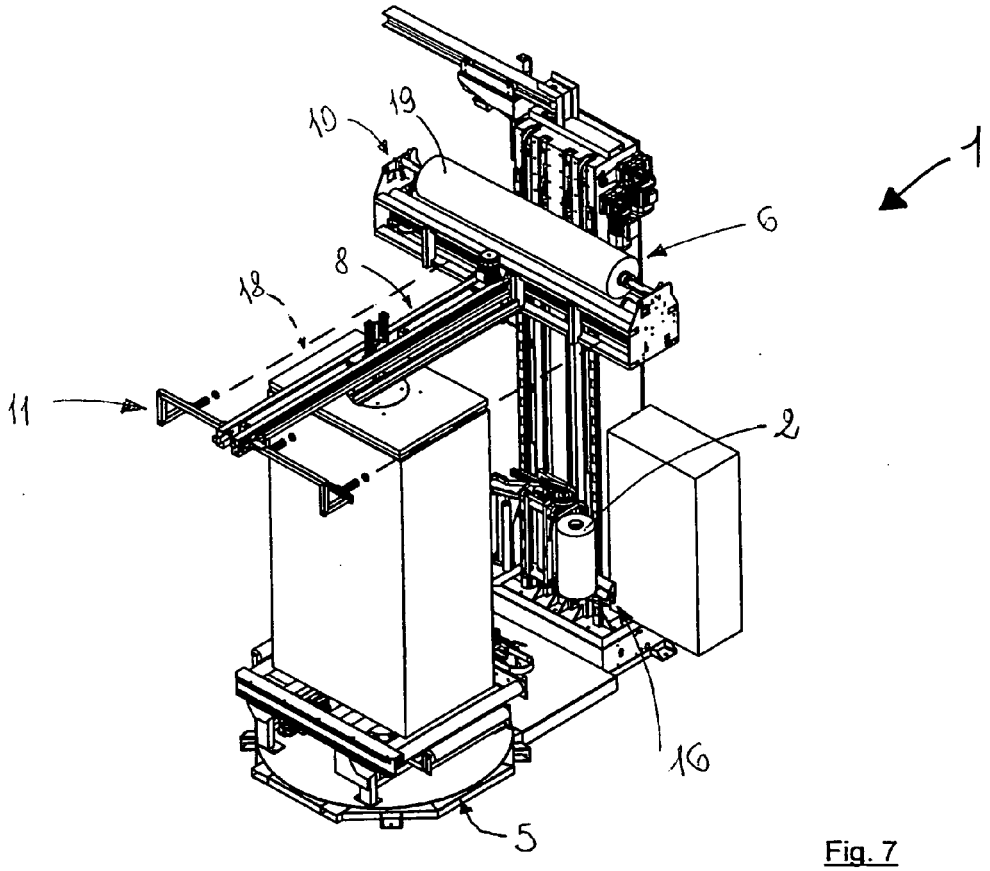

Fig. 7

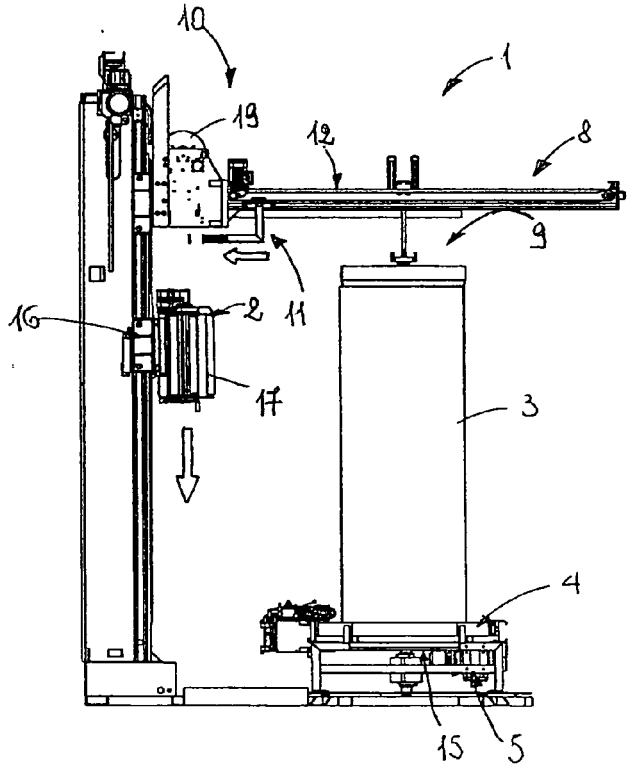

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 14 00 0277

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 192 853 A (INPROPACK S L) 27 January 1988 (1988-01-27) * abstract * * figures 1-4 * * page 3, line 15 - line 20 * * page 3, line 15 - line 17 *	1-3	INV. B65B11/04 B65B11/58
A	DE 299 21 296 U1 (SCHEICH DIETER [DE]) 4 May 2000 (2000-05-04) * abstract * * figures 1,3,6 *	1-3	
A	US 5 564 254 A (THIMON JACQUES [FR] ET AL) 15 October 1996 (1996-10-15) * abstract * * figures 14d-14i *	1-3	
A	US 5 048 261 A (LANCASTER III PATRICK R [US] ET AL) 17 September 1991 (1991-09-17) * the whole document *	1-3	TECHNICAL FIELDS SEARCHED (IPC) B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 May 2014	Damiani, Alberto

CATEGORY OF CITED DOCUMENTS

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13-05-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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