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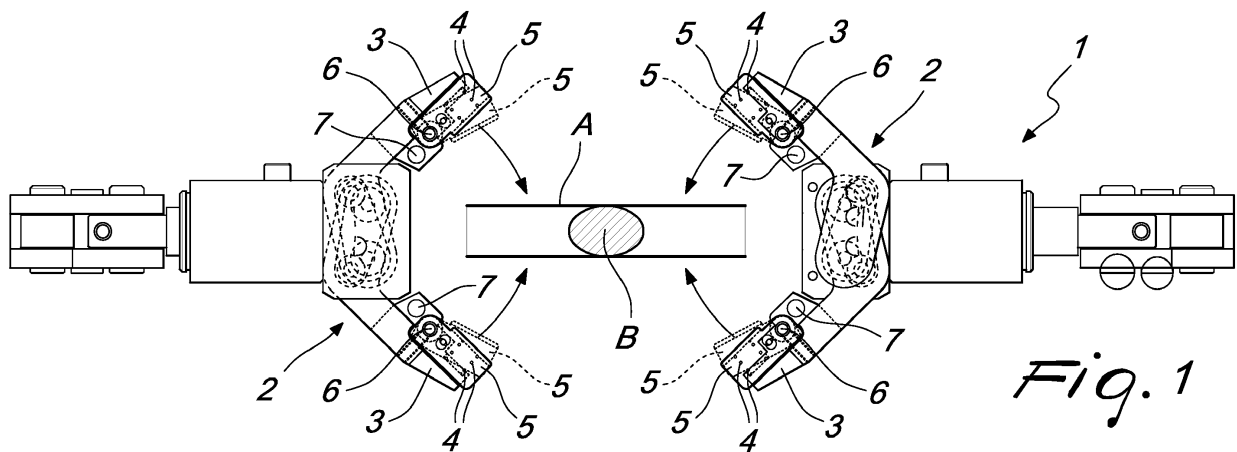
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(54) WRAPPING UNIT

(57) A wrapping unit (1), comprising at least one gripper (2) provided with mutually opposite jaws (3) for clamping at least one end of a tubular blank (A) that contains a product (B) to be packaged; at least one of the jaws (3)

comprises at least one air extraction unit (4) for extracting the air from the inside of the tubular blank (A) simultaneously with its clamping.

*Fig. 1*

Description

[0001] The present invention relates to a wrapping unit designed for the packaging mainly of chocolates, candy, small pastries and the like, hereinafter generically termed products.

[0002] Packaging devices are known which provide for covering each individual product with a sheet made of a material preferably chosen among polymeric, metallic, paper and combinations thereof.

[0003] The flaps of this covering sheet can be mutually sealed (cold or with heat) for better isolation of the contained product and a consequent protection thereof against atmospheric and environmental agents.

[0004] In particular, devices of the known type provide for the shaping of a tubular covering for the product (obtained by wrapping the sheet around the product itself) in which a notch is preferably provided which ensures the possibility to open the package easily on the part of the user.

[0005] This technical solution is disclosed in European patent No. 1888410.

[0006] This solution does not allow to achieve complete packaging of the product and therefore requires in subsequent stations the execution of subsequent closure processes.

[0007] The further closure stations of the known type are not versatile and are therefore suitable to perform a single type of packaging.

[0008] It is furthermore appropriate to specify that wrapping machines of the known type are also particularly specific: each of them is normally designed to provide a single type of wrapping; the poor versatility of machines of the known type makes them less appealing for potential clients.

[0009] The aim of the present invention is to solve the problems described above, by providing a wrapping unit that is versatile and therefore suitable to generate wrappings with different characteristics on the processed products.

[0010] Within this aim, an object of the invention is to propose a wrapping unit in which format changing operations are particularly easy.

[0011] Another object of the invention is to propose a wrapping machine that is versatile.

[0012] A further object of the present invention is to provide a wrapping assembly and a wrapping machine that have modest costs, are relatively simple to provide in practice and safe in application.

[0013] This aim, as well as these and other objects that will become better apparent hereinafter, are achieved by a wrapping unit, characterized in that it comprises at least one gripper provided with mutually opposite jaws for clamping at least one end of a tubular blank that contains a product to be packaged, at least one of said jaws comprising at least one air extraction unit for extracting the air from the inside of said tubular blank simultaneously with its clamping.

[0014] This aim and these and other objects are also achieved by means of a wrapping machine of the type that comprises a packaging carousel provided with a plurality of consecutive stations, characterized in that it comprises:

- a first forming station, provided with grip means for receiving a product from a supply unit and with mutual coupling elements for the flaps of a covering sheet, between said grip means and said supply unit there being a packaging sheet, said grip means clamping said product with the interposition of said packaging sheet so as to form a partial wrapping of said product on the part of said sheet, said coupling elements mutually joining the protruding flaps of said sheet that is partially wrapped around said product so as to constitute a tubular blank that contains said product;
- a wrapping unit comprising at least one gripper provided with mutually opposite jaws for the clamping of at least one end of a tubular blank that contains a product to be packaged, at least one of said jaws comprising at least one air extraction unit for extracting the air from the inside of said tubular blank simultaneously with its clamping;
- a twisting station comprising at least one rotatable pair of pincers which is preset to clamp at least one of the ends of said tubular blank, which contains said product, and is closed at at least one end for rolling up said at least one end onto itself;
- an expulsion station preset to deliver said product wrapped within said sheet at a predefined output area.

[0015] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the wrapping unit according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a schematic top view of a wrapping unit according to the invention prior to the clamping of a tubular blank that contains a product;

Figure 2 is a schematic top view of a wrapping unit according to the invention during the clamping of a tubular blank that contains a product;

Figure 3 is a schematic side view of a wrapping unit according to the invention during the clamping of a tubular blank that contains a product.

[0016] With particular reference to the figures cited above, a wrapping unit is generally designated by the reference numeral 1.

[0017] The wrapping unit 1 comprises at least one gripper 2 which is provided with mutually opposite jaws 3 for clamping at least one end of a tubular blank A that contains a product B to be packaged.

[0018] It is necessary to specify that at least one of the jaws 3 comprises at least one air extraction unit 4 to extract air from the inside of the tubular blank A simultaneously with its clamping.

[0019] The adoption of a unit 1 provided with a single gripper 2 according to the invention allows to provide so-called "single-twist" wrappings (generally termed "twist on top" wrappings), in which the product B is in contact with a closed base of the wrapping sheet (the blank A is therefore closed at one end and is not a tubular element provided with a through opening) and its open tubular portion is clamped by the gripper 2 and subsequently (in a subsequent station) subjected to twisting (rolling up onto itself with respect to its own axis).

[0020] According to an embodiment that is particular efficient and suitable to provide the wrapping termed "double twist" (i.e., in which the ends of the tubular blank are both open, upstream and downstream of the product B, and are subsequently rolled up onto themselves in a station arranged downstream of the unit 1), the grippers 2 can validly be at least two, which face each other.

[0021] The grippers 2 are mutually arranged at a distance that is substantially similar to the length of the tubular blank A, so that when the blank A is arranged between them its portions that protrude externally with respect to the product B are aligned with the jaws 3 (which close, clamping them).

[0022] In particular, a first gripper 2 is preset to clamp a portion of the tubular element A that is arranged upstream of the product B contained therein, while a second gripper 2 is preset to clamp a portion of the tubular element A arranged downstream of the product B contained therein.

[0023] The tubular blank A comprises, along its internal surface, areas that can be sealed.

[0024] Upon the clamping of the upstream portion or of the downstream portion of the product B on the part of the at least one gripper 2, the sealable areas that are internal to said portion make mutual contact and mate.

[0025] Generally speaking, sealable areas are adopted which are constituted by layers of adhesive (which can be active at room temperature or can be activated after heating or following clamping) which ensure perfect cohesion of the affected surfaces, with consequent isolation and segregation of the product B within the tubular blank A after the clamping performed with the grippers 2.

[0026] With particular reference to a constructive solution of unquestionable interest in practice and in application, at least one jaw 3 of each gripper 2 can comprise effectively an air extraction unit 4 for extracting air from the inside of the tubular blank A simultaneously with its clamping.

[0027] This air extraction allows greater stability and more uniform distribution of the covering with respect to the product B (the tubular element A tends to cover the product B by following its shape and replicating its contour) and minimizes the problems linked to oxidation and perishing of the product itself (the absence of air pre-

serves the product B against potential contaminations or deteriorations).

[0028] According to the constructive solution shown by way of (nonlimiting) example in the accompanying figures, the at least one jaw 3, more precisely the air extraction unit 4 thereof, can advantageously comprise an oscillating terminal clamp 5, intended to abut against the tubular blank A.

[0029] The air extraction unit 4 is in fact operational by virtue of the sliding of the clamps 5 on the surface of the tubular blank A (as close as possible to the product B): progressively, the clamps 5 move into mutual contact, compressing the tubular blank A and therefore in practice eliminating the air.

[0030] The clamp 5 is pivoted to the respective jaw 3 with respect to a pivot 6: the clamp 5 can oscillate freely or can be controlled by a respective actuator.

[0031] More specifically, elastic means are arranged which are designed to keep the clamp 5 in a rotated configuration of maximum distance from the respective jaw 3: upon the clamping of the gripper 2, the terminal end of each clamp 5 is the first part of the jaw 3 that makes contact with the tubular blank A, facilitating the stretching of the sheet (which constitutes the blank A) along the product B and the exit of the air that is present between them; therefore it ensures the provision of a covering that perfectly replicates the shapes of the product B.

[0032] According to a constructive hypothesis of unquestionable interest in application, the at least one jaw 2 comprises a heater 7 for increasing the temperature of a surface thereof that abuts against the tubular blank A.

[0033] The clamping of a portion of the blank A on the part of the gripper 2 provided with at least one jaw 3 that has a heated portion causes the heat-sealing of the portions (of the flaps) of the tubular blank A that are mutually pressed against each other.

[0034] It has thus been shown that even in the case of sealable areas that are constituted by layers of adhesive that can be activated by heat it is possible to ensure optimum packaging.

[0035] Furthermore, it is specified that it is possible (by adopting sheets made of thermoplastic material) to utilize the natural capacity of said material for thermal bonding, without the need to add additional sealable layers along the internal surfaces of the tubular blank A.

[0036] The present invention is also suitable to form an entire wrapping machine which comprises a packaging carousel provided with a plurality of consecutive stations.

[0037] In particular, the carousel comprises a first forming station.

[0038] The forming station is provided with grip means for receiving the product B from a supply unit and with mutual coupling elements for the flaps of a covering sheet.

[0039] In particular, the packaging sheet is conveniently arranged between the grip means and the supply unit. The grip means therefore clamp the product B with the

interposition of the packaging sheet, forming a partial wrapping of the product on the part of said sheet.

[0040] The coupling elements mutually join the protruding flaps of the sheet that is partially wrapped around the product B until they constitute a tubular blank A that contains the product.

[0041] The carousel further comprises, downstream of the forming station, a wrapping unit 1, which comprises at least one gripper 2 that is provided with mutually opposite jaws 3 for the clamping of at least one end of the tubular blank A that contains a product B to be packaged (blank A provided by the forming station in a preceding step).

[0042] At least one of the jaws 3 comprises, in this case, at least one air extraction unit 4 for extracting the air from the inside of the tubular blank A simultaneously with its clamping.

[0043] The carousel further comprises a twisting station, arranged downstream of the wrapping unit 1, which comprises at least one rotatable pair of pincers which is preset to clamp at least one of the ends of the tubular blank A that contains the product B and is closed at at least one end.

[0044] The twisting station performs the function of rolling onto itself the at least one end of the tubular blank A that is arranged upstream and/or downstream of the product B contained therein.

[0045] The carousel comprises, finally, an expulsion station that is designed to deliver the product A wrapped within the closed and partially rolled up sheet to a pre-defined exit area.

[0046] It is specified that the coupling elements that are present in the forming station and at least one of the mutually opposite jaws 3 of the forming unit 1 can validly comprise respective heaters 7 for the heat-sealing of the flaps of sheet that are clamped and juxtaposed by them.

[0047] If adhesive layers that are active even at ambient temperature are arranged on the sheet flaps, it is not necessary to have the heaters 7 (or it is possible to deactivate them if the machine comprises them anyway).

[0048] Furthermore, the coupling elements of the forming station can comprise effectively a blade for cutting the flaps of the sheet that are clamped by them.

[0049] Such blade is movable between a retracted configuration, at an arrangement of mutual separation of the coupling elements, and a protruding configuration, at an arrangement of mutual abutment of the coupling elements.

[0050] This generates an incision at the clamping region of the juxtaposed flaps of the sheet, creating a point for easy opening of the wrapping for the end user.

[0051] It is specified that in the machine according to the invention the wrapping unit 1 can validly comprise at least two grippers (ensuring the possibility to provide wrappings of the so-called "double-twist" type), which face each other and are arranged at a mutual distance that is substantially similar to the length of the tubular blank A.

[0052] As already described earlier, a first gripper 2 is preset to clamp a portion of the tubular element A arranged upstream of the product B contained therein, a second gripper 2 is preset to clamp a portion of the tubular element A arranged downstream of the product B contained therein.

[0053] In order to ensure that the machine according to the invention generates a wrapping that is aesthetically pleasant and suitable for a close-fitting covering of the product B, at least one jaw 3 of each gripper 2 comprises at least one air extraction unit 4 for extracting the air from inside the tubular blank A simultaneously with its clamping.

[0054] Advantageously, the present invention solves the previously described problems, proposing a wrapping unit 1 that is versatile and therefore suitable to generate wrappings with different characteristics on the processed products.

[0055] As shown, the unit 1 in fact allows to provide wrappings of the type known as "single-twist", "double-twist", and in general sealed wrappings.

[0056] Usefully, the wrapping unit 1 ensures that the format changing operations are particularly easy: the unit in fact has a structure that is simple and can be disassembled easily by any specialized operator.

[0057] Conveniently, the wrapping machine according to the invention also is versatile, allowing the provision of wrappings of various shapes and of the sealed type.

[0058] Validly, the present invention defines a wrapping unit 1 and a wrapping machine that are relatively simple to provide in practice and have modest costs, such as to render them technical solutions of assured application.

[0059] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0060] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

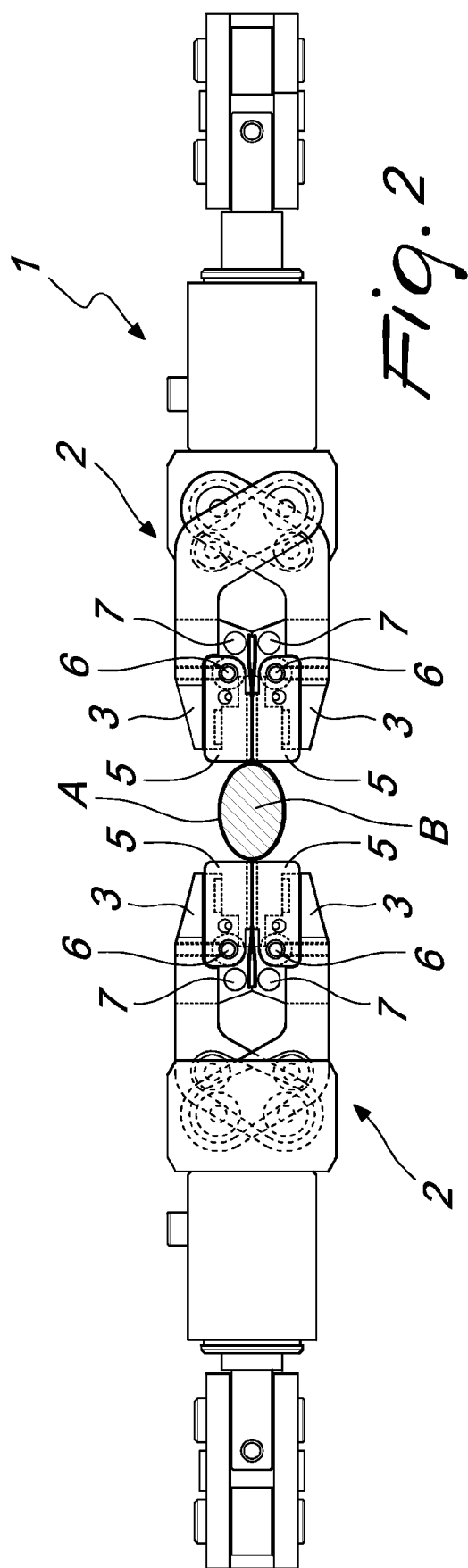
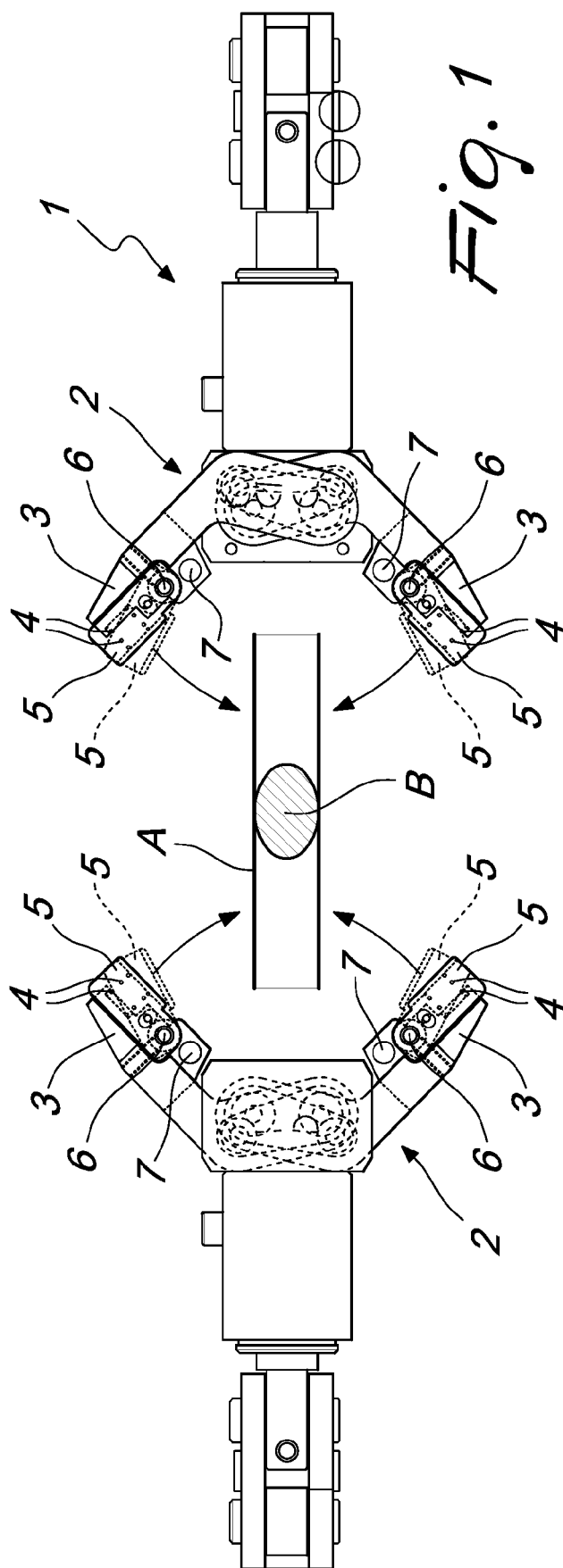
[0061] In practice, the materials used, as well as the dimensions, may be any according to the requirements and the state of the art.

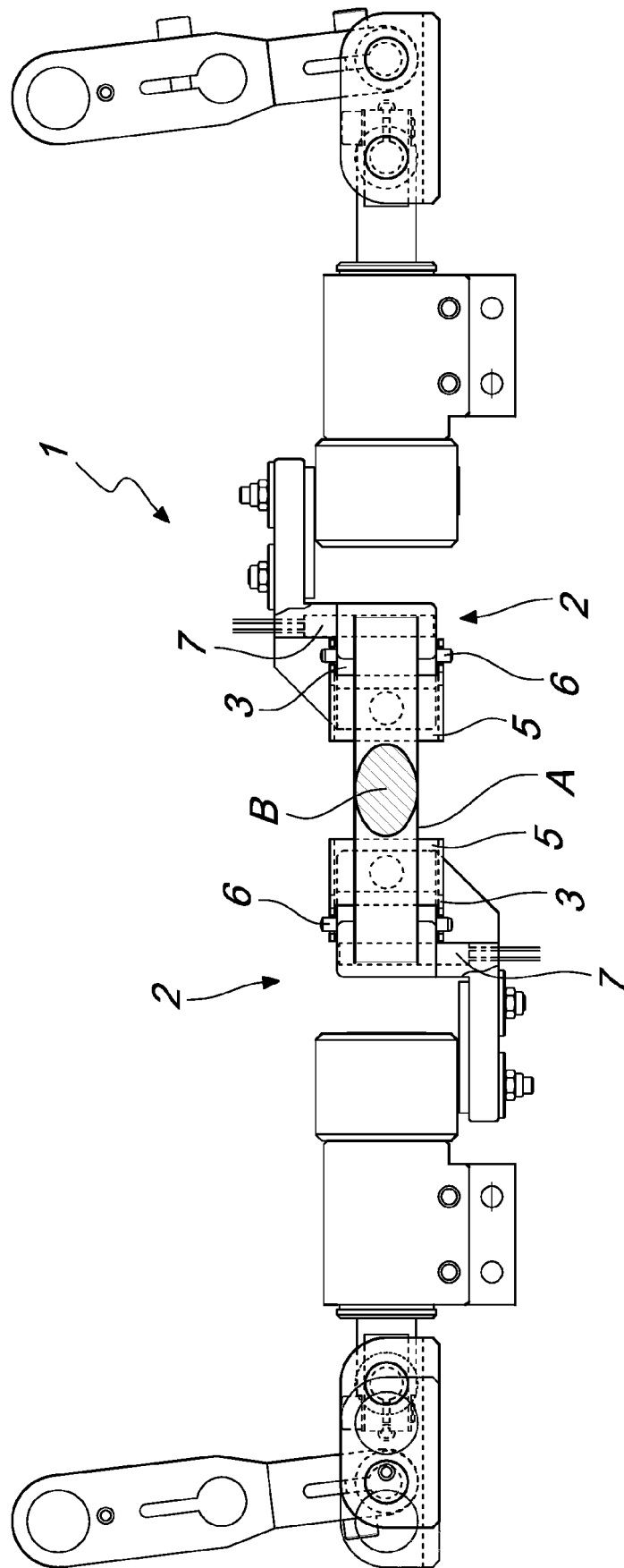
[0062] The disclosures in Italian Patent Application no. 102015000079664 (UB2015A006283), from which this application claims priority, are incorporated herein by reference.

[0063] 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 interpretation of each element identified by way of example by such reference signs.

Claims

1. A wrapping unit, **characterized in that** it comprises at least one gripper (2) provided with mutually opposite jaws (3) for clamping at least one end of a tubular blank (A) that contains a product (B) to be packaged, at least one of said jaws (3) comprising at least one air extraction unit (4) for extracting the air from the inside of said tubular blank (A) simultaneously with its clamping. 5 10
2. The wrapping unit according to claim 1, **characterized in that** said grippers (2) are at least two, face each other and are arranged at a mutual distance that is substantially similar to the length of said tubular blank (A), a first gripper (2) being preset to clamp a portion of said tubular element (A) that is arranged upstream of the product (B) contained therein, a second gripper (2) being preset to clamp a portion of said tubular element (A) located downstream of the product (B) contained therein. 15 20
3. The wrapping unit according to claim 2, **characterized in that** at least one of said jaws (3) of each gripper (2) comprises at least one air extraction unit (4) for extracting the air from the inside of said tubular blank (A) simultaneously with its clamping. 25
4. The wrapping unit according to claim 1, **characterized in that** at least one of said jaws (3) comprises an oscillating terminal clamp (5) that is intended to abut against said tubular blank (A), said at least one air extraction unit (4) being formed by said terminal clamp (5) that is therefore preset to extract the air from said tubular blank (A). 30 35
5. The wrapping unit according to claim 1, **characterized in that** at least one of said jaws (3) comprises a heater (7) for increasing the temperature of a surface thereof that abuts against said tubular blank (A), the clamping of a portion of the blank (A) on the part of said gripper (2) provided with at least one jaw (3) having a heated portion producing the heat-sealing of the flaps of the tubular blank (A) that are mutually pressed against each other. 40 45
6. A wrapping machine of the type comprising a packaging carousel provided with a plurality of consecutive stations, **characterized in that** it comprises: 50
 - a first forming station, provided with grip means for receiving a product (B) from a supply unit and with mutual coupling elements for the flaps of a covering sheet, between said grip means and said supply unit there being a packaging sheet, said grip means clamping said product (B) with the interposition of said packaging sheet so as to form a partial wrapping of said product on the part of said sheet, said coupling elements mutually joining the protruding flaps of said sheet that is partially wrapped around said product (B) so as to constitute a tubular blank (A) that contains said product (B);
 - a wrapping unit (1) comprising at least one gripper (2) provided with mutually opposite jaws (3) for the clamping of at least one end of a tubular blank (A) that contains a product (B) to be packaged, at least one of said jaws (3) comprising at least one air extraction unit (4) for extracting the air from the inside of said tubular blank (A) simultaneously with its clamping;
 - a twisting station comprising at least one rotatable pair of pincers which is preset to clamp at least one of the ends of said tubular blank (A), which contains said product (B), and is closed at at least one end for rolling up said at least one end onto itself;
 - an expulsion station preset to deliver said product (B) wrapped within said sheet at a predefined output area.
7. The wrapping machine according to claim 6, **characterized in that** said coupling elements and at least one of said mutually opposite jaws (3) comprise respective heaters (7) for heat-sealing the sheet flaps that are clamped and juxtaposed by them.
8. The wrapping machine according to claim 6, **characterized in that** said coupling elements comprise a blade for cutting the flaps of said sheet clamped by them, said blade being movable between a retracted configuration, at an arrangement for mutual separation of said coupling elements, and a protruding configuration, at an arrangement for mutual abutment of said coupling elements with consequent clamping of said juxtaposed flaps of said sheet.
9. The wrapping machine according to claim 6, **characterized in that** said wrapping unit (1) comprises at least two grippers (2), which face each other and are arranged at a mutual distance that is substantially similar to the length of said tubular blank (A), a first gripper (2) being preset to clamp a portion of said tubular element (A) that is arranged upstream of the product (B) contained therein, a second gripper (2) being preset to clamp a portion of said tubular element (A) that is arranged downstream of the product (B) contained therein.
10. The wrapping machine according to claim 9, **characterized in that** at least one jaw (3) of each gripper (2) comprises at least one air extraction unit (4) for extracting the air from the inside of said tubular blank (A) simultaneously with its clamping. 55







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Place of search Munich		Date of completion of the search 8 March 2017	Examiner Ungureanu, Mirela
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