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(54) **Machine for packing a product in a sheet of heat-shrink packing material**

(57) On a packing machine, a product (2) is fed along a horizontal supporting surface (S) and through a packing station (17) where the product (2) is wrapped in a relative sheet (3) of heat-shrink packing material obtained from a first reel (25) located, in use, in a raised operating position in which the first reel (25) is located

over the supporting surface (S), and from a second reel (26) located, in use, in a lowered operating position in which the second reel (26) is located below the supporting surface (S); an actuating device (29) moving the first reel (25) between the raised operating position and a lowered reel-change position to change the first reel (25).

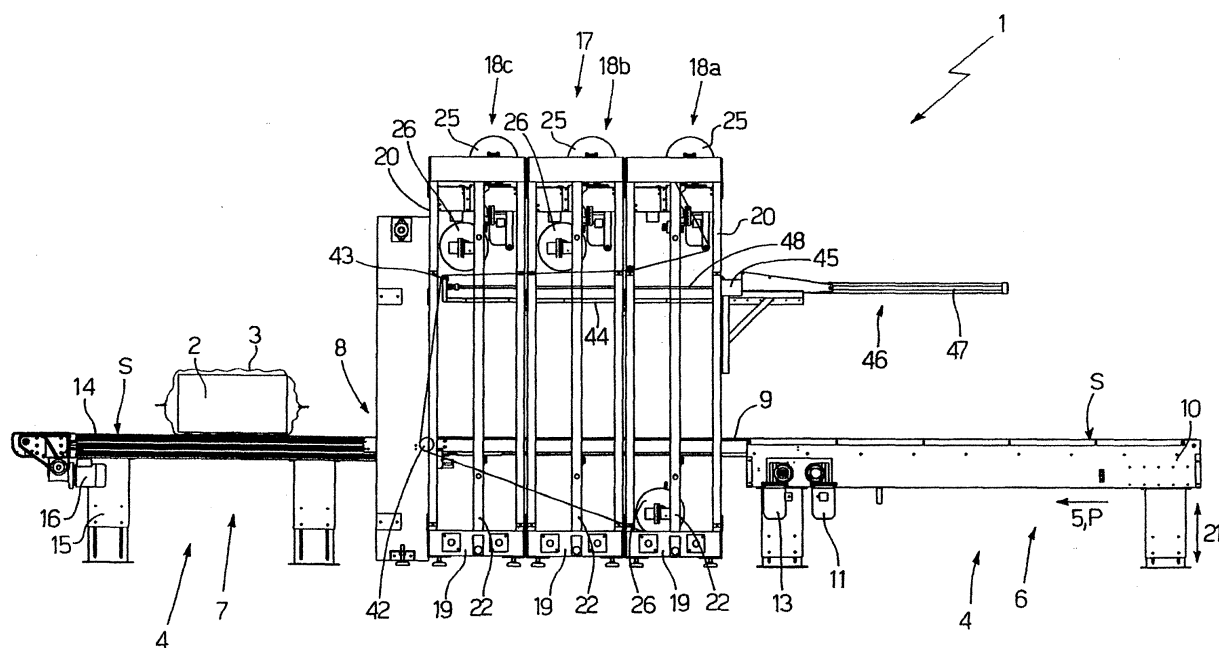


Fig.2

Description

[0001] The present invention relates to a machine for packing a product in a sheet of heat-shrink packing material.

[0002] The present invention is particularly advantageous for use in the furniture industry, to which the following description refers purely by way of example.

[0003] More specifically, the present invention relates to a packing machine of the type comprising a packing station; conveying means defining a substantially horizontal supporting surface for the product, and for feeding the product along the supporting surface and through the packing station; at least two reels of heat-shrink strip located at the packing station; and packing means for wrapping the product in said strips and detaching the sheet of packing material from the strips.

[0004] The two reels comprise a first reel located in use in a top operating position in which the first reel is located over the supporting surface; and a second reel located in use in a bottom operating position in which the second reel is located below the supporting surface. In the top operating position, the first reel, which is relatively heavy and of considerable size, is therefore located in a part of the packing machine which is difficult to reach.

[0005] A major drawback of known packing machines of the above type lies in the first reel being changed manually, which is a difficult, painstaking job which therefore increases the time taken to set up the machine.

[0006] It is an object of the present invention to provide a machine for packing a product in a sheet of heat-shrink packing material, designed to eliminate the aforementioned drawbacks and which is cheap and easy to produce.

[0007] According to the present invention, there is provided a machine for packing a product in a sheet of heat-shrink packing material, as claimed in Claim 1.

[0008] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view in perspective of a preferred embodiment of the packing machine according to the present invention;

Figure 2 shows a schematic side view, with parts removed for clarity, of the Figure 1 packing machine;

Figure 3 shows a schematic view in perspective of a detail of Figures 1 and 2.

[0009] Number 1 in Figures 1 and 2 indicates as a whole a machine for packing a product 2 - in the example shown, a product of the furniture industry - in a relative sheet 3 of heat-shrink packing material.

[0010] Machine 1 comprises a known conveying unit 4 for feeding product 2 in a substantially horizontal di-

rection 5 and along a substantially horizontal path P, and which in turn comprises two conveying devices 6, 7 located in series in direction 5 and connected to each other at a transfer station 8.

[0011] Device 6 comprises a conveyor belt 9, which defines a supporting surface S for product 2, and is looped about a number of pulleys (not shown) fitted to a fixed base 10 of device 6 to rotate intermittently, with respect to base 10 and under the control of a known actuating device 11, about respective axes (not shown) parallel to one another and to a horizontal direction 12 crosswise to direction 5.

[0012] Surface S is of variable length measured parallel to direction 5, by one of said pulleys (not shown) being a movable pulley fitted in sliding manner to base 10 to move linearly in direction 5, with respect to base 10 and under the control of a known actuating device 13, between a withdrawn position (not shown), in which the movable pulley is substantially contained within base 10, and an extracted position (Figure 2), in which the movable pulley is located frontwards of base 10 in direction 5.

[0013] Device 7 comprises a conveyor belt 14, which has a conveying branch substantially coplanar with surface S, and is looped about two pulleys (not shown) fitted to a fixed base 15 of device 7 to rotate intermittently, with respect to base 15 and under the control of an actuating device 16 synchronized with device 13, about respective axes (not shown) parallel to each other and to direction 12.

[0014] Unit 4 feeds product 2 firstly through a packing station 17, where product 2 is wrapped in sheet 3, and then through a heat-shrink station (not shown) for shrinking sheet 3 about product 2.

[0015] Station 17 comprises a number of packing units 18 (in the example shown, three units 18a, 18b, 18c) located in series in direction 5, and each comprising a fixed frame 19 connectable to frames 19 of the other units 18a, 18b, 18c.

[0016] As shown in Figure 3, frame 19 comprises two uprights 20 substantially parallel to each other and to a direction 21 perpendicular to directions 5 and 12; two guides 22, each associated with a respective upright 20 and parallel to direction 21; and two supporting devices 23, 24 fitted to guides 22 to support respective reels 25, 26 of heat-shrink strip positioned with their longitudinal axes parallel to direction 12, and connected to each other as described in detail later on.

[0017] Device 23 comprises a slide 27 comprising two skids 28 fitted in sliding manner to guides 22 to move linearly in direction 21 along guides 22 and under the control of an actuating device 29; two powered rollers 30 (only one shown in Figure 3) extending between skids 28 and parallel to direction 12 to support reel 25; and two fork members 31 associated with skids 28 and engaged by a central winding pin 32 of reel 25.

[0018] Device 29 comprises two toothed belts 33, each of which is movable in a respective vertical plane,

is connected to a respective skid 28, and is looped about two pulleys (not shown), each of which is mounted coaxially with a respective pulley (not shown) of the other belt 33. Belts 33 are operated synchronously to move slide 27, and therefore reel 25, in direction 21 between a raised operating position (Figures 1, 2, 3), in which reel 25 is located over surface S, and a lowered reel-change position (not shown) to change reel 25.

[0019] Device 24 comprises two skids 34 fitted in sliding manner to guides 22 to move linearly in direction 21 along guides 22 and under the control of an actuating device 35; and two fork members 36 fitted to skids 34 and engaged by a central winding pin 37 of reel 26.

[0020] Device 35 comprises two toothed belts 38, each of which is movable in a respective vertical plane, is connected to a respective skid 34, and is looped about two pulleys (not shown), each of which is mounted coaxially with a respective pulley (not shown) of the other belt 38. Belts 38 are operated synchronously to move skids 34, and therefore reel 26, in direction 21 between a lowered operating position (shown in Figure 2 for one of the three reels 26), in which reel 26 is located below surface S, and a raised rest position (shown in Figure 2 for the other two reels 26), in which reel 26 is located over surface S.

[0021] With reference to Figure 1, the strips of each pair of reels 25, 26 are joined, at each operating cycle of machine 1, by a known cut-and-seal device 39 located at transfer station 8, to the front of units 18a, 18b, 18c in direction 5. Device 39 comprises a fixed bottom bar 40 parallel to direction 12; and a movable top bar 41 extending in direction 12, and which is movable in direction 21 between a raised rest position and a lowered operating position, in which bars 40 and 41 cooperate mutually to overlap the strips of a pair of reels 25, 26, to stabilize the overlap by a sealing operation, and to cut an intermediate point of the overlap to cut a sheet 3 of packing material off the strips of reels 25 and 26 considered.

[0022] As shown in Figure 2, to keep the strips of each pair of reels 25, 26 positioned correctly at station 8, the strip of each reel 26 is looped about an idle roller 42 extending in direction 12 and mounted at a free end of belt 9 to move in direction 5, together with the movable pulley (not shown) of belt 9; and the strip of each reel 25 is looped about an idle roller 43 parallel to direction 12 and extending between the free ends of two telescopic rods 44 parallel to direction 5.

[0023] Rods 44 are fixed to a horizontal cross member 45 parallel to direction 12 and in turn fixed to frame 19 of unit 18a, and form part of an actuating device 46 for moving roller 43 in direction 5, and which also comprises an actuating cylinder 47 projecting from cross member 45, parallel to direction 5, and having an output rod 48 connected to roller 43. Roller 43 and the movable pulley (not shown) of conveying device 6 therefore move in direction 5 with respective independent laws of motion.

[0024] Operation of machine 1 will now be described

with reference to Figure 2, and as of the instant in which:

reels 25 are in the raised operating position, reels 26 of units 18b and 18c are in the raised rest position, and reel 26 of unit 18a has been moved into the lowered operating position; the movable pulley (not shown) of conveying device 6 and, therefore, roller 42 are in the extracted position; bar 41 is in the raised rest position; and rod 48 has been moved into an extracted position so that roller 43 engages the strip of the reel 25 considered.

[0025] Conveying unit 4 feeds product 2 in direction 5 against the strips of reels 25, 26 of unit 18a, so as to fold the strips substantially into a U about product 2. Once product 2 is downstream from cut-and-seal device 39 in direction 5, device 7 is deactivated, and top bar 41 is moved into the lowered operating position to overlap the strips of reels 25 and 26, to stabilize the overlap by a sealing operation, and to cut an intermediate point of the overlap to cut sheet 3 of packing material off the strips of reels 25 and 26 considered.

[0026] Once packing of products 2 by reels 25 and 26 of unit 18a is completed, rod 48 is moved into a withdrawn position (not shown), so that roller 43 releases the strip of reel 25 considered; the movable pulley (not shown) of conveying device 6 and, therefore, roller 42 are moved into the withdrawn position to clear station 17 and release the strip of reel 26 considered; reel 26 of unit 18a is set to the raised rest position; reel 26 of unit 18b or 18c is moved into the lowered operating position; and the movable pulley (not shown) of conveying device 6, roller 42, and rod 48 are again moved into the extracted position.

[0027] To change one of reels 25, rod 48 is moved into the withdrawn position, so that roller 43 releases the strip of reel 25 considered; the movable pulley (not shown) of conveying device 6 is moved into the withdrawn position to clear station 17; and slide 27 of reel 25 considered is moved into the lowered reel-change position by relative actuating device 29.

[0028] The presence of slides 27 and relative actuating devices 29, and the design of actuating device 46, which extends entirely over and parallel to surface S, therefore enable reels 25 to be changed relatively easily.

Claims

1. A machine for packing a product (2) in a sheet (3) of heat-shrink packing material, the machine comprising a packing station (17); conveying means (4) defining a substantially horizontal supporting surface (S) for the product (2), and for feeding the product (2) in a given direction (5) and through said packing station (17); at least one pair of reels (25,

26) of heat-shrink strip, a first (25) of said reels (25, 26) being located, in use, in a raised operating position, in which the first reel (25) is located over the supporting surface (S), and a second (26) of said reels (25, 26) being located, in use, in a lowered operating position, in which the second reel (26) is located below the supporting surface (S); and packing means (39) located at said packing station (17) to wrap the product (2) in the strips of said pair of reels (25, 26), and to detach said sheet (3) of packing material from the strips; and being **characterized by** comprising first actuating means (22, 27, 29) for moving said first reel (25) between said raised operating position and a lowered reel-change position.

2. A machine as claimed in Claim 1, wherein said first actuating means (22, 27, 29) comprise first guide means (22); a first slide (27) mounted to slide along said first guide means (22); and a first actuating device (29) for moving the first slide (27) along the first guide means (22); said first reel (25) being carried by said first slide (27) to translate with the first slide (27) along said first guide means (22).
3. A machine as claimed in Claim 2, and also comprising second actuating means (34, 35) for moving said second reel (26) between said lowered operating position and a raised rest position, in which the second reel (26) is located over said supporting surface (S).
4. A machine as claimed in Claim 3, wherein the second actuating means (34, 35) comprise a second slide (34) mounted to slide along said first guide means (22); and a second actuating device (35) for moving the second slide (34) along the first guide means (22); said second reel (26) being carried by said second slide (34) to translate with the second slide (34) along said first guide means (22).
5. A machine as claimed in Claim 4, and comprising at least two said pairs of reels (25, 26) arranged successively in said direction (5), and, for each said pair of reels (25, 26), a frame (19) supporting the relative pair of reels (25, 26), the relative said first guide means (22), and the relative first and second actuating device (29, 35); the frames (19) being connectable to one another.
6. A machine as claimed in any one of the foregoing Claims, and also comprising a positioning roller (43) positioned crosswise to said direction (5), movable in said direction (5), and engaged, in use, by one of the strips of one of said reels (25, 26).
7. A machine as claimed in Claim 6, wherein said supporting surface (S) is of variable length measured

in said direction (5), and comprises a portion movable between a withdrawn position and an extracted position; said portion and said roller (43) moving in said direction (5) with respective independent laws of motion.

8. A machine as claimed in Claim 6 or 7, and also comprising third actuating means (46) for moving said roller (43) in said direction (5) and comprising second guide means (44) extending in said direction (5) and over said supporting surface (S), and a third actuating device (47) for moving the roller (43) along the second guide means (44).

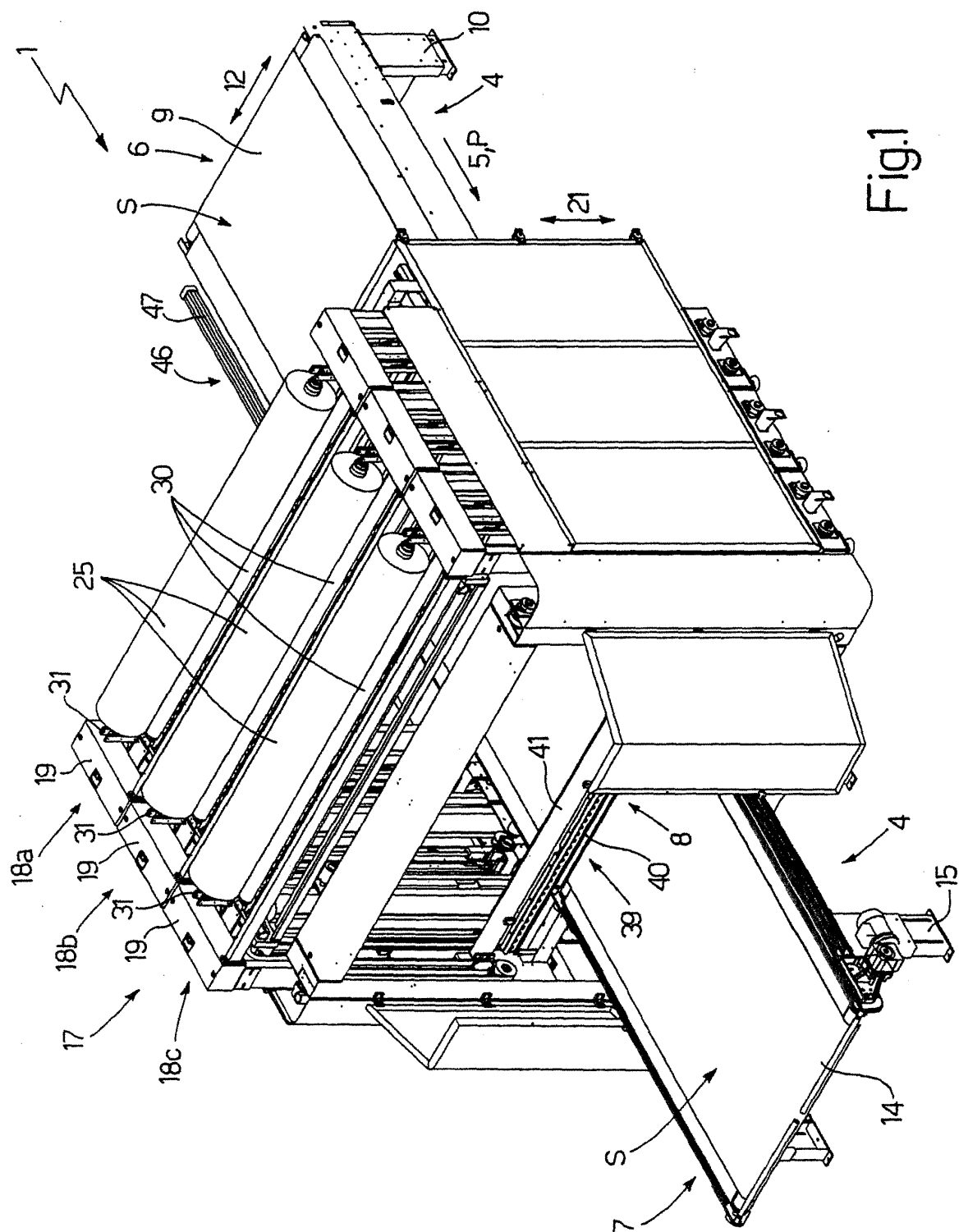


Fig.1

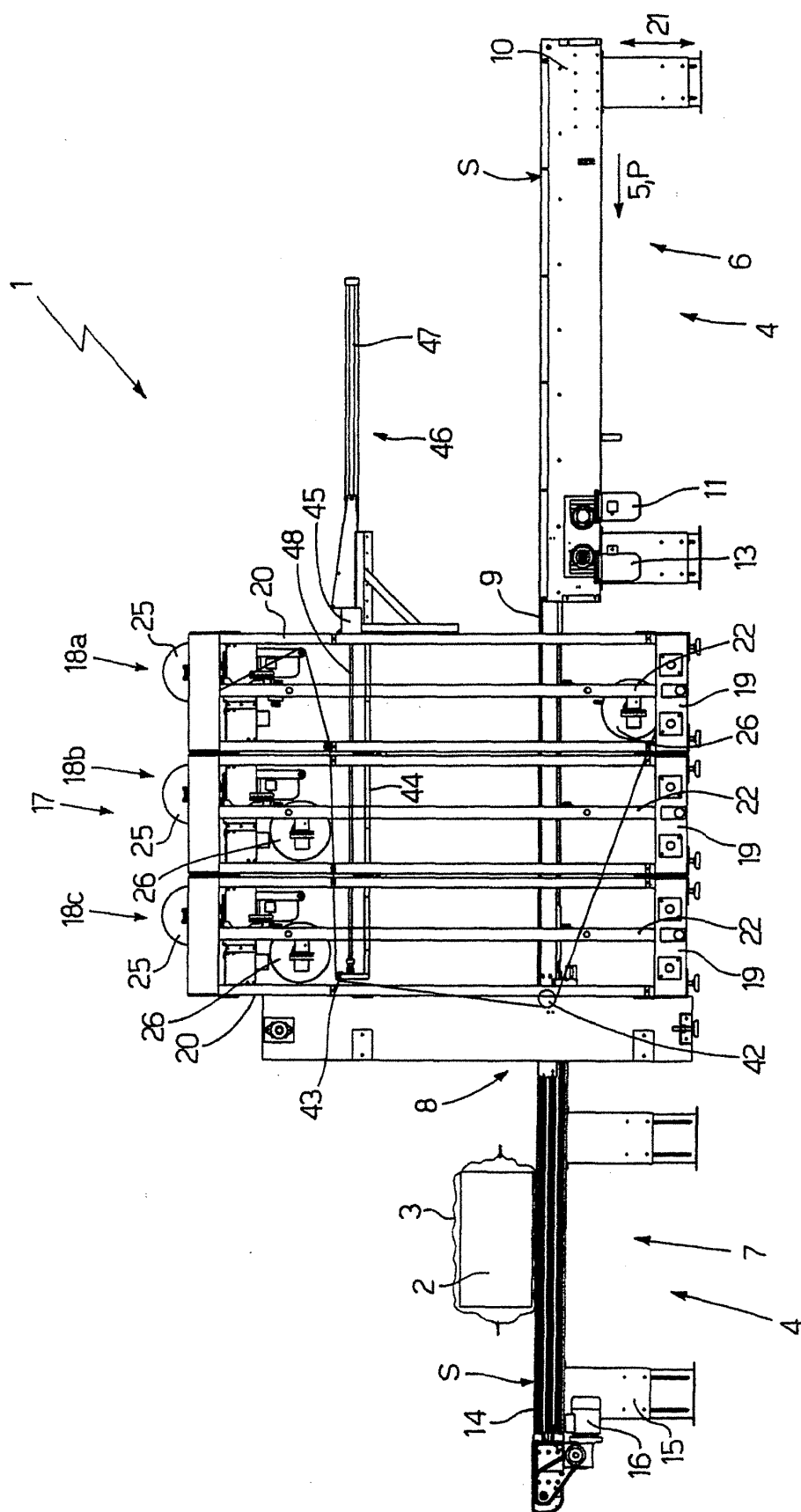


Fig.2

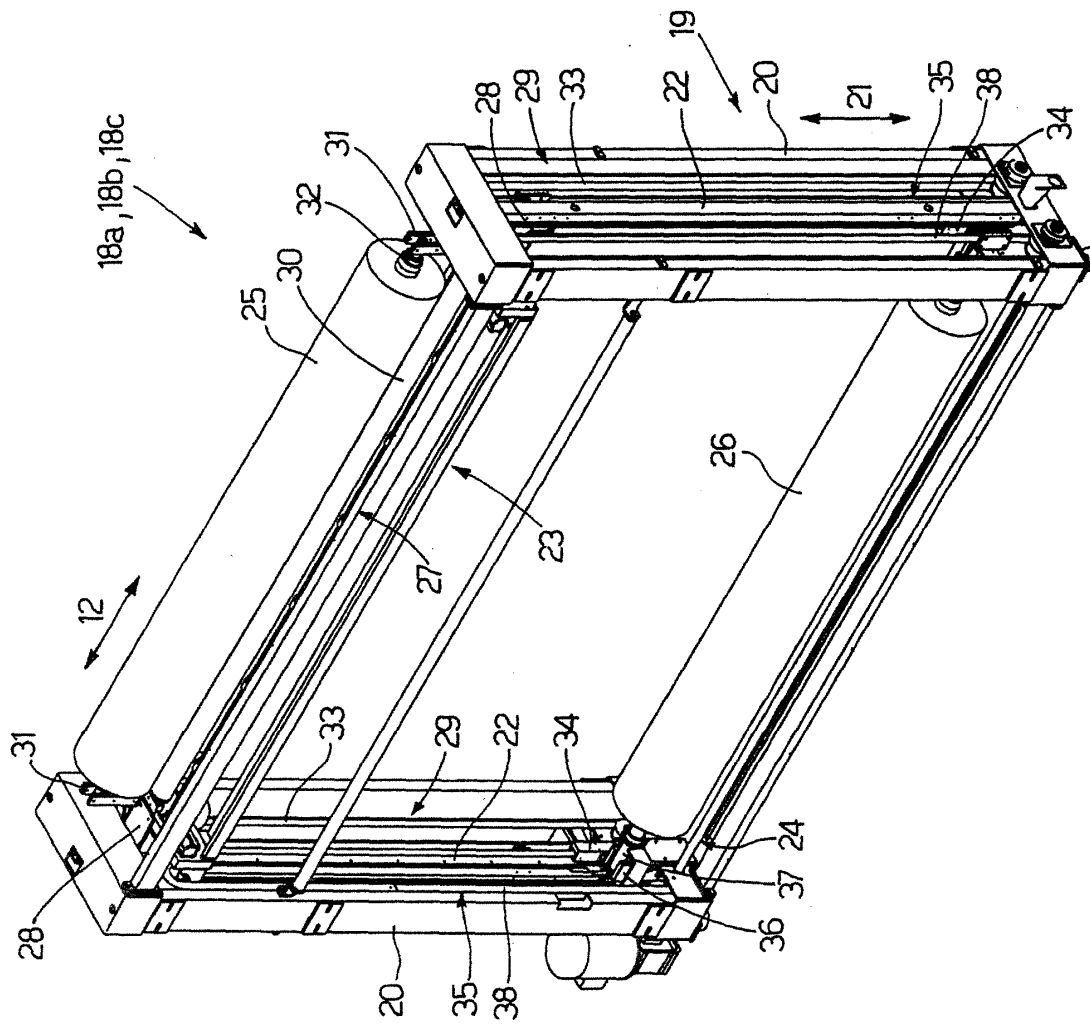


Fig.3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 10 2248

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 1 310 427 A (CONSTRUCCIONES METALICAS JOSE) 14 May 2003 (2003-05-14) * paragraph '0033! * * paragraph '0045! - paragraph '0050!; figures 1-6 *	1-5	B65B9/02 B65B53/00 B65B41/12
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 August 2004	Vigilante, M
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 04 10 2248

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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