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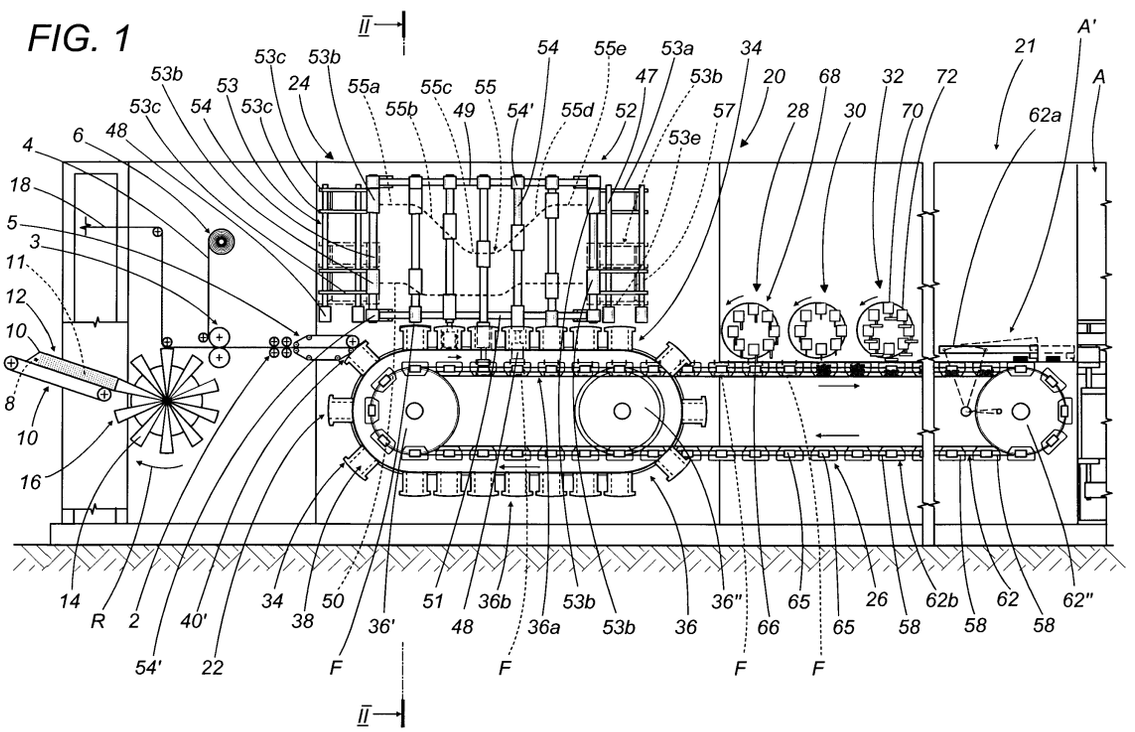
(54) Process and apparatus for packaging a food product, especially a pasty food product

(57) A process and apparatus for packaging a food product, in particular a pasty food product such as a processed cheese portion, a stock cube, butter, margarine and the like, in a wrapper made from a blank of suitable shape which is folded to make the package to receive the product. The apparatus comprises means (22) for feeding a blank from which the product is made, means (24) for folding the blanks into a shape suitable for receiving the product, means (26) for feeding the wrapper in the folded state, means (28) for inserting the product into the folded wrapper, and means (30, 32) for closing the wrapper containing the product. The advantage of the present invention is that the wrapper feeding, folding, filling and closing means (22, 24, 26, 28, 30, 32) form the wrapper without stopping, as the latter moves forward along the wrapping line.

FIG. 1



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Description

[0001] The present invention relates to a process and apparatus for packaging a food product.

[0002] The invention relates especially to the packaging of a pasty food product, such as a processed cheese portion, a stock cube, butter, margarine and the like, in an appropriate wrapper.

[0003] The invention applies to a wrapper of the type made from a blank of suitable shape which is folded to make the wrapping to receive the product.

[0004] At present, known apparatus for the packaging of products of this type generally comprise means for feeding a blank from which the container for the product is made, means for folding the blank into a shape suitable for receiving the product, means for feeding the wrapper after it has been folded into a cupped shape suitable for receiving the product, means for inserting the product into the wrapper once the latter has been folded in the filling configuration, and means for closing the wrapper containing the product.

[0005] In packaging machines of this type, the wrapper is fed from one machine station to another, stopping at each station long enough to allow one of the above mentioned operations to be carried out.

[0006] To obtain satisfactory productivity from these known machines, the steps of folding a flat blank or sheet into a cupped wrapper, inserting the product into the cupped wrapper and closing the top of the wrapper are speeded up to a very high degree. As a result of the increasingly high speeds of the machines, the blank from which the wrapper is made is subjected to considerable stress and must therefore be made of a sufficiently thick, resistant material. Otherwise, the wrapper is likely to be damaged during the wrapping process and holes or microscopic holes in the wrapper allow the food product to come into contact with the atmosphere, creating the risk of contamination or accelerating the natural decaying process.

[0007] The wrapper must therefore be made from a good quality and/or suitably thick material in order to provide a sufficient guarantee of resistance. All of this leads to high costs which manufacturers must sustain to wrap their products.

[0008] In other known machines, the means for feeding the flat blank and the means for feeding the wrapper in the cupped configuration suitable for receiving the product consist of carrousels which cross each other at the point where the wrapper is folded into a cupped shape. This makes the feed means extremely cumbersome and limits the number of products being wrapped in the machine at any one time.

[0009] As stated in claim 1, the present invention provides a process for packaging a food product, especially a pasty food product, such as a processed cheese portion, a stock cube, butter, margarine and the like, in an appropriate wrapper made from a blank of suitable shape which is folded to make the wrapper to receive the product. The apparatus which implements the process comprises wrapper feeding means at packaging means which comprise at least one of the following operating means: means for folding the blanks into a form suitable for receiving the product; means for inserting the product into the wrapper in the folded, filling configuration; and means for closing the wrapper containing the product. At least one of these operating means works as the wrapper moves.

[0010] Thus, since the wrapper does not stop to allow the corresponding packaging operation to be carried out, the productivity of the present packaging apparatus is significantly higher than that of machines known up to now, which means that, to obtain the same productivity as that provided by known machines, the packaging operations can be performed more slowly, thus subjecting the wrappers to less stress. The apparatus therefore makes it possible to use wrapping materials that are less resistant and that cost less, thereby lowering the packaging costs of the products.

[0011] Obviously, the best result can be obtained if all the operating sections of the machine work in the manner outlined above. However, even a machine where only some of the operating sections work in the way outlined above provides an advantageous result and therefore falls within the scope of the present invention.

[0012] The invention also relates to a packaging apparatus as described in claim 3.

[0013] Further advantageous aspects of the process and apparatus disclosed appear in the other claims.

[0014] The technical characteristics and advantages of the invention will now be described in more detail below with reference to the accompanying drawings, which illustrate preferred embodiments of the invention without limiting its scope of application, and in which:

- Figure 1 is a schematic lengthways representation of a first preferred embodiment of the apparatus according to the present invention;
- Figure 2 is a schematic top plan representation of the first preferred embodiment of the apparatus according to the present invention;
- Figure 3 is a schematic cross section, through line II-II in Figure 1, of the initial section of the first preferred embodiment of the apparatus according to the present invention;
- Figure 4 is a schematic lengthways representation of a central portion, constituting the wrapper folding section, of a second preferred embodiment of the apparatus according to the present invention;
- Figure 5 is a schematic top plan representation of a detail showing the lower section of the central portion of the second preferred embodiment of the apparatus according to the present invention.

[0015] Figure 1 in the accompanying drawings shows a first preferred embodiment of the apparatus 20 according to the present invention for packaging pasty

food products such as, for example, processed cheese portions which are preferably in the shape of a triangle or circular sector, but which may also have the shape of a square, rectangle, circle or any other geometrical figure.

[0016] The present apparatus might, for example, be used to package products in wrappers of the type forming the subject-matter of Italian patent application No. B099A000377 by the same applicant as the present.

[0017] The present preferred embodiment of the apparatus essentially comprises a frame 21 that supports wrapper feed means 22, 26 at operating means for packaging the product in a wrapper.

[0018] These operating means of the first apparatus basically comprise means 24 for folding the blanks into a cupped configuration suitable for receiving the product, means 28 for inserting the product into the wrapper blank when the latter is in the folded, filling configuration, and means 30, 32 for closing the wrapper containing the product.

[0019] In the process according to the present invention, these operating means work to wrap the product while the wrapper is actually moving forward along the packaging line.

[0020] In practice, instead of stopping to perform the packaging operations as occurs in similar machines made according to prior art, the present invention advantageously enables the packaging operations to be performed in motion. This enables higher productivity or, conversely, makes it possible to perform the same packaging operations at a lower speed to obtain the same productivity but subjecting the wrapping material and machine components to less stress and strain.

[0021] Obviously, the scope of the invention includes apparatus in which only one or some of the above mentioned packaging operations are performed in this way or apparatus in which the application of the process according to the invention is limited to one or some preferred sections of the machine.

[0022] According to the present preferred embodiment, therefore, the motion of the wrapper feed means 22, 26 that convey the wrappers is continuous, or substantially continuous, and the normal feed cycle does not require the wrappers to be stopped or slowed down. Obviously, the machine only stops in the event of faults or unexpected events along the line. In particular, the invention provides for the feeding of the wrappers at a constant speed.

[0023] As illustrated, the feeding of the wrappers is performed, in particular, by first means 22 which feed the blanks and which enable the wrappers to be formed into a cupped shape suitable for receiving the product, and by second feed means 26, which receive the wrappers folded into a cup shape by the means 22, and which feed the product to the other operating sections located downstream of the section just mentioned where the wrappers are folded into a cup shape.

[0024] As explained in more detail below, this embodiment of the invention comprises a first and a second line, working side by side, for the preparation of corresponding sets of wrapped products.

[0025] With reference also to Figure 2, it can be seen that the wrapping material is unwound from a single roll and cut into two parallel webs 18, 18, each supplying a corresponding line L1,L2 (this feature not being specifically illustrated in the accompanying drawings).

[0026] As each of the webs 18 is being fed, a suitably shaped label is then placed on the surface or side of it forming the bottom of the wrapper by appropriate means 16 having a plurality of radial portions 14, carrying the labels on the ends, the labels being smeared with glue on one face. The arms 14 turn in the direction of the arrow R in such a way as to bring each label into contact with, and hence gluing it to, the corresponding wrapper.

[0027] The feeding of the labels 11 is performed by a conveyor belt 10, which moves the labels towards and against the pickup end of a corresponding radial arm 14. Above the conveyor belt 10, there are means for guiding and accommodating a stack 8 of the labels 11.

[0028] The invention further provides for an appropriate wrapper tear strip which, for each line is unwound from a roll 6 of web 4 and then appropriately placed on the corresponding wrapper by applicator rollers 3.

[0029] In Figure 1, the numeral 2 denotes means or rollers for unwinding the web of wrapping material with labels and tear tapes applied to it, whilst the numeral 5 in Figure 1 denotes means for cutting the web transversely to form separate blanks.

[0030] In the present preferred embodiment of the apparatus, the aforementioned means 24 for folding the blank are designed to fold the blank, which is labelled F in the figures, while the blank is moving forward.

[0031] To enable this to be done, the product feed means 22 consist of a plurality of elements 34 for holding the blanks F and means 36 for feeding the blank holding elements 34 along a defined path, part of which forms the feed path of the blanks F.

[0032] As illustrated in the accompanying drawings, the blank F holding elements take the form of hopper-like elements 34 each of which has an open-ended axial cavity 38 with a suitably shaped profile that enables the blank to be folded by being pushed through the cavity 38 itself.

[0033] These hopper-like elements 34 each have a face 40', which the blank F rests on, at one end of the through cavity 38.

[0034] Each blank F is transferred by the cutting means 5 to a corresponding element 34 that holds it by suction. Holding the blanks by suction is a technique well known to experts in the trade. These suction means are not therefore described in further detail.

[0035] An advantage of the invention lies in that the blank is transferred to the hopper 34 while the hopper is moving forward and is in a position such that the upper face of it holding the blank, is inclined by a certain angle to the horizontal.

[0036] As shown also in Figure 3, the means for feeding the holding elements comprise, for each line, an endless conveyor 36 driven by wheels 36' and 36" in a vertical plane and having an active feed section 36a and a return section 36b running under the active section 36a.

[0037] The endless conveyor 36 consists of a first and a second endless element, preferably in the form of conveyor belts 39, 41, at a defined transversal distance from each other, and crossbars 43, at defined longitudinal intervals from each other, designed to support the blank holding elements 34. The ends of the crossbars 43 are connected to the first and second conveyor belts 39, 41.

[0038] The endless conveyor 36 for the blank holding elements 34 comprises, for each hopper-like element 34, a corresponding supporting element 42. As clearly shown in Figure 3, the supporting element 42 is slidably mounted on a corresponding crossbar 43 and comprises a sleeve-like portion 42a, which encircles and slides on the crossbars 43, a horizontal arm 42b extending horizontally from the sleeve 42a and ending with a connecting portion or means such as, for example, a securing bracket 42c, by which the corresponding hopper-like element 34 is attached.

[0039] Means are also provided to move the holding elements 34 sideways after these have folded the wrappers F into a cupped shape and in such a way that the blank holding elements 34 are carried outside the feed path of the underlying means 26 that feed the wrappers in the folded state, thus enabling the conveyor to travel along the return section. All of this must take place without any risk of interference or collision between the hopper-like elements 34 and the underlying means 26 that support the folded wrappers.

[0040] The means for moving the elements 34 sideways comprise cam means 45 (see Figure 2) which act, through appropriate means (which are not illustrated in the drawings, being well known to experts in the trade) on the elements 42 that support the blank holding elements 34 in such a manner as to move them, as shown in Figure 3, from the position illustrated with the continuous line to the position illustrated with the dashed line.

[0041] In practice, as shown in Figure 2, the profile of the cam 45 has a first straight section 45a parallel to the feed direction of the blank holding and folding elements 34 and of the means 26 that feed the wrappers in the folded state, so that the holding elements 34, as they are being fed along the longitudinal folding section, are exactly aligned on the vertical with the means 26. Near the front end of the conveyor 36, the cam means 45 have a second section 45b that is inclined in a horizontal plane towards the outside of the machine in such a way as to divert outwards the blank holding elements 34, which no longer have the blanks F in them, and thus allowing them to move downwards and travel along the return section without interfering with the means 26 that feed the wrappers F in the folded state which proceed straight on lengthways.

[0042] It is also possible to provide the cam 45 with an initial section 45c, upstream of the first section 45a, that is appropriately shaped to move the hopper-like elements 34, dimensioned accordingly, to corresponding transversal pickup positions, different from the one shown here, for example a position further towards the inside, that is to say, towards the central section of the machine. In practice, this would enable the webs 18, 18 of wrapping material, to be placed closer together than the ones illustrated in the drawings and, with an appropriately selected initial cam profile section 45c, it would be possible, thanks to the cam sections 45c themselves, to pick up the blanks at the point where they are actually fed and then transfer them along the longitudinal feed line according to the present embodiment in a condition of vertical alignment with the folding pusher elements 48 (described in detail below) and with the means 26 that feed the blanks F in the folded state.

[0043] In this case, the provision of independent systems 36, 45 and 36, 45 for supporting and controlling each row of wrapper holding and forming hoppers 34, said systems being located on opposite sides of the machine, is useful to obtain the maximum versatility and adaptability of the machine to the different types and sizes of wrappers and webs 18, 18 from which the wrappers F are made.

[0044] In the present embodiment of the apparatus, as illustrated, the means for feeding the blanks F feed the blanks along a mainly straight path. This arrangement not only reduces the width of the machine's footprint but also allows operators to easily access the different parts of the machine when necessary.

[0045] Looking in more detail, the folding means comprise means for pushing the blanks F into the axial cavity 38 of each hopper-like element 34, thus forming the blanks into a cupped shape suitable for receiving the product.

[0046] The means for pushing the blanks into the axial cavities 38 of the hopper-like elements comprise suitably shaped pusher elements or forming pistons 48, each mounted on the end of a corresponding stem 47, and moving between a vertically retracted or raised position where it is outside the axial cavity of the hopper-like element 34, and a vertically advanced or lowered position where the forming piston is driven into and through the axial cavity 38 of the hopper 34.

[0047] Means 52 are provided to feed the pusher elements 48 along a defined path.

[0048] The path followed by each pusher element 48 under the action of the feed means 52 comprises a first downstroke section 52a during which it moves down and at the same time lengthways, parallel to the feed path of the forming hoppers 34, and during which the wrapper F is formed into a cupped shape, and a second return section 52b. As illustrated, the means for feeding the pusher elements 48 consist preferably of an endless conveyor 52.

[0049] The conveyor 52 of the pusher elements 48 thus has an active branch which extends in such a way

that, as they move, the pusher elements 48 are positioned over the corresponding blank holding and forming elements 34, and an idle return branch where they move in a horizontal plane extending well over the feed means 22 of the blank holding elements and the means 26 for feeding the wrappers F in the folded state, as illustrated especially in Figures 1 and 3.

[0050] The endless conveyor 52 comprises a first and a second endless element, driven by wheels 52' and 52" and preferably in the form of conveyor belts 49, 51, placed at a defined vertical distance from each other and between which there extend bars 54 that support the pusher elements 48. The ends of the bars 54 have securing portions 54' by which they are connected to the conveyor belts 49 and 51. The pusher elements 48 are mounted on support means 53 that slide on the vertical bars 54 of the conveyor 52 having corresponding sleeve-like portions 53b, 53b which encircle and slide on the bars 54 and from which there extend corresponding brackets 53c, 53c that support the stems 47 of the corresponding pusher elements 48.

[0051] The means for moving the pusher elements 48 between a retracted position outside the hopper 34 and a forward position extending into and through the axial cavity 38 of the hopper 34, comprise cam-like control means 55 that extend in the direction of feed of the hopper elements 34 and have a vertically modulated profile designed to enable vertical control of the pusher elements 48.

[0052] The means that vertically move the pusher 48 supporting elements 53 obviously comprise, besides the cam-like means 55, appropriate drive transmission means which are not illustrated in the accompanying drawings since they are well known to experts in the trade.

[0053] As illustrated in Figure 1, the cam profile 55 has, for the downstroke section of the pushers 48, a first section 55a at a high level at which the corresponding pusher 48 is outside the hopper cavity 38, and a second section 55b, consisting of a downwardly inclined ramp which causes the pusher element 48 to go down into the hopper and through to the other side below it into an appropriately shaped recess which accommodates the wrapper on the means that feed the wrappers in the folded state. The second section is followed by a short horizontal section 55c, at the lowermost level of the pusher elements, by an upwardly inclined ramp 55d enabling the pushers 48 to be withdrawn, and a horizontal section 55e at the same level as the first section 55a and corresponding to the level at which the pushers 48 travel along the return section.

[0054] The folding means are completed by reed elements (which are not explicitly illustrated in the accompanying drawings) which fold the flaps or tabs of the wrapper and which are designed to be placed on the sides of the corresponding wrapper. These side folding reed elements are mounted on means or slides (labelled 57 as a whole) that are similar, though shorter, than those of the pusher elements 48. The slides 57 also run on the vertical bars 54.

[0055] The vertical movement of the slides or support means 57 is controlled by cam-like means, whose profile, labelled 50, is explicitly illustrated in Figure 1. As shown, the cam profile 50 extends vertically in much the same way as cam-like means 55, from which it differs in that the height of the vertical movement it causes is lower, advanced and more prolonged than that controlled by the cam-like means 55.

[0056] The reed elements, of which there is one for each edge of the wrapped product, are well known to experts in the trade and do not therefore need to be described in further detail. The means that support and drive them are the same as those of the pusher elements 48.

[0057] The means 26 that feed the wrappers in the folded state are designed to receive the wrappers while these are in motion.

[0058] The means 26 that feed the wrappers in the folded state suitable for receiving the product comprise a plurality of elements 58, each holding a wrapper in the folded state, and means 62 for feeding the folded wrapper holding elements 58 along a defined path.

[0059] Looking in more detail, the folded wrapper holding elements consist of cup-like elements 58, each forming a specially shaped recess 60 whose side profile matches the shape of the base of the wrapped product and that is designed to accommodate the wrapper F in the folded state. The recess 60 completes the forming and shaping of the fold lines at the bottom of the cupped wrapper.

[0060] The folded wrapper holding elements 58 comprise an endless conveyor 62 driven by wheels 62' and 62" in a vertical plane and having an active feed section 62a and a return section 62b running under the active section.

[0061] The folded wrapper feed means 26 follow a straight path.

[0062] As illustrated, the folded wrapper feed means 26 run on the side of the folding means 48 opposite the means 34 that feed the blanks.

[0063] The active feed and return sections of the conveyor 62 of the folded wrapper holding elements are inside the active and return sections of the feed means 36 that convey the blank holding elements 34. As shown in particular in Figures 2 and 3, the conveyor 62 comprises a first and a second conveyor belt 61, 63 at a defined transversal distance from each other, that support longitudinally spaced transversal portions or crossbars 65, forming first and second transversally spaced recesses 60 designed to receive and hold the wrappers in the folded state.

[0064] Each of the first and second recesses 60 hold the wrappers F of a corresponding longitudinal row of wrappers.

[0065] As illustrated and described above, the blank feed means comprise a first and a second row of forming

and holding elements 34 and the related longitudinal feed conveyors 36, 36 which extend on opposite transversal sides of the conveyor 62 for the folded wrapper feed means.

[0066] To allow both the wrappers F, F moving forward in pairs along the two longitudinal parallel lines to be folded simultaneously, the brackets 53c support a first and a second stem 47 for corresponding pusher elements 48 in such a way that the transversal distance between the pushers corresponds to the distance between the two parallel rows of wrapped products.

[0067] The numeral 28 in Figure 1 denotes means for filling the cupped wrappers positioned lengthways downstream of the folding means. The filling means 28 are designed to fill the wrappers F while the latter are in motion. In a preferred, advantageous embodiment, product feed nozzles 66, kept in the vertical position, are moved on rotating drive means 68 in such a way that the lower section of the circular path followed by the nozzles 66 enables the latter to be inserted into cupped wrappers and to follow their lengthways movement for long enough to release the product inside the cupped wrappers.

[0068] The aforementioned wrapper closing means are located longitudinally downstream of the filling means 28 and comprise means 30 for folding the upper flaps or tabs of the wrapper over the top of the product (said means being illustrated schematically in Figure 1) and means 32 for sealing the folded flaps.

[0069] The closing means 30, 32 are designed to close the wrapper containing the product while the wrapper is in motion.

[0070] In a preferred embodiment, the sealing means 32 comprise sealers 70, which are kept in the vertical position as they are moved on rotating drive means 72. The means 72 are fitted in such a way that the lower section of the circular path followed by the sealers 70 enables the latter to come into contact with the upper flaps of the wrapper folded over the product and to follow them for long enough to seal them.

[0071] The means 30 for folding the upper flaps, like the means described above, perform this operation while the wrappers containing the product are in motion and also comprise appropriate elements carried by corresponding means that enable them to follow the movement of the wrappers long enough to fold them.

[0072] As already mentioned, a particularly advantageous aspect of the present invention is that the feed means 24, 26 move the wrappers forward with continuous motion. The productivity of the apparatus according to the present invention is therefore significantly higher than that of machines known up to now, which means that, for the same productivity as that of known machines, the wrappers are subjected to less stress, so it is possible to use wrapping materials that are less resistant and that cost less, thereby lowering the packaging costs of the products.

[0073] As illustrated, the wrapper conveying means comprise a shared conveyor 26 designed to convey the wrappers between the aforementioned folding means 24, the filling means 28 and the wrapper closing means 30, 32.

[0074] The conveyor belts of the aforementioned operating means are made preferably of stainless steel to avoid excessive deformation and allow the parts carried to maintain the correct position and thus ensuring the perfect alignment of the different parts operating in conjunction with each other.

[0075] The embodiments of the feed means described up to now are preferred embodiments. Obviously, other embodiments are possible.

[0076] The apparatus may further comprise a cartoning unit, labelled A in the accompanying drawings and only partly illustrated, being designed to pack the individual processed cheese portions in cartons. The transfer from the cheese portion feed means 26 to the cartoning unit is effected by appropriate pickup and dispensing means labelled A' in Figure 1.

[0077] Figures 4 and 5 illustrate the wrapper folding section of a second preferred embodiment of the apparatus according to the present invention.

[0078] In the second preferred embodiment of the apparatus, as illustrated in Figures 4 and 5, the wrapper holding elements or folding hoppers 134 are advantageously conveyed by the endless conveyor 152 which carries the pusher elements 148.

[0079] The endless conveyor 152 is substantially the same as the one of the first preferred embodiment of the apparatus, which carries only the folding pushers.

[0080] Like that of the first embodiment, the endless conveyor 152 has an active branch 152a which extends in such a way as to position the blank F holding and folding elements 134 over the corresponding feed elements 26 which receive the folded wrappers, as shown in Figure 4.

[0081] As illustrated in particular in Figure 5, the conveyor 152 of the holding elements 134 also has an idle return branch 152b. The conveyor belt 152a extends in a substantially horizontal direction.

[0082] With reference to Figure 4, the endless conveyor 152 comprises a first and a second endless element, labelled 149 and 151, respectively, in the form of belts placed at a defined vertical distance from each other, and connected to each other by appropriate bars 154 which constitute slidable supporting means for the holding elements 134 and for the folding pusher elements 148 of the wrappers F.

[0083] As can be seen in Figure 4, the upper endless element 149 is supported by wheels 149a, 149b each of which is in turn supported by a shaft, whose axis is labelled 149'a , 149'b.

[0084] As illustrated also in Figure 5, the lower endless element 151 is supported by wheels 151a, 151b each of which is in turn supported by a shaft 151c, 151d, whose axis is labelled 151'a , 151'b.

[0085] As clearly shown in Figure 5, the wheels

around which the endless elements 149, 151 run have a specially shaped outer profile with semicircular recesses 157 at defined angular intervals, said recesses 157 meshing with the vertical bars 154 in such a way that the wheels drive the endless conveyor 152.

[0086] As illustrated in Figures 4 and 5, the wrapper holding and folding elements 134, consist of a single part having a pair of vertical folding apertures 138, 138 designed to receive a corresponding pusher 148, 148.

[0087] The pushers 148 and the corresponding supporting rods 147 are hollow and are connected to a hose 159a, 159b merging into a single main hose 159, constituting air ducting means which convey air used to facilitate detachment of the wrapper from the pusher 148 after the wrapper has been folded.

[0088] In this second preferred embodiment, the folding means or pushers 148, 148 for both pairs of wrappers positioned on the single holding element 134, are carried by a single supporting element 153 that slides on the vertical bars 154 of the conveyor 152. The pusher 148 supporting means comprise a sleeve-like portion 153b which encircles and slides on the rods 154, and from which a vertical bracket 153c and a horizontal bracket 153d extend, these brackets supporting a pair of rods 147, 147 for a corresponding pusher 148.

[0089] The means for moving each pusher element 148 between a retracted position outside the corresponding hopper 134 and an advanced position inside and through the axial cavity 138 of the hopper 134, comprise a cam-like control profile 155, on which there runs a roller 155' attached to the pusher 148 supporting means. The cam extends in the direction of feed of the hopper elements 134 and runs in a vertical direction in such a way as to control the vertical movement of the pusher elements 148.

[0090] In this second preferred embodiment, the holding and folding elements 134 are supported by means 142 that slide on the vertical bars 154 of the horizontal conveyor 152.

[0091] The hopper element 134 supporting means comprise a sleeve-like portion 142b which encircles and slides on the bars 154 and from which a vertical bracket 142c and a horizontal bracket 142d extend, the brackets supporting a pair of hollow, vertical bushes 142a, 142a forming the aforementioned shaped folding apertures 138, 138.

[0092] The holding elements 134 are moved along a vertical working path by appropriate means.

[0093] The means for vertically moving the hopper means 134 comprise a cam-like control profile 145 on which there runs a roller 145' attached to the supporting means of the pushers 148. The cam 145 extends vertically in the same direction as the feed direction of the hopper elements 134 in such a way that the starting section of its active path enables the hoppers to pick up the blanks from a suction belt N which holds the blanks, which may already be equipped with labels and tear strips, on its lower face.

[0094] The initial section of the cam 145 moves the elements 134 between a lowered position, upstream of the wrapper pickup point, and a raised position corresponding to the wrapper pickup point, labelled R in Figure 4.

[0095] Although not explicitly illustrated in the accompanying drawings, the second preferred embodiment might, in addition to the aforementioned units for filling the cupped wrappers, for folding and sealing the tabs to the tops of the wrappers, also comprise a unit, located between the wrapper feed station and the tab folding station and designed to apply a cap to the top of each wrapper so as to obtain a traditional type of wrapper. The cap applicator unit, which forms part of the means for closing the wrapper containing the product, might be made, for example, in much the same way as the aforementioned units 28, 30, 32 of the first preferred embodiment of the apparatus described herein.

[0096] The invention described can be subject to modifications and variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A process for packaging a food product, especially a pasty food product, such as a processed cheese portion, a stock cube, butter, margarine and the like, in an appropriate wrapper made from a blank of suitable shape which is folded to make the package to receive the product; the apparatus which implements the process comprising wrapper feeding means (22, 26) at packaging means, said packaging means comprising at least one of the following operating means: means (24) for folding the blanks into a form suitable for receiving the product; means (28) for inserting the product into the wrapper in the folded, filling configuration; and means (30, 32) for closing the wrapper containing the product; the process being characterised in that at least one of the operating means (24, 28, 30, 32) works as the wrapper moves forward.

2. The process according to claim 1, characterised in that the wrapper feed means (24, 26) convey the wrappers with continuous or substantially continuous motion.

3. An apparatus (20) for packaging a food product, especially a pasty food product, such as a processed cheese portion, a stock cube, butter, margarine and the like, in an appropriate wrapper made from a blank of suitable shape which is folded to make the package to receive the product; the packaging apparatus comprising wrapper feeding means (22, 26) at packaging means, said packaging means com-

prising at least one of the following operating means: means (24) for folding the blanks into a form suitable for receiving the product; means (28) for inserting the product into the wrapper in the folded, filling configuration; and means (30, 32) for closing the wrapper containing the product; the apparatus being characterised in that at least one of the operating means (24, 28, 30, 32) works as the wrapper moves forward.

4. The apparatus according to claim 3, characterised in that the wrapper feed means (24, 26) convey the wrappers with continuous or substantially continuous motion.

5. The apparatus according to claim 3 or 4, characterised in that the feed means comprise means (22) for feeding a blank from which a product wrapper is made, and means (26) for feeding the wrapper in the folded state.

6. The apparatus according to claim 5, characterised in that the blank feeding means (22) comprise a plurality of elements (34; 134) for holding the blanks and means (36; 136) for feeding the blank holding elements (34; 134) along a defined path.

7. The apparatus according to claim 6, characterised in that the blank holding elements consist of hopper-like elements (34; 134), each having an open-ended axial cavity (38, 138) with a suitably shaped profile constituting blank folding means, and a face (40'), which the blank rests on, at one end of the through cavity (38; 138).

8. The apparatus according to claim 6 or 7, characterised in that the means for feeding the holding elements (134) comprise an endless conveyor (152).

9. The apparatus according to claim 8, characterised in that the conveyor (152) of the holding elements (134) has an active branch which extends in such a way that, as they move, the blank holding elements (134) are positioned over the corresponding feed elements (26) which receive the folded wrappers.

10. The apparatus according to any of the foregoing claims from 7 to 9, characterised in that means are provided to move the holding elements (134) between a lowered position, upstream of the wrapper pickup point, and a raised position corresponding to the wrapper pickup point (R).

11. The apparatus according to any of the foregoing claims from 7 to 10, characterised in that the holding elements (134) consist of a single part comprising a first and a second wrapper folding bush (142a, 142a).

12. The apparatus according to claim 7, characterised in that the means for feeding the holding elements (34) comprise an endless conveyor (36) running in a vertical plane and having an active feed section (36a) and a return section (36b) under the active section.

13. The apparatus according to claim 12, characterised in that the endless conveyor (36) comprises a supporting element (42) for each blank holding element (34), said supporting element (42) being slidably mounted on a corresponding crossbar (43), means (45) being provided to transversely move the supporting elements (42) in such a way that the blank holding elements (34) are carried outside the feed path of the wrapper feed means (26) and thus enabling the conveyor (36) to travel along the return section.

14. The apparatus according to claim 13, characterised in that the means for transversely moving the holding elements (34) comprise cam-like means (45) acting on the elements (42) that support the blank holding elements (34).

15. The apparatus according to any of the foregoing claims from 3 to 14, characterised in that the blank feed means (22) carry the blanks along a straight feed path.

16. The apparatus according to any of the foregoing claims from 3 to 15, characterised in that the folding means comprise means (48, 148) designed to push each blank into a corresponding axial cavity (38, 138) of the hopper elements in such a way as to fold the blanks into a shape suitable for receiving the product.

17. The apparatus according to claim 16, characterised in that the means for pushing the blanks into the cavities (38; 138) of the hopper elements comprises corresponding pusher elements (48; 148) that move between a retracted position where it is outside the hopper-like element (34; 134), and an advanced position where it is inside the axial cavity (38; 138) of the hopper (34; 134), means (52; 152) being provided to move the pusher elements (48; 148) along a feed path parallel to the hopper-like elements (34; 134).

18. The apparatus according to claim 17, characterised in that the means (52; 152) for moving the pusher elements (48; 148) along a defined feed path parallel to the hopper-like elements (34; 134) comprise an endless conveyor (52; 152).

19. The apparatus according to claim 18, characterised in that the conveyor (52; 152) that carries the pusher elements (48; 148) has an active branch extending in such a way that as the pusher elements (48; 148) move, they are positioned above the corresponding blank feed elements (34; 134).

20. The apparatus according to claim 18 or 19, characterised in that the conveyor (52; 152) that carries the pusher elements (48; 148) has an active branch (52a; 152a) and an idle return branch (52b; 152b) that move in a horizontal plane.

21. The apparatus according to any of the foregoing claims from 18 to 20, characterised in that the endless conveyor (52; 152) comprises a first and a second endless conveying element (49, 51; 149, 152) placed at a defined transversal distance from each other and between which there extend bars (54; 154) that support the pusher elements (48; 148).

22. The apparatus according to any of the foregoing claims from 16 to 21, characterised in that the means for moving each pusher element (48; 148) between a retracted position outside the corresponding hopper (34; 134) and an advanced position inside and through the axial cavity (38; 138) in the hopper (34; 134) comprise cam-like control means (55; 155) which extend in the same direction as the feed direction of the hopper-like elements (34; 134).

23. The apparatus according to any of the foregoing claims from 16 to 22, characterised in that the pusher elements (48; 148) are supported by slidable supports (53; 153) on vertical bars (54; 154) of the pusher element conveyor (52; 152).

24. The apparatus according to any of the foregoing claims from 3 to 23, characterised in that the means (26) for feeding the wrappers in the folded state receive the wrappers as they move forward.

25. The apparatus according to any of the foregoing claims from 3 to 24, characterised in that the means (26) for feeding the wrappers in the folded state suitable for receiving the product comprise a plurality of elements (58), each holding a wrapper in the folded state, and means (62) for feeding the folded wrapper holding elements (58) along a defined path.

26. The apparatus according to claim 25, characterised in that the folded wrapper holding elements comprise a holding element (58) forming a corresponding recess (60) that accommodates the wrapper in the folded state.

27. The apparatus according to claim 25 or 26, characterised in that the means for feeding the folded wrapper holding elements (58) comprise an endless conveyor (62) that moves in a substantially vertical plane and has an active feed section (62a) and a return section (62b) extending under the active section.

28. The apparatus according to claim 27, characterised in that the active section (62a) and the return section (62b) of the conveyor (62) that carries the folded wrapper holding elements (58) extend inside the active section (36a) and return section (36b) of the conveyor (36) that carries the blank holding elements.

29. The apparatus according to any of the foregoing claims from 3 to 28, characterised in that it comprises two parallel product handling lines, namely, a first line (L1) and a second line (L2).

30. The apparatus according to claim 28, characterised in that it comprises first and second means (22) for feeding the flat blanks and having longitudinal alignment control means (45, 45) which are independent of each other.

31. The apparatus according to claim 29 or 30, characterised in that the first and second means (22) for feeding the flat blanks extend outside the corresponding edges of the means (26) that feed the wrappers in the folded state.

32. The apparatus according to any of the foregoing claims from 29 to 31, characterised in that it comprises first and second pusher means (48, 48; 148, 148) for each line, carried in pairs by a single conveyor (52; 152).

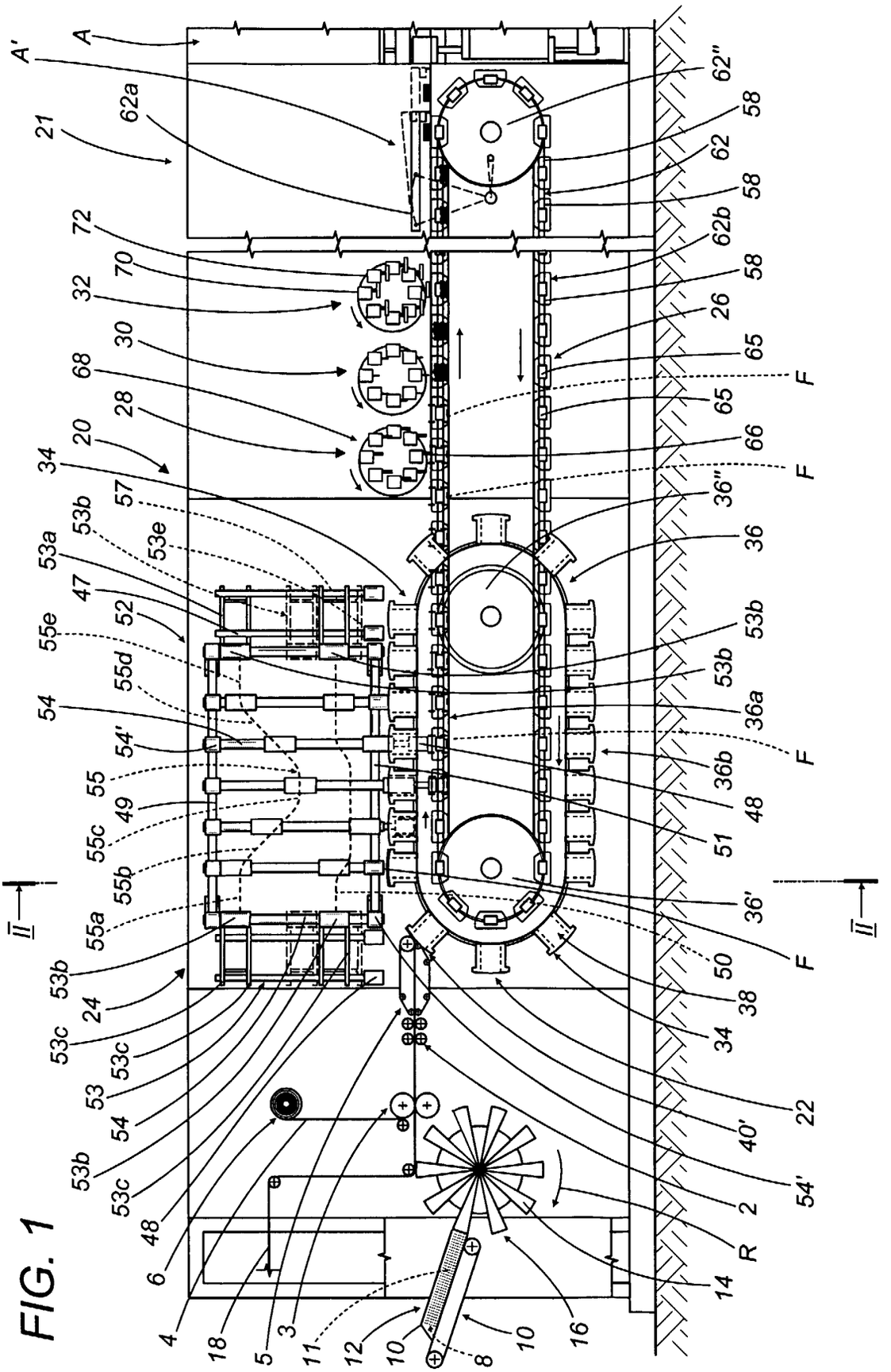

A
A'
21
62a
62"
58
62
58
72
70
62b
58
32
26
30
65
F
68
65
28
66
F
20
34
57
36"
53b
53e
36
53a
47
52
53b
55e
55d
53b
54
36a
54'
F
55
36b
49
48
55c
51
55b
36'
55a
F
53b
50
24
38
53c
34
53c
53
22
54
40'
53b
53c
54'
48
2
R
6
14
4
18
5
3
11
12
10
8
10
16
II
II

FIG. 1

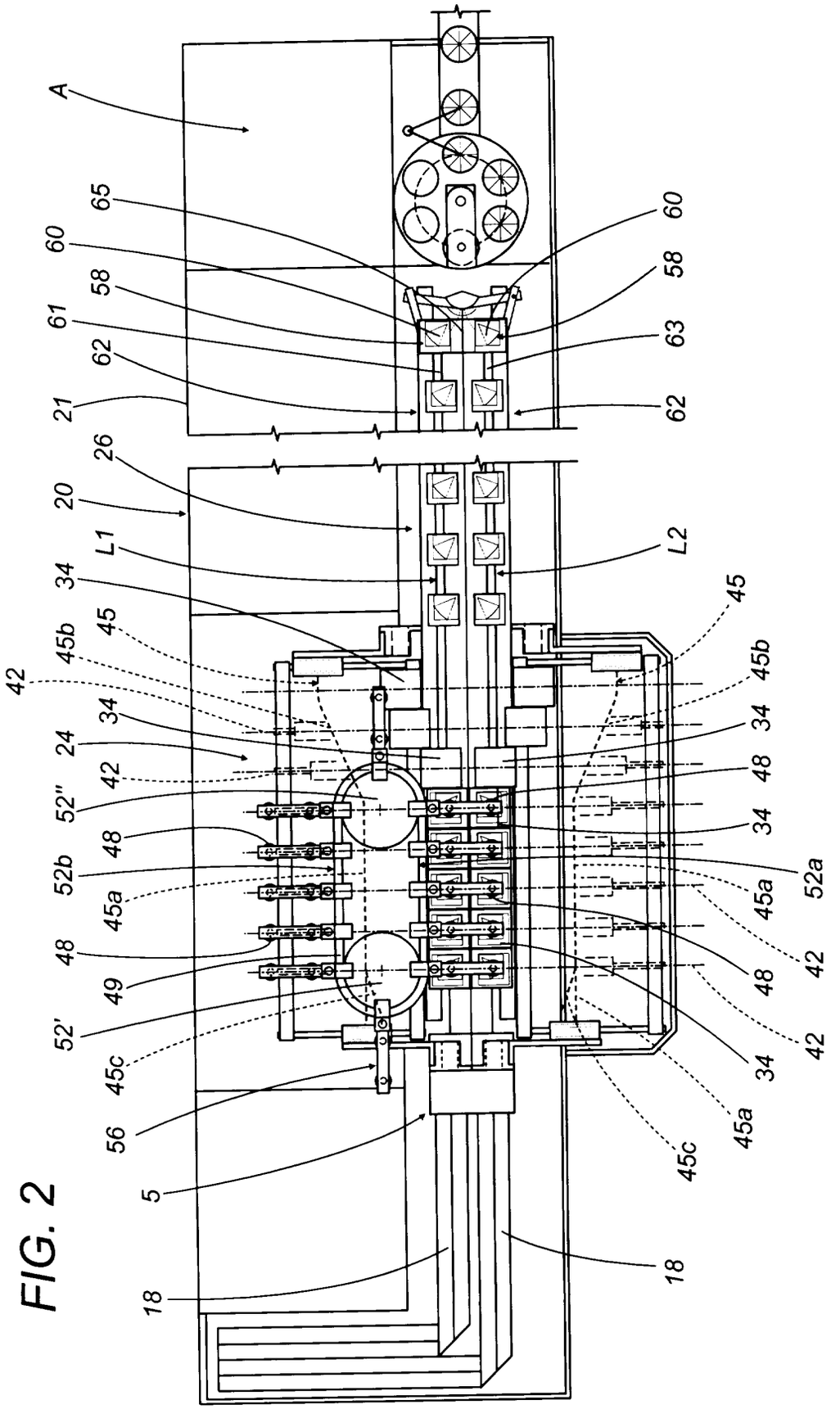
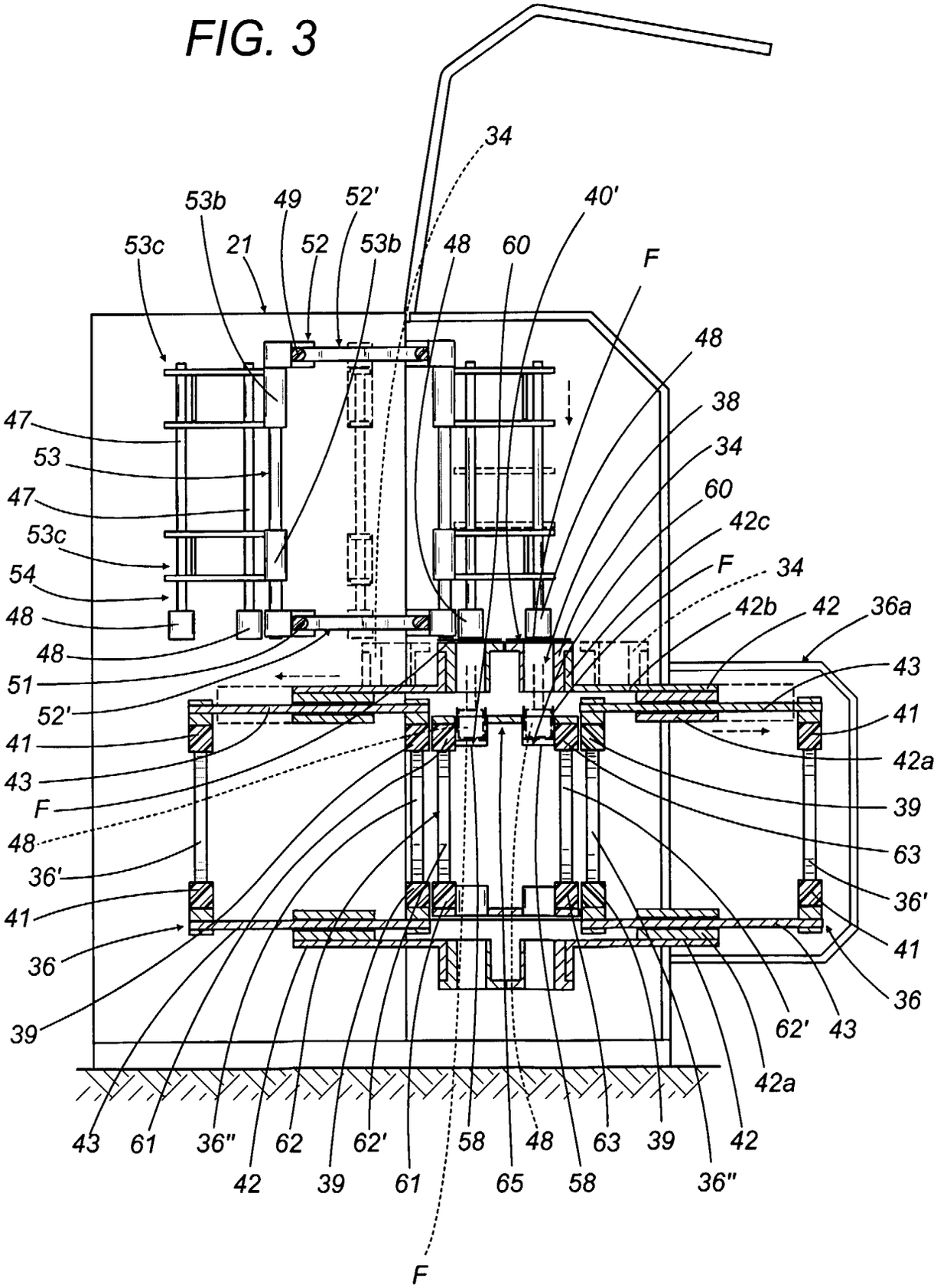

A
65
60
58
61
62
21
26
20
L1
34
45
45b
42
34
24
42
52''
48
52b
45a
48
49
52'
45c
56
5
18
60
58
63
62
L2
45
45b
34
48
34
52a
45a
42
48
42
34
45a
45c
18

FIG. 2

FIG. 3


34
53b
49
52'
40'
53c
21
52
53b
48
60
F
48
38
47
53
34
47
60
53c
42c
54
F
34
48
42b
42
36a
48
43
51
41
52'
41
43
F
39
48
63
36'
41
36'
41
36
36
39
62'
43
42a
43
61
36"
62
62'
58
48
63
39
42
42
39
61
65
58
36"
F

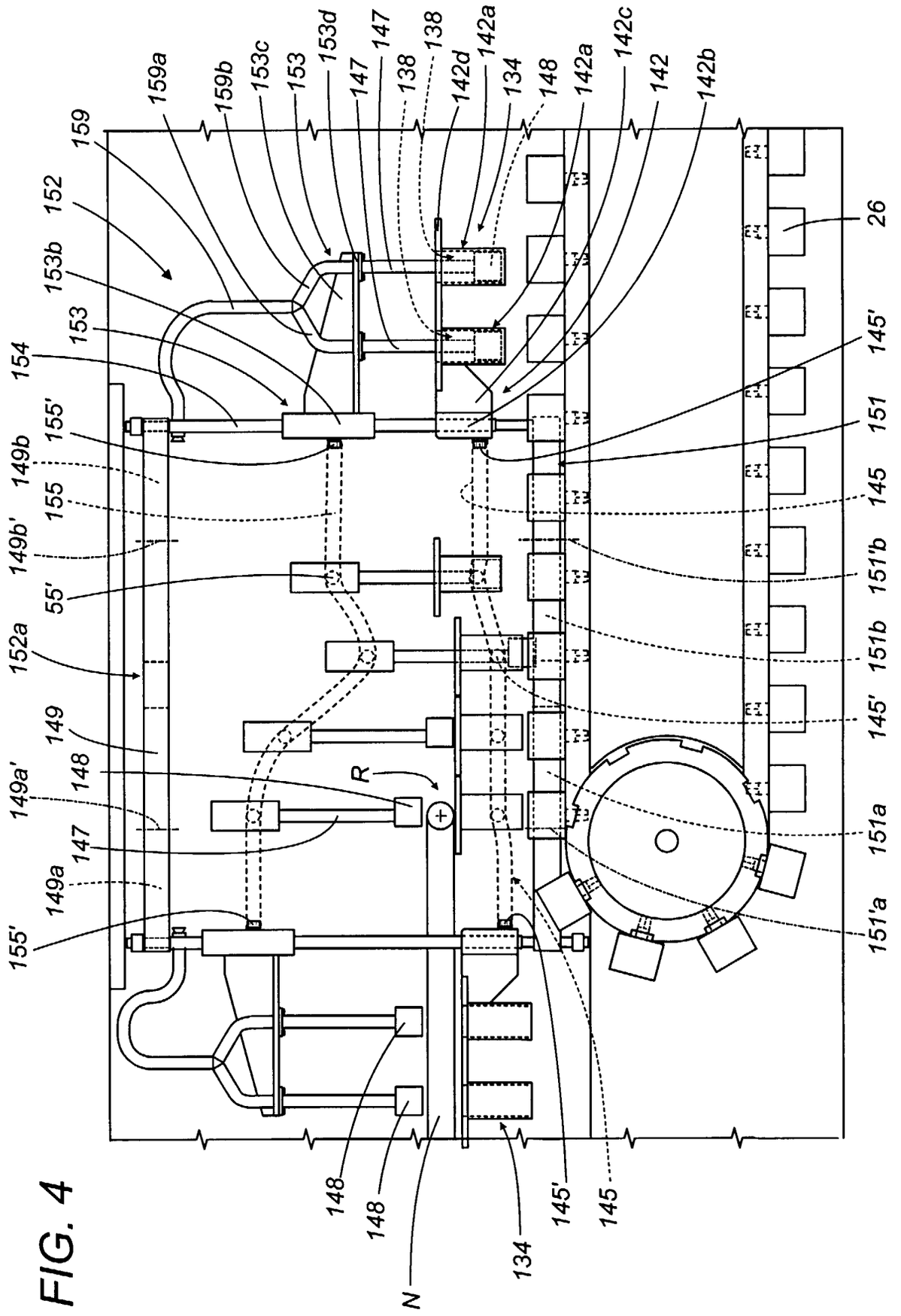

159a
159b
153c
153
153d
147
138
142d
142a
134
148
142a
142c
142
142b
159
152
153b
153
154
155'
149b
155
149b'
55'
152a
149
148
149a'
147
149a
155'
R
N
148
148
134
145'
145
26
145'
151
145
151'b
151b
151b
145'
151a
151'a

FIG. 4

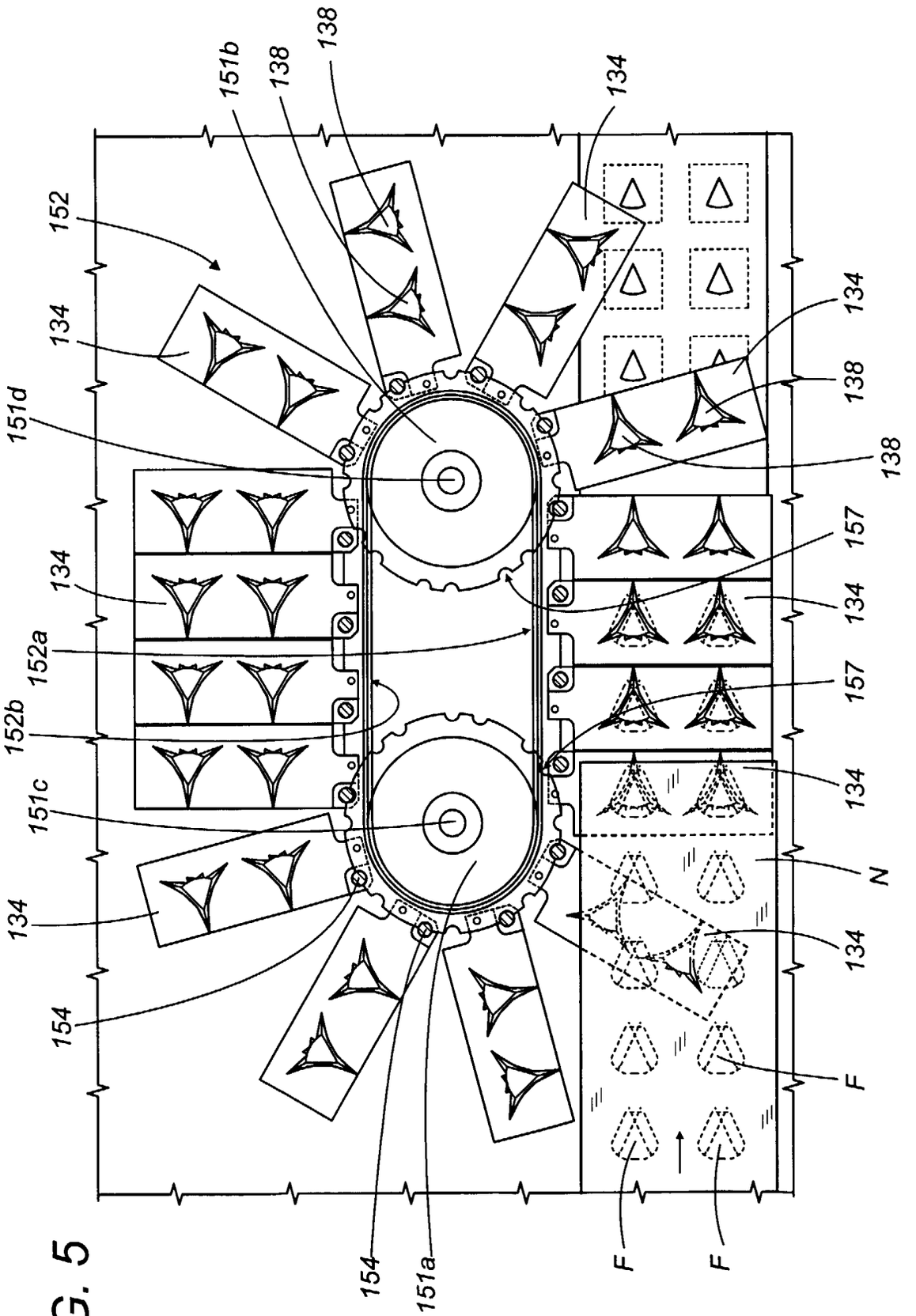

152
134
151d
134
152a
152b
151c
134
154
151b
138
138
134
134
138
138
157
134
157
134
N
134
F
F
F
154
151a

FIG. 5