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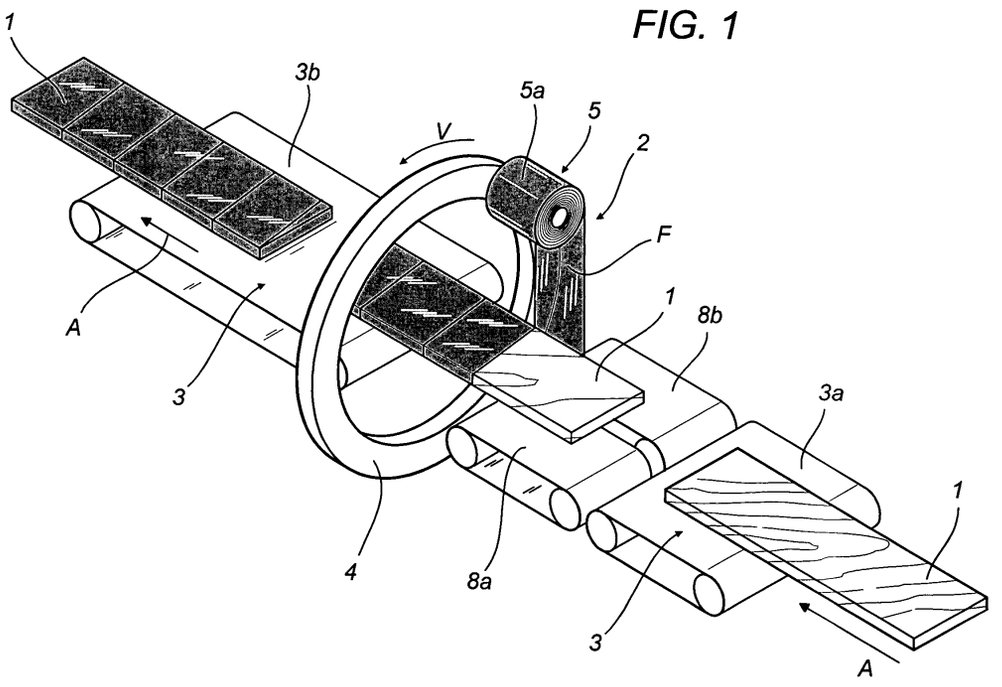
(54) An apparatus for wrapping groups of products with plastic film

(57) An apparatus for wrapping groups (1) of products with plastic film comprising: a horizontal surface (3) for supporting the group (1) and feeding it in a direction (A), the surface (3) being divided into two portions (3a, 3b) positioned on opposite sides of a ring (4) equipped with means (5) for dispensing film (F) around the group (1) of products passing through the ring (4), and in such a way as to wrap the group (1) of products in a spiral and according to a predetermined direction (V); a film (F) gripping and cutting unit (6) designed to allow the formation of a wrapping tail end (C) for the group (1) of products; the unit (6) being positioned close to the ring (4) and at the portion (3a) of the surface (3) upstream of the ring (4) relative to the direction of feed (A), and wrapped by the film (F); means (7) for joining the film (F) acting on a section (T) of film (F) wrapped around the group (1) and positioned close to the gripping and cutting unit (6) so as to allow the section (T) of film (F) subsequently forming part of the tail end (C) to be joined to the coils (S) of film above, in this way stably sealing the wrapping on the group (1) of products.

FIG. 1



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Description

[0001] The present invention relates to an apparatus for wrapping groups of products with stretch plastic film.

[0002] At present, amongst apparatuses which wrap products with stretch plastic film, to produce a wrapper which wraps the product (both for sealing and to protect the product or pack produced in this way), one is known in the jargon in the field as the "ring" type.

[0003] This apparatus basically has a horizontal surface which feeds the group or groups of products towards a wrapping device consisting of a ring (through which the product passes) and an unwinding unit consisting of a reel of plastic film and an idle roller which dispenses the film at a product wrapping area. More particularly, on the above-mentioned machine the ring is rotatably supported by a set of rollers distributed along its circumference and integral with a base frame, the ring - supporting rollers assembly lying in a vertical plane which is perpendicular to the horizontal product feed surface.

[0004] The unwinding unit, including the reel, turns together with the motor-powered ring in such a way that the products fed horizontally are wrapped with the film extending in a spiral configuration due to the combination of ring / unwinding unit - product movements. The product is wrapped together with a portion of the feed surface, close to the ring, which has an architecture that, when the products are fed along the direction of feed, allows the film wrapped around to be slipped off at the trailing end of the surface, adjacent to another station for ejection of the wrapped product.

[0005] In particular, at the end of wrapping, that is to say, when the trailing end of the group is close to the ring, group feed and roller rotation are normally slowed or stopped to allow the film to be cut and the final flap of film to be stuck on the group of products.

[0006] In a known solution, this operation is performed using a film gripping and cutting unit, which can be inserted in the last turns of film on the pack, so as to intercept and narrow a section of film, wound between the group of products and the roller, until it forms a film cord which is cut by a knife present on the unit. Once the film has been cut, the flap is stuck directly to the group of products by simple adhesion and by compression.

[0007] Adhesion by compression of the final flap of film cut on the rest of the film already wrapped has been effective until now, but for some products to be wrapped, such as panels or furniture components which have to be stacked on top of one another in warehouses and must be able to slide relative to one another, said procedure may be insufficient. This is because the ability to slide requires the use of a film with low surface adhesion which is not well suited to the above-mentioned technique of sealing by adhesion.

[0008] As indicated, this negative aspect affects sealing of the final flap, which may become detached from the rest of the film, making product sealing imperfect or unsatisfactory.

[0009] The aim of the present invention is, therefore, to overcome this disadvantage by providing an apparatus for wrapping groups of products with stretch film which has a structure designed to allow the final flap of film to adhere to the wrapped group in a way that is always precise and secure irrespective of the type of film used for wrapping.

[0010] Accordingly, this aim is achieved by an apparatus for wrapping groups of products with plastic film comprising: a horizontal surface for supporting the group and feeding it in a given direction, the surface being divided into two portions positioned on opposite sides of a ring equipped with means for dispensing film around the group of products passing through the ring, and in such a way as to wrap the group of products in a spiral and according to a predetermined direction; a film gripping and cutting unit designed to allow the formation of a wrapping tail end for the group of products; the unit being positioned close to the ring and at the portion of the surface upstream of the ring, relative to the direction of feed, and wrapped by the film; means for joining the film acting on a section of film wrapped around the group, said means being positioned close to the gripping and cutting unit so as to allow the section of film subsequently forming part of the tail end to be joined to the coils of film above and so stably sealing the wrapping on the group of products.

[0011] The technical characteristics of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 is a schematic perspective view of an apparatus for wrapping groups of products with plastic film in accordance with the present invention;
- Figure 2 is a side view, with some parts cut away to better illustrate others and with joining means in an operating configuration, of a detail of the apparatus illustrated in Figure 1;
- Figure 3 is a front view with some parts cut away to better illustrate others, of the detail illustrated in Figure 2;
- Figure 4 is a side view, with some parts cut away to better illustrate others and with joining means in a non-operating configuration, of the detail illustrated in Figure 2.

[0012] With reference to the accompanying drawings, in particular Figure 1, the apparatus disclosed is used to wrap groups 1 of products with plastic film, for example stretch film. In particular, the products may be, by way of example and without limiting the scope of the in-

vention, panels or furniture units which are chiefly flat.

[0013] This apparatus, labelled 2 as a whole, comprises:

- a horizontal surface 3 for supporting and feeding the group 1 in a direction A (see arrows in Figure 1); the surface 3 is divided into two portions 3a and 3b positioned on opposite sides of
- a ring 4 equipped with means 5 for dispensing the film F around the group 1 of products passing through the ring 4, and in such a way as to wrap the group 1 of products in a spiral and according to a predetermined direction V (see arrow in Figure 1) ;
- a film F gripping and cutting unit 6, designed to allow the formation of a wrapping tail end C for the group 1 of products when the group's trailing end 1a reaches the ring 4; this unit 6 (see Figure 2) is positioned close to the ring 4 and at the portion 3a of the surface 3 upstream of the ring 4, relative to the direction of feed A, and wrapped by the film F.

[0014] The above-mentioned film F dispensing means 5, of the known type, basically comprise a reel 5a of film and a plurality of pre-tensioning and idle rollers 5b, 5c for the film F which operate during rotation of the ring 4 and of the carriage 5e supporting the reel 5a and rollers 5b, 5c.

[0015] As is clearly illustrated in Figure 2, the apparatus 2 also comprises means 7 for joining the film F acting on a section T of film F wrapped around the group 1 of products.

[0016] These joining means 7 are positioned close to the gripping and cutting unit 6 so as to allow the section T of film F subsequently forming part of the tail end C to be joined to the coils S of film above, stably sealing the wrapping on the group 1 of products.

[0017] More precisely, as illustrated in Figures 2, 3 and 4, the joining means 7 may be, by way of example and without limiting the scope of the invention, sealing means positioned close to the portion 3a of the surface 3 upstream of the ring 4 and upstream of the gripping and cutting unit 6 relative to the direction V of wrapping.

[0018] Examining the structure in greater detail, the portion 3a of the surface 3 upstream of the wrapping ring 4 comprises at least one end consisting of two conveyor belts 8a and 8b, parallel with one another, closed in a loop and designed to have the film F partially wrapped around them. These belts 8a and 8b have a construction architecture designed to allow extraction of the film F wrapped around them as the group 1 of products is fed forwards (structure not illustrated, being of the known type and not forming part of the subject matter of the present invention).

[0019] The sealing means 7 are positioned under one of the belts, labelled 8a, whose lower branch is fitted with a counter-plate 9 for the sealing means 7.

[0020] The gripping and cutting unit 6 comprises at least one horizontal rod 10 (illustrated with a dashed line), mobile axially in both directions along the direction A (see arrows F1) and designed to move close to one side (the lower one) of the group 1 so as to allow at least one coil S of film F to be wrapped over the rod 10 to form an opening between the group 1 and the coil S. Next to the rod 10 there is a first arm 11 with gripper means 12 designed to pick up the section T of film, which is part of a final coil S1 wrapped around the trailing end 1a of the group 1, between the rod 10 and the dispensing means 5, and cause it to narrow until the cord-shaped section T of film is formed.

[0021] Close to the first arm 11 there are cutting means 13 designed to allow the cord-shaped section T to be divided and to form the wrapping tail end C held by the first arm 11 (the structure and movements of part of this unit are amply illustrated in patent IT 1.305.805 by the same Applicant and so are not described in further detail in this text).

[0022] The sealing means 7 are upstream of the cutting means 13 relative to the direction of wrapping V. The sealing means act on the cord-shaped section T of film of the final coil S1 before activation of the cutting means 13 acting on the same cord-shaped section T.

[0023] At a structural level, the sealing means 7 may comprise:

- a sealing plate 14 connected to a second arm 15 pivoting, at 15a, at a frame 16 supporting the portion 3a of the surface, and
- drive means 17 for the second arm 15 which provide movement from a non-operating position, in which the second arm 15 and the plate 14 are distanced from the belt 8a that is part of the portion 3a (see Figures 3 and 4), and a rotated operating position, in which the second arm 15 and the plate 14 are in contact with the counter-plate 9 connected at the belt 8a in such a way as to seal the section T of film F onto the coils S above (see arrows F2).

[0024] As illustrated in Figure 3, the counter-plate 9 is "U"-shaped, designed to encompass and protect both sides of the belt 8a from below without affecting belt 8a movement.

[0025] An apparatus structured in this way operates as follows:
the group 1 being wrapped is fed along the supporting surface 3 in the direction of feed A and, after reaching the pair of belts 8a and 8b, begins being wrapped by rotation of the ring 4 with the reel 5a as it passes through the ring 4 and
reaches the other part of the surface 3, downstream of the ring 4 (as illustrated in Figure 1).

[0026] Just before group 1 wrapping is completed, that is to say, when the trailing end 1a of the group 1 is close to the ring 4 (see Figure 2), the movement of the ring 4 is slowed and the gripping and cutting unit 6 is activated. The latter, according to a known method, moves the horizontal rod 10 close to the lower side of

the group 1 so as to allow a coil S1 of film F to be wrapped over the rod 10, forming the opening between the group 1 and the coil S.

[0027] At this point the first arm 11 equipped with the gripper means 12 is activated. The latter pick up the section T of film, which is part of the final coil S1, between the rod 10 and the dispensing means 5, and cause it to narrow, by moving the first arm 11 backwards (see arrow F3) until the section T of film becomes cord-shaped.

[0028] At this point the sealing means 7 are activated and, by the movement of the second arm 15, bring the sealing plate 14 into contact with the counter-plate 9, joining the final coil S1 to the coils S above.

[0029] When sealing is complete, with the surface 3 stationary, the cutting means 13 are activated, separating the final coil S1 from the film F originating from the reel 5a so that the group 1 thus obtained can be freed and released to the remaining zone of the surface 3, downstream of the ring 4.

[0030] An apparatus structured in this way, therefore, fulfils the preset aims thanks to the fact that it is equipped with means for creating a stable join, such as the sealing means, which are structured in such a way that they do not alter the architecture of the apparatus, but are integrated in it.

[0031] The joining operation is extremely rapid and does not affect apparatus production times, but it does make group sealing extremely secure, with an acceptable appearance.

[0032] The invention described has evident industrial applications and may be subject to modifications and variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. An apparatus for wrapping groups (1) of products with plastic film, the apparatus (2) comprising:

   - a horizontal surface (3) for supporting and feeding the group (1) in a direction (A), the surface (3) being divided into two portions (3a, 3b) positioned on opposite sides of
   - a ring (4) equipped with means (5) for dispensing the film (F) around the group (1) of products passing through the ring (4), and in such a way as to wrap the group (1) of products in a spiral and according to a predetermined direction (V);
   - a film (F) gripping and cutting unit (6), designed to allow the formation of a wrapping tail end (C) for the group (1) of products; the unit (6) being positioned close to the ring (4) and at the portion (3a) of the surface (3) upstream of the ring (4), relative to the direction of feed (A), and wrapped by the film (F), the apparatus (2) being **characterised in that** it comprises means (7) for joining the film (F) acting on a section (T) of film (F) wrapped around the group (1), the joining means being located close to the gripping and cutting unit (6) so as to allow the section (T) of film (F) subsequently forming part of the tail end (C) to be joined to the coils (S) of film above and so stably sealing the wrapping on the group (1) of products.

2. The apparatus according to claim 1, **characterised in that** the joining means (7) are sealing means positioned close to the portion (3a) of the surface (3) located upstream of the ring (4).

3. The apparatus according to claim 1, **characterised in that** the joining means (7) are sealing means positioned close to the portion (3a) of the surface (3) located upstream of the ring (4) and upstream of the gripping and cutting unit (6) relative to the direction (V) of wrapping.

4. The apparatus according to claim 1, in which the portion (3a) of the surface (3) located upstream of the wrapping ring (4) comprises at least one end consisting of two conveyor belts (8a, 8b) parallel with one another, closed in a loop and designed to have the film (F) partially wrapped around them, the apparatus being **characterised in that** the joining means (7) are positioned under one of the belts (8a) whose lower branch is equipped with a counter-plate (9) for the sealing means (7).

5. The apparatus according to claim 1, in which the gripping and cutting unit (6) comprises at least:

   - a horizontal rod (10), mobile axially in both directions along the direction (A) and designed to move close to one side of the group (1) so as to allow at least one coil (S) of film (F) to be wrapped over the rod (10), forming an opening between the group (1) and the coils (S);
   - at least a first arm (11) with gripper means (12) designed to pick up a section (T) of film which is part of a final coil (S1) wrapped around the trailing end of the group (1), between the rod (10) and the dispensing means (5) and to cause it to narrow until it forms a cord-shaped section (T) of film;
   - cutting means (13), positioned close to the first arm (11), and designed to allow division of the cord-shaped section (T) and formation of the wrapping tail end (C) held by the first arm (11), the apparatus being **characterised in that** the joining means (7) are positioned upstream of the cutting means (13) relative to the direction (V) of wrapping and act on the cord-shaped section (T) of film of the final coil (S1) before

the cutting means (13) act on the cord-shaped section (T).

6. The apparatus according to claim 2 or 3, **characterised in that** the sealing means (7) comprise a sealing plate (14) connected to a second arm (15) pivoting at a frame (16) supporting a portion (3a) of surface, and drive means (17) for the second arm (15) which provide movement from a non-operating position, in which the second arm (15) and the plate (14) are distanced from a belt (8a) which is part of the portion (3a), and a rotated operating position, in which the second arm (15) and the plate (14) are in contact with the counter-plate (9) connected at the belt (8a) so as to seal the section (T) of film (F) onto the coils (S) above.

7. The apparatus according to claim 6, **characterised in that** the counter-plate (9) is "U"-shaped so as to encompass and protect both sides of the belt (8a) from below without affecting belt (8a) movement.

FIG. 1

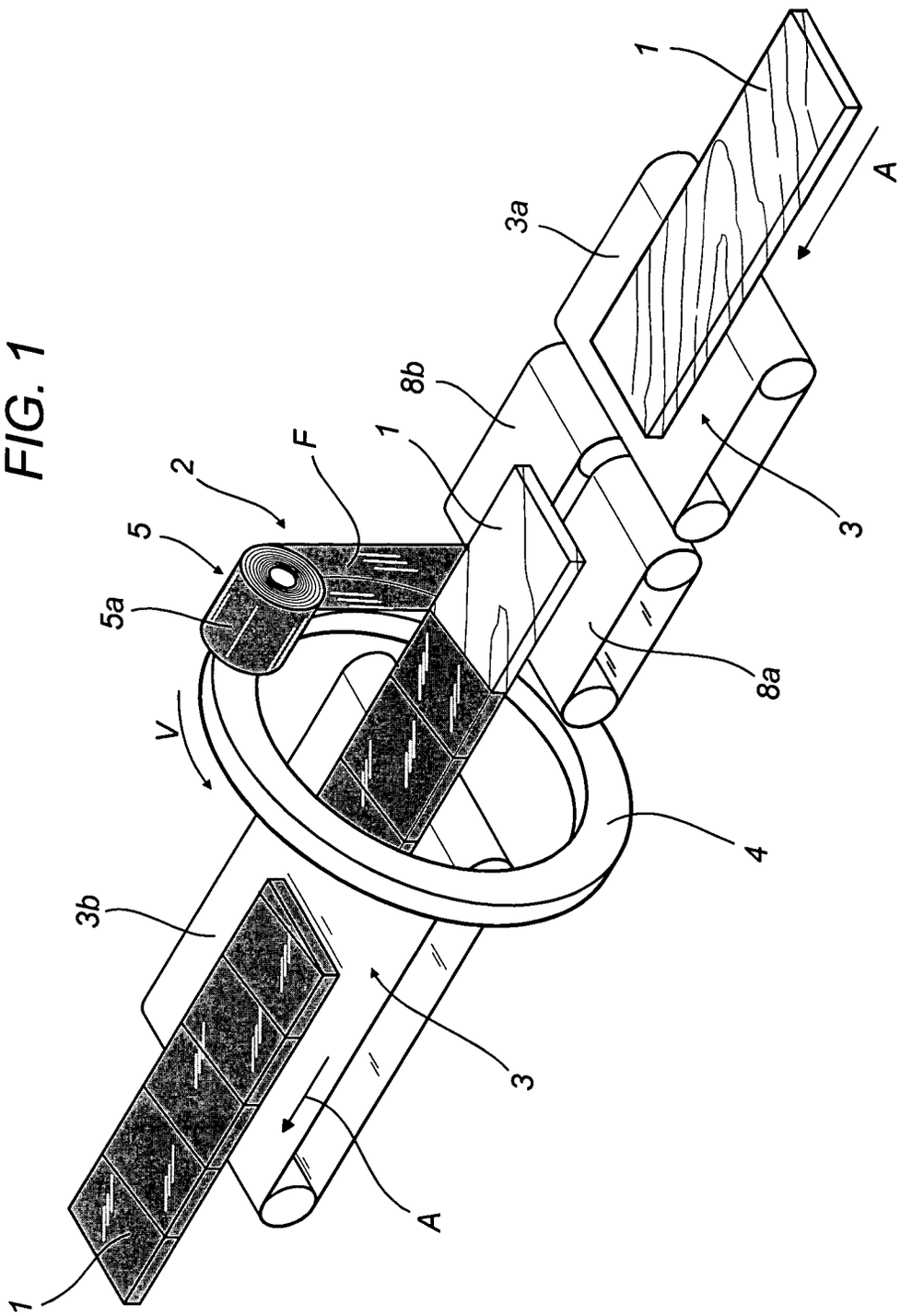
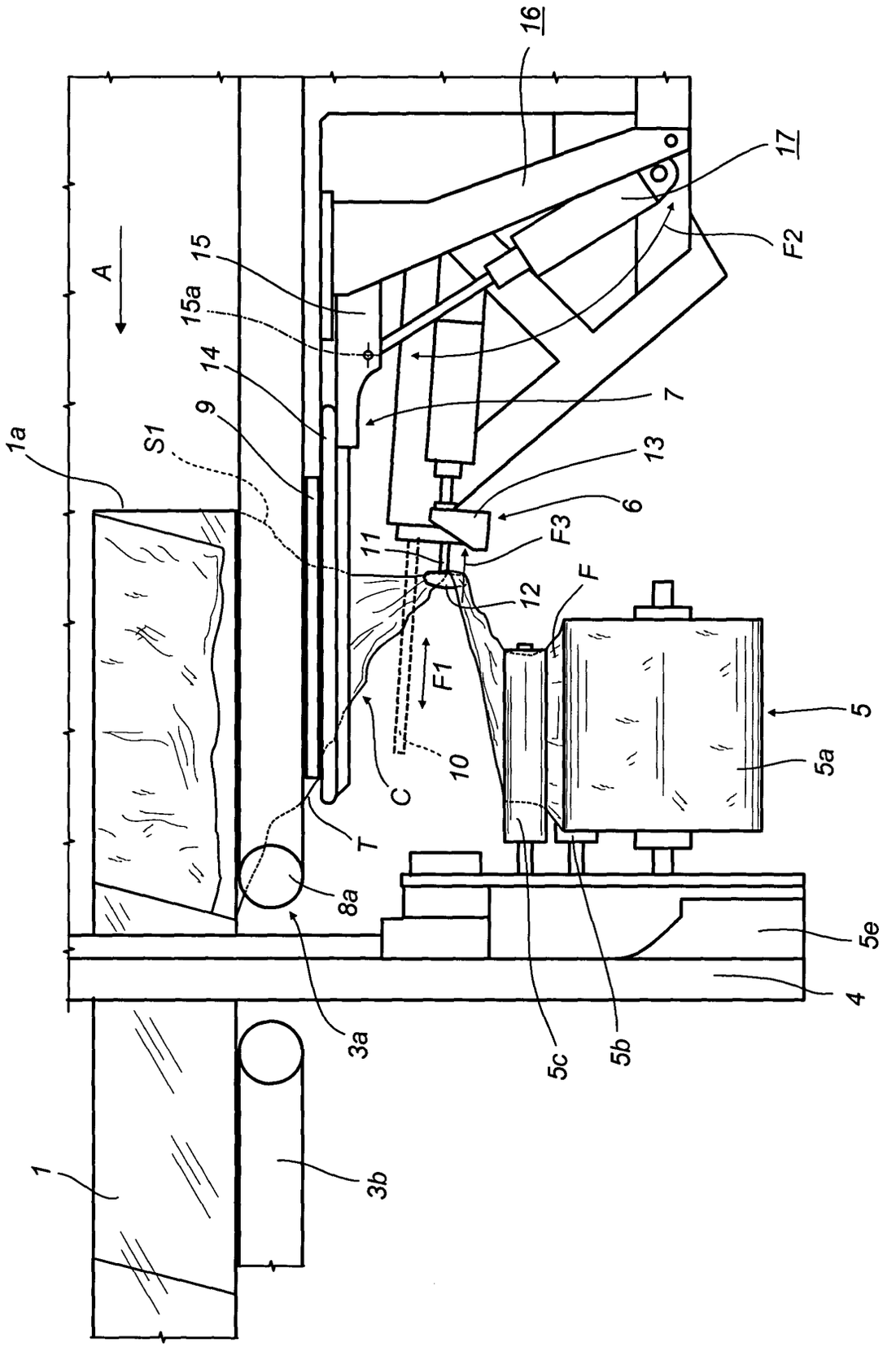


FIG. 2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17
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14
9
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F3
11
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10
C
T
8a
3a
5c
5b
5e
4
1
3b

FIG. 3

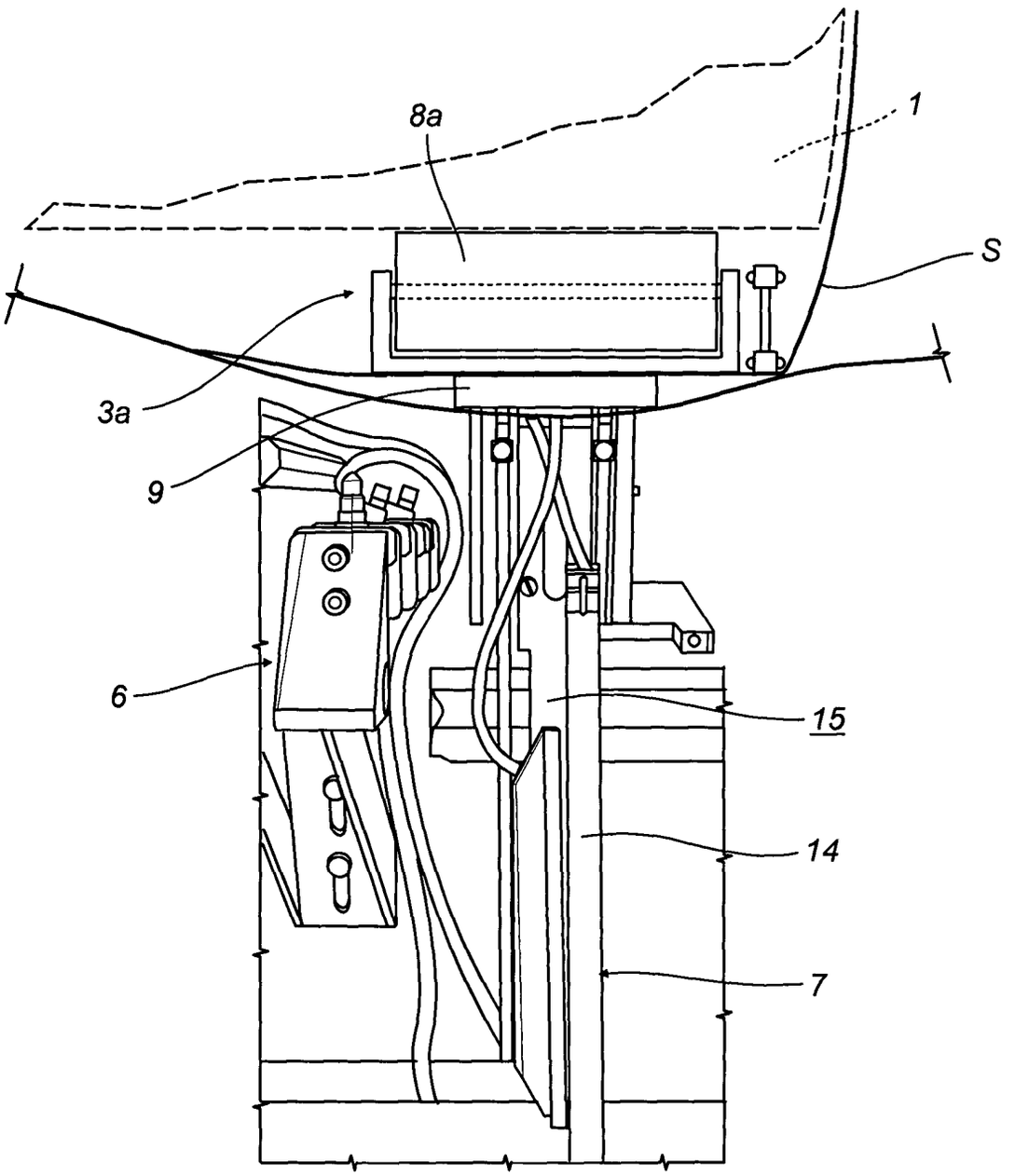
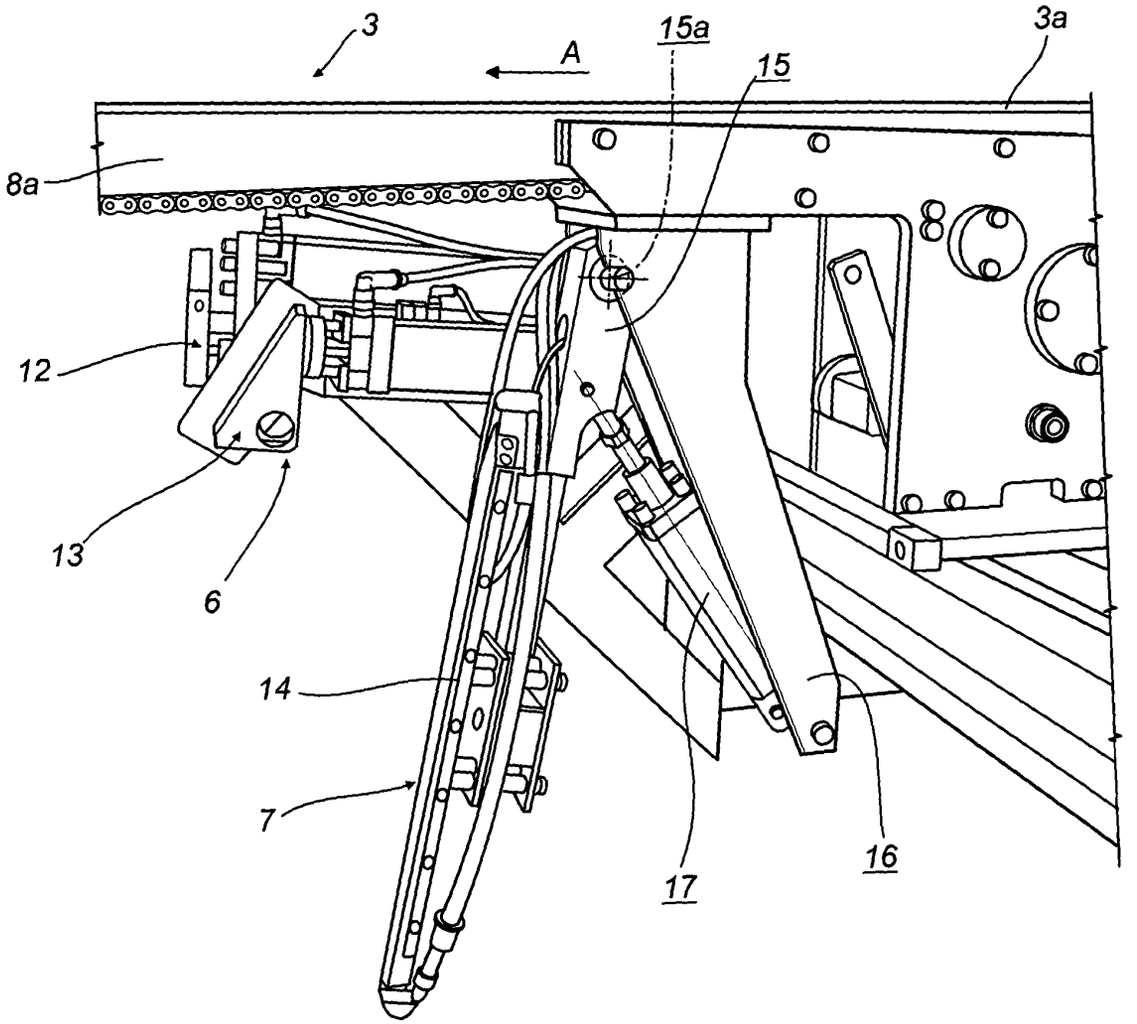


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5441

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 September 2004	Vigilante, M

CATEGORY OF CITED DOCUMENTS

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