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(54) **Improved hooding machine, with distribution-device height adjustment**

(57) A hooding machine is disclosed, comprising a support frame (1) on which a system for the forming of a sleeve made of plastic material is arranged. A distribution unit (11) is provided mounted vertically movable with respect to the support frame (1) of the machine, and gripping and advancement means consist of at least a first advancement device (10, 10a) comprising two symmetrically opposite conveyor-belt assemblies (12, 13; 14, 15),

which run on two end-less paths having at least adjacent continuous portions (12a, 13a; 14a, 15a), along which said belts adhere by pressure one to the other dragging between them a plastic sheet (F) for forming the hood, each of said assemblies of mutually opposite belts also having at least a variable-geometry loop (12g, 13g) the size of which is reduced or extended based on at least the vertical displacement of said distribution unit (11).

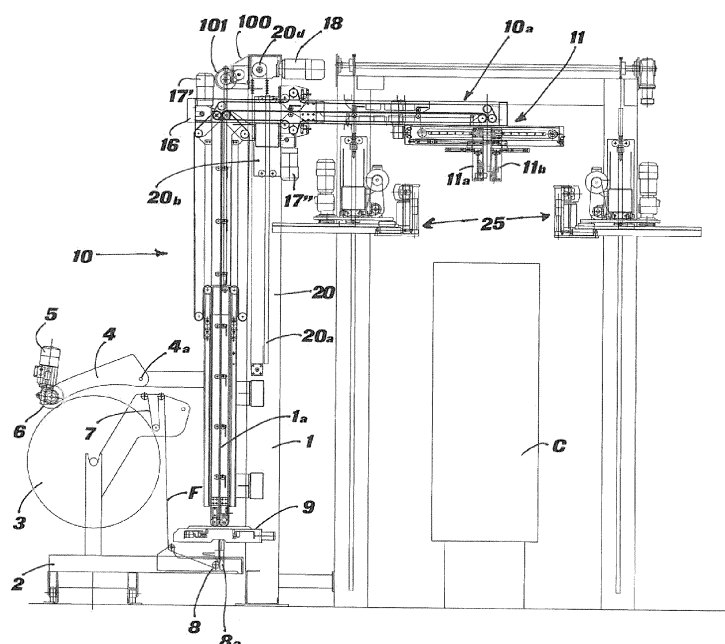


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a wrapping machine forming a plastic film sleeve, that is, a so-called hooding machine. These are machines provided for the wrapping of loads, generally piled on pallets, with a plastic sleeve consisting of a stretching or heat-shrinking tubular film folded on a plane and wound on a feeding reel.

BACKGROUND OF THE INVENTION

[0002] The general principle of wrapping apparatuses for pallet-piled loads of this type is the following: a load arranged on pallets is brought in correspondence of a wrapping position in the middle of a main support structure of a wrapping machine. A tubular sheet in a flat condition is taken off a respective reel, cut to measure, sealed and welded at one end, conventionally called rear end, leaving the other end open, conventionally called "mouth", to form a bag-like body, called "sleeve". This sleeve is then gripped by the mouth end, opened and then to fit onto the load to cover it.

[0003] Machines of this type are widely known. Various types are shown in documents EP 285,855 in the name of Lachenmeier, EP 1,060,988 in the name of Thimon, EP 1,086,893 and EP 1,510,460 both in the name of the same Applicant.

[0004] In these prior-art documents, an edge of the tubular film, fed from the reel, is gripped from a position generically at the bottom of said main support structure and brought - through gripping and dragging means - up to a position above the top of the load, where a transfer station is found; from here, the tubular film is taken by spreading-apart means which open the mouth thereof and force-fit it on the load. The cutting to measure (depending on the load height) and the welding of the rear end of the sleeve may occur alternatively at the bottom of the machine, hence during a step preceding force-fitting, or above the top of the machine, hence during a final step of force-fitting.

[0005] As already mentioned, for the wrapping a plastic wrapping film is used, which may be of a stretching or heat-shrinking type.

[0006] When a heat-shrinking film is used, the force-fitting step does not carry particular problems because the tubular portion of the film is rather wide and is effortlessly applied on the load; the final step of the wrapping then consists in the tight closing of the sleeve on the load, which is performed by subjecting the wrapping film to heat shrinking due to heat supply.

[0007] When a stretching film is used instead, the step of force-fitting the sleeve is preceded by a crosswise stretching step and of temporary spreading apart of the sleeve which then, in the final wrapping step, returns into its initial condition due to the elastic effect and hence automatically tightens around the load. Machines which

operate in this way, with different techniques, are known for example from EP1,832,515 and EP1,510,460 in the name of the same Applicant.

[0008] In any case, as can be easily understood from the above-reported examples, these apparatuses are of a significant height: as a matter of fact, the sizing is conceived on the basis of the tallest loads that the machine must be able to wrap, furthermore considering that above the load height the dragging means of the tubular film, the members for the spreading apart and force-fitting and, in some cases, the welding and cutting assembly are furthermore provided.

[0009] That entails firstly maintenance problems. As a matter of fact, operators, in order to be able to access all the functional members of the machine, are forced to climb up to be able to operate at the top of the machine. Moreover, in the machines in which the cutting and welding assembly is found at the top head of the machine (i.e. immediately above the spreading- apart and force-fitting members), the operator must climb up even at each reel change, because he must engage the initial edge of the film into gripping devices arranged immediately downstream of the welding assembly.

[0010] Moreover, throughput of the apparatus is not optimised if there are significant height changes of the loads to be wrapped. As a matter of fact, the path along which the sleeve is formed and force-fitted is always the same (sized for a maximum-height load) even when it is necessary to wrap a low load which would theoretically require a much shorter sleeve processing treatment path. In substance, based on load height variability, machine idle times arise, both during the sleeve ascent step and in the sleeve descent step, which reduce overall throughput.

[0011] These problems so far have been addressed by adopting an apparatus configuration in which all the fundamental members are found in the low part of the machine (typically the welding and cutting assembly) or can be lowered to operator height. For the former solution, see for example EP 1,086,893. For the second solution see instead EP 2,069,206 in the name of Lachenmeier A/S or EP 2,336,034 in the name of MSK - VERPACKUNGS-SYSTEME GmbH.

[0012] In particular, EP 2,069,206 shows an apparatus in which, in order to partly solve these problems, it has been provided to mount also the transfer assembly and the cutting and welding unit on a vertically-moving frame which can be coupled with the moving frame of the force-fitting means.

[0013] However, this solution is not fully satisfactory, both due to its reliability, and because it is still cumbersome during reel change. As a matter of fact, during the course of this last operation, the operator is still forced to insert the tubular film along the sleeve-forming path, until engaging it beyond the cutting and welding unit.

SUMMARY OF THE INVENTION

[0014] The problem at the basis of the invention is hence to provide a structure of hooding machine of the above-cited type, which overcomes the mentioned drawbacks and which, on the one hand, is more accessible during maintenance and reel change operations, without putting the operator at risk and, on the other hand, allows to remove undesired idle times during processing.

[0015] These objects are achieved through the features mentioned in claims 1 and 7. The dependent claims describe preferred features of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Further features and advantages of the invention are in any case more evident from the following detailed description of a preferred embodiment, given purely as a non-limiting example and illustrated in the attached drawings, wherein:

fig. 1 is a schematic front elevation view of a hooding machine according to an embodiment of the invention;

figs. 2A, 2B and 2C are schematic front elevation views, taken in the same direction as fig. 1, relating to the sole belt dragging system, in three different operation attitudes;

fig. 3 is a schematic front elevation view, relating to the sole spreading-apart and sleeve application unit, taken in the same direction as fig. 1 and in a waiting home waiting for the plastic tubular film;

fig. 3A is a top plan view of fig. 3;

fig. 4 is a schematic front elevation view, fully similar to that of fig. 3, but with the spreading-apart unit in a working position where it is opening/spreading-apart the plastic tubular film;

fig. 4A is a top plan view of fig. 4;

fig. 5 is an enlarged, schematic view, of the detail referred to by A in fig. 2A; and

fig. 6 is an enlarged, schematic view of the detail referred to by B in fig. 2A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] As shown in the drawings, an hooding machine comprises, in a way known per se, a main post 1 of a main support structure (not better shown overall, being of a type largely-known per se).

[0018] Beside post 1 there is arranged a carriage 2 carrying feeding reels 3 of a film F of plastic material, of a tubular shape but folded on a plane. For the purposes of the present invention the use of a heat-shrinking or extending plastic sheet is unimportant, even if the opening/spreading-apart unit for the film of plastic material - such as shown in particular in drawings 3, 4 - is an exemplifying system for extendable film.

[0019] The usefulness of reel-carrying carriage 2 is not related to the teaching of the present invention and will hence not be described in further detail.

[0020] As an example, on post 1 there are arranged control means of the rotation of reel 3, consisting of an arm 4, mounted with one end thereof pivoting around a pin 4a and carrying at the other free end thereof a motorisation 5 for a roller 6, which roller rests on the periphery of reel 3 and controls it in rotation by friction.

[0021] The tubular sheet or film F, supplied from the reel 3, first runs through a tensioning device 7 and subsequently on a diverting device 8 towards a cutting and welding unit 9. In the illustrated embodiment, the cutting and welding unit of the sleeves is hence preferably arranged in the lower part of the machine.

[0022] Cutting and welding unit 9, in a manner known per se, comprises two mutually opposite welding bars 9a, 9b, which may be moved mutually closer together and further apart, as well as - upstream (in the progress direction of film F) or below said bars - a cutting blade 9c cooperating and which may be moved closer together with an opposite cutting abutment 9d. The two mutually opposite assemblies are normally kept mutually spaced apart (attitude shown in fig. 6), so as to define a running path for sheet F. When it is necessary to close one end of the tubular sheet to form a sleeve, the two assemblies are temporarily brought closer together to weld and cut, and then moved further apart again.

[0023] In this preferred embodiment, in order to be able to give feeding continuity to plastic sheet F, diverting device 8 furthermore comprises a holding and presentation unit 8a (shown in greater detail in fig. 6) the function of which is to hold the free edge of sheet F (separated from the sleeve by above-lying cutting unit 9) until the moment of releasing it to a gripper and advancement means - better described here in the following - which grips it to drag it towards and beyond said cutting and welding unit 9.

[0024] With this part of the hooding machine a gripping and advancement device according to the invention is associated, overall referred to as 10 for the vertically-running part and as 10a for the horizontally-running part, which leads to a distribution station, overall referred to as 11 and arranged on the vertical of the stationing site of the load C to be wrapped.

[0025] Advancement device 10 essentially consists - according to the fundamental feature of the present invention, and as better shown in drawings 2A-2C - of two mutually opposite ribbon or belt assemblies 12, 13, which run along two specular, end-less paths, arranged so as to both have at least one mutually adjacent vertical side and another side shaped with a variable path. The two adjacent sides define a vertical plane along which the sheet of plastic material F is meant to move, held therebetween and driven into motion by friction by the two mutually opposite belts. The loop of the end-less path may be modified in its shape, so as to shorten or lengthen the overall bulk (in height) of the belt unit (the extent of

the circular-path belts nevertheless being the same) and hence of the two mutually adjacent vertical sides of the path.

[0026] In detail, please notice that the belt 12 of the first assembly (the left one in the drawings) follows a first vertical segment 12a, from a lower transfer roller 12b to an upper transfer roller 12c; after a lateral deviation (roller 12e) it then follows a second vertical segment 12f and a third vertical segment 12j between which a varying-size loop 12g is defined. Loop 12g is defined by the relative position of two rollers 12h which are mounted mutually moving in a way which will be explained further on.

[0027] Since the first vertical segment 12a is meant to drag plastic sheet F upwards, it is provided that the first belt assembly 12 rotates on the circular path in an anti-clockwise direction (in the plane of the drawing of figs. 2A-2C), so that segment 12a moves upwards according to arrow S.

[0028] Belt 13 in turn follows a minor path with respect to the advancement plane of sheet F, that it, to the lying plane of the two mutually opposite belts which define the continuous, vertical side of the path. Belt 13 hence also has a first vertical, uprising (S) segment 13a and two vertical descending (arrow D) segments 13f, 13j. These last two are joined by a loop-shaped segment 13g. In its belt, ribbon unit 13 runs in sequence on transfer rollers 13b, 13c, 13e, 13h and again 13b. The righthand assembly, by consistency with the movement of the left-hand assembly, moves along the closed loop in a clockwise direction (in the drawing plane).

[0029] According to an essential feature of the invention, the first vertical path segments 12a e 13a are mutually adjacent, so as to define between them a sliding plane; in addition thereto, there are also provided guiding means (not shown since they are within the reach of a person skilled in the field) apt to impart a pressure on the belts, which tends to keep them tightly adhering one to the other.

[0030] Due to this arrangement, as can be easily understood, when retaining means 8a presents the initial end of sheet F in the proximity of the lower rollers 12b, 13b, these cylinders perform a gripping function and guide sheet F between belts 12 and 13, which hence drag upwards sheet F, in the direction S, retaining it between the path segments 12a and 13a of the two belt assemblies.

[0031] In order to allow an efficient gripping of the initial edge of sheet F, preferably also lower cylinders 12b and 13b are vertically movable, so as to temporarily drop below the level in which the welding and cutting station 9 is located (fig. 2A and 6). In particular, the edge of sheet F is retained in its central area by guiding reeds 8a', while the lateral edges of sheet F are exposed and can be captured by belts 12a and 13a which drop below the level of station 9 and beside reeds 8a'. In the rest of the work step, particularly in the final cutting and welding step, rollers 12b and 13b rise back to above station 9 so as not to interfere with welding and cutting units 9a-9d (fig.

2A).

[0032] For such purpose, according to a preferred embodiment of the invention, lower transfer rollers 12b and 13b are mounted in the lower part of a carriage 1a mounted vertically translatable on frame 1. On the same carriage 1a there are mounted two homologous rollers (one for each assembly 12 and 13) of the roller pair 12h and 13h which define the variable-size loops. Thereby, when carriage 1a drops, to bring lower transfer rollers 12b and 13b below cutting and welding unit 9, also loops 12g and 13g vary in size, allowing the downward extension of the path defined by the two belt assemblies, the extension of the belts necessarily remaining the same

[0033] The vertical movement of carriage 1a is driven, for example, by an actuation motor 100 with a crankshaft drive 101 mounted in the top part of frame 1.

[0034] When sheet F arrives at the top of upward path S, the initial edge thereof (coinciding with the sleeve mouth) comes out between the two transfer rollers 12c, 13c and is here taken by a second portion of the advancement device, and precisely the advancement device 10a running in a horizontal direction.

[0035] Said latter advancement device is construed - in a way fully similar to the first vertical segment, i.e. having two specularly opposite belt assemblies having at least one horizontal side mutually adjacent. In this case, the two adjacent assemblies are arranged and driven into motion so that the two horizontal and mutually adjacent belt segments drag sheet F, captured between them, towards the distal end of the advancement device, that is, in direction T (figs. 2A-2C).

[0036] In particular, two belts 14, 15 run on two end-less paths so as to have two adjacent horizontal sides 14a, 15a, with the belts in close mutual contact, which can thus actuate - in a way similar to belts 12, 13 - the transportation of sheet F towards a distribution station 11.

[0037] In order to give more continuity to the advancement path of sheet F, preferably the two end-less belts 14 and 15 wind on initial end rollers which are mutually coaxial, although unconstrained, with respect to terminal transfer rollers 12c and 13c of assemblies 12 and 13 (see fig. 5).

[0038] Considering the upper assembly, which provides continuity to the left-hand assembly 12, a first continuous, linear segment 14a is identified, which then bends downwards through the joint action of a final roller 14' and the adjacent terminal roller 15c of the underlying belt assembly 15. This deviation at the distal end of the second advancement device 10a, allows sheet F to be directed downwards (T' in fig. 2A) to then be taken by distribution assembly 11.

[0039] From final roller 14', the belt bends upwards on deviation cylinder 14c and comes back along a path slightly offset from the first segment 14a, ending on terminal roller 14b which deviates the belt to roller 12c.

[0040] Symmetrically, a continuous segment 15a of the lower belt - which ensures the continuity of the path coming from the righthand assembly 13 of first advance-

ment device 10 - unwinds off roller 13c to an end cylinder 15c, from which return outer segment 15d departs.

[0041] In order to be able to wind the two assemblies of homologous belts 12, 14 and 13, 15 onto common axes which ensure the dragging continuity of film F, the belts are offset along the coaxial rollers seen on plan view.

[0042] On the other hand, in the drawings only one belt for each end-less handling assembly is shown, but it is understood that each assembly could comprise multiple belts arranged offset on the plane perpendicular to the plane of figs. 1, 2A-2C. Preferably, it is provided that each assembly comprises at least two belts which follow identical paths, arranged in the proximity of the two opposite lateral edges of tubular sheet F.

[0043] The two advancement devices 10 and 10a are preferably driven independently by separate motors 17' and 17'', respectively. In the transition step of film F from one device to the subsequent one, dragging speeds are kept as equal as possible (ideally in sync), if anything with a slightly higher speed for second advancement device 10a. Vice versa, the two movements can be made independent to achieve further advantageous results which will be described further on in connection with the operation of the invention.

[0044] Moreover, preferably, belts 12-15 are in the shape of toothed belts, with inner toothing: that allows to achieve a perfect movement sync of the two belts of each pair of belts.

[0045] An amount of deviation of the path of the belts is defined in correspondence of cylinders 14f and 15f - which have the function of respective driving pulleys of drive motor 17'' - for the purpose of obtaining a greater winding of the belts and hence a greater dragging/driving friction.

[0046] The configuration just described of the second horizontal-advancement device is certainly preferable for reasons of construction evenness and to achieve further advantages which will be highlighted further on. Moreover, it makes it possible - in an embodiment not shown - to manufacture belts 12 and 14 in a single, continuous piece and belts 13 and 15, respectively, in turn in a single, continuous piece, with the advantage of an absolute transport continuity of sheet F along the vertical and horizontal paths.

[0047] However, for the purposes of the main teaching offered here, the illustrated configuration of the second advancement device 10a is not strictly necessary and could be replaced by another horizontal means of transport, known per se and not shown here.

[0048] Vice versa, the arrangement, described above, of the two tightly adjacent conveyor belts 12, 13 is essential for the purpose of achieving the objects of the present invention, as is evident from the following description on the operation of the machine according to the invention.

[0049] Returning to fig. 1, a rising motor 18 can be noticed, which drives the lifting/lowering movement of an

upper frame 16, suitably guided on column 1, which supports the entire distribution assembly 11 and the second advancement device 10a. With lifting frame 16 there are integral in movement at least also the top roller assembly 12c, 13c and 14b through which the sheet F is transferred from first device 10 to second device 10a.

[0050] The vertical movement of the frame, as mentioned, is constrained by a guide, overall referred to as 20, which may for example consist of a rail 20a, along which a carriage 20b - integral with frame 16 - is slidable, supported by a chain 20c, driven by a motorised wheel 20d.

[0051] According to a feature of the invention, the vertical movement of frame 16 is coordinated with the change of configuration of loops 12g and 13g. In particular, as frame 16 lowers, loops 12g and 13g become deeper and artificially extend the path of belts 12 and 13 so as to recover the slack which would otherwise originate from the approaching displacement of the upper transfer rollers 12c and 13c toward the lower transfer rollers 12b and 13b. Vice versa, when the frame 16 rises back up, loops 12g and 13g reduce their overall size, to allow the loop path of the belts to extend upwards. In substance, a height extension of the end-less path of belt assemblies 12 and 13 results in a contraction of the size of loops 12g and 13g, so as to maintain the correct tensioning of the belts (because the linear extension of the end-less belt cannot change). Vice versa, a shortening of the path height produces an extension of loops 12g and 13g.

[0052] Thereby at least two extreme configurations originate, when assemblies 12 and 13 have maximum extension and the loops minimum extension (fig. 2B), and when assemblies 12 and 13 have minimum extension (corresponding to the minimum height of the machine) and the loops have maximum extension (fig. 2C).

[0053] As already mentioned, the geometric change of the loops can also occur when only lower rollers 12b and 13b drop below cutting and welding unit 9, to take the edge of plastic sheet F, and one does not wish to lower frame 16 (fig. 2A to be compared with fig. 2B).

[0054] The geometric change of the loops can be achieved in a plurality of different ways. Preferably, as shown, each of the two loops 12g and 13g is formed by a pair of tensioning rollers, 12h and 13h, respectively, mutually horizontally offset and movable one with respect to the other in a vertical direction. In the embodiment shown, the inner rollers of pairs 12h and 13h are integral with carriage 1a, while the outer rollers of pairs 12h and 13h are integral with the vertical movement of frame 16.

[0055] As visible also in fig.1, the distribution unit 11 comprises gripping arms 11a, 11b, which are capable of gripping the initial edge of sleeve-shaped film F, coming from rollers 15c, 14c', to bring it in correspondence of the spreading-apart and application unit, overall referred to as 25. This last unit comprises for example, a spreading-apart device consisting of the four assemblies 25a, 25b, 25c, 25d at the corners of a rectangular load foot-print

(as shown in figs. 3-4A); these assemblies are schematised both in a pick-up position of sleeve F (figs. 3 and 3A), and when they are in a spreading-apart position of the extensible plastic material of sleeve F (figs. 4, 4A). No further details of the structure and operation of this spreading-apart and application unit are provided, but reference can simply be made - as an example - to the apparatus described in EP 1,510,460.

Operation

[0056] As can be clearly seen from the comparison of drawings 2A, 2B and 2C, through the first advancement device consisting of the two conveyor-belt assemblies provided with variable-geometry loops, it is possible to obtain the height adjustment of frame 16 and of distribution unit 11. This last unit may take up at least the following positions:

- a maximum-height position, as illustrated in fig. 2A, in which tensioning rollers 12h and 13h of loops 12g and 13g are rather close, forming loops having a short extension;
- a maximum-height position, as illustrated in fig. 2B, in which frame 16 is at the maximum height and the lower rollers are lowered to start the drawing step of plastic sheet F; tensioning rollers 12h, 13h are very close and the loops have a negligible extension;
- finally, a minimum-height position, as illustrated in fig. 2C, in which the tensioning rollers are at the maximum relative distance; for example, the outer rollers - movable together with frame 16 - are found at the lower level thereof, virtually next to cutting and welding unit 9, so that very large loops 12g, 13g originate.

[0057] As can be understood, the geometric variation of loops 12g, 13g and the height position of frame 16 (hence of distribution assembly 11) is determined each time depending on the height of the load to be wrapped, so that distribution unit 11 is as close as possible to the top of the load.

[0058] Thereby a first one of the objects of the present invention is accomplished, that is, to reduce as far as possible the sleeve-lowering path on the load and hence to remove the idle time required to bring the sleeve mouth in proximity of the load.

[0059] The lowering of distribution unit 11 to the minimum height (fig. 2C) is also achieved to ease an operator's access for maintenance purposes.

[0060] Due to the separation of the transport path of plastic sheet F into two advancement devices, a further advantageous result can be achieved. As a matter of fact, especially for the tallest formats, which hence require to operate with the machine set on maximum height (fig. 2B), it is possible to deliver a sleeve to distribution unit 11 (activity delegated to the movement of the second advancement device) while, at the same time, another sleeve is formed in the first segment of advancement

device 10.

[0061] That requires to detect the format of load C when it arrives near the machine, so as to operate in advance and form the correctly-sized sleeve while another sleeve is applied to the preceding load. This mode - as can be guessed - further increases the productivity of the machine.

[0062] However, it is understood that the invention is not limited to the special embodiments illustrated above, which make up only non-limiting examples of the scope of the invention, but that a number of variants are possible, all within the reach of a person skilled in the field, without departing from the scope of the invention.

[0063] For example, although a displacement path of sheet F, divided into two segments, one perfectly vertical and the other perfectly horizontal, has been described, it is not ruled out that the two paths may be differently inclined.

[0064] Accordingly, by "adjacent continuous linear portions" of the two assemblies of mutually opposite belts it is not understood that they are strictly rectilinear, but simply that they remain adjacent on that portion to guarantee the continuity of the accompanying path of sheet F. In such respect, what is essential for the purposes of the teaching provided here is that the belt assemblies always have an inner path portion - which defines, together with the opposite assembly, the continuous gap between which tubular sheet F is pinched and dragged - and an outer path portion along which the end-less belt path closes.

Claims

1. Hooding machine for the wrapping of loads, comprising a support frame (1) on which a system for the forming of a sleeve made of plastic material is arranged, starting from a tubular sheet (F) folded on a plane and wound on at least one feeding reel (3), wherein said forming system comprises in the proximity of the machine base, presenting means (8a) of an initial edge of said tubular sheet, gripping and advancement means which guide said tubular sheet (F) along a forming path until above a stationing position of a load to be wrapped, a cutting and welding unit (9), arranged along said forming path, and a distribution (11) and force-fitting unit (25), arranged in the upper part of the machine, suitable to cooperate to take up said sleeve from said gripping and advancement means and force-fitting it onto said load, **characterised in that** said distribution unit (11) is mounted vertically movable with respect to the support frame (1) of the machine, and said gripping and advancement means consist of at least a first advancement device (10, 10a) compris-

- ing two symmetrically opposite conveyor-belt assemblies (12,13; 14,15), which run on two end-less paths having at least adjacent continuous portions (12a,13a; 14a,15a), along which said belts adhere by pressure one to the other dragging between them said plastic sheet (F), and **in that** each of said assemblies of mutually opposite belts also has at least a variable-geometry loop (12g, 13g) the size of which is reduced or extended based on at least the vertical displacement of said distribution unit (11).
2. Hooding machine as claimed in claim 1, **characterised in that** said distribution unit (11) is supported on a frame (16) guided in a vertical movement on said support frame (1) of the machine.
 3. Hooding machine as claimed in claim 1 or 2, **characterised in that** said first belt-employing advancement device (10) defines a first, substantially-vertical, continuous, linear part (12a, 13a) and a second belt-employing advancement device (10a) is further provided which defines a second, substantially horizontal, continuous linear part (14a, 15a).
 4. Machine as claimed in claim 3, wherein the homologous belt assemblies of the first advancement device (10) and of the second advancement device (10a) have at least an axis of transfer rollers (12c, 13c) in common.
 5. Machine as claimed in claim 3 or 4, wherein said second advancement device (10a) is integral in the vertical movement with said distribution unit (11) and has two mutually opposite, fixed-geometry belt assemblies (14, 15).
 6. Machine as claimed in any one of the preceding claims, wherein
said cutting and welding unit (9) is arranged between said presentation means (8a) and a lower end of said first advancement device (10),
a lower portion of the path of said belts (12, 13) of the first advancement device is provisionally downwardly extendable, below said cutting and welding unit (9), in a gripping step of the edge of plastic sheet (F), and wherein
the size of said at least one variable-geometry loop (12g, 13g) is changed also according to the displacement of said lower portion of the path of the belts (12, 13).
 7. Machine as claimed in claim 6, wherein at least one lower transfer roller (12b, 13b) and one transfer roller (12h, 13h) of said variable-geometry loop (12g, 13g), for each mutually opposite belt (12, 13) assembly of said first advancement device (10), are mounted integral in movement with a vertically-translatable carriage (1a).
 8. Method for the forming of a wrapping sleeve in an hooding machine, comprising the steps of taking a plastic tubular sheet (F), folded on a plane, off a storage reel (3), causing said tubular plastic sheet (F) to advance in a forming path along which at least one welding and cutting unit (9) is provided, transferring a sleeve formed along said forming path to distribution unit (11) and force-fitting (25) units mounted at the top of the hooding machine, applying said sleeve on a load to be wrapped (C) through said force-fitting unit (25), **characterised in that** said tubular plastic sheet (F) is caused to advance along said forming path captured between adjacent belts (12a, 13a, 14a, 15a) belonging to at least two assemblies of mutually opposite belts (10, 10a) and mounted running on two end-less paths, and **in that** said distribution unit (11) is controlled in vertical translation so as to adapt the height position thereof to the size of the load to be wrapped, changing the geometry of at least one variable-geometry loop (12g, 13g) of said assemblies of mutually opposite belts (10, 10a) accordingly.
 9. Method for the forming of a wrapping sleeve in an hooding machine as claimed in claim 8, wherein said forming path is divided into two sections defined by four assemblies of mutually opposite belts, symmetrically coupled two by two so as to define two distinct, continuous, linear dragging parts in sequence one after the other, the driving of the two continuous, linear dragging parts being controlled in an independent manner.
 10. Method for the forming of a wrapping sleeve in an hooding machine as claimed in claim 9, wherein while a first sleeve is formed along the first one of said two continuous, linear dragging parts, a second sleeve is transferred to said distribution (11) and force-fitting units (25) along the second one of said two continuous, linear dragging parts.

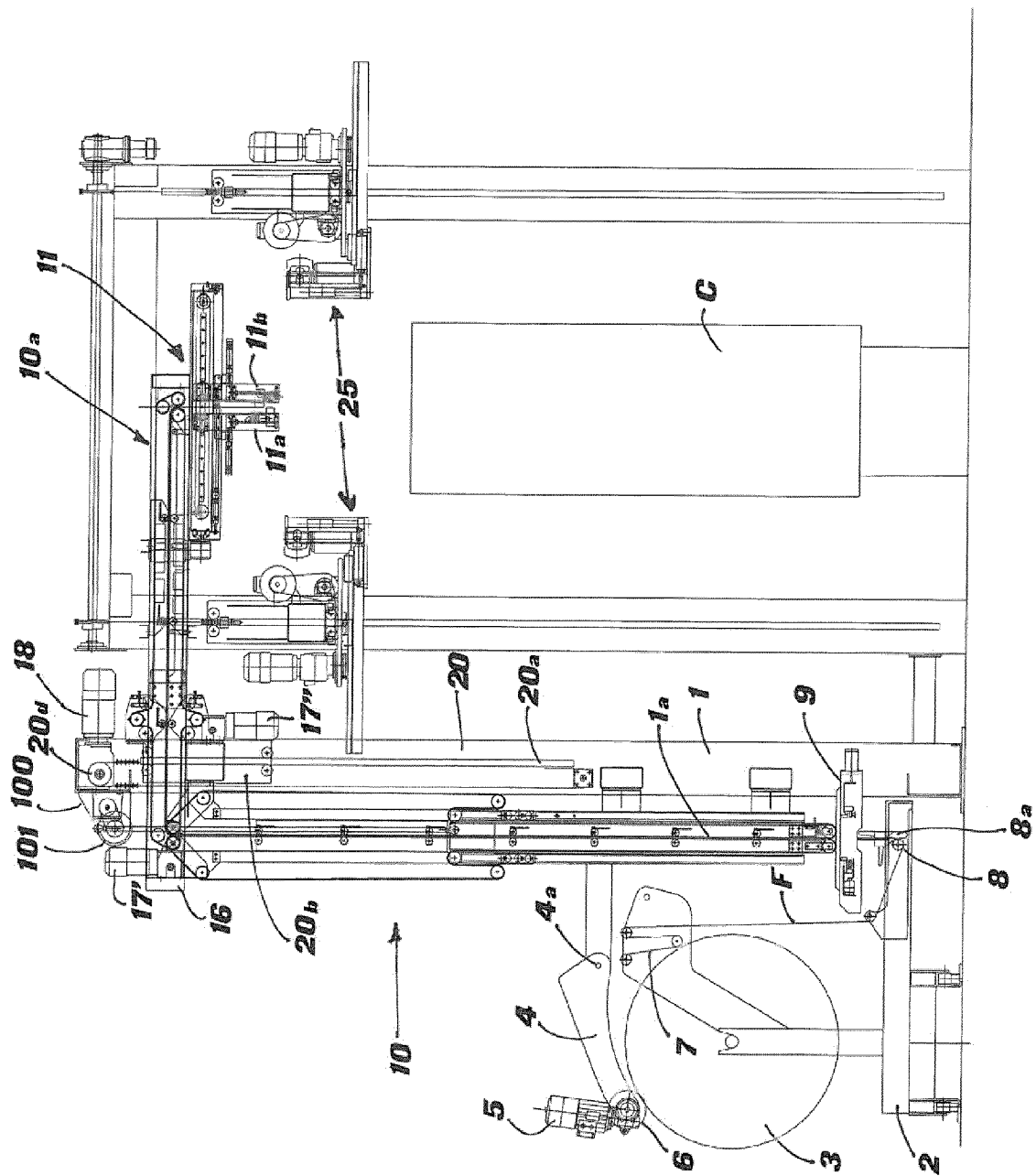


Fig. 1

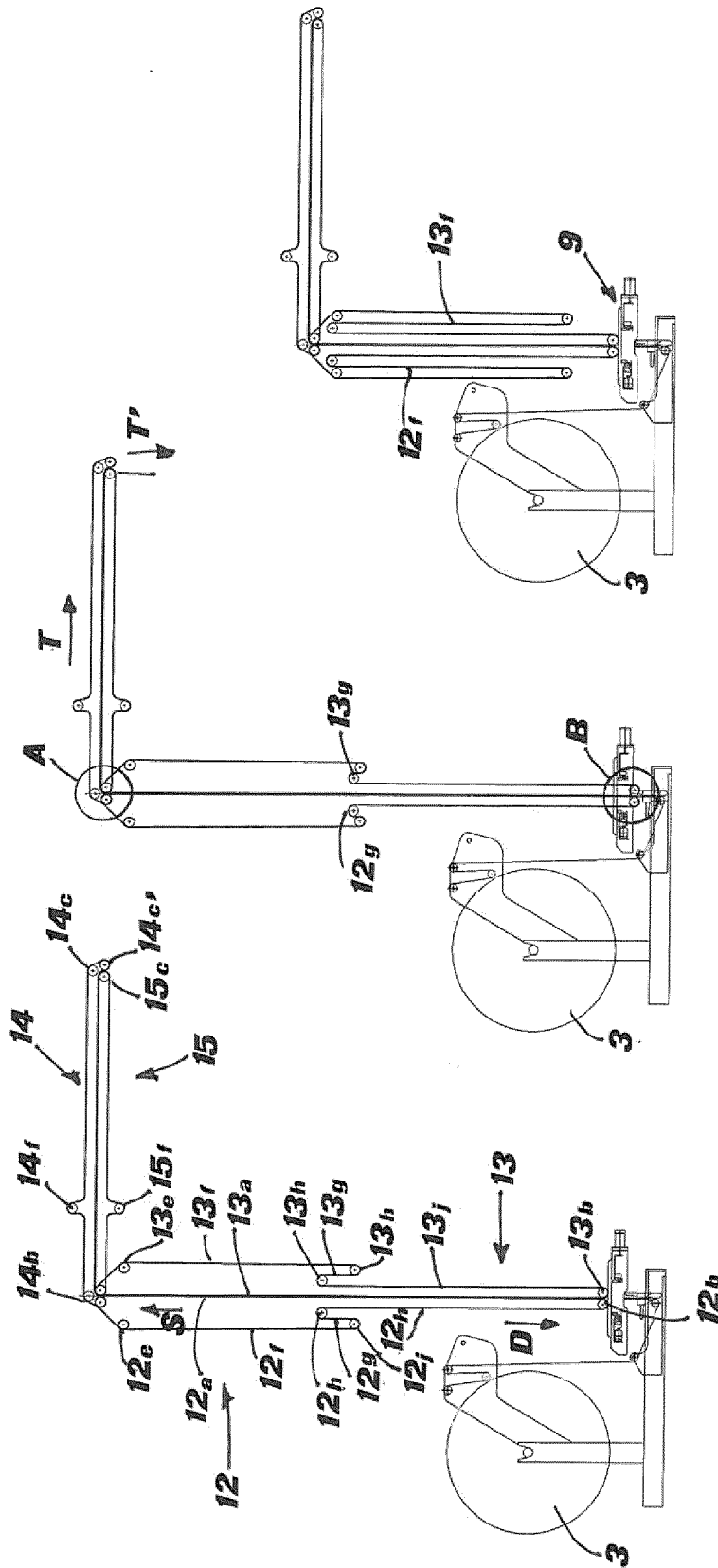


Fig. 2B

Fig. 2A

Fig. 2C

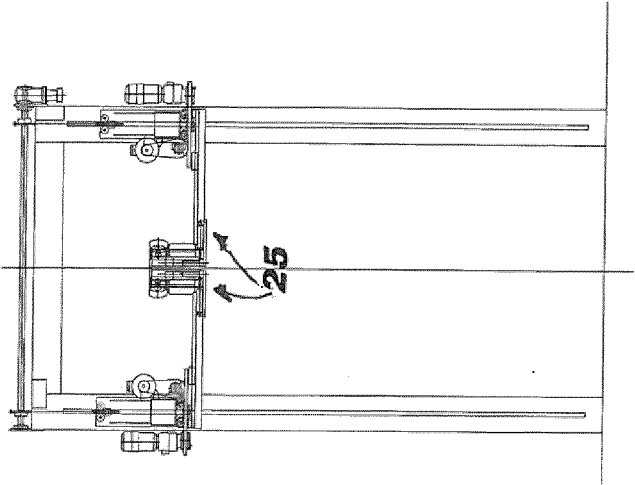


Fig. 3

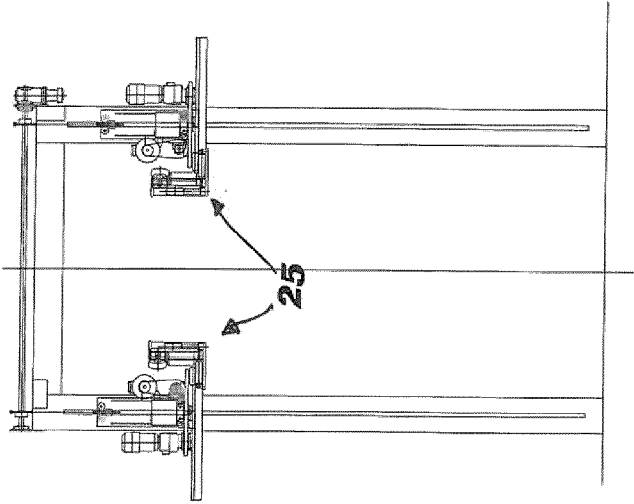


Fig. 4

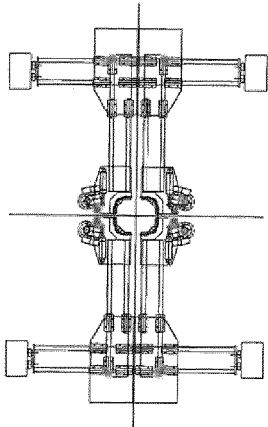


Fig. 3A

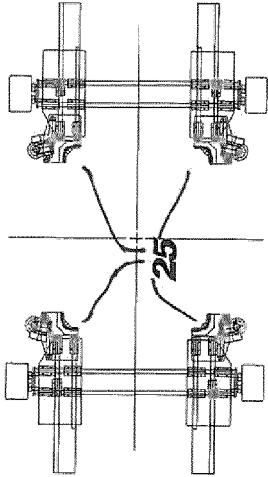


Fig. 4A

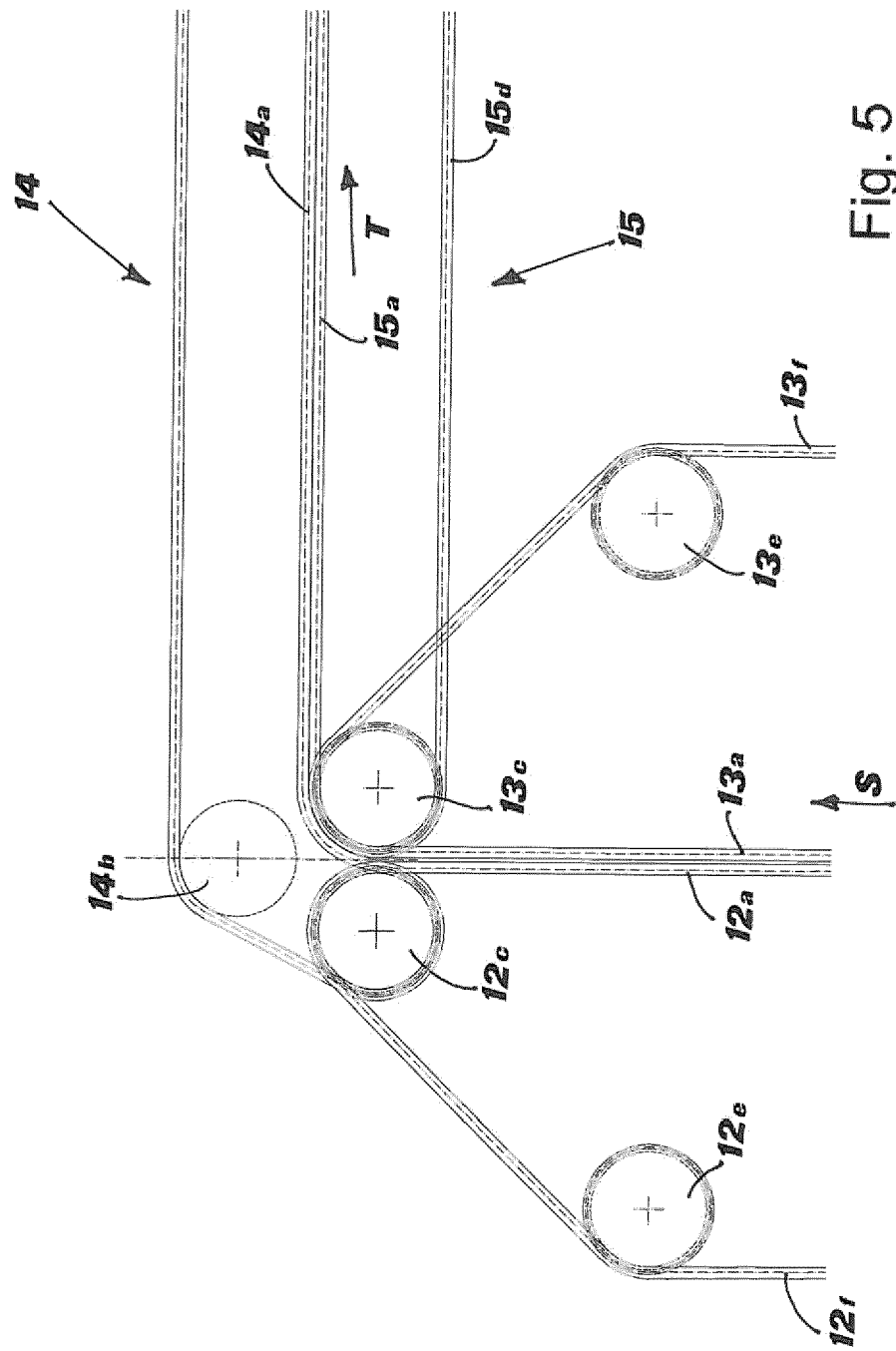


Fig. 5

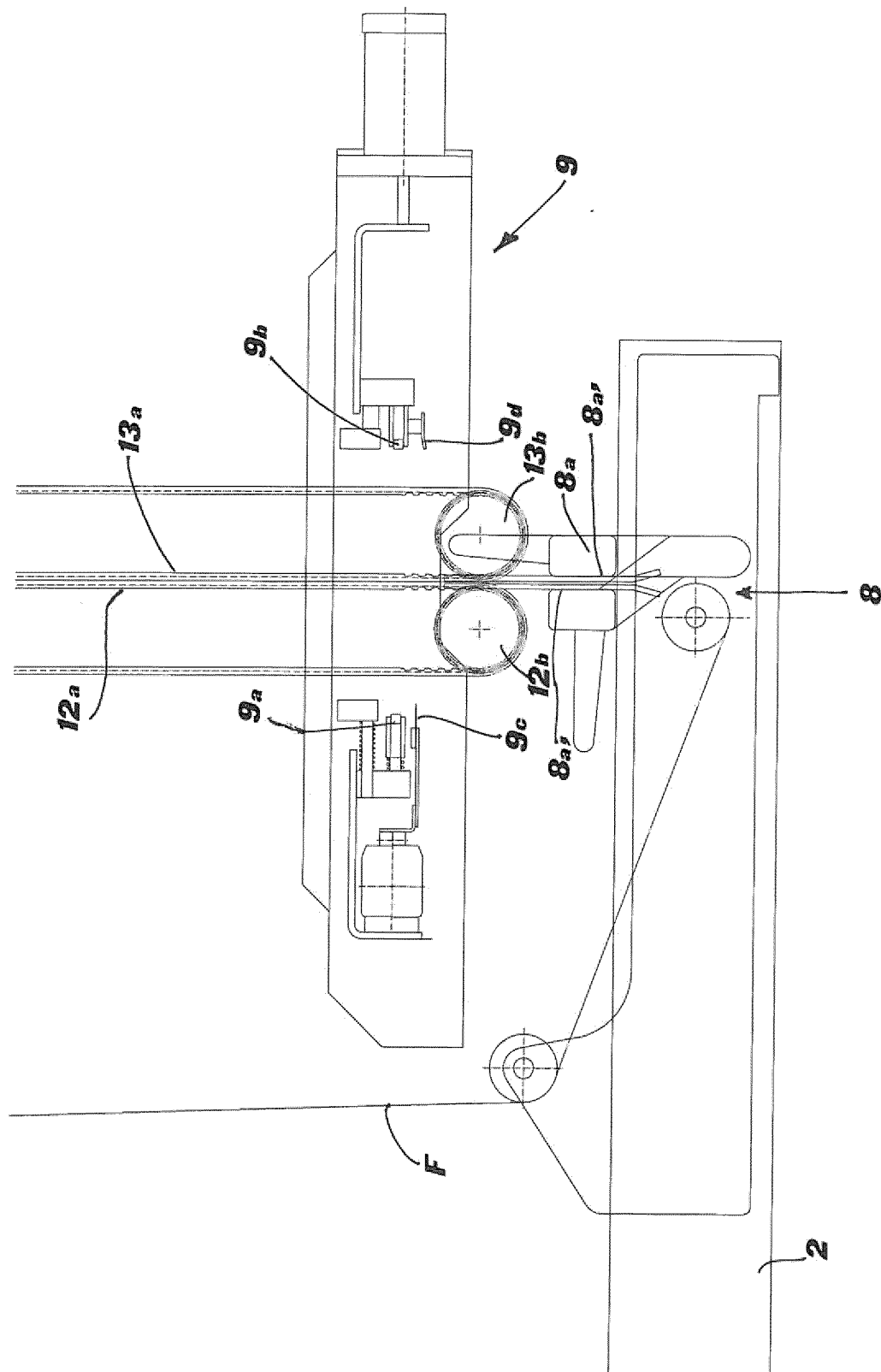


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 13 18 7954

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			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 February 2014	Examiner Damiani, Alberto
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