

(19)



(11)

EP 1 494 924 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
03.01.2007 Bulletin 2007/01

(51) Int Cl.:
B65B 11/28 (2006.01) **B65B 59/04** (2006.01)

(21) Application number: **03710077.3**

(86) International application number:
PCT/IB2003/001203

(22) Date of filing: **02.04.2003**

(87) International publication number:
WO 2003/082675 (09.10.2003 Gazette 2003/41)

(54) **WRAPPING MACHINE**

EINWICKELMASCHINE

MACHINE D'EMBALLAGE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**

(30) Priority: **03.04.2002 IT BO20020174**

(43) Date of publication of application:
12.01.2005 Bulletin 2005/02

(73) Proprietor: **SACMI Packaging S.P.A.
Imola (Bologna) (IT)**

(72) Inventors:
• **FRABETTI, Fabio
I-40123 Bologna (IT)**

• **BARALDI, Luca
I-40133 Bologna (IT)**
• **GIOVANNINI, Flavio
I-40067 Rastignano (IT)**

(74) Representative: **Negrini, Elena
Agazzani & Associati S.r.l.
Via dell'Angelo Custode 11/6
40141 Bologna (IT)**

(56) References cited:
**EP-A- 0 733 548 EP-A- 0 769 453
DE-U- 29 623 691 US-A- 3 899 865**

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Description

TECHNICAL FIELD

[0001] The present invention relates to automatic packaging machines, and particularly the invention refers to a wrapping machine for wrapping chocolates, candies, sweets and similar products having different shape with different wrapping style.

BACKGROUND ART

[0002] The known wrapping machines are provided with mobile or fixed folding members, which allow to carry out a single predefined wrapping style. It is possible to carry out a different wrapper, still belonging to the same wrapper typology, only by suitably replacing and/or modifying the folding members. Usually, said known machines do not allow to carry out wrappers belonging to other wrapping styles. Typically a machine fit for carry out double twist wrappers can carry out, after changes, a single twist wrapper, but it is not able to carry out an envelope portfolio or a bunch wrapper.

[0003] The main drawback of said known machines consists in the production rigidity that is in the restricted selection of wrapping styles, which can be carried out.

[0004] Other drawback consists in that the replacement operations of the folding members, for adjusting the machine for a different wrapping style, are difficult and require long machine stops, with consequent interruption of production and increase of costs.

[0005] There are modular wrapping machines that allow realizing several wrapping styles by assembling suitable folding modules to the basic structure of the machine.

[0006] The main drawback of said machines consists in that such flexibility is possible only during the production phase of the machine since the modules, once assembled to the machine, can not be disassembled and replaced in reasonable times, precluding the flexibility and versatility of the machine, once the latter is working at the production plant.

[0007] Other drawback of the known wrapping machines consists in that it is impossible to modify or change the product outlet flow, according to the specific production demands.

[0008] It is known that in the wrapping machines for rectangular chocolates and similar products with traditional wrapping styles, the wrapping material must move parallelly to the product short side, which for stability demands is moved along a direction parallel to the product long side. For this reason said machines have a product feeding group, usually a belt or belts in cascade, perpendicular to the wrapping material flow on the machine and thus to the machine main axis.

[0009] The main drawback of such machines is the position of the feeding group, which makes more difficult the access to the machine maintenance points positioned

at the opposite sides with respect to said feeding group and preclude an operator to control at the same time two wrapping machines, parallelly positioned.

[0010] There are also known wrapping machines for chocolates or similar products having a flat base, provided with of feeding groups including one or more storage belt, parallelly positioned with respect to the wrapping material flow of the machine. In this case, the aligned products in mutual contact, due to the push of the queue, are moved to the picking zone, in which a pusher insert, one by one, the products into a feeding disk or into a positioning wheel, in order to rotate of 90° the products and to position them with the correct orientation at the following working station.

[0011] The main drawback of said feeding groups consists in that for high motion speeds the products tend to slip on the storage belt, causing an idle turn of the wrapping machine with consequent production and efficiency decrease.

[0012] Other drawback consists in that the stresses exerted on the products by the pusher and by the feeding disk, in order to position the product in the following station, may cause damages of products, with possible detachments of splinters and portions thereof, which may dirt and/or obstruct the machine members.

[0013] Document EP 0 733 548 discloses a wrapping machine for wrapping chocolates and similar products with a wrapping material, according to the preamble of claim 1.

[0014] Said wrapping machine includes an unwinding and cutting group and a feeding group fit to feed an elevator group respectively with a portion of wrapping material and a respective product which are provided associated from said elevator group to a wrapping wheel head to mate a folding group and to be transferred to an outlet group of the wrapped product.

[0015] Said wrapping wheel head comprises eight grippers and said folding group comprises folding modules and three seats for housing said folding modules.

[0016] Documents US 3 899 865, EP 0 769 453 and DE 296 23 691 disclose wrapping machine provided with wrapping wheel head for wrapping chocolates and similar products with a wrapping material.

DISCLOSURE OF THE INVENTION

[0017] Object of the present invention is to propose a wrapping machine for wrapping chocolates or similar, which is fit to carry out completely different wrapping styles, allowing to pass in an easy and quick way from a wrapping style to others, without changes or difficult adjustment operations of the folding members.

[0018] Other object of the present invention is to propose a machine, which can be integrated with a plurality of different feeding groups of known type, different groups according to the product to be wrapped, to their speed and to the wrapping style to perform on the product.

[0019] Further object is to propose a machine, which can have different configurations of the product outlet, in such way to satisfy the different plant demands of final user.

[0020] Other object of the present invention is to propose a wrapping machine provided with a feeding group which can operate at very high speeds, guaranteeing both a regular and reliable operation, without blockages, jams and product feeding lacks, and a delicate handling and/or moving of the product preserving it from damages.

[0021] The above-mentioned objects are achieved according to the claim contents.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The characteristics of the present invention are underlined in the following with particular reference to the attached drawings, in which:

- figure 1 shows a front schematic view of the wrapping machine of the present invention;
- figure 2 shows a plan partial view of figure 1 machine;
- figure 3 shows an enlarged partial section front view of figure 1 machine;
- figure 4 shows an enlarged partial front view of a feeding group of figure 1 machine;
- figure 5 shows a plan view of the feeding group of figure 4;
- figure 6 shows a partial section view according to the plan VI-VI of figure 4;
- figure 7 shows a schematic perspective partial view of a variant of figure 1 machine, having a feeding group with storage belt, pusher and filling disk, in association with products in different wrapping steps;
- figure 8 shows a schematic perspective partial view of another variant of figure 1 machine having a feeding group with hopper and filling disk in association with products in different wrapping steps;
- figure 9 shows a schematic perspective partial view of a further variant of figure 1 machine characterized by a feeding group with slot belt in association with products in different wrapping steps.

BEST MODE OF CARRYING OUT THE INVENTION

[0023] With reference to figures 1 to 6, numeral 1 indicates a wrapping machine to enfold chocolates and similar products 100 by a wrapping material 101, substantially constituted by an unwinding and cutting group 6 of the wrapping material 101 and a feeding group 10 of the product 100.

[0024] The unwinding and cutting group 6 and the feeding group 10, feed an elevator group 5 respectively with a portion of wrapping material 101 and a respective product 100. The elevator group 5 provides the product 100, associated with the wrapping material 101, to a wrapping head 2 for mating a folding group 3 and for

transferring the wrapped product 100 to an outlet group 7.

[0025] The wrapping head 2, rotating on a horizontal axis, has eight gripper means 4 radially and angularly equidistant for gripping the product 100 and the wrapping material 101.

[0026] The folding group 3 is constituted by a plurality of folding modules, first 31, second 32 and third 33, which are positioned around the wrapping head 2 and are fit for folding borders of wrapping material 101 around the product 100 according to different wrapping styles.

[0027] The machine includes three seats first 45, second 46 and third 47, which are fixed around the wrapping head 2 in different positions, approximately in correspondence of sequential positions of the gripper means 4 of the wrapping head 2 in the stop steps. The seats are fit for alternatively and removably housing one of the folding modules, usually the third module 33, according to the required configuration of the machine 1.

[0028] The first folding module 31 includes a first folder means 40, of known type, which is mobile along a tangential direction with respect to the wrapping head 2, in order to fold a lower border of a wrapping material portion 101, in case a double twist or fancy wrapping style has to be carried out.

[0029] In alternative, the first folding module 31 includes second folder means 41, of known type, mutually facing and oscillating in a tangential direction with respect to the wrapping head 2 in order to fold side borders of wrapping material portion 101, pre-shaped by the passage through fixed folders during the product elevation, and to carry out an envelope portfolio wrapping style.

[0030] The second folding module 32 includes folder means second 42 and third 43, of known type, constituted by two couples of opposing folders, fit to carry out orthogonal and opposed folding of borders of a wrapping material portion 101 with envelope portfolio or fancy or bunch style.

[0031] The third folding module 33 includes a couple closing fingers 44 which realize the final double twist closing of a wrapping material 101.

[0032] The machine further includes first fixed folder means 80 which are interposed between the elevator group 5 and the wrapping head 2 and which, during the motion of respective product 100 by means of elevator group 5, provide to realize respective folding of wrapping material 101. Particularly, the first fixed folder means 80, according to their geometry and conformation, execute a "H" shaped folding for an "envelope portfolio" wrapping style, or an upturned "U" shaped folding for a "double twist" wrapping style or a "hood" folding for a "bunch" wrapping style.

[0033] The machine 1 also includes second fixed folder means 81 positioned close to the wrapping head 2 and fit to carry out suitable folding of wrapping material 101 on the product 100, during the transfer thereof from the first folding module 31 to the following modules 32, 33.

[0034] If the machine must carry out double twist or fancy wrapping styles for ovoid or spherical products, the

second folder means execute the tubular closing of wrapping material 101, by folding the corresponding side edge.

[0035] It is important to underline that using different modules, separately or in combination, the machine can carry out wrappers 101 having very different wrapping styles. The time needed for the size change over, or rather the replacement of mobile and fixed folders, shaped according to the dimensions and/or type of product 100, is very easy and fast.

[0036] The first fixing seat 45 is approximately adjacent to the second folding module 32, while the second seat 46 is in position almost symmetrical to the first seat 45, with respect to a vertical plan passing through the rotating axis of wrapping head 2. The third seat 47 is interposed between the seats first 45 and second 46 and is approximately aligned to the vertical plan passing through the rotating axis of wrapping head 2.

[0037] By fixing the third folding module 33 to the first seat 45, the machine 1 can have an outlet group 7 of the product including removal means 35, of known type, which take each product 100 wrapped by the wrapping head 2 and transfer it to transport means 36, consisting for instance of a belt of known type, in order to orderly move outwards the products 100, according to a motion direction which is parallel to the feeding direction of products 100 in the feeding group 10 and which has the same sense.

[0038] In case the outlet group 7 includes chute means 38, for the bulk exit of products 100, the third folding station 33 can be connected to the second seat 46 or to the third seat 47.

[0039] Particularly, by positioning the third folding module 33 at the third seat 47, it is possible having a double outlet group 7, constituted by removal 35 and transport 36 means, for products having "envelope portfolio", "fancy", "bunch" wrapping styles, and by following chute means 38 for double twist products.

[0040] If the removal means 35 and transport means 36 are not required but only the chute means 38 are requested, the third folding module 33 is fixed to the second seat 46.

[0041] The elevator group 5 includes articulated quadrilaterals 51, 52 of known type, connected to respective motorized cams and fit for moving a counter-elevator 50 and an elevator 53. The latter has side rests 59 for supporting side borders of wrapping material 101 and for avoiding that said borders can be bent because of the air resistance, while raising the product 100.

[0042] In the preferred embodiment, the machine 1 includes a feeding group 10 of product 100 substantially constituted by a first belt means 13, a second belt means 14, a third belt means 16 and a positioning wheel 9.

[0043] The first belt means 13 has a continuous advance motion and supports and moves a plurality of products 100, aligned by a preceding alignment group, known and not shown, and arranged in a single line at mutual contact. The second belt means 14, which is aligned

downstream the first belt means 13, has an alternate advance motion, in other words a periodical intermittent motion, and is associated with holding means 15 of product 100, which operate on the portion of said second belt means 14 on which the products 100 are positioned.

[0044] The third belt means 16, which is aligned and upstream to the first belt means 13, has a continuous advance motion, with a translation speed greater than the speed of first belt means 13 and realizes the product store.

[0045] The holding means 15 are constituted essentially by an air suction means 17 connected through a duct means 19 to at least an opening 18 carried out in the second belt means 14, in order to hold and to constrain through suction the products 100 to the second belt means 14.

[0046] The suction means 17 consists of a vacuum pump or a suction fan and the opening 18 may consist of a longitudinal slot, carried out by a couple of parallel and transversally spaced apart conveyor belts 22, which constitute the second belt means 14.

[0047] In alternative, the opening 18 may consist of a plurality of through holes carried out in the second belt means 14.

[0048] The duct means 19 have, for instance, an elongated delta shape, and are provide with a suction mouth 23, which has an elongated shape and is in flow communication with the opening 18. The suction mouth 23 is connected to the suction means 17, by means of an inner duct having divergent shape starting from said suction mouth 23 up to the connection with said suction means 17.

[0049] The feeding group 10 includes two first sensor means 20 of minimum and maximum load, fit to sense the presence of products 100 on the first belt means 13 and particularly to measure the respectively the minimum and maximum dimension of the storage queue of products 100 on said belt, in order to reduce or to increase the speed of the machine of wrapping machine and/or of the upstream product flow.

[0050] There are furthermore second sensor means 25, positioned close to the portion of second belt means 14 adjacent to the positioning wheel 9 and fit to sense the presence and the correct position of product 100 and consequently fit to define the operational steps between second belt means 14 and wheel 9.

[0051] The sensor means 20, 25 are of known type, such as optical type, for instance photocells or optical fibers, or inductive type.

[0052] The second belt means 14 is powered by an electric motor 21 of Brushless type, position, speed and acceleration controlled, in such a way to move according to predefined and programmable motion laws, while the belt means first 13 and third 16 are rotated by a ratio-motor 24.

[0053] The positioning wheel 9, rotating on a vertical axis and facing the second belt means 14 downstream the holding means 15, has four pliers means 11 angularly

and equally spaced apart fit for grasping the product 100 from the second belt means 14. The pliers means 11 are positioned at 90° one with respect to the other and fixed to the wheel 9 with an orientation almost tangential to a geometric circumference inscribed in the positioning wheel 9 and concentric to the latter.

[0054] The positioning wheel 9 is substantially constituted by a first column 61, fixed to the machine 1 and rotatably supporting a second column 62 and a third column 63, coaxial thereto and independently rotating with respect to a vertical axis.

[0055] Each pliers means 11 is fixed, through a support plate 68, to the third column 63 and includes a couple of mobile tines 12, symmetrically rotating between a closing condition C, in which said tines 12 are at their minimum distance for grasping a product 100, to an opening condition D, in which they are at the maximum distance for releasing said product 100.

[0056] The opening and the closing of mobile tines 12 of each pliers means 11 is made through transmission means 65, connected to control means 64 of the second column 62 and moved by these last ones, by virtue of the partial alternate rotation of said second column 62.

[0057] Each transmission means 65 is essentially constituted by a pivot 67, which is slidably supported by the third column 63 and connected to the mobile tines 12 of the respective pliers means 11 through a pinion-rack connection. Furthermore the pivot 67 is slidably engaged, through sliding rolls 66, to a cam profile of control means 64.

[0058] The partial rotation of the cam profile causes the rising or descending translation of pivots 67 and, consequently respectively, the opening or closing rotation of mobile tines 12 of pliers means 11.

[0059] The wrapping machine is entirely controlled by calculation and control electronic means fit to control the phase relations between the feeding group 10, the sensor means 20, 25, the elevator group 5, the unwinding and cutting group 6, the wrapping head 2, the folding group 3 and the outlet group 7.

[0060] The operation of the wrapping machine 1 object of the present invention provides that the folding modules 31, 32, 33 are independently activated in order to have different operational combinations for carrying out respective wrapping styles of wrapping material portion 101. For instance, by driving the folding modules, first 31 and second 32, in association with a fixed folder which operates, during the elevation stroke of the elevator, it is possible to carry out an envelope portfolio wrapping style, while driving the first folding module 31, having a first mobile folder 40, and driving the third folding module 33, it is possible to carry out a double twist wrapping material 101.

[0061] By positioning the fourth folding module 33, which can be connected to the first seat 45 or to the second seat 46, it is possible providing in different positions the wrapped product 100 to the outlet group 7.

[0062] The operation of feeding group 10 provides that

the belt means third 16 and first 13 moves with uniform and continuous rectilinear motion the products 100 at different and decreasing speeds such to guarantee a storage queue of the products 100, controlled by minimum and maximum load sensor means 20, sufficient to feed without discontinuity the following the second belt means 14. The latter moves according to an alternate motion law, having a stroke equal to the product length to be moved and with a speed varying from a minimum value equal to zero to a maximum value, which is function of the machine cycle.

[0063] In the picking condition A of second belt means 14, while a product 100 is transferred from the first belt means 13 to the second belt means 14, another product 100, in a transfer condition T, is grasped by pliers 11 of the positioning wheel 9. By moving the second belt means 14 it is possible to progressively move the products 100 toward the positioning wheel 9. The gradual acceleration and deceleration of said belt means respectively at the start and at the end of the motion, allows to avoid the product slipping on said belt means and it allows, by virtue also of the particular layout of the pliers means 11 on the positioning wheel 2, the rotation of product 100, grasped by the pliers means 11, without interference with the following coming product.

[0064] In the moving conditions M of second belt means 14, in which the products are moved by the latter, the holding means 15 maintain each product 100 fixed to the belt means 14, cooperating in avoiding slipping phenomenon that could create gaps between the products, which can not filled anymore, or even collisions between the products.

[0065] The second belt means 14 is moved by an alternate motion and with motion law of asymmetrical cycloidal type, with asymmetry ratio of 1,5, that is with a duration of the acceleration phase equal to $\frac{3}{4}$ of the whole cycle and a deceleration phase equal to $\frac{1}{4}$ of the cycle. Such law guarantees a smooth and slow moving of products 100 on the belt, to reduce the risks of possible slipping of products.

[0066] During the operation of the machine, the positioning wheel 9 takes the product 100 from the second belt means 14 and moves it with alternated circular motion from the transfer condition T to a release condition R, in which the machine is motionless and the related pliers means 11 is opened for releasing the product 100 to the elevator group 5.

[0067] A variant of the wrapping machine 1 object of the present invention includes an outlet group 7, shown with dashed lines in figure 1, in which the wrapped products 100 are moved according to a motion direction, which is parallel to the feeding direction of products in the feeding group 10, but with opposite sense.

[0068] Another variant of the machine 1, schematically shown in figure 7, includes a feeding group 10 constituted by a storage belt 71, pusher means 72 and a feeding disk 73. The belt 71 has an alternate advance motion and transfers the products 100, aligned by a preceding storing

system, known and not shown, to pusher means 72, which move each product 100 from said belt 71 to the disk 73. The latter has a plurality of slots, shaped for housing the products 100, and it rotates on a vertical axis to transport the products to the elevator group 5. Typically this type of feeding group is used in case of chocolates or the like, having a flat base.

[0069] The machine further has an outlet group 7, essentially constituted by a chute 38 for bulk collecting of products 100.

[0070] A further variant of the machine, schematically and partially shown in figure 8, includes a feeding group 10, constituted by a storage hopper 75 of products 100, which feeds a centrifugal filling disk 76, rotating on a vertical axis. The filling disk 76 has shaped seats 60 for accommodating the products 100 and for transporting them to the elevator group 5. Typically, this type of feeding group is used in case of chocolates or the like having spherical or ovoidal shape.

[0071] The shown variant has an outlet group 7, in which the products 100 wrapped are moved according to a motion direction which is parallel to the unwinding direction of wrapping material 101, with respect to which the products have concordant sense. In such outlet group, each product 100 wrapped is taken by the wrapping head 2 and transferred to transport and rolling means 36, of known type, which complete wrapper with "fancy" style.

[0072] The figure 9 shows another variant of the machine, in which the feeding group 10 includes a slot belt 77 having counter-dies 78 for accommodating respective products 100 and their transfer to the elevator group 5. The products 100 are picked from moulding dies through suitable devices of "pick-and-place" type, known and not shown, and transferred on the belt 77.

[0073] It is provided a further variant of the machine, not shown, in which the feeding group 10 is of combined type or rather it includes a storage belt 71 with pusher means 72 and feeding disk 73, to process products with flat base and a hopper 75 with centrifugal filling disk 76, in case of spherical or ovoidal products.

[0074] Such type of combined feeding group allows moving products 100 having any shape, with flat base or spherical/ovoidal.

[0075] The main advantage of the present invention is to provide a wrapping machine for wrapping chocolates, candies or similar products, which is fit to carry out completely different wrapping styles, allowing easy and quick size change over operations for adjusting the machine for different wrapping styles.

[0076] Other advantage of the present invention is to provide a machine, which can be integrated with a plurality of different feeding groups of known type, according to the product to be wrapped, to the required speed and to the wrapping style.

[0077] Further advantage is to provide a machine, which can have different configurations of the product outlet, in such way to satisfy the demands of final user.

[0078] Other advantage is to provide a wrapping machine with a feeding group, which can operate at very high speeds, with a regular and reliable operation, without blockages, jams and product feeding lacks, and having a delicate handling and moving thereof, preserving it from damages.

Claims

1. Wrapping machine for wrapping chocolates and similar products (100) with a wrapping material (101), including an unwinding and cutting group (6) and a feeding group (10) fit to feed a elevator group (5) respectively with a portion of wrapping material (101) and a respective product (100), said wrapping material and said product are transferred together from said elevator group (5) to a wrapping wheel head (2) to mate a folding group (3) and to be transferred to an outlet group (7) of the wrapped product (100), said wrapping wheel head (2) comprising grippers and said folding group (3) comprising folding modules and seats for housing said folding modules; said machine (1) being **characterized in that:**

- the wrapping wheel head (2) has radially and angularly equidistant at least eight gripper means (4) for the product (100) associated to the wrapping material portion (101);
- the folding group (3) includes, at least first folding modules (31), second folding modules (32) and third folding modules (33), positioned around the wrapping wheel head (2) and fit to fold the wrapping material portion (101) around the product (100);
- the folding group (3) includes at least three seats first (45), second (46) and third (47) fixed around the wrapping wheel head (2) for housing alternatively and removably at least one of the folding modules (31, 32, 33);

one or more folding modules (31, 32, 33) being independently operated to carry out different wrapping styles of the wrapping material (101) at least a folding module (31, 32, 33), connectable to one of the seats (45, 46, 47), such that said wrapped product (100) can be transferred towards the outlet group (7) in different orientation.

2. Wrapping machine according to claim 1 **characterized in that** the first folding module (31) includes first folder means (40) mobile along a direction tangential with respect to the wrapping head (2) and fit for folding a lower border of the wrapping material portion (101) with double twist wrapping style.

3. Wrapping machine according to claim 1 **characterized in that** the first folding module (31) includes two

seconds folder means (41) facing each other and oscillating along direction tangential with respect to the wrapping head (2), fit for folding side borders of the wrapping material portion (101) with envelope portfolio wrapping style.

4. Wrapping machine according to claim 1 **characterized in that** the second folding module (32) includes folder means third (42) and forth (43) mobile and fit for carrying out orthogonal and opposed folds of borders of the wrapping material portion (101) with envelope portfolio or fancy or bunch wrapping style.
5. Wrapping machine according to claim 1 **characterized in that** the third folding module (33) includes a couple of closing fingers (44) for closing the wrapping material (101) according to a double twist wrapper style.
6. Wrapping machine according to claim 1 **characterized in that** includes first fixed folder means (80) interposed at least between the elevator group (5) and the wrapping head (2) for folding borders of the wrapping material (101) while the elevator group (5) moves the product (100).
7. Wrapping machine according to claim 1 **characterized in that** includes second fixed folder means (81) positioned around the wrapping head (2) for folding borders of wrapping material (101) when the wrapping head (2) moves the respective product (100).
8. Wrapping machine according to claim 1 **characterized in that** the first seat (45) is approximately adjacent to the third folding module (32); the second seat (46) is in a position nearly symmetrical to the first seat (45) with respect to vertical plan passing through the rotation axis of wrapping head (2); the third seat (47) is interposed between the seats first (45) and second (46) and approximately aligned to the vertical plan passing through the rotation axis of wrapping head (2).
9. Wrapping machine according to claim 1 **characterized in that** the third folding station (33) is connected to the first seat (45) and the outlet group (7) of product includes removal means (35), fit to pick each product (100) wrapped by the wrapping head (2) and to transfer it to transport means (36) for orderly moving outwards the products (100), according to a moving direction parallel to the moving direction of the wrapping material (101) in the unwinding and cutting group (6).
10. Wrapping machine according to claim 9 **characterized in that** the transport means (36) extend starting from the removal means (35) in concordant or opposite direction with respect to the entry direction of

products (100) in the feeding group (10).

11. Wrapping machine according to claim 1 **characterized in that** the third folding station (33) is connected to the second seat (46) or to the third seat (47) and the outlet group (7) includes chute means (38) for the bulk exit of products (100).
12. Wrapping machine according to claim 1 **characterized in that** the feeding group (10) of product (100) includes:
 - a first belt means (13), having continuous advance motion, which supports and moves a plurality of products (100), aligned and arranged in a single line at mutual contact;
 - a second belt means (14) aligned and downstream the first belt means (13), having an alternate advance motion and associated to holding means (15) of the product (100);
 - a positioning wheel (9) rotating, facing the second belt means (14) downstream the holding means (15) and having angularly equidistant a plurality of pliers means (11) for gripping the product (100);

the second belt means (14) moves the products (100), reciprocally spaced, from a picking condition (A), in which the second belt means (14) receives the product (100) from the first belt means (13), through moving conditions (M), in which the holding means (15) keep each product (100) fixed to the second belt means (14), to a transfer condition (T), in which the second belt means (14) is motionless and the product (100), not constrained thereto anymore, is grasped by a pliers (11) of the positioning wheel (9), which moves the product (100) with circular motion, from the transfer condition (T) to a release condition (R) in which the wheel (9) is motionless and pliers (11) is opened for transferring the product (100) to the elevator group (5).
13. Wrapping machine according to claim 12 **characterized in that** includes a third belt means (16) aligned to the first belt means (13) and positioned upstream thereto having a continuous advance motion.
14. Wrapping machine according to claim 13 **characterized in that** the first belt means (13) has translation speed lower than the speed of third belt means (16) and greater than the average translation speed of second belt means (14).
15. Wrapping machine according to claim 12 **characterized in that** the holding means (15) includes at least an air suction means (17) connected through duct means (19) to at least an opening (18) of second

belt means (14), in order to hold by suction each product (100) supported by the second belt means (14).

16. Wrapping machine according to claim 15 **characterized in that** the suction means (17) consists in a vacuum pump or a suction fan.
17. Wrapping machine according to claim 15 **characterized in that** the opening (18) includes a plurality of through holes carried out on the second belt means (14).
18. Wrapping machine according to claim 15 **characterized in that** the second belt means (14) consists of a couple of conveyor belts (22) parallel and transversally spaced apart by a longitudinal slot which realizes an opening (18) at least.
19. Wrapping machine according to claim 15 **characterized in that** the duct means (19) include a suction mouth (23) having an elongated shape and in flow communication with the opening (18).
20. Wrapping machine according to claim 19 **characterized in that** the duct means (19) include at least a inner duct having divergent shape starting from the suction mouth (23) up to connection with the suction means (17).
21. Wrapping machine according to claim 12 **characterized in that** the feeding group (10) includes at least sensor means first (20) and second (25), optical or inductive or capacitive type, fit for sensing the presence of products (100) respectively in correspondence of the first belt means (13) and of the second belt means (14).
22. Wrapping machine according to claim 12 **characterized in that** the second belt means (14) is rotatably powered by an electric motor (21) of brushless type, controlled in position, speed and acceleration.
23. Wrapping machine according to claim 12 and 13 **characterized in that that** the belt means, first (13) and third (16), are rotatably powered by at least a respective ratio-motor (24).
24. Wrapping machine according to claim 12 **characterized in that** the positioning wheel (9) includes at least four pliers means (11) mutually positioned at 90° and fixed to the wheel (9) with an arrangement almost tangential to a circumference inscribed in the positioning wheel (9).
25. Wrapping machine according to claim 12 **characterized in that** the positioning wheel (9) includes a first column (61) fixed to the wrapping machine (1)

and rotatably supporting a second column (62) and a third column (63), coaxial thereto and independently rotating on a vertical axis.

26. Wrapping machine according to claims 24 and 25 **characterized in that** each pliers means (11) is fixed, through a support plate (68), to the third column (63) and includes a couple of mobile tines (12), symmetrically rotating between a closing condition (C), in which said tines (12) are at the minimum mutual distance for gripping a product (100), to an opening condition (D), in which they are at the maximum mutual distance for releasing said product (100).
27. Wrapping machine according to claim 26 **characterized in that** each pliers means (11) includes transmission means (65) connected to control means (64) of the second column (62), these last ones being fit to open and close the mobile tines (12) of each pliers means (11), through the rotation of said second column (62).
28. Wrapping machine according to claim 26 **characterized in that** each transmission means (65) includes at least a pivot (67), slidably supported by third column (63), connected to the mobile tines (12) of the respective pliers means (11) through a pinion-rack connection, and slidably engaged by sliding rolls (66) to a cam profile of control means (64).
29. Wrapping machine according to claim 1 **characterized in that** the elevator group (5) includes articulated quadrilaterals (51, 52) connected to respective powered cams and fit for moving at least a counter-elevator means (50) and an elevator means (53).
30. Wrapping machine according to claim 29 **characterized in that** the elevator means (53) includes at least two side rests (59) for supporting the wrapping material portion (101) during the raising of product (100).
31. Wrapping machine according to claim 1 **characterized in that** the feeding group (10) of the product (100) includes:
 - a storage belt (71), having an alternate advance motion, for moving aligned products (100);
 - pusher means (72) for transferring each product (100) from the belt (71) to a feeding disk (73), having a plurality of first slots (74) for housing products (100) and rotating on a vertical axis for transporting these last ones to the elevator group (5).
32. Wrapping machine according to claim 1 **characterized in that** the feeding group (10) includes a storage

hopper (75) of product (100) which feeds a centrifugal filling disk (76), having a plurality of second slots (60) and rotating on a vertical axis for transporting each product (100) to the elevator group (5).

33. Wrapping machine according to claim 1 **characterized in that** the feeding group (10) includes a belt (77) provided with counter-dies (78) for accommodating respective products (100) and for transferring said products to the elevator group (5).
34. Wrapping machine according to claims 31 and 32 **characterized in that** the feeding group (10) is of combined type and includes at least a storage belt (71) with pusher means (72) and a feeding disk (73), and a hopper (75) with centrifugal filling disk (76).
35. Wrapping machine according to any of the preceding claims **characterized in that** is totally controlled by electronic calculation and control means fit to control the phase relations at least among the feeding group (10), the elevator group (5), the unwinding and cutting group (6), the wrapping head (2), the folding group (3) and the outlet group (7).

Patentansprüche

1. Einhüllmaschine zum Umhüllen von Schokoladeartikeln und ähnlichen Produkten (100) mit einem Einhüllmaterial (101), welche umfasst: eine Abwickel- und Schneidgruppe (6) und eine Zuführgruppe (10) zum Beaufschlagen einer Elevatorgruppe (5) mit einem Einhüllmaterial-Abschnitt (101) bzw. einem entsprechenden Produkt (100), wobei das Einhüllmaterial und das Produkt gemeinsam von der Elevatorgruppe (5) an einen Einhüllradkopf (2) abgegeben werden, um eine Faltgruppe (3) zugeordnet und zu einer Einlassgruppe (7) des umhüllten Produktes (100) übertragen zu werden, wobei der Einhüllradkopf (2) Greifer aufweist und die Faltgruppe (3) Faltmodule und Aufnahmen zum Aufnehmen der Faltmodule aufweist; wobei die Maschine (1) **dadurch gekennzeichnet ist, dass:**
 - der Einhüllradkopf (2) radial und winkelmäßig gleich beabstandet mindestens acht Greifermitel (4) für das Produkt (100) hat, welche dem Einhüllmaterial - Abschnitt (101) zugeordnet sind;
 - die Faltgruppe (3) mindestens erste Faltmodule (31), zweite Faltmodule (32) und dritte Faltmodule (33) aufweist, die um den Einhüllradkopf (2) herum angeordnet und zum Falten des Einhüllmaterial-Abschnittes (101) um das Produkt (100) ausgebildet sind;
 - die Faltgruppe (3) mindestens drei Aufnahmen, und zwar eine erste (45), eine zweite (46)

und eine dritte (47), umfasst, welche um den Einhüllradkopf (2) herum festgelegt sind, um abwechselnd und lösbar zumindest eines der Faltmodule (31, 32, 33) aufzunehmen;

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wobei ein Faltmodul oder mehrere Faltmodule (31, 32, 33) unabhängig betätigbar sind, um unterschiedliche Einhüllarten des Einhüllmaterials (101) auszuführen,

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wobei mindestens ein Faltmodul (31, 32, 33) mit einer der Aufnahmen (45, 46, 47) so verbindbar ist, dass das umhüllte Produkt (100) in Richtung auf die Auslassgruppe (7) in unterschiedlicher Ausrichtung übertragen werden kann.

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2. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste Faltmodul (31) erste Faltmittel (40) umfasst, die in einer tangentialen Richtung bezüglich des Einhüllkopfes (2) beweglich und zum Falten eines unteren Randes des Einhüllmaterial-Abschnittes (101) mit der Doppeltwist-Faltmethode ausgebildet sind.

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3. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste Faltmodul (31) zwei zweite Faltmittel (41) umfasst, die einander zugewandt sind und in tangentialer Richtung bezüglich des Einhüllkopfes (2) oszillieren, um Seitenränder des Einhüllmaterial-Abschnittes (101) mit der Portfoliouns Schlag-Einhüllmethode zu falten.

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4. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Faltmodul (32) dritte Faltmittel (42) und vierte Faltmittel (43) umfasst, die beweglich sind und zum Ausführen orthogonaler und gegenüberliegender Faltungen von Rändern des Einhüllmaterial-Abschnittes (101) mit der Portfoliouns Schlag- oder Fancy- oder Bunch-Einhüllmethode ausgebildet sind.

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5. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das dritte Faltmodul (33) mehrere Schließfinger (44) zum Schließen des Einhüllmaterials (101) entsprechend einer Doppeltwist-Einhüllmethode umfasst.

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6. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** sie erste festliegende Faltmittel (80) umfasst, die mindestens zwischen der Elevatorgruppe (5) und dem Einhüllkopf (2) angeordnet sind, um Ränder des Einhüllmaterials (101) zu falten, während die Elevatorgruppe (5) das Produkt (100) bewegt.

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7. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** sie zweite festliegende Faltmittel (81) umfasst, die um den Einhüllkopf (2) herum angeordnet sind, um Ränder des Einhüllmaterials

(101) zu falten, wenn der Einhüllkopf (2) das entsprechende Produkt (100) bewegt.

8. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Aufnahme (45) ungefähr an dem dritten Faltmodul (32) angrenzt; die zweite Aufnahme (46) in einer Position ist, die nahezu symmetrisch zu der ersten Aufnahme (45) bezüglich einer durch die Drehachse des Einhüllkopfes (2) verlaufenden vertikalen Ebene ist; die dritte Aufnahme (47) zwischen der ersten Aufnahme (45) und der zweiten Aufnahme (46) angeordnet und zu der durch die Drehachse des Einhüllkopfes (2) verlaufenden vertikalen Ebene ungefähr ausgerichtet ist. 5
9. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das dritte Faltmodul (33) mit der ersten Aufnahme (45) verbunden ist und die Produkt-Auslassgruppe (7) Austragmittel (35) umfasst, um jedes durch den Einhüllkopf (2) umhüllte Produkt (100) zu erfassen und an Transportmittel (36) zu übertragen, um die Produkte (100) in einer Bewegungsrichtung parallel zu der Bewegungsrichtung des Einhüllmaterials (101) in der Abwickel- und Schneidgruppe (6) geordnet nach außen zu bewegen. 10
10. Einhüllmaschine nach Anspruch 9, **dadurch gekennzeichnet, dass** die Transportmittel (36) ausgehend von den Austragmitteln (35) in gleicher oder entgegengesetzter Richtung bezüglich der Eintrittsrichtung der Produkte (100) in die Zuführgruppe (10) verlaufen. 15
11. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das dritte Faltmodul (33) mit der zweiten Aufnahme (46) oder der dritten Aufnahme (47) verbunden ist und die Auslassgruppe (7) Rutschenmittel (38) für die Massenausgabe der Produkte (100) umfasst. 20
12. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Produkt-Zuführgruppe (10) umfasst: 25
 - ein erstes Bandmittel (13) mit einer kontinuierlichen Vorwärtsbewegung, welches mehrere Produkte (100), ausgerichtet und in einer einzigen Linie mit gegenseitigem Kontakt angeordnet, abstützt und bewegt;
 - ein zweites Bandmittel (14), welches ausgerichtet und stromab zu dem ersten Bandmittel (13) angeordnet ist, eine abwechselnde Vorwärtsbewegung hat und Haltemitteln (15) des Produktes (100) zugeordnet ist;
 - ein rotierendes Positionierrad (9), das dem zweiten Bandmittel (14) stromab der Haltemittel (15) zugewandt ist und in gleichem Winkelab-

stand mehrere Zangenmittel (11) zum Ergreifen des Produktes (100) hat;

- wobei das zweite Bandmittel (14) die gegenseitig beabstandeten Produkte (100) von einer Erfassungsstelle (A), an der das zweite Bandmittel (14) das Produkt (100) von dem ersten Bandmittel (13) empfängt, durch Bewegungsstellen (M), an denen die Haltemittel (15) jedes Produkts (100) an dem zweiten Bandmittel (14) festhalten, zu einer Übertragungsstelle (T) bewegt, an der das zweite Bandmittel (14) bewegungslos ist und das nicht mehr daran festgelegte Produkte (100) von einer Zange (11) des Positionierrades (9) erfasst wird, welche das Produkt (100) in einer kreisförmigen Bewegung von der Übertragungsstelle (T) zu einer Freigabestelle (R) bewegt, an der das Rad (9) bewegungslos ist und die Zange (11) geöffnet wird, um das Produkt (100) zu der Elevatorgruppe (5) zu übertragen. 30
13. Einhüllmaschine nach Anspruch 12, **dadurch gekennzeichnet, dass** sie ein drittes Bandmittel (16) umfasst, das zu dem ersten Bandmittel (13) ausgerichtet und stromauf zu diesem angeordnet ist, wobei es eine kontinuierliche Vorwärtsbewegung hat. 35
14. Einhüllmaschine nach Anspruch 13, **dadurch gekennzeichnet, dass** das erste Bandmittel (13) eine Translationsgeschwindigkeit hat, die kleiner als die Geschwindigkeit des dritten Bandmittels (16) und größer als die durchschnittliche Translationsgeschwindigkeit des zweiten Bandmittels (14) ist. 40
15. Einhüllmaschine nach Anspruch 12, **dadurch gekennzeichnet, dass** die Haltemittel (15) mindestens ein Luftsaugmittel (17) umfassen, das durch Leitungsmittel (19) mit mindestens einer Öffnung (18) des zweiten Bandmittels (14) verbunden ist, um jedes Produkt (100), das von dem zweiten Bandmittel (14) getragen wird, durch Saugwirkung zu halten. 45
16. Einhüllmaschine nach Anspruch 15, **dadurch gekennzeichnet, dass** die Saugmittel (17) aus einer Vakuumpumpe oder einem Saugzuggebläse bestehen. 50
17. Einhüllmaschine nach Anspruch 15, **dadurch gekennzeichnet, dass** die Öffnung (18) mehrere Durchgangslöcher umfasst, die an dem zweiten Bandmittel (14) gebildet sind. 55
18. Einhüllmaschine nach Anspruch 15, **dadurch gekennzeichnet, dass** das zweite Bandmittel (14) aus mehreren Förderbändern (22) besteht, welche parallel und in Querrichtung beabstandet sind durch einen Längsschlitz, der mindestens eine Öffnung (18) bildet.

19. Einhüllmaschine nach Anspruch 15, **dadurch gekennzeichnet, dass** die Leitungsmittel (19) einen Saugmund (23) umfassen, der eine längliche Form hat und mit der Öffnung (18) in Strömungsverbindung steht.
20. Einhüllmaschine nach Anspruch 19, **dadurch gekennzeichnet, dass** die Leitungsmittel (19) mindestens eine innere Leitung umfassen, die ausgehend von dem Saugmund (23) bis zur Verbindung mit den Saugmitteln (17) eine divergierende Form hat.
21. Einhüllmaschine e nach Anspruch 12, **dadurch gekennzeichnet, dass** die Zuführgruppe (10) mindestens ein erstes Sensormittel (20) und ein zweites Sensormittel (25) optischer oder induktiver oder kapazitiver Bauart umfasst, die zum Erfassen des Vorhandenseins von Produkten (100) entsprechend dem ersten Bandmittel (13) bzw. dem zweiten Bandmittel (14) ausgebildet sind.
22. Einhüllmaschine e nach Anspruch 12, **dadurch gekennzeichnet, dass** das zweite Bandmittel (14) durch einen bürstenlosen elektrischen Motor (21), der hinsichtlich Position, Geschwindigkeit und Beschleunigung gesteuert wird, drehend angetrieben wird.
23. Einhüllmaschine nach den Ansprüchen 12 und 13, **dadurch gekennzeichnet, dass** das erste Bandmittel (13) und dritte Bandmittel (16) durch mindestens einen entsprechenden Ratio-Motor (24) drehend angetrieben werden.
24. Einhüllmaschine nach Anspruch 12, **dadurch gekennzeichnet, dass** das Positionierrad (9) mindestens vier Zangenmittel (11) umfasst, die mit gegenseitigem Abstand von 90° angeordnet und an dem Positionierrad (9) mit einer nahezu tangentialen Anordnung bezüglich eines in das Positionierrad (9) eingeschriebenen Umfangs festgelegt sind.
25. Einhüllmaschine nach Anspruch 12, **dadurch gekennzeichnet, dass** das Positionierrad (9) eine erste Säule (61) umfasst, die an der Maschine (1) festgelegt ist und eine zweite Säule (62) und eine dritte Säule (63) drehbar lagert, welche koaxial hierzu sind und sich auf einer vertikalen Achse unabhängig drehen.
26. Einhüllmaschine nach den Ansprüchen 24 und 25, **dadurch gekennzeichnet, dass** jedes Zangenmittel (11) durch eine Tragplatte (68) an der dritten Säule (63) festgelegt ist und ein Paar bewegliche Arme (12) umfasst, die sich symmetrisch drehen zwischen einer Schließstellung (C), in der die Arme (12) den kleinsten gegenseitigen Abstand zum Erfassen eines Produktes (100) haben, und einer Öffnungsstellung (D), in der sie den größten gegenseitigen Abstand zum Freigeben des Produktes (100) haben.
27. Einhüllmaschine nach Anspruch 26, **dadurch gekennzeichnet, dass** jedes Zangenmittel (11) Übertragungsmittel (65) umfasst, die mit Steuermitteln (64) der zweiten Säule (62) verbunden sind, wobei die letzteren zum Öffnen und Schließen der beweglichen Arme (12) jedes Zangenmittels (11) durch Drehung der zweiten Säule (62) ausgebildet sind.
28. Einhüllmaschine nach Anspruch 26, **dadurch gekennzeichnet, dass** jedes Übertragungsmittel (65) mindestens einen Gelenkzapfen (67) umfasst, der von der dritten Säule (63) gleitend gelagert wird, mit den beweglichen Armen (12) des entsprechenden Zangenmittels (11) durch eine Zahnrad-Zahnstangen-Verbindung verbunden ist und von Gleitrollen (66) mit einem Nockenprofil der Steuermittel (64) gleitend in Anlage gehalten wird.
29. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Elevatorgruppe (5) ein Vier-Lenker-Gestänge (51, 52) umfasst, das mit entsprechend angetriebenen Nocken verbunden und zum Bewegen mindestens eines Gegenelevatormittels (50) und eines Elevatormittels (53) ausgebildet ist.
30. Einhüllmaschine nach Anspruch 29, **dadurch gekennzeichnet, dass** das Elevatormittel (53) mindestens zwei seitliche Stützen (59) zum Abstützen des Einhüllmaterial-Abschnittes (101) während des Anhebens des Produktes (100) umfasst.
31. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zuführgruppe (10) des Produktes (100) umfasst:
- ein Speicherband (71) mit wechselnder Vorwärtsbewegung zum Bewegen ausgerichteter Produkte (100);
 - Stößelmittel (72) zum Übertragen jedes Produktes (100) von dem Band (71) zu einer Förderscheibe (73), die mehrere erste Schlitze (74) zur Aufnahme von Produkten (100) hat und sich um eine vertikale Achse zum Transportieren der letzteren zu der Elevatorgruppe (5) dreht.
32. Einhüllmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Zuführgruppe (10) einen Produkt-Speichertrichter (75) umfasst, der eine zentrifugale Füllscheibe (76) versorgt, welche mehrere zweite Schlitze (60) hat und sich um eine vertikale Achse dreht, um jedes Produkt (100) zu der Elevatorgruppe (5) zu transportieren.
33. Einhüllmaschine nach Anspruch 1, **dadurch ge-**

kennzeichnet, dass die Zuführgruppe (10) ein Band (77) umfasst, das mit Gegenstücken (78) zum Aufnehmen entsprechender Produkte (100) und zum Übertragen dieser Produkte zu der Elevatorgruppe (5) versehen ist.

34. Einhüllmaschine nach den Ansprüchen 31 und 32, **dadurch gekennzeichnet, dass** die Zuführgruppe (10) vom Kombinationstyp ist und mindestens ein Speicherband (71) mit Stößelmitteln (72) und einer Zuführscheibe (73) sowie einen Trichter (75) mit einer zentrifugalen Füllscheibe (76) umfasst.

35. Einhüllmaschine nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie insgesamt durch elektronische Rechner- und Steuermittel gesteuert wird, die zum Steuern der Phasenbeziehungen zwischen mindestens der Zuführgruppe (10), der Elevatorgruppe (5), der Abwickel- und Schneidgruppe (6), dem Einhüllkopf (2), der Faltgruppe (3) und der Auslassgruppe (7) ausgebildet sind.

Revendications

1. Machine d'emballage pour emballer des chocolats et des produits similaires (100) à l'aide d'un matériau d'emballage (101), incluant un groupe de déroulement et de découpe (6) et un groupe d'alimentation (10) prévus pour alimenter un groupe élévateur (5) respectivement avec une partie de matériau d'emballage (101) et un produit respectif (100), ledit matériau d'emballage et ledit produit sont transférés ensemble à partir dudit groupe élévateur (5) vers une tête tournante d'emballage (2) pour appariement avec un groupe de pliage (3), et pour être transféré vers un groupe de sortie (7) du produit emballé (100), ladite tête tournante d'emballage (2) comportant des dispositifs de préhension, et ledit groupe de pliage (3) comportant des modules de pliage et des sièges pour recevoir lesdits modules de pliage, ladite machine (1) étant **caractérisée en ce que** :

- la tête tournante d'emballage (2) a au moins huit moyens de préhension (4) équidistants angulairement et radialement et pour le produit (100) associé à la partie de matériau d'emballage (101),
- le groupe de pliage (3) comporte au moins des premiers modules de pliage (31), des deuxièmes modules de pliage (32) et des troisièmes modules de pliage (33), positionnés autour de la tête tournante d'emballage (2), et prévus pour plier la partie de matériau d'emballage (101) autour du produit (100),
- le groupe de pliage (3) comporte au moins trois sièges, un premier (45), un deuxième (46) et un

troisième (47), fixés autour de la tête tournante d'emballage (2) pour recevoir en alternance et de manière amovible au moins un des modules de pliage (31, 32, 33),

un ou plusieurs modules de pliage (31, 32, 33) étant actionnés indépendamment pour mettre en oeuvre différents styles d'emballage du matériau d'emballage (101), au moins un module d'emballage (31, 32, 33) pouvant être relié à un des sièges (45, 46, 47) de telle sorte que ledit produit emballé (100) peut être transféré vers le groupe de sortie (7) dans une orientation différente.

2. Machine d'emballage selon la revendication 1, **caractérisée en ce que** ledit premier module de pliage (31) comporte des premiers moyens de pliage (40) mobiles le long d'une direction tangentielle à la tête d'emballage (2), et prévus pour plier une bordure inférieure de la partie de matériau d'emballage (101) avec un style d'emballage à double torsion.

3. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le premier module de pliage (31) comporte deux deuxièmes moyens de pliage (41) en vis-à-vis l'un de l'autre, et qui oscillent le long d'une direction tangentielle par rapport à la tête d'emballage (2), prévus pour plier les bordures latérales de la partie de matériau d'emballage (101) avec un style d'emballage de portefeuille-enveloppe.

4. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le deuxième module de pliage (32) comporte des troisièmes (42) et quatrièmes (43) moyens de pliage (41) mobiles et prévus pour effectuer des plis orthogonaux et opposés de bordures de la partie de matériau d'emballage (101) avec un style d'emballage de portefeuille-enveloppe, fantaisie ou en sachet.

5. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le troisième module de pliage (33) comporte une paire de doigts de fermeture (44) pour fermer le matériau d'emballage (101) selon un style d'emballage à double torsion.

6. Machine d'emballage selon la revendication 1, **caractérisée en ce qu'elle** comporte des premiers moyens de pliage fixes (80) interposés au moins entre le groupe élévateur (5) et la tête d'emballage (2), pour plier des bordures du matériau d'emballage (101) tandis que le groupe élévateur (5) déplace le produit (100).

7. Machine d'emballage selon la revendication 1, **caractérisée en ce qu'elle** comporte des deuxièmes moyens de pliage fixes (81) positionnés autour de la tête d'emballage (2) pour plier des bordures de

matériau d'emballage (101) lorsque la tête d'emballage (2) déplace le produit respectif (100).

8. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le premier siège (45) est approximativement adjacent au troisième module de pliage (32), le deuxième siège (46) est dans une position presque symétrique au premier siège (45) par rapport à un plan vertical passant à travers l'axe de rotation de la tête d'emballage (2), le troisième siège (47) est interposé entre les premier (45) et deuxième (46) sièges, et est aligné approximativement avec le plan vertical passant à travers l'axe de rotation de la tête d'emballage (2).
9. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le troisième poste de pliage (33) est relié au premier siège (45), et le groupe de sortie (7) du produit comporte des moyens d'enlèvement (35) prévus pour saisir chaque produit (100) emballé par la tête d'emballage (2) et pour le transférer vers des moyens de transport (36) pour un déplacement de manière ordonnée des produits (100), vers l'extérieur, selon une direction de déplacement parallèle à la direction de déplacement du matériau d'emballage (101) dans le groupe de déroulement et de découpe (6).
10. Machine d'emballage selon la revendication 9, **caractérisée en ce que** les moyens de transport (36) s'étendent en démarrant à partir des moyens d'enlèvement (35) dans une direction concordante ou opposée par rapport à la direction d'entrée de produits (100) dans le groupe d'alimentation (10).
11. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le troisième poste de pliage (33) est relié au deuxième siège (46) ou au troisième siège (47), et le groupe de sortie (7) comporte des moyens formant goulotte (38) pour la sortie en vrac des produits (100).
12. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le groupe d'alimentation (10) de produits (100) comporte :
 - des premiers moyens formant courroie (13), ayant un mouvement d'avancement continu, qui supportent et déplacent une pluralité de produits (100), alignés et agencés en une ligne unique en contact mutuel,
 - des deuxième moyens formant courroie (14), alignés et en aval des premiers moyens formant courroie (13), ayant un mouvement d'avancement alterné, et associés à des moyens de maintien (15) du produit (100),
 - une roue de positionnement (9) rotative, en vis-à-vis des deuxième moyens formant courroie

(14) en aval des moyens de maintien (15), et ayant, équidistants angulairement, une pluralité de moyens formant pince (11) pour saisir le produit (100),

les deuxième moyens formant courroie (14) déplacent les produits (100), réciproquement espacés, depuis un état de préhension (A), dans lequel les deuxième moyens formant courroie (14) reçoivent le produit (100) à partir des premiers moyens formant courroie (13), à travers des états de déplacement (M), dans lesquels les moyens de maintien (15) maintiennent chaque produit (100) fixé sur les deuxième moyens formant courroie (14), vers un état de transfert (T) dans lequel les deuxième moyens formant courroie (14) sont immobiles, et le produit (100), plus du tout contraint, est saisi par une pince (11) de la roue de positionnement (9), qui déplace le produit (100) avec un mouvement circulaire, depuis l'état de transfert (T) vers un état de libération (R) dans lequel la roue (9) est immobile, et la pince (11) est ouverte pour transférer le produit (100) vers le groupe élévateur (5).

13. Machine d'emballage selon la revendication 12, **caractérisée en ce qu'elle** comporte des troisième moyens formant courroie (16) alignés avec les premiers moyens formant courroie (13), et positionnés en amont de ceux-ci, ayant un mouvement d'avancement continu.
14. Machine d'emballage selon la revendication 13, **caractérisée en ce que** les premiers moyens formant courroie (13) ont une vitesse de déplacement en translation inférieure à la vitesse des troisième moyens formant courroie (16), et supérieure à la vitesse moyenne de déplacement en translation des deuxième moyens formant courroie (14).
15. Machine d'emballage selon la revendication 12, **caractérisée en ce que** les moyens de maintien (15) comportent au moins des moyens d'aspiration pneumatique (17) reliés à travers des moyens formant conduit (19) à au moins une ouverture (18) des deuxième moyens formant courroie (14), pour maintenir par aspiration chaque produit (100) supporté par les deuxième moyens formant courroie (14).
16. Machine d'emballage selon la revendication 15, **caractérisée en ce que** les moyens d'aspiration (17) comprennent une pompe à vide ou un ventilateur d'aspiration.
17. Machine d'emballage selon la revendication 15, **caractérisée en ce que** l'ouverture (18) comporte une pluralité de trous traversants réalisés sur les deuxième moyens formant courroie (14).

18. Machine d'emballage selon la revendication 15, **caractérisée en ce que** les deuxièmes moyens formant courroie (14) sont constitués d'un couple de courroies transporteuses (22) parallèles et espacées transversalement par une fente longitudinale qui réalise au moins une ouverture (18). 5
19. Machine d'emballage selon la revendication 15, **caractérisée en ce que** les moyens formant conduit (19) comportent une embouchure d'aspiration (23) ayant une forme allongée, et en communication d'écoulement avec l'ouverture (18). 10
20. Machine d'emballage selon la revendication 19, **caractérisée en ce que** les moyens formant conduit (19) comportent au moins un conduit intérieur ayant une forme divergente en commençant à partir de l'embouchure d'aspiration (23) jusqu'à la connexion avec les moyens d'aspiration (17). 15
21. Machine d'emballage selon la revendication 12, **caractérisée en ce que** le groupe d'alimentation (10) comporte au moins des premiers (20) et seconds (25) moyens formant capteur, du type optique ou inductif ou capacitif, prévus pour détecter la présence de produits (100) respectivement en correspondance des premiers moyens formant courroie (13) et des deuxièmes moyens formant courroie (14). 20
22. Machine d'emballage selon la revendication 12, **caractérisée en ce que** les deuxièmes moyens formant courroie (14) sont alimentés en puissance de manière rotative par un moteur électrique (21) du type sans balai, commandé en termes de position, de vitesse et d'accélération. 25
23. Machine d'emballage selon les revendications 12 et 13, **caractérisée en ce que** les premiers (13) et troisièmes (16) moyens formant courroie sont alimentés en puissance de manière rotative par au moins un motoréducteur respectif (24). 30
24. Machine d'emballage selon la revendication 12, **caractérisée en ce que** la roue de positionnement (9) comporte au moins quatre moyens formant pince (11) positionnés mutuellement à 90°, et fixés sur la roue (9) avec un agencement presque tangentiel à une circonférence inscrite dans la roue de positionnement (9). 35
25. Machine d'emballage selon la revendication 12, **caractérisée en ce que** la roue de positionnement (9) comporte une première colonne (61) fixée sur la machine d'emballage (1), et supportant de manière rotative une deuxième colonne (62) et une troisième colonne (63), coaxiales à celle-ci, et tournant indépendamment sur un axe vertical. 40
26. Machine d'emballage selon les revendications 24 et 25, **caractérisée en ce que** les moyens formant pince (11) sont fixés, chacun à travers une plaque de support (68), à la troisième colonne (63), et comportent une paire de dents mobiles (12) tournant de manière symétrique entre un état de fermeture (C), dans lequel lesdites dents (12) sont à la distance mutuelle minimum pour saisir un produit (100), vers un état d'ouverture (D), dans lequel elles sont à la distance mutuelle maximum pour libérer ledit produit (100). 45
27. Machine d'emballage selon la revendication 26, **caractérisée en ce que** les moyens formant pince (11) comportent chacun des moyens de transmission (65) reliés aux moyens de commande (64) de la deuxième colonne (62), ces derniers étant prévus pour ouvrir et fermer les dents mobiles (12) de chacun des moyens formant pince (11) à travers la rotation de ladite deuxième colonne (62). 50
28. Machine d'emballage selon la revendication 26, **caractérisée en ce que** les moyens de transmission (65) comportent chacun au moins un pivot (67) supporté de manière pivotante par la troisième colonne (63), relié aux dents mobiles (12) des moyens formant pince respectifs (11) à travers une connexion à pignon-crémaillère, et mis en prise de manière coulissante par des rouleaux coulissants (66) sur un profil de came de moyens de commande (64). 55
29. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le groupe élévateur (5) comporte des quadrilatères articulés (51, 52) reliés aux cames alimentées en puissance respectives, et prévus pour déplacer au moins des moyens formant contre-élévateur (50) et des moyens formant élévateur (53). 60
30. Machine d'emballage selon la revendication 29, **caractérisée en ce que** les moyens formant élévateur (53) comportent au moins deux appuis latéraux (59) pour supporter la partie de matériau d'emballage (101) pendant la montée du produit (100). 65
31. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le groupe d'alimentation (10) du produit (100) comporte : 70
- une courroie de stockage (71), ayant un mouvement d'avance alterné, pour déplacer des produits alignés (100),
 - des moyens de poussée (72) pour transférer chaque produit (100) à partir de la courroie (71) vers un disque d'alimentation (73), ayant une pluralité de premières fentes (74) pour recevoir des produits (100), et tournant sur un axe vertical pour transporter ces derniers vers le groupe élévateur (5).

32. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le groupe d'alimentation (10) comporte une trémie de stockage (75) de produits (100), qui alimente un disque de remplissage centrifuge (76), ayant une pluralité de deuxièmes fentes (60) et tournant sur un axe vertical pour transporter chaque produit (100) vers le groupe élévateur (5). 5
33. Machine d'emballage selon la revendication 1, **caractérisée en ce que** le groupe d'alimentation (10) comporte une courroie (77) munie de contre-disques (78) pour accepter des produits respectifs (100), et pour transférer lesdits produits vers le groupe élévateur (5). 10
34. Machine d'emballage selon les revendications 31 et 32, **caractérisée en ce que** le groupe d'alimentation (10) est du type combiné, et comporte au moins une courroie de stockage (71) ayant des moyens de poussée (72) et un disque d'alimentation (73), et une trémie (75) ayant un disque de remplissage centrifuge (76). 15 20
35. Machine d'emballage selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'elle** est totalement commandée par des moyens de calcul et de commande électroniques prévus pour commander les relations de phase au moins parmi le groupe d'alimentation (10), le groupe élévateur (5), le groupe de déroulement et de découpe (6), la tête d'emballage (2), le groupe de pliage (3) et le groupe de sortie (7). 25 30

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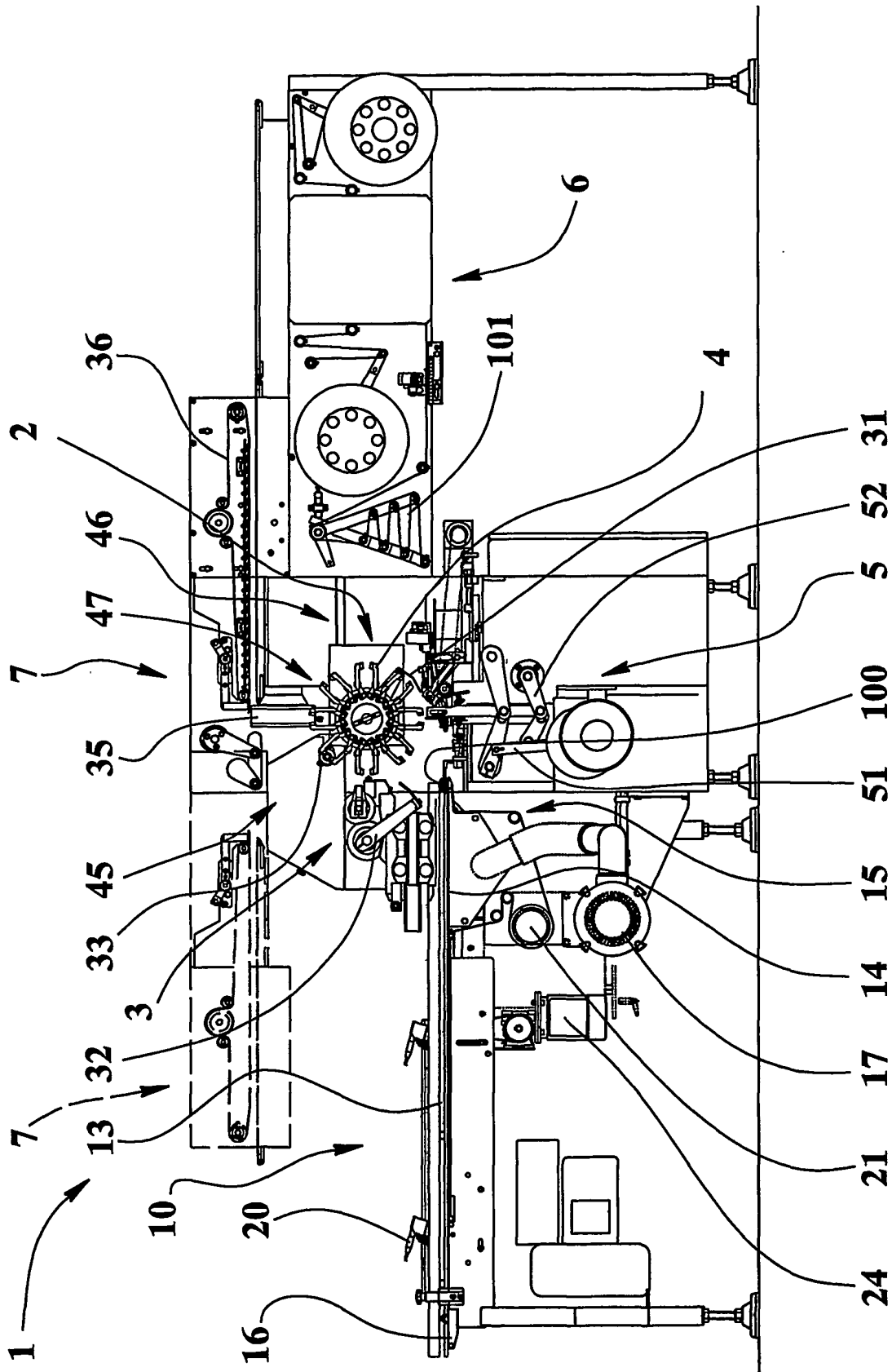
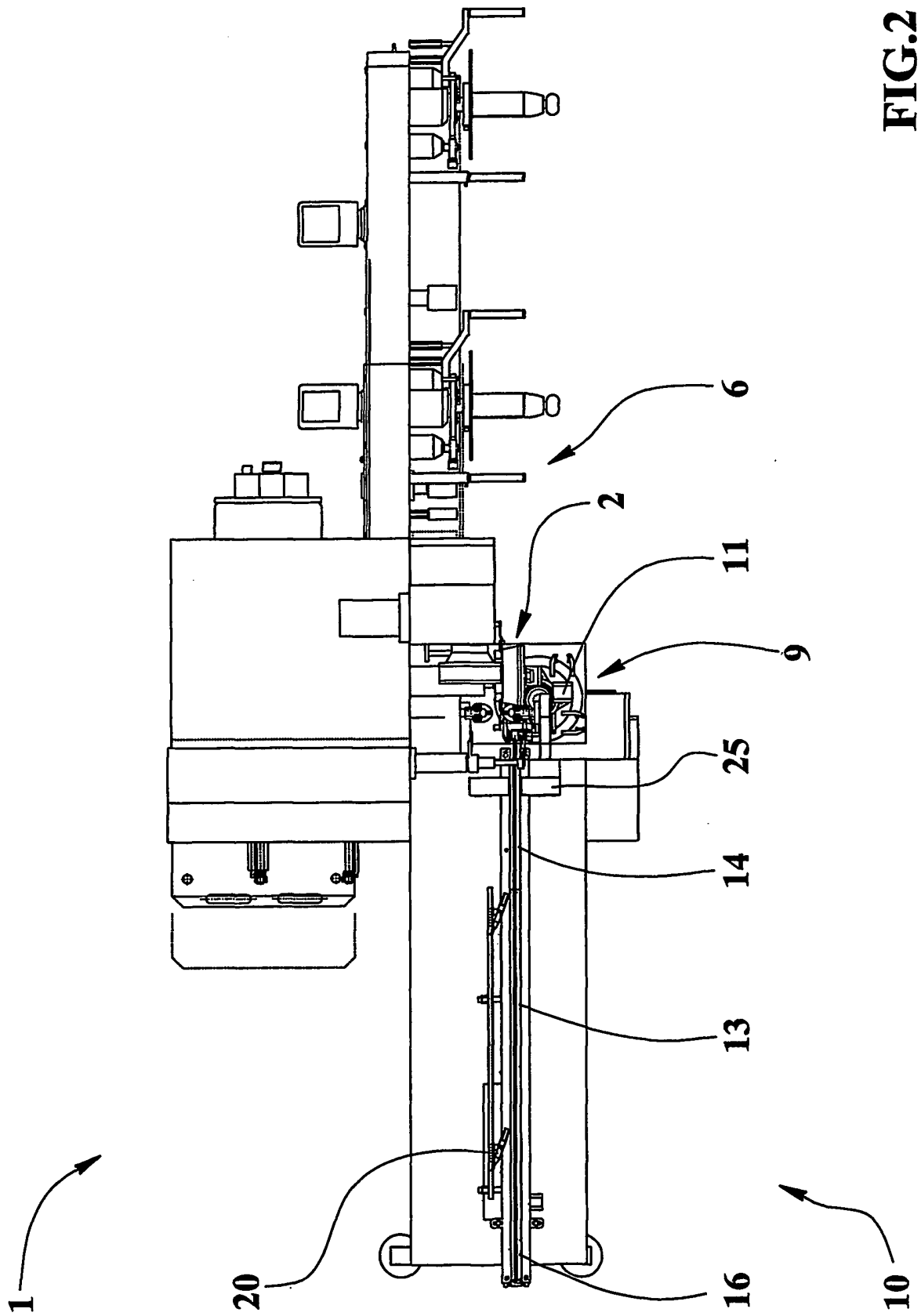


FIG.1



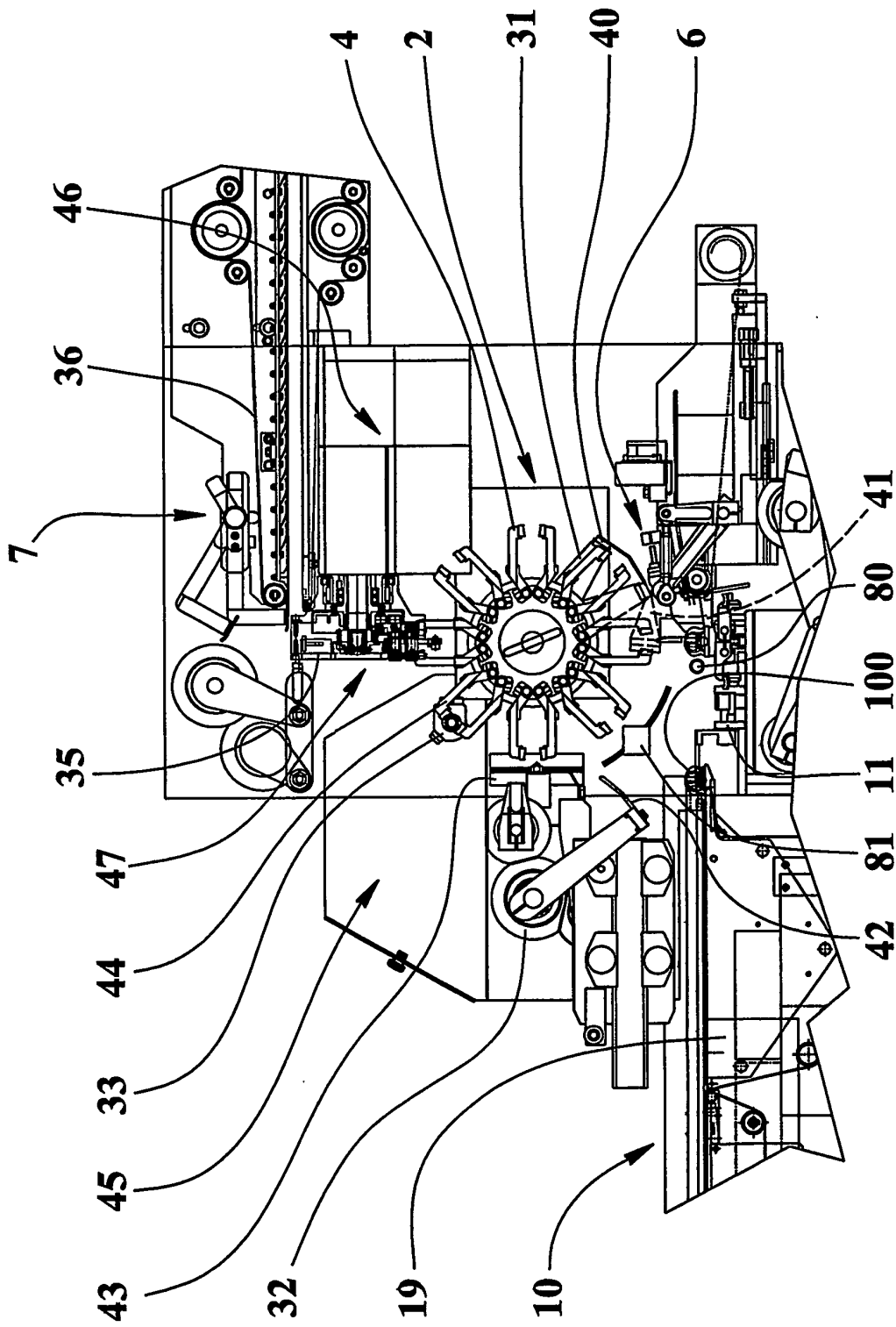


FIG.3

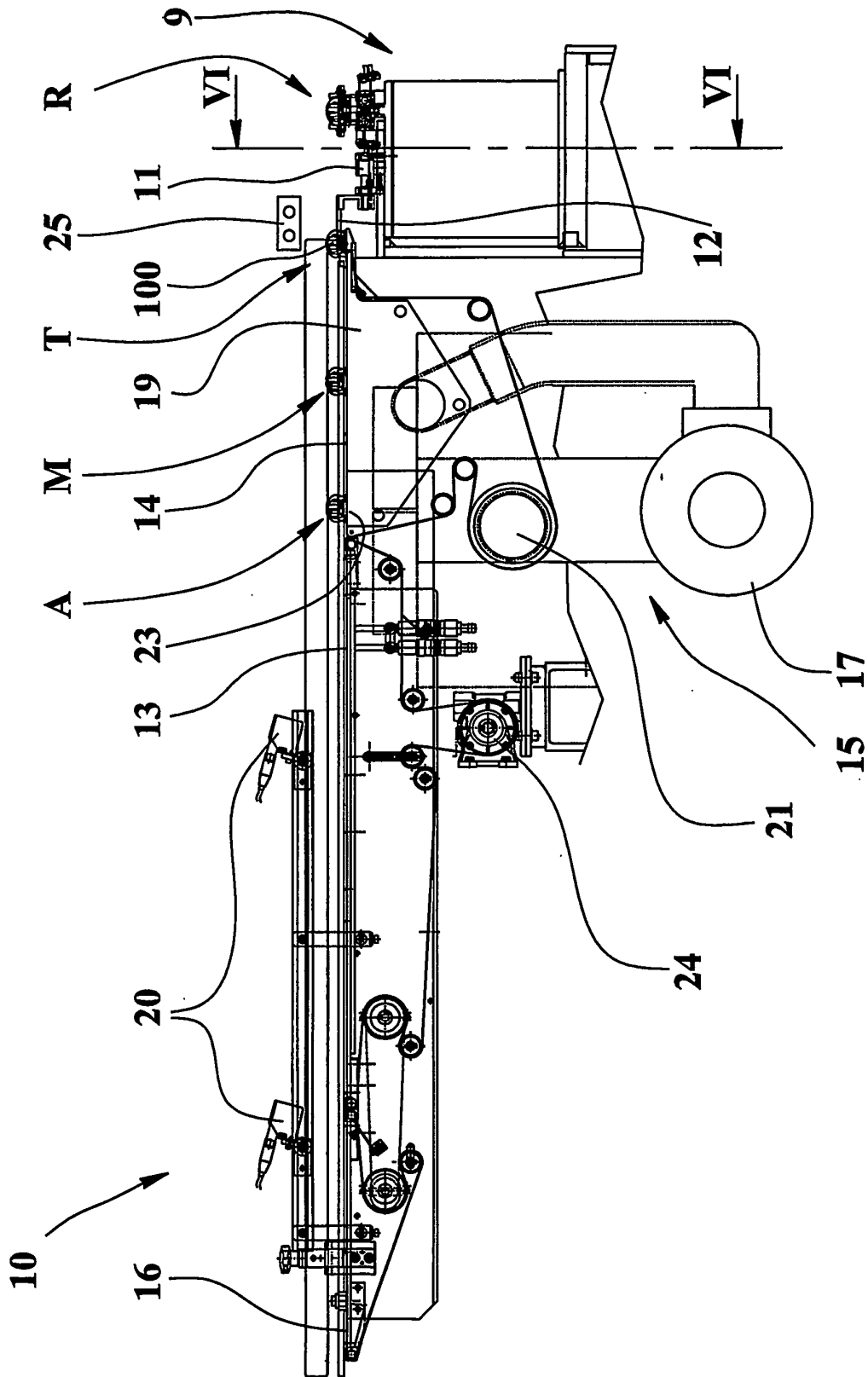


FIG.4

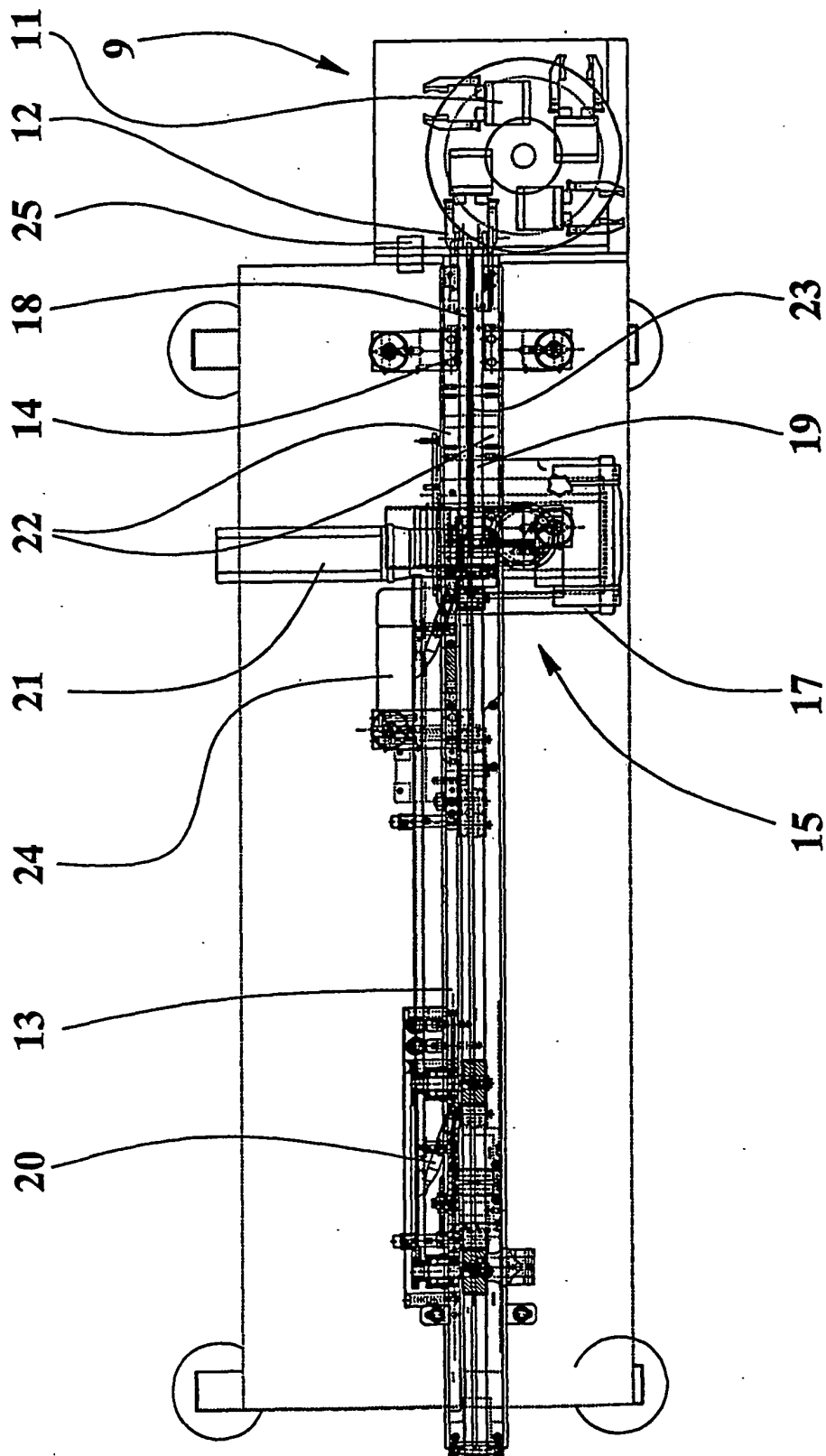


FIG.5

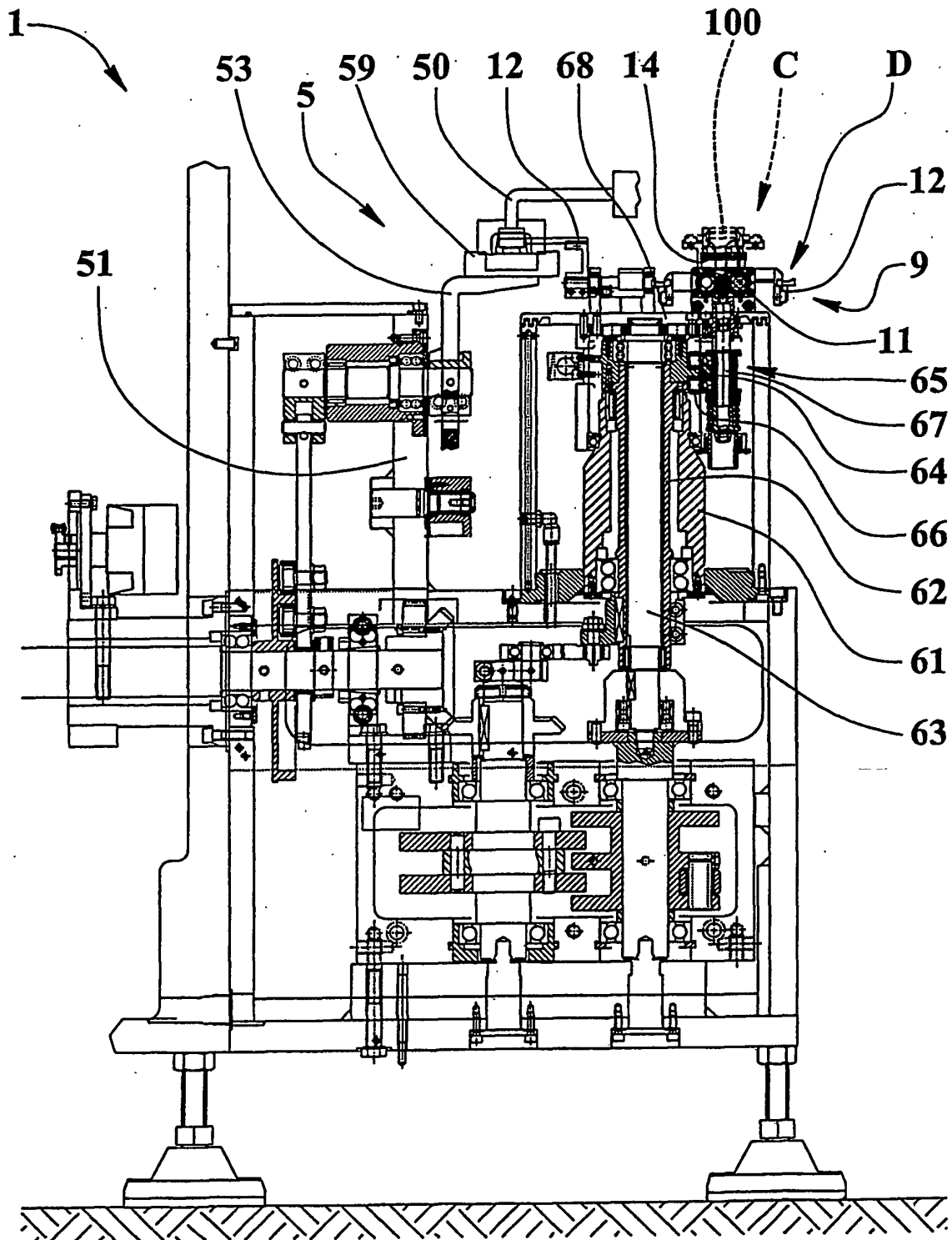


FIG.6

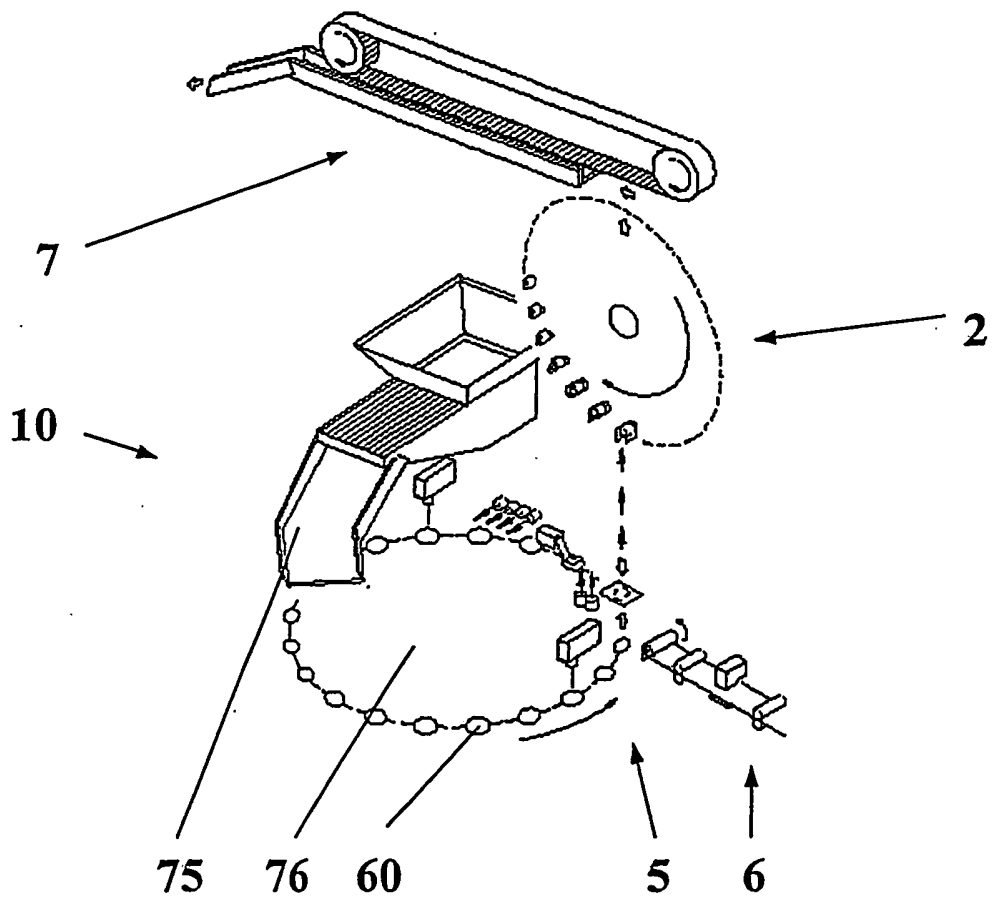
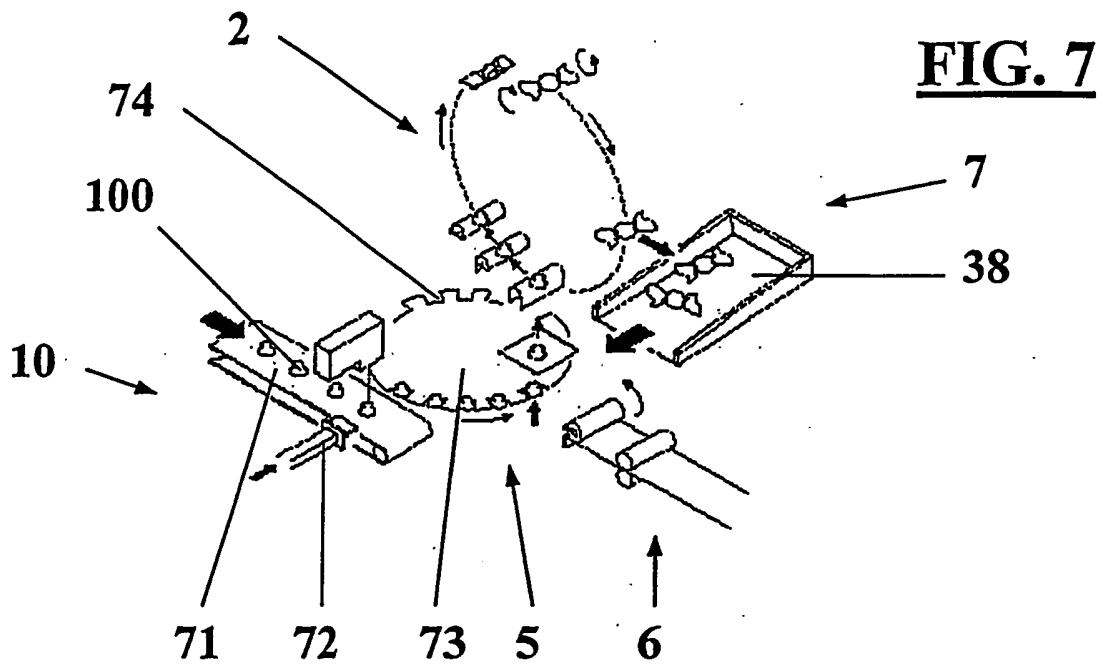


FIG. 8

