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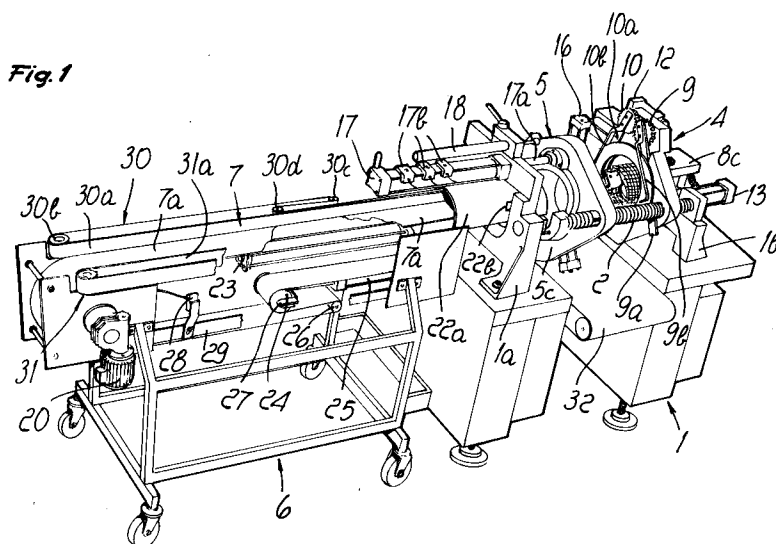
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I-20123 Milano (IT)(54) **machine for continuously packaging food products in a net.**

(57) Machine for continuously packaging food products in a net comprising a frame (1) which supports a net spreading element (8a). A cutting unit (4) is located peripherally with respect to the spreading element (8a) and is movable between a position which substantially flanks the spreading element (8a) and a forward-shifted position. A clamp unit (5) is provided with clamps suitable to clamp the net against a cylindrical element. The unit is movable between a position in which the cylindrical element flanks the spreading element (8a) and a position in which it is spaced from the spreading element (8a)

by a distance which is slightly greater than the longitudinal dimension of the product to be packaged. A conveyor belt (7) extends from a position in which it is in contact with the spreading element (8a) to a position in which it is spaced from the spreading element (8a) by a distance at least equal to the maximum spacing of the clamp unit. There are also a second conveyor belt (32) for removing the packaged product and means (5c,17b,27,28) for automatic actuation and control of all the moving elements.

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The present invention relates to a machine for continuously packaging food products in a net.

The existence of devices for packaging food products, such as for example roast chicken or pork, in a net is known; said devices comprise a tubular element on which the net is peripherally loaded, whereas the product to be packaged in the net is inserted inside said element in order to make it protrude from one end by manual actuation or by means of a pusher, so that it makes contact with the net.

This method is obviously rather slow, most of all because it is often necessary to interrupt operation to peripherally supply the tubular net element, and therefore the aim of the present invention is to provide a machine for continuously packaging food products in a net which is highly productive.

This aim is achieved by a machine for continuously packaging food products in a net, according to the present invention, characterized in that it comprises, aligned consecutively on a frame:

-- a hemispherical net spreading element being provided with wings and supported by said frame in a fixed position;

-- a cutting unit located peripherally with respect to the spreading element, comprising blades suitable to cut the net, and provided with means for translatable motion along longitudinal guides supported by said frame, between a position which substantially flanks the hemispherical part of the spreading element and a position in which the blades operate in a plane which is shifted forward with respect to the end of the wings of said spreading element;

-- a clamp unit provided with clamps suitable to clamp the net against a hollow cylindrical element rigidly coupled to said unit, and provided with means for translatable motion along longitudinal guides supported by the frame, between a position in which said hollow cylindrical element is inserted within the wings of the spreading element, so that the clamps face the interspaces present between said wings, and a position in which said hollow cylindrical element is spaced from said spreading element by a distance which is slightly greater than the longitudinal dimension of the product to be packaged in a net;

-- a conveyor belt arranged so that its upper portion for conveying the product to be packaged in a net is arranged longitudinally, and suitable to move, with its end directed toward the net spreading element, from a position in which it is in contact with said spreading element to a position in which it is spaced from the spreading element by a distance at least equal to the maximum spacing of the clamp unit;

-- means for removing the packaged product;

-- means for automatic actuation and control of all the moving elements.

Further characteristics and advantages of the present invention will become apparent from the description of a preferred but not exclusive embodiment of the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of the machine according to the present invention, with the conveyor belt and the clamp unit in an intermediate position of their stroke, and with the cutting unit at its rightward stroke limit;

figure 2 is a detail view of the conveyor belt at its rightward stroke limit;

figure 3 is a detail view of the cutting unit shown at its rightward stroke limit, and of the clamp unit, which is shown in solid lines in an intermediate position of its stroke and in dot-and-dash lines in the extreme positions; the conveyor belt is also visible in its leftward stroke limit position.

With reference to the above figures, the numeral 1 generally designates the frame portion which, by means of the raised portions 1a and 1b, supports the longitudinal guides 2 and 3 on which the cutting unit 4 and the clamp unit 5, described in detail hereinafter, slide; the numeral 6 generally designates the frame portion which is detachably associated with the portion 1 and supports the conveyor belt 7, described hereinafter.

The net spreading element is located proximate to the rightward end of the guides 2 and 3 and comprises a hemispherical part 8a provided with wings, such as 8b, and supported in a fixed position on the frame by means of the plate 8c.

The cutting unit 4 comprises the plate 4a, which supports the rotation axes of the meshing gears 9 and 10, with which the net cutting blades 9a and 10a are respectively rigidly coupled; the gear 10 is connected to the crank 11 which is associated with the stem of the actuation cylinder 12 and thus, as a consequence of the actuation of said stem, the blades perform a scissors-like movement which cuts the net at the appropriate time.

In this operation, the curved ends of the rods 9b and 10b, respectively rigidly associated with the blades 9a and 10a, enter the net and retain it. The described cutting unit 4 is provided with means, comprising the actuation cylinders 13 and 14, which are suitable to move it between a position in which it substantially flanks the hemispherical part 8a of the net spreading element, shown in the figures, and a position in which the blades 9a, 10a act in a plane which is shifted forward and to the left with respect to the end of the wings, such as 8b, of said spreading element.

The clamp unit 5 comprises the plate 5a, which supports clamps, such as 15, directly connected to the stem of actuation cylinders, such as 16, and suitable to clamp the net against the hollow cylindrical element 5b which is rigidly coupled to the plate 5; said plate 5a furthermore supports the photocell 5c, which detects the arrival of a product to be packaged on the conveyor belt 7 and stops said belt.

Said clamp unit 5 is provided with means suitable to move it, along the longitudinal guides 2 and 3, between the two positions shown in dot-and-dash lines in figure 3: a first position, at the rightward stroke limit, in which the hollow cylindrical element 5b is inserted within the wings, such as 8b, of the net spreading element so that the clamps, such as 15, face the interspaces between said wings; and a second position, in which the hollow cylindrical element is spaced from said net spreading element by a distance which is slightly greater than the longitudinal dimension of the product to be packaged.

Said means comprise the actuation cylinder 17, the stem 17a whereof is connected to the plate 5a, and the mechanical stroke limit 18 with the shock-absorber 18a.

In order to allow changes in the size of the product to be packaged, the cylinder 17 is of the type in which the stroke can vary in the direction away from the net spreading element, and there are sensors 17b which can be selectively activated to adjust said stroke on the dimensions of three preset sizes; naturally, the mechanical stroke limit 18 is also fixed to the frame in a variable position.

The conveyor belt 7 acts so that its upper portion 7a is stretched between a drive pulley associated with the shaft 19, which is motorized by means of the motor 20 and is supported by the portion 6 of the frame in a fixed position, and the snub pulley 21, which is supported at the end of telescopic guides, such as 22, which are associated with the frame portion 6; the snub pulley is provided with means, comprising the actuation cylinder 23 with the stem 23a, which are suitable to move it through the hollow cylindrical element 5b between an extreme rightward position, in which is it in contact with the net spreading element, and an extreme leftward position, shown in figure 3, in which it is spaced from said spreading element by a distance which is at least equal to the maximum spacing of the clamp unit 5.

The numeral 22a furthermore designates a hood which is provided with the opening 22b and is rigidly coupled to the final portion of said guides 22 to protect the product when the net is removed from the spreading element; the opening 22b has the purpose of allowing the operation of the photocell 5c.

Naturally, the conveyor belt 7 is provided with compensation means suitable to ensure its tension for every position of the snub pulley 21; said means comprise, consecutively and starting from the upper belt portion 7a, a first snub pulley 24 connected to the actuation cylinder 25 which acts together with the actuation cylinder 23 so as to keep constant the distance between said pulley 24 and the snub pulley 21 of the upper belt portion, and a second fixed pulley 26.

The actuation cylinder 23 which actuates the snub pulley 21 is of the variable stroke type with a stroke which can be varied in the direction away from the net spreading element, so as to allow changing the size of the product to be packaged, and its actuation is controlled by means of the slider 27 designed to make contact with the sensor 28 which, in order to allow varying the stroke of the actuation cylinder 23, is associable with the guide 29 rigidly coupled to the frame in a variable position.

The upper portion 7a of the conveyor belt 7 is flanked by moving sides which are driven at the same speed as the belt 7 in order to optimize the conveyance of the product to be packaged; said sides are constituted by the portions 30a, 31a of two secondary belts, generally designated by the reference numerals 30 and 31; the secondary belt designated by 30 is now described.

The portion 30a of said secondary belt 30 is stretched between the driving pulley 30b, driven by the drive shaft 19 and supported in a fixed position on the frame portion 6, and the snub pulley 30c, supported by the telescopic guides laterally to the snub pulley 21 of the upper portion 7a of the conveyor belt and thus being movable therewith; the path of the secondary belt 30 obviously includes compensation means comprising a snub pulley 30d, movable together with the pulley 30c and at a constant distance therefrom, and a fixed snub pulley 30e.

The machine according to the present invention is completed by the conveyor 32 for removing the packaged products.

Description of the operation of the machine according to the present invention begins from the situation in which the cutting unit 4 is at the rightward stroke limit, flanking the hemispherical part 8a of the net spreading element, the clamp unit 5 is also at the rightward stroke limit, with the cylindrical element 5b inserted below the wings, such as 8b, of the net spreading element, and with the clamps, such as 15, facing the interspaces between said wings, and the conveyor belt 7 is in the situation in which the snub pulley 21 is at the rightward stroke limit and rests against the net spreading element.

In this situation, the conveyor belt 7 is moving and an operator places a product to be packaged on it.

When this product arrives, being conveyed by the conveyor belt, at the opening of the photocell 5c, said photocell stops the belt and starts the automatic packaging cycle; the clamps, such as 15, are thus closed, clamping the net against the element 5b, and the clamp unit 5 immediately moves to the left and pulls the net, which arranges itself around the end part of the conveyor belt 7, with the product to be packaged resting thereon, so that the snub pulley 21 of said conveyor belt can move leftwards, making the product fall into the net. Once the belt 7 has reached its leftward stroke limit, the cutting unit 4 also moves to the left until it reaches the position in which the blades 9a and 10a can cut the net, skimming the ends of the wings such as 8b.

The clamps, such as 15, open immediately, releasing the net, and the packaged product falls onto the removal conveyor 32.

At this point everything returns to the initial position, and an operating cycle can restart with a much higher rate than that obtainable with known machines, and thus with a considerable increase in productivity with respect to said known machines.

The described invention is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept: thus, for example, in the above described embodiment the compensation means of the conveyor belt may assume any form.

In another embodiment, the conveyor belt can operate so that its upper portion is stretched between a drive pulley and a snub pulley located on the side of the net spreading element, both of said pulleys being supported by a truck provided with means suitable to move it longitudinally, inserting the belt inside the hollow cylindrical element rigidly associated with the clamp unit, between a position in which the snub pulley is in contact with the net spreading element and a position in which it is spaced from said spreading element by a distance which is at least equal to the maximum spacing of the clamp unit.

In the practical embodiment of the invention, all the details may be replaced with other technically equivalent elements; the materials employed, as well as the shapes and dimensions, may furthermore be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference

signs.

Claims

- 5 1. Machine for continuously packaging food products in a net, characterized in that it comprises, aligned consecutively on a frame (1):
 - 10 -- a hemispherical net spreading element (8a) being provided with wings (8b) and supported by said frame (1) in a fixed position;
 - 15 -- a cutting unit (4) located peripherally with respect to the spreading element (8a), comprising blades (9a,10a) suitable to cut the net, and provided with means for translatable motion (13,14) along longitudinal guides (2,3) supported by said frame (1), between a position which substantially flanks the hemispherical part of the spreading element (8a) and a position in which the blades operate in a plane which is shifted forwards with respect to the ends of the wings (8b) of said spreading element (8a);
 - 20 -- a clamp unit (5) provided with clamps (15) suitable to clamp the net against a hollow cylindrical element (5b) rigidly coupled to said unit (5), and provided with means for translatable motion (17,18), along longitudinal guides (2,3) supported by the frame (1), between a position in which said hollow cylindrical element (5b) is inserted within the wings (8b) of the spreading element (8a), so that the clamps (15) face the interspaces present between said wings (8b), and a position in which said hollow cylindrical element (5b) is spaced from said spreading element (8a) by a distance which is slightly greater than the longitudinal dimension of the product to be packaged in a net;
 - 25 -- a conveyor belt (7) arranged so that its upper portion (7a) for conveying the product to be packaged in a net is arranged longitudinally, and suitable to move, with its end directed toward the net spreading element (8a), from a position in which said end is in contact with said spreading element (8a) to a position in which it is spaced from the spreading element (8a) by a distance at least equal to the maximum spacing of the clamp unit (5);
 - 30 -- means (32) for removing the packaged product;
 - 35 -- means for automatic actuation and control (5c,17b,27,28) of all the moving elements.
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2. Machine according to claim 1, characterized in that the cutting unit comprises two blades act-

- ing like scissors and associated, at one end, with two meshing gears, one of which is motorized by means of a crank associated with the stem of an actuation cylinder, a rod with a curved end, suitable to enter the net during cutting, being associated with each blade. 5
3. Machine according to one or more of the preceding claims, characterized in that the clamp unit is provided in the form of a plate which supports, at the face directed toward the net spreading element, the clamps which are directly connected to the end of the stem of actuation cylinders, and supports, at the other face, a photocell detecting the arrival of a product to be packaged and stops the conveyor belt. 10 15
4. Machine according to one or more of the preceding claims, characterized in that the means for the translatory motion of the clamp unit comprise at least one actuation cylinder the stroke whereof can vary in the direction away from the net spreading element, so as to allow to change the size of the product to be packaged, a stroke limiter being provided which has a shock-absorber suitable to be fixed, in an adjustable position, to abut the stroke of the clamp unit in said direction away from the spreading element. 20 25 30
5. Machine according to one or more of the preceding claims, characterized in that the at least one variable-stroke actuation cylinder comprises a plurality of sensors which can be selectively activated to adjust the stroke of the clamp unit related to preset sizes. 35
6. Machine according to one or more of the preceding claims, characterized in that the conveyor belt operates so that its upper portion is stretched between a drive pulley, which is associated with a motorized shaft supported by the frame in a fixed position, and a snub pulley, which is provided with means suitable to cause its translatory motion, through the hollow cylindrical element rigidly coupled to the clamp unit, between a position in which it is in contact with the net spreading element and a position in which it is spaced from said spreading element by a distance at least equal to the maximum spacing of the clamp unit, compensation means being provided which are suitable to ensure the tension of the conveyor belt for every position of the snub pulley. 40 45 50 55
7. Machine according to one or more of the preceding claims, characterized in that the snub pulley of the conveyor belt is supported at the end of telescopic guides associated with a portion of the frame which supports said conveyor belt together with all the elements connected thereto, and in that it is detachably associated with the frame portion which comprises the guides for the translatory motion of the cutting unit and of the clamp unit, a hood being associated with the final portion of said guides, said hood being provided with an opening which delimits, together with the conveyor belt, a portion of space for accommodating the product to be packaged.
8. Machine according to one or more of the preceding claims, characterized in that the means for the translatory motion of the snub pulley of the conveyor belt comprise an actuation cylinder the stroke whereof can vary in the direction away from the net spreading element, so as to allow to change the size of the product to be packaged.
9. Machine according to one or more of the preceding claims, characterized in that the compensation means with which the conveyor belt is provided comprise, consecutively and starting from the upper belt portion, a first snub pulley which is connected to means suitable to keep it at a constant distance from the snub pulley of said upper belt portion, and a second fixed pulley.
10. Machine according to one or more of the preceding claims, characterized in that the compensation means with which the conveyor belt is provided comprise, consecutively and starting from the upper belt portion, a first snub pulley connected to an actuation cylinder which operates together with the actuation cylinder which causes the translatory motion of the snub pulley of said upper belt portion so as to keep constant the distance between said pulleys, and a second fixed pulley, a slider being connected to the first snub pulley and being suitable to make contact with a sensor associated with the frame in a variable position and controls the automatic actuation of the variable-stroke actuation cylinder which moves the snub pulley of the upper portion of the conveyor belt.
11. Machine according to one or more of the preceding claims, characterized by the presence of moving sides which flank the conveyor belt and move at the same speed as said conveyor belt.

12. Machine according to one or more of the preceding claims, characterized in that each moving side comprises a secondary belt which operates so that its portion which faces the conveyor belt is stretched between a drive pulley, supported in a fixed position, and a snub pulley, supported so that it flanks the snub pulley of the upper portion of said conveyor belt, compensation means being provided which comprise a first snub pulley, kept at a constant distance from said snub pulley of the upper portion of the conveyor belt, and a second fixed snub pulley.

13. Machine according to claims 1 and 11, characterized in that the conveyor belt operates so that its upper portion is stretched between a drive pulley and a snub pulley which is located on the side of the net spreading element, both of said pulleys being supported by a truck provided with means suitable to move it longitudinally, with insertion of the belt in the hollow cylindrical element which is rigidly coupled to the clamp unit, between a position in which the snub pulley is in contact with the net spreading element and a position in which it is spaced from said spreading element by a distance at least equal to the maximum spacing of the clamp unit.

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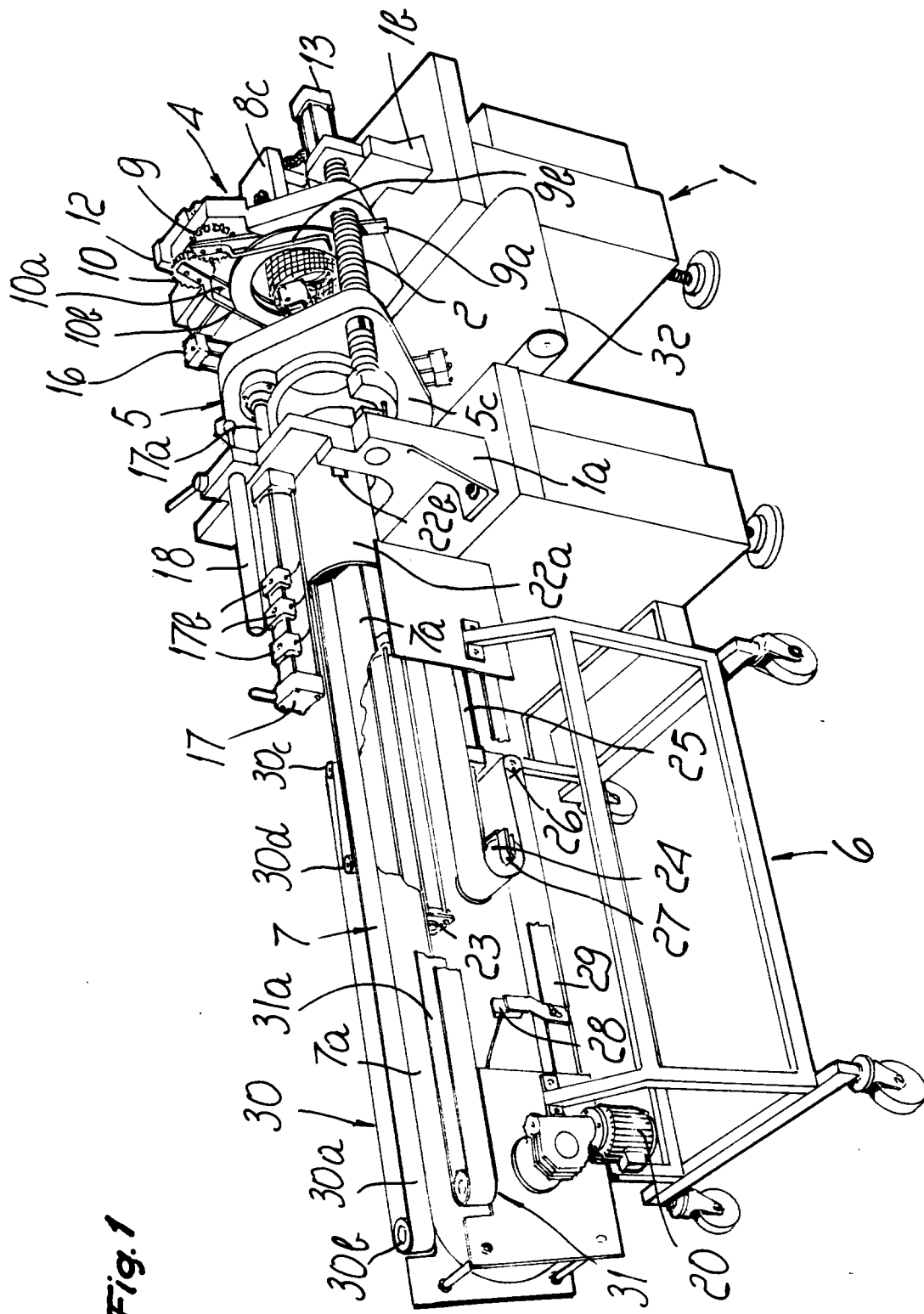
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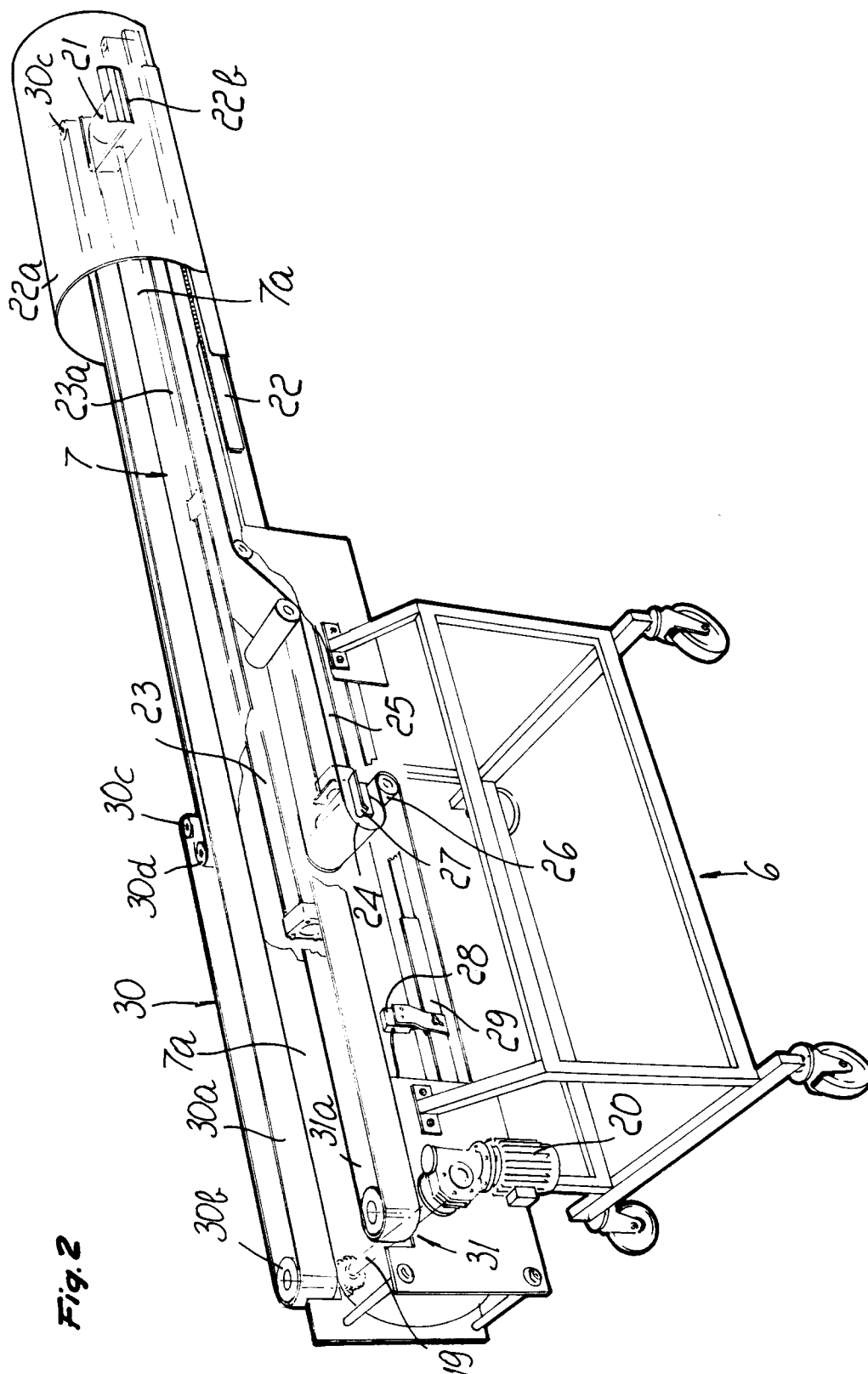
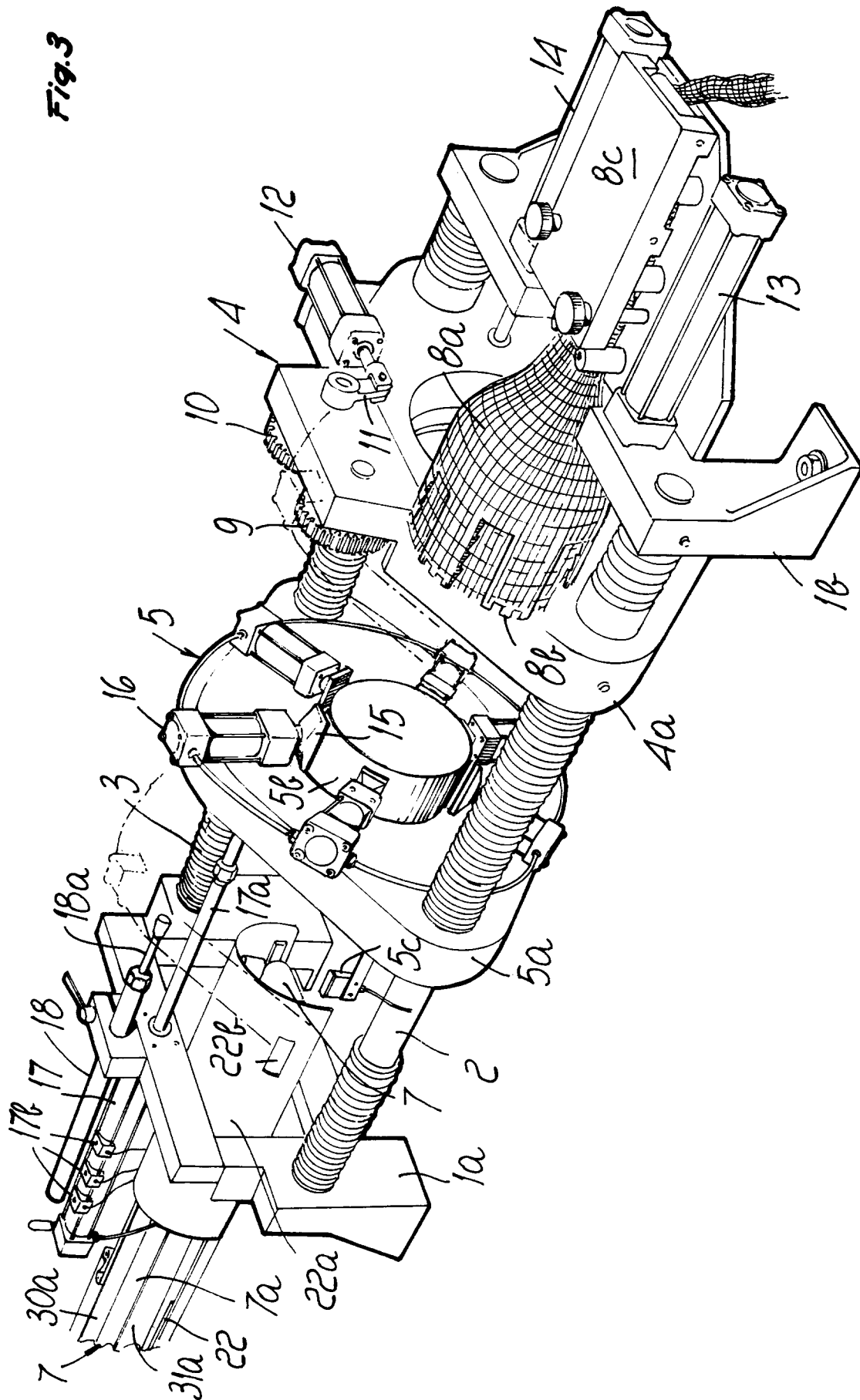


Fig. 3





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EUROPEAN SEARCH REPORT

Application Number

EP 93 83 0167

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.5)
A	FR-A-2 116 859 (MORANDI) * page 2, line 32 - page 6, line 24; figures 1-4 * -----	1	B65B9/13
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 SEPTEMBER 1993	Examiner CLAEYS H.C.M.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			