



(11)

EP 3 140 100 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

24.01.2018 Bulletin 2018/04

(51) Int Cl.:

B65B 35/40 (2006.01) **B65B 35/46** (2006.01)
B65B 29/02 (2006.01) **B65B 61/08** (2006.01)
B65B 9/02 (2006.01) **B65B 51/30** (2006.01)

(21) Application number: **15719969.6**

(86) International application number:

PCT/EP2015/000910

(22) Date of filing: **29.04.2015**

(87) International publication number:

WO 2015/169434 (12.11.2015 Gazette 2015/45)

(54) **MACHINE AND METHOD FOR PACKAGING INFUSION PRODUCTS**

VORRICHTUNG UND VERFAHREN ZUM VERPACKUNG VON INFUSIONSPRODUKTE

MACHINE ET METHODE POUR L'EMBALLAGE DE PRODUITS INFUSES

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(72) Inventors:

- **LIBRIO, Lucio**
40139 Bologna (IT)
- **RUGGERI, Riccardo**
40141 Bologna (IT)
- **VITALI, Antonio**
40062 Molinella (BO) (IT)

(30) Priority: **08.05.2014 IT BO20140274**

(43) Date of publication of application:

15.03.2017 Bulletin 2017/11

(74) Representative: **Martegani, Franco et al**

via Carlo Alberto, 41
20900 Monza (IT)

(73) Proprietor: **Azionaria Costruzioni Macchine
Automatiche**

A.C.M.A. S.p.A.
40131 Bologna (IT)

(56) References cited:

EP-A2- 0 945 344 WO-A1-92/22461
GB-A- 2 228 912 US-A- 3 943 686
US-B1- 6 318 894

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a machine and method for the production of infusion products.

[0002] In particular, infusion products refer to bags or capsules of filter material containing infusion products such as, for example, tea, aromatic herbs, dried fruit, coffee, barley, etc...

[0003] In order to maintain the aroma of infusion products with time, the individual packaging of one or more bags or capsules in a respective sealed envelope, is known.

[0004] The individual sealed envelopes are then generally ordered into pre-established groups and packaged in respective boxes or hard cardboard packages for sale.

[0005] Packaging machines of bags or capsules are known, comprising a feeding hopper of the envelopes to which a vertical tube of wrapping material is connected, in which groups of bags are inserted by gravity.

[0006] In particular, the tube is obtained by welding the end edges of a continuous strip/web of wrapping material, thus defining a longitudinal fin-shaped junction.

[0007] Welding means are positioned downstream of the hopper for forming a plurality of sealed containment envelopes of the bags, suitable for welding the vertical tube of wrapping material along respective transversal junctions forming a continuous succession of sealed envelopes.

[0008] A cutting device positioned downstream of the welding means separates each sealed envelope from the envelope connected to it.

[0009] These machines, however, have various drawbacks.

[0010] As the groups of bags are inserted inside the vertical tube by gravity, they are arranged randomly and disorderly inside the respective sealed envelope.

[0011] A further drawback is the cost component of the wrapping material used for individually packaging the bags.

[0012] This component, in fact, is relatively high as the vertical tube of wrapping material used in the packaging machines of the known type has a much greater diameter with respect to the encumbrance of each single envelope or capsule.

[0013] Furthermore, the longitudinal fin-shaped junction of the tube requires the use of a web of wrapping material having considerable transversal dimensions.

[0014] It has also been found that packaging machines with a vertical tube of wrapping material are machines having a relatively limited hourly production due to the maximum production rates that can be reached.

[0015] GB 2228912 describes a machine for producing products for infusion, comprising a device for realization of discrete bags, each of which comprises a dose of infusion material. The machine is also provided with a packaging device for groups of bags in a respective package.

[0016] There is therefore the necessity of providing a machine and method for the production of infusion prod-

ucts which can limit the costs of the groups of bags of filter material or capsules packaged individually with respect to the known art.

[0017] In this respect, an aspect of the present invention is to provide a machine for the production of infusion products which comprises a device for producing individual articles, each of which comprises a dose of infusion material, and a packaging device of groups of individual articles in a respective containment envelope. The packaging device comprises feeding means of at least one continuous web of wrapping material destined for individually wrapping each group of individual articles, and a common advance path P of the groups of articles and continuous web.

[0018] In particular, the advance path P has at least one section which develops along a horizontal lying plane along which closing means of the continuous web are positioned, around at least part of a respective group of articles.

[0019] The section of path which develops according to a horizontal lying plane advantageously allows the production rate of the packaging machine to be increased with respect to the known art.

[0020] A further advantage lies in the fact that the horizontal section of the advance path P avoids the use of the vertical tube of wrapping material for packaging the groups of individual articles.

[0021] Further characteristics and advantages of the present invention will appear evident from the following description which is indicative, and therefore non-limiting, of a preferred embodiment of a machine for the production of infusion products as illustrated in the enclosed drawings, in which:

- figure 1 illustrates a schematic front view of a machine for the production of infusion products according to the present invention;
- figure 2 illustrates a schematic plan view of the machine of figure 1;
- figures 3 to 6 illustrate a schematic perspective view of various functioning phases of the machine of figure 1 without some parts to illustrate others more clearly;

[0022] Figure 7 illustrates a schematic perspective view in an enlarged scale of a detail of the machine of figure 1.

[0023] The reference number 1 indicates a machine for the production of infusion products.

[0024] The machine 1 comprises a device 2 for producing individual articles 3, each of which comprises a dose 4 of infusion material.

[0025] Individual articles 3 preferably refers to bags or capsules of filter material containing infusion products such as, for example, tea, aromatic herbs, dried fruit, coffee, barley, etc...

[0026] A continuous succession 5 of individual articles 3 is fed, at the outlet of the forming device 2, to respective

cutting means 6 suitable for separating an individual article 3 from the subsequent article, as illustrated in figure 3.

[0027] The machine 1 comprises a packaging device 7 of groups 8 of individual articles 3 in a respective containment envelope 9.

[0028] The machine 1 comprises formation means 10 of the groups 8 of articles 3.

[0029] The formation means 10 of the groups 8 are positioned downstream of the cutting means 6 of the continuous succession 5 of individual articles 3.

[0030] The formation means 10 comprise a feeding device 11 of the individual articles 3 suitable for conveying at least one individual article 3 to a formation station 12 of the groups 8.

[0031] The formation means 10 comprise a withholding element 13 of the articles 3 positioned in correspondence with the formation station 12 of the groups 8.

[0032] The withholding element 13 is suitable for withholding the individual articles 3 during the formation 12 of the groups 8.

[0033] The withholding element 13 cooperates with the feeding device 11 for the formation of each group 8 of articles 3.

[0034] In the preferred embodiment, the feeding device 11 of the individual articles 3 moves along a vertical direction, in particular downwards, and viceversa.

[0035] An articulated system 14 moves the feeding device 11 during the formation of each group 8.

[0036] The withholding element 13 is equipped with a rotational movement, in particular oscillating, around a respective rotation axis 13a.

[0037] The rotation axis 13a is a vertical rotation axis.

[0038] The withholding element 13 comprises a supporting surface 15 of the articles 3 and an arm 16, hinged to the rotation axis 13a, for moving the supporting surface 15.

[0039] When in use, the withholding element 13 maintains a rest position in correspondence with the formation station 12 during the formation of the group 8.

[0040] When the formation of the group 8 is complete, the withholding element 13 rotates around its rotation axis 13a for disengaging the group 8 formed.

[0041] During the movement of the withholding element 13, an abutment element 17 is engaged with at least part of the articles 3 of the group 8 for withdrawing the articles 3 from the withholding element 13, in particular from the supporting surface 15.

[0042] The machine 1 comprises transfer means 18 of the group 8 of articles 3 to the packaging device 7.

[0043] The transfer means 18 are positioned downstream of the formation station 12 of the groups 8.

[0044] In particular, the formation means 10 of the groups 8 feed each group 8 to the transfer means 18, as illustrated in figure 4.

[0045] In particular, the feeding device 10 moves the group 8 forward towards the transfer means 18, once it has become engaged with the last article 3 of the group

8, whereas, contemporaneously, the withholding element 13 becomes disengaged with the remaining part of the groups 8 withheld during its formation.

[0046] The transfer means 18 comprise a conveyor 19 rotating around its rotation axis 19a.

[0047] The rotation axis 19a of the conveyor is a vertical rotation axis.

[0048] The rotation axes of the withholding element 13 and the conveyor 19 are parallel to each other.

[0049] The conveyor 19 has a plurality of housing pockets 20 of a respective group 8 of articles 3.

[0050] The pockets 20 are preferably angularly equidistant with respect to each other.

[0051] The transfer means 18 can be moved from a collection station 21 to a releasing station 22 of the groups 8.

[0052] The conveyor 19 transfers the groups of the collection station 21 to the releasing station 22 rotating around its own axis 19a, in particular effecting a rotation of 90°, as illustrated in figure 5.

[0053] The machine 1 comprises feeding means 23 of the groups 8 of articles 3 to the packaging device 7.

[0054] The feeding means 23 remove the groups 8 from the transfer means 18 and release said groups 8 at the packaging device 7.

[0055] The feeding means 23 translate the groups 8 according to a horizontal advance direction.

[0056] The feeding means 23 comprise a pusher 24 that causes a respective group 8 of articles 3 to advance.

[0057] The pusher 24 is engaged with a respective group 8 of articles 3 housed in the pocket 20 of the conveyor 19 and moves the group 8 of articles 3 forward towards the packaging device 7, as illustrated in figure 6.

[0058] The feeding means 23 comprise an articulated movement system 25 of the pusher 24.

[0059] The packaging device 7 comprises feeding means 26 of at least a continuous web 27 of wrapping material destined for individually wrapping each group 8 of individual articles 3, and a common advance path P of the groups 8 of articles 3 and continuous web 27.

[0060] According to the present invention, the advance path P has at least one section T which develops along a horizontal lying plane along which closing means 28 of the continuous web 27 are positioned, around at least part of a respective group 8 of articles 3.

[0061] The closing means 28 join the continuous web 27 at least along a joining band 29 transversal with respect to the advance direction of the continuous web 27.

[0062] In other words, the joining band 29 is transversal to the horizontal lying plane of the section T.

[0063] The closing means 28 join the continuous web 27 at least along a joining band 30 longitudinal with respect to the advance direction of the continuous web 27.

[0064] In other words, the longitudinal joining band 30 is parallel to the horizontal lying plane of the section T.

[0065] In the preferred embodiment, the packaging device 7 comprising feeding means 26 of two continuous webs 27, in particular a first and a second continuous

web 31, 32 of wrapping material, destined for individually wrapping each group 8 of individual articles 3.

[0066] The feeding means 23 of the groups 8 of articles 3 position the groups 8 on the continuous web 27, in particular the first continuous web 31 of wrapping material along the above-mentioned horizontal section T, forming a continuous succession of groups 8 of articles 3.

[0067] The closing means 28 join the two continuous webs 27, i.e. the first and second continuous web 31, 32, around at least part of a respective group 8 of articles 3 so that the groups 8 of articles 3 are interposed with respect to each other.

[0068] With reference to each group 8, the closing means 28 join the two continuous webs 27, i.e. the first and second continuous web 31, 32, along two transversal joining bands 29 and two longitudinal joining bands 30, with respect to the advance direction of the continuous web 27, defining the closed envelope 9 containing a respective group 8 of articles 3.

[0069] According to a preferred embodiment, the closing means 28 comprise a first welding element 33 suitable for producing the longitudinal joining bands 30 and a second welding element 34 suitable for producing the transversal joining bands 29.

[0070] The first welding element 33 forms the two longitudinal joining bands 30 arranged with opposing bands with respect to the centre line of the continuous bands 27.

[0071] The first welding element 33 is preferably positioned upstream of the second welding element 34, with respect to the advance direction of the continuous webs 27.

[0072] The first welding element 33 comprises two pairs of welding rolls 35 rotating around respective rotation axes 35a.

[0073] Each pair of rolls 35 is arranged with opposing bands with respect to the centre line of the continuous webs 27.

[0074] The pairs of rolls 35 advantageously move the continuous webs 27 and interposed groups 8 along the advance path P, in particular along the horizontal section T.

[0075] The packaging device 7 comprises at least one cutting device 36 of the continuous webs 27 of wrapping material.

[0076] The cutting device 36 is preferably positioned along the horizontal section T of the advance path P.

[0077] In this embodiment, the cutting device 36 and the second welding element 34 are produced in a single welding and cutting element.

[0078] The cutting device 36 comprises at least one blade 37 cooperating with a respective anvil 38 along the portions of continuous web 27 positioned between one transversal joining band 29 and a consecutive transversal band 29.

[0079] The blade 37 and anvil 38 are coordinated for forming continuous successions of envelopes 9 connected to each other.

[0080] In particular, the anvil 38 comprises a first por-

tion 39 suitable for forming a plurality of scored lines 41 between one transversal joining band 29 and the consecutive transversal band 29 and a second portion 40 adjacent to the first portion 39 suitable for severing the continuous web 27 between one transversal joining band 29 and the consecutive band 29 for separating one envelope 9 from the consecutive envelope.

[0081] The blade 37 is coordinated with the anvil 38 to cooperate with the first portion 39, forming the scored lines 41, or to cooperate with the second portion 40, for severing the continuous web 27.

[0082] The blade 37 and the anvil 38 rotate around respective rotation axes 37a, 38a.

[0083] The blade 37 and the anvil 38 are mutually phased so that the blade 37 abuts against the first portion 39 forming the scored lines 41 so as to keep the envelopes 9 connected to each other.

[0084] In order to produce continuous successions 42 of envelopes 9, the blade 37 and the anvil 38 are mutually phased so that the blade 37 abuts against the second portion 40 to separate the first and last envelope 9 of the respective continuous succession 42.

[0085] As illustrated in figure 7, the first portion 39 has an abutment surface provided with a plurality of cavities or grooves 42, which reproduce the scored lines 41 in negative.

[0086] The second portion 40 has a continuous and flat abutment surface for allowing the blade 37 to completely shear the one or more continuous webs 27.

[0087] The present invention of a method for producing infusion products comprises a phase for forming individual articles 3, each of which comprises a dose 4 of infusion material, a packaging phase of groups 8 of individual articles 3 in a respective containment envelope 9.

[0088] The packaging phase comprises a feeding phase of at least one continuous web 27 of wrapped material destined for individually wrapping each group 8 of individual articles 3 along a common advance path P of the groups 8 of articles 3 and continuous web 27.

[0089] The method advantageously comprises a closing phase of the continuous web 27 around at least part of a respective group 8 of articles 3 along at least a section T of the advance path P developing according to a horizontal lying plane.

[0090] During the closing phase, the continuous web 27 is joined at least along a transversal joining band 29 with respect to the advance direction of the continuous web 27.

[0091] During the closing phase, the continuous web 27 is joined at least along a longitudinal joining band 30 with respect to the advance direction of the continuous web 27.

[0092] The method comprises: a phase for feeding two continuous webs 27, in particular a first and a second continuous web 31, 32 of wrapping material, destined for individually wrapping each group 8 of individual articles 3; a phase for positioning the groups 8 of articles 3 on the continuous web 27, in particular the first continuous web

31 of wrapping material, along the above-mentioned horizontal section T, forming a continuous succession of groups 8 of articles 3;

a phase for joining the first and second continuous web 31, 32 around at least part of a respective group 8 of articles 3 so that the groups 8 of individual articles 3 are interposed between the first and second continuous web 31, 32;

a phase for joining the first and second continuous web 31, 32 along two transversal joining bands 29 and along two longitudinal joining bands 30, with respect to the advance direction of the first and second continuous band 31, 32, defining the envelope 9;

a phase for severing one or more of the continuous webs 27 of wrapping material along respective portions of continuous web 27 arranged between one transversal joining band 29 and the consecutive band 29 for forming continuous successions of envelopes 9.

[0093] The phase for severing one or more of the continuous webs 27 comprises a phase for forming a plurality of scored lines 41 between one transversal joining band 29 and the consecutive band 29 or a phase for severing the one or more continuous webs between one transversal joining band 29 and the consecutive band 29.

[0094] The present invention allows the production rate of the packaging machine 1 to be increased, considerably reducing the costs for the packaging material into envelopes 9 by the use of closing means 28 positioned along a horizontal section T of the advance path P of the continuous web 27.

Claims

1. A machine for making products for infusion comprising a device (2) for making individual articles (3), each comprising a dose (4) of material for infusion, and a device (7) for packaging groups (8) of individual articles (3) in a respective containment envelope (9); the packaging device (7) comprising feed means (26) for feeding at least one continuous web (27) of wrapping material intended to individually surround in an envelope each group (8) of individual articles (3), and a feed path (P) shared by the groups (8) of articles (3) and the continuous web (27); where in the device the feed path (P) comprises at least one stretch (T) extending according to a horizontal lying plane along which closing means (28) are positioned for closing the continuous web (27) around at least part of a respective group (8) of articles (3), in which the packaging device (7) comprises at least one cutting unit (36) for cutting the one or more continuous webs (27) of wrapping material; **characterized in that** the cutting unit (36) comprising at least one blade (37) operating in conjunction with a respective anvil (38) along respective portions of the continuous web (27) positioned between one transversal joining band (29) and the consecutive

band (29); the blade (37) and the anvil (38) being coordinated to produce continuous series of envelopes (9), in which the anvil (38) comprises a first portion (39) designed to make a plurality of scored lines (41) between one transversal joining band (29) and the consecutive band (29), and a second portion (40) adjacent to the first portion (39) designed to cut the one or more continuous webs (27) between one transversal joining band (29) and the consecutive band (29); the blade (37) being coordinated with the anvil (38) to make the scored lines (41) or to sever the one or more continuous webs (27), being the blade (37) and the anvil (38) are mutually phased so that the blade (37) abuts against the first portion (39) forming the scored lines (41) so as to keep the envelopes (9) connected to each other and being the blade (37) and the anvil (38) mutually phased so that the blade (37) abuts against the second portion (40) to separate the first and last envelope (9) of the respective continuous succession (42).

2. The machine according to claim 1, **characterized in that** the closing means (28) join the continuous web (27) at least along a joining band (29) which is transversal relative to the line of feed of the continuous web (27).
3. The machine according to claim 1 or 2, **characterized in that** the closing means (28) join the continuous web (27) at least along a joining band (30) which is longitudinal relative to the line of feed of the continuous web (27).
4. The machine according to any one of claims 1 to 3, **characterized in that** it comprises feed means (26) for feeding two continuous webs (27), in particular a first and a second continuous web (31, 32) of wrapping material, intended to individually surround in an envelope each group (8) of individual articles (3).
5. The machine according to any one of claims 1 to 4, **characterized in that** it comprises feed means (23) for feeding the groups (8) of articles (3) to the packaging device (7); the feed means (23) positioning the groups (8) of articles (3) on the continuous web (27) of wrapping material along the horizontal stretch (T), creating a continuous series of groups (8) of articles (3).
6. The machine according to any one of claims 1 to 5, **characterized in that** the closing means (28) join the one or more continuous webs (27) around at least part of a respective group (8) of articles (3) in such a way that the groups (8) of individual articles (3) are interposed between portions of the same continuous web (27) or between two different continuous webs (27), in particular a first and a second continuous web (31, 32) of wrapping material.

7. The machine according to any one of claims 1 to 6, **characterized in that**, with reference to each group (8), the closing means (28) join the one or more continuous webs (27) along two joining bands (29) which are transversal and two joining bands (30) which are longitudinal relative to the line of feed of the continuous web (27), forming the closed envelope (9) containing a respective group (8) of articles (3).
8. A method for making products for infusion comprising a step of making individual articles (3), each of which comprises a dose (4) of material for infusion, a step of packaging groups (8) of individual articles (3) in a respective containment envelope (9); the packaging step comprising a step of feeding at least one continuous web (27) of wrapping material intended to individually surround in an envelope each group (8) of individual articles (3) along a feed path (P) shared by the groups (8) of articles (3) of the continuous web (27); the method moreover comprises a step of closing the continuous web (27) around at least part of a respective group (8) of articles (3) along at least one stretch (T) of the feed path (P) extending according to a horizontal lying plane, a step of cutting at least one or more continuous webs (27) of wrapping material along respective portions of the continuous web (27) positioned between one transversal joining band (29) and the consecutive band (29) to produce continuous series of envelopes (9) in which the step of cutting the one or more continuous webs (27) comprises a step of making a plurality of scored lines (41) between one transversal joining band (29) and the consecutive band (29), or a step of severing the one or more continuous webs (27) between one transversal joining band (29) and the consecutive band (29) **characterized in that** the step of cutting is made with a cutting unit (36) comprising at least one blade (37) operating in conjunction with a respective anvil (38) along respective portions of the continuous web (27), being, in said step of cutting, the blade (37) and the anvil (38) coordinated to produce continuous series of envelopes (9), the anvil (38), in said step of cutting, comprising a first portion (39) designed to make a plurality of scored lines (41) between one transversal joining band (29) and the consecutive band (29), and a second portion (40) adjacent to the first portion (39) designed to cut the one or more continuous webs (27) between one transversal joining band (29) and the consecutive band (29); the blade (37) being coordinated with the anvil (38) to make the scored lines (41) or to sever the one or more continuous webs (27), being the blade (37) and the anvil (38) are mutually phased so that the blade (37) abuts against the first portion (39) forming the scored lines (41) so as to keep the envelopes (9) connected to each other and being the blade (37) and the anvil (38) mutually phased so that

the blade (37) abuts against the second portion (40) to separate the first and last envelope (9) of the respective continuous succession (42).

9. The method according to claim 8, **characterized in that** during the closing step, the at least one or more continuous webs (27) is joined at least along a joining band (29) which is transversal relative to the line of feed of the continuous web (27).
10. The method according to claim 9, **characterised in that** during the closing step the one or more continuous webs (27) is joined at least along a joining band (30) which is longitudinal relative to the line of feed of the continuous web (27).
11. The method according to claim 8, **characterised in that** it comprises a step of feeding two continuous webs (27), in particular a first and a second continuous web (31, 32) of wrapping material, which are intended to individually surround in an envelope each group (8) of individual articles (3).
12. The method according to any one of claims 8 to 11, **characterised in that** it comprises a step of positioning the groups (8) of articles (3) on the continuous web (27) of wrapping material along the horizontal stretch (T), producing a continuous series of groups (8) of articles (8).
13. The method according to any one of claims 8 to 12, **characterised in that** it comprises a step of joining the at least one or more continuous webs (27) around at least part of a respective group (8) of articles (3) in such a way that the groups (8) of individual articles (3) are interposed between portions of the same continuous web (27) or between two different continuous webs (27), in particular a first and a second continuous web (31, 32) of wrapping material.
14. The method according to any one of claims 8 to 13, **characterised in that** it comprises a step of joining the at least one or more continuous webs (27) along two joining bands (29) which are transversal and along two joining bands (30) which are longitudinal relative to the line of feed of the continuous web (27), forming the closed envelope (9) containing a respective group (8) of articles (3).

Patentansprüche

1. Maschine zum Herstellen von Produkten zur Infusion, mit einer Vorrichtung (2) zum Herstellen einzelner Artikel (3), die jeweils eine Dosis (4) aus Material zur Infusion umfassen, sowie einer Vorrichtung (7) zum Verpacken von Gruppen (8) einzelner Artikel (3) in einer jeweiligen Aufnahmeumhüllung (9); wo-

bei die Verpackungsvorrichtung (7) ein Zufuhrmittel (26) zum Zuführen zumindest einer kontinuierlichen Bahn (27) aus Umwicklungsmaterial, das dazu bestimmt ist, jede Gruppe (8) einzelner Artikel (3) einzeln in einer Umhüllung zu umgeben, sowie einen Zufuhrpfad (P) umfasst, der von den Gruppen (8) aus Artikeln (3) und der kontinuierlichen Bahn (27) gemeinsam genutzt wird;

wobei in der Vorrichtung der Zufuhrpfad (P) zumindest eine Ausdehnung (T) umfasst, die sich gemäß einer horizontalen Ebene erstreckt und entlang der ein Schließmittel (28) zum Schließen der kontinuierlichen Bahn (27) um zumindest einen Teil einer jeweiligen Gruppe (8) aus Artikeln (3) positioniert ist, wobei die Verpackungsvorrichtung (7) zumindest eine Schneideinheit (36) zum Schneiden der einen oder mehreren kontinuierlichen Bahnen (27) aus Umwicklungsmaterial umfasst; **dadurch gekennzeichnet, dass** die Schneideinheit (36) zumindest eine Klinge (37) umfasst, die in Verbindung mit einem jeweiligen Amboss (38) entlang jeweiliger Abschnitte der kontinuierlichen Bahn (27) wirkt, die zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) positioniert sind; wobei die Klinge (37) und der Amboss (38) koordiniert sind, um eine kontinuierliche Serie von Umhüllungen (9) zu erzeugen, wobei der Amboss (38) einen ersten Abschnitt (39), der so ausgelegt ist, dass eine Mehrzahl von Kerblinien (41) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) erstellt, und einen zweiten Abschnitt (40) benachbart dem ersten Abschnitt (39) umfasst, der so ausgelegt ist, die eine oder mehreren kontinuierlichen Bahnen (27) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) zu schneiden; wobei die Klinge (37) mit dem Amboss (38) koordiniert ist, um die Kerblinien (41) herzustellen oder die eine oder mehreren kontinuierlichen Bahnen (27) zu trennen, wobei die Klinge (37) und der Amboss (38) gegenseitig so phasenversetzt sind, dass die Klinge (37) an dem ersten Abschnitt (39) anliegt, wobei die Kerblinien (41) gebildet werden, um die Umhüllungen (9) miteinander verbunden zu halten, und die Klinge (37) und der Amboss (38) gegenseitig so phasenversetzt sind, dass die Klinge (37) an dem zweiten Abschnitt (40) anliegt, um die erste und letzte Umhüllung (9) der jeweiligen kontinuierlichen Abfolge (42) zu trennen.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das Schließmittel (28) die kontinuierliche Bahn (27) zumindest entlang eines Verbindungsbandes (29) verbindet, das transversal in Bezug auf die Zufuhrlinie der kontinuierlichen Bahn (27) ist.
3. Maschine nach einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** das Schließmittel

(28) die kontinuierliche Bahn (27) zumindest entlang eines Verbindungsbandes (30) verbindet, das längs bezüglich der Zufuhrlinie der kontinuierlichen Bahn (27) liegt.

4. Maschine nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** sie ein Zufuhrmittel (26) zum Zuführen von zwei kontinuierlichen Bahnen (27), insbesondere einer ersten und einer zweiten kontinuierlichen Bahn (31, 32) aus Umwicklungsmaterial umfasst, das dazu bestimmt ist, jede Gruppe (8) einzelner Artikel (3) in einer Umhüllung einzeln zu umgeben.
5. Maschine nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** sie ein Zufuhrmittel (23) zum Zuführen der Gruppen (8) von Artikeln (3) zu der Verpackungsvorrichtung (7) umfasst; wobei das Zufuhrmittel (23) die Gruppen (8) von Artikeln (3) an der kontinuierlichen Bahn (27) aus Umwicklungsmaterial entlang der horizontalen Ausdehnung (T) positioniert, wobei eine kontinuierliche Reihe aus Gruppen (8) von Artikeln (3) erzeugt wird.
6. Maschine nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** das Schließmittel (28) die eine oder mehreren kontinuierlichen Bahnen (27) um zumindest einen Teil einer jeweiligen Gruppe (8) von Artikeln (3) auf solche Weise verbindet, dass die Gruppen (8) einzelner Artikel (3) zwischen Abschnitten derselben kontinuierlichen Bahn (27) oder zwischen zwei verschiedenen kontinuierlichen Bahnen (27), insbesondere einer ersten und einer zweiten kontinuierlichen Bahn (31, 32) aus Umwicklungsmaterial angeordnet sind.
7. Maschine nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** mit Bezug auf jede Gruppe (8) das Schließmittel (28) die eine oder mehreren kontinuierlichen Bahnen (27) entlang zwei Verbindungsbändern (29), die transversal sind, und zwei Verbindungsbändern (30) verbindet, die bezüglich der Zufuhrlinie der kontinuierlichen Bahn (27) längsgerichtet sind, wobei die geschlossene Umhüllung (9) gebildet wird, die eine jeweilige Gruppe (8) aus Artikeln (3) enthält.
8. Verfahren zum Herstellen von Produkten für Infusion, mit einem Schritt zum Herstellen einzelner Artikel (3), von denen jeder eine Dosis (4) aus Material zur Infusion umfasst, einem Schritt zum Verpacken von Gruppen (8) einzelner Artikel (3) in einer jeweiligen Aufnahmeumhüllung (9); wobei der Verpackungsschritt einen Schritt zum Zuführen zumindest einer kontinuierlichen Bahn (27) aus Umwicklungsmaterial, das dazu bestimmt ist, jede Gruppe (8) einzelner Artikel (3) in einer Umhüllung einzeln zu umgeben, entlang eines Zufuhrpfades

des (P) umfasst, der von den Gruppen (8) aus Artikeln (3) der kontinuierlichen Bahn (27) gemeinsam genutzt ist;

wobei das Verfahren ferner umfasst: einen Schritt zum Schließen der kontinuierlichen Bahn (27) um zumindest einen Teil einer jeweiligen Gruppe (8) aus Artikeln (3) entlang zumindest einer Ausdehnung (T) des Zufuhrpfades (P), der sich gemäß einer horizontalen Ebene erstreckt, einen Schritt zum Schneiden zumindest einer oder mehrerer kontinuierlicher Bahnen (27) aus Umwicklungsmaterial entlang jeweiliger Abschnitte der kontinuierlichen Bahn (27), die zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) positioniert sind, um eine kontinuierliche Reihe von Umhüllungen (9) zu erzeugen, wobei der Schritt zum Schneiden der einen oder mehreren kontinuierlichen Bahnen (27) einen Schritt zum Herstellen einer Mehrzahl von Kerblinien (41) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) oder einen Schritt zum Trennen der einen oder mehreren kontinuierlichen Bahnen (27) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) umfasst, **dadurch gekennzeichnet, dass** der Schritt zum Schneiden mit einer Schneideinheit (36) ausgeführt wird, die zumindest eine Klinge (37) umfasst, die in Verbindung mit einem jeweiligen Amboss (38) entlang jeweiliger Abschnitte der kontinuierlichen Bahn (27) wirkt, wobei bei dem Schritt zum Schneiden die Klinge (37) und der Amboss (38) so koordiniert werden, dass eine kontinuierliche Reihe von Umhüllungen (9) erzeugt wird, wobei der Amboss (38) bei dem Schritt zum Schneiden einen ersten Abschnitt (39), der so ausgelegt ist, eine Mehrzahl von Kerblinien (41) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) herzustellen, und einen zweiten Abschnitt (40) benachbart dem ersten Abschnitt (39) umfasst, der so ausgelegt ist, die eine oder mehreren kontinuierlichen Bahnen (27) zwischen einem transversalen Verbindungsband (29) und dem nachfolgenden Band (29) zu schneiden; wobei die Klinge (37) mit dem Amboss (38) so koordiniert ist, dass die Kerblinien (41) gebildet oder die eine oder mehreren kontinuierlichen Bahnen (27) getrennt werden, wobei die Klinge (37) und der Amboss (38) gegenseitig so phasenversetzt sind, dass die Klinge (37) an dem ersten Abschnitt (39) anliegt, wobei die Kerblinien (41) gebildet werden, um so die Umhüllungen (9) miteinander verbunden zu halten, und wobei die Klinge (37) und der Amboss (38) gegenseitig so phasenversetzt sind, dass die Klinge (37) an dem zweiten Abschnitt (40) anliegt, um die erste und letzte Umhüllung (9) der jeweiligen kontinuierlichen Abfolge (42) zu trennen.

9. Verfahren nach Anspruch 8, **dadurch gekennzeichnet, dass** während des Schließschritts die zu-

mindest eine oder die mehreren kontinuierlichen Bahnen (27) zumindest entlang eines Verbindungsbandes (29) verbunden werden, das transversal bezüglich der Zufuhrlinie der kontinuierlichen Bahn (27) ist.

10. Verfahren nach Anspruch 9, **dadurch gekennzeichnet, dass** während des Schließschritts die eine oder die mehreren kontinuierlichen Bahnen (27) zumindest entlang eines Verbindungsbandes (30) verbunden werden, das längs bezüglich der Zufuhrlinie der kontinuierlichen Bahn (27) ist.

11. Verfahren nach Anspruch 8, **dadurch gekennzeichnet, dass** es einen Schritt zum Zuführen zweier kontinuierlicher Bahnen (27), insbesondere einer ersten und einer zweiten kontinuierlichen Bahn (31, 32) aus Umwicklungsmaterial umfasst, die dazu bestimmt sind, jede Gruppe (8) einzelner Artikel (3) in einer Umhüllung einzeln zu umgeben.

12. Verfahren nach einem der Ansprüche 8 bis 11, **dadurch gekennzeichnet, dass** es einen Schritt zum Positionieren der Gruppen (8) aus Artikeln (3) an der kontinuierlichen Bahn (27) aus Umwicklungsmaterial entlang der horizontalen Ausdehnung (T) umfasst, wobei eine kontinuierliche Reihe von Gruppen (8) aus Artikeln (8) erzeugt wird.

13. Verfahren nach einem der Ansprüche 8 bis 12, **dadurch gekennzeichnet, dass** es einen Schritt zum Verbinden der zumindest einen oder mehreren kontinuierlichen Bahnen (27) um zumindest einen Teil einer jeweiligen Gruppe (8) aus Artikeln (3) derart umfasst, dass die Gruppen (8) aus einzelnen Artikeln (3) zwischen Abschnitten derselben kontinuierlichen Bahn (27) oder zwischen zwei verschiedenen kontinuierlichen Bahnen (27), insbesondere einer ersten und einer zweiten kontinuierlichen Bahn (31, 32) aus Umwicklungsmaterial angeordnet sind.

14. Verfahren nach einem der Ansprüche 8 bis 13, **dadurch gekennzeichnet, dass** es einen Schritt zum Verbinden der zumindest einen oder mehreren kontinuierlichen Bahnen (27) entlang von zwei Verbindungsbändern (29), die transversal sind, und entlang zweier Verbindungsbänder (30) umfasst, die längs relativ zu der Zufuhrlinie der kontinuierlichen Bahn (27) sind, wobei die geschlossene Umhüllung (9) gebildet wird, die eine jeweilige Gruppe (8) aus Artikeln (3) enthält.

Revendications

1. Machine de fabrication de produits à infuser comprenant un dispositif (2) permettant de fabriquer des articles individuels (3), comprenant chacun une dose

(4) de matière à infuser, et un dispositif (7) permettant d'emballer des groupes (8) d'articles individuels (3) dans une enveloppe de confinement respective (9) ; le dispositif d'emballage (7) comprenant un moyen d'alimentation (26) pour faire avancer au moins une bande continue (27) de matériau d'emballage destinée à entourer individuellement dans une enveloppe chaque groupe (8) d'articles individuels (3), et un chemin d'alimentation (P) partagé par les groupes (8) d'articles (3) et la bande continue (27) ;

dans laquelle, dans ledit dispositif, le chemin d'alimentation (P) comprend au moins une portion (T) s'étendant selon un plan d'étendue horizontal le long duquel des moyens de fermeture (28) sont positionnés pour fermer la bande continue (27) autour d'au moins une partie d'un groupe respectif (8) d'articles (3), dans lequel le dispositif d'emballage (7) comprend au moins une unité de coupe (36) pour couper la ou les bande(s) continue(s) (27) de matériau d'emballage ; **caractérisée en ce que** l'unité de coupe (36) comprend au moins une lame (37) fonctionnant en association avec une enclume respective (38) le long de parties respectives de la bande continue (27) positionnées entre une bande de jonction transversale (29) et la bande suivante (29) ; la lame (37) et l'enclume (38) étant coordonnées pour produire des séries continues d'enveloppes (9), dans laquelle l'enclume (38) comprend une première partie (39) conçue pour réaliser une pluralité de lignes pointillées (41) entre une bande de jonction transversale (29) et la bande suivante (29), et une deuxième partie (40) adjacente à la première partie (39) conçue pour couper la ou les bande(s) continue(s) (27) entre une bande de jonction transversale (29) et la bande suivante (29) ; la lame (37) étant coordonnée avec l'enclume (38) pour réaliser les lignes pointillées (41) ou pour découper la ou les bande(s) continue(s) (27), la lame (37) et l'enclume (38) étant mutuellement en phase de telle manière que la lame (37) bute contre la première partie (39) formant les lignes pointillées (41) afin de maintenir les enveloppes (9) reliées entre elles et la lame (37) et l'enclume (38) étant mutuellement en phase de telle manière que la lame (37) bute contre la deuxième partie (40) pour séparer la première et la dernière enveloppe (9) de la succession continue respective (42).

2. Machine selon la revendication 1, **caractérisée en ce que** les moyens de fermeture (28) joignent la bande continue (27) au moins le long d'une bande de jonction (29) qui est transversale par rapport à la ligne d'avance de la bande continue (27).
3. Machine selon la revendication 1 ou 2, **caractérisée en ce que** les moyens de fermeture (28) joignent la bande continue (27) au moins le long d'une bande de jonction (30) qui est longitudinale par rapport à la

ligne d'avance de la bande continue (27).

4. Machine selon l'une quelconque des revendications 1 à 3, **caractérisée en ce qu'elle** comprend un moyen d'alimentation (26) pour faire avancer deux bandes continues (27), en particulier une première et une deuxième bande continue (31, 32) de matériau d'emballage, destinées à entourer individuellement dans une enveloppe chaque groupe (8) d'articles individuels (3).
5. Machine selon l'une quelconque des revendications 1 à 4, **caractérisée en ce qu'elle** comprend un moyen d'alimentation (23) pour faire avancer les groupes (8) d'articles (3) jusqu'au dispositif d'emballage (7) ; le moyen d'alimentation (23) positionnant les groupes (8) d'articles (3) sur la bande continue (27) de matériau d'emballage le long de la portion horizontale (T), en créant une série continue de groupes (8) d'articles (3).
6. Machine selon l'une quelconque des revendications 1 à 5, **caractérisée en ce que** les moyens de fermeture (28) joignent la ou les bande(s) continue(s) (27) autour d'au moins une partie d'un groupe respectif (8) d'articles (3) de telle manière que les groupes (8) d'articles individuels (3) sont intercalés entre des parties de la même bande continue (27) ou entre deux bandes continues différentes (27), en particulier une première et une deuxième bande continue (31, 32) de matériau d'emballage.
7. Machine selon l'une quelconque des revendications 1 à 6, **caractérisée en ce que**, en relation avec chaque groupe (8), les moyens de fermeture (28) joignent la ou les bande(s) continue(s) (27) le long de deux bandes de jonction (29) qui sont transversales et de deux bandes de jonction (30) qui sont longitudinales par rapport à la ligne d'avance de la bande continue (27), formant l'enveloppe fermée (9) qui contient un groupe respectif (8) d'articles (3).
8. Procédé de fabrication de produits à infuser comprenant une étape de fabrication d'articles individuels (3), comprenant chacun une dose (4) de matière à infuser, une étape d'emballage de groupes (8) d'articles individuels (3) dans une enveloppe de confinement respective (9) ; l'étape d'emballage comprenant une étape consistant à faire avancer au moins une bande continue (27) de matériau d'emballage destinée à entourer individuellement dans une enveloppe chaque groupe (8) d'articles individuels (3) le long d'un chemin d'alimentation (P) partagé par les groupes (8) d'articles (3) de la bande continue (27) ; le procédé comprend en outre une étape consistant à fermer la bande continue (27) autour d'au moins une partie d'un groupe respectif (8) d'articles (3) le

long d'au moins une portion (T) du chemin d'alimentation (P) s'étendant selon un plan d'étendue horizontal, une étape consistant à couper au moins une ou plusieurs bande(s) continue(s) (27) de matériau d'emballage le long de parties respectives de la bande continue (27) positionnées entre une bande de jonction transversale (29) et la bande suivante (29) pour produire des séries continues d'enveloppes (9), dans lequel l'étape de coupe de la ou les bande(s) continue(s) (27) comprend une étape consistant à réaliser une pluralité de lignes pointillées (41) entre une bande de jonction transversale (29) et la bande suivante (29), ou une étape consistant à couper la ou les bande(s) continue(s) (27) entre une bande de jonction transversale (29) et la bande suivante (29) ; **caractérisé en ce que** l'étape de coupe est exécutée avec une unité de coupe (36) comprenant au moins une lame (37) fonctionnant en association avec une enclume respective (38) le long de parties respectives de la bande continue (27), la lame (37), dans ladite étape de coupe, étant coordonnée avec l'enclume (38) pour produire des séries continues d'enveloppes (9), l'enclume (38), dans ladite étape de coupe, comprenant une première partie (39) conçue pour réaliser une pluralité de lignes pointillées (41) entre une bande de jonction transversale (29) et la bande suivante (29), et une deuxième partie (40) adjacente à la première partie (39) conçue pour couper la ou les bande(s) continue(s) (27) entre une bande de jonction transversale (29) et la bande suivante (29) ; la lame (37) étant coordonnée avec l'enclume (38) pour réaliser les lignes pointillées (41) ou pour découper la ou les bande(s) continue(s) (27), la lame (37) et l'enclume (38) étant mutuellement en phase de telle manière que la lame (37) bute contre la première partie (39) formant les lignes pointillées (41) afin de maintenir les enveloppes (9) reliées entre elles et la lame (37) et l'enclume (38) étant mutuellement en phase de telle manière que la lame (37) bute contre la deuxième partie (40) pour séparer la première et la dernière enveloppe (9) de la succession continue respective (42).

9. Procédé selon la revendication 8, **caractérisé en ce que** pendant l'étape de fermeture, la ou les bande(s) continue(s) (27) sont jointes au moins le long d'une bande de jonction (29) qui est transversale par rapport à la ligne d'avance de la bande continue (27).
10. Procédé selon la revendication 9, **caractérisé en ce que** pendant l'étape de fermeture, la ou les bande(s) continue(s) (27) sont jointes au moins le long d'une bande de jonction (30) qui est longitudinale par rapport à la ligne d'avance de la bande continue (27).
11. Procédé selon la revendication 8, **caractérisé en ce qu'il** comprend une étape consistant à faire avancer deux bandes continues (27), en particulier une pre-

mière et une deuxième bande continue (31, 32) de matériau d'emballage, qui sont destinées à entourer individuellement dans une enveloppe chaque groupe (8) d'articles individuels (3).

12. Procédé selon l'une quelconque des revendications 8 à 11, **caractérisé en ce qu'il** comprend une étape consistant à positionner les groupes (8) d'articles (3) sur la bande continue (27) de matériau d'emballage le long de la portion horizontale (T), en produisant une série continue de groupes (8) d'articles (3).
13. Procédé selon l'une quelconque des revendications 8 à 12, **caractérisé en ce qu'il** comprend une étape consistant à joindre la ou les bande(s) continue(s) (27) autour d'au moins une partie d'un groupe respectif (8) d'articles (3) de telle manière que les groupes (8) d'articles individuels (3) sont intercalés entre des parties de la même bande continue (27) ou entre deux bandes continues différentes (27), en particulier une première et une deuxième bande continue (31, 32) de matériau d'emballage.
14. Procédé selon l'une quelconque des revendications 8 à 13, **caractérisé en ce qu'il** comprend une étape consistant à joindre la ou les bande(s) continue(s) (27) le long de deux bandes de jonction (29) qui sont transversales et le long de deux bandes de jonction (30) qui sont longitudinales par rapport à la ligne d'avance de la bande continue (27), en formant l'enveloppe fermée (9) qui contient un groupe respectif (8) d'articles (3).

FIG.1

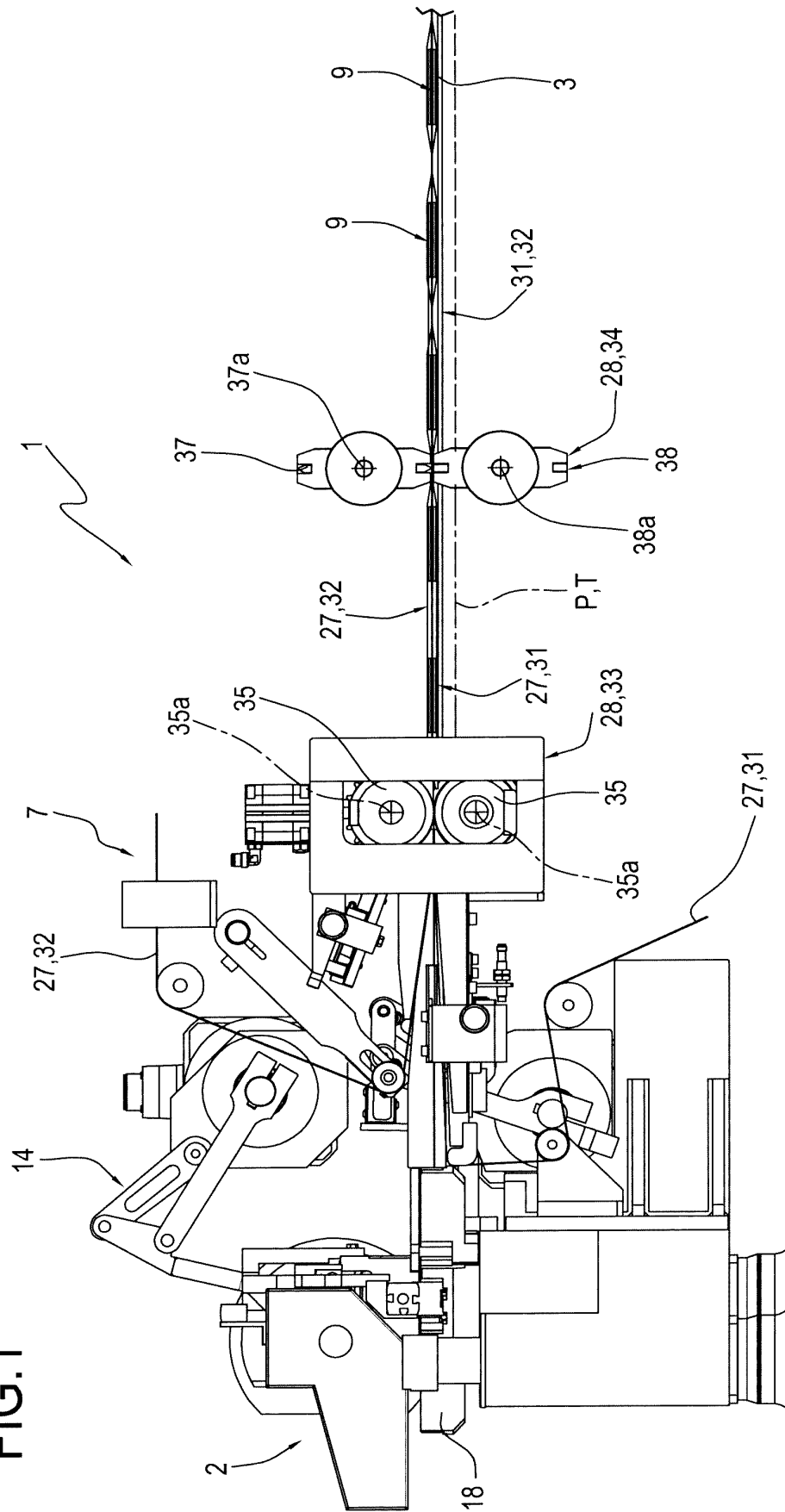
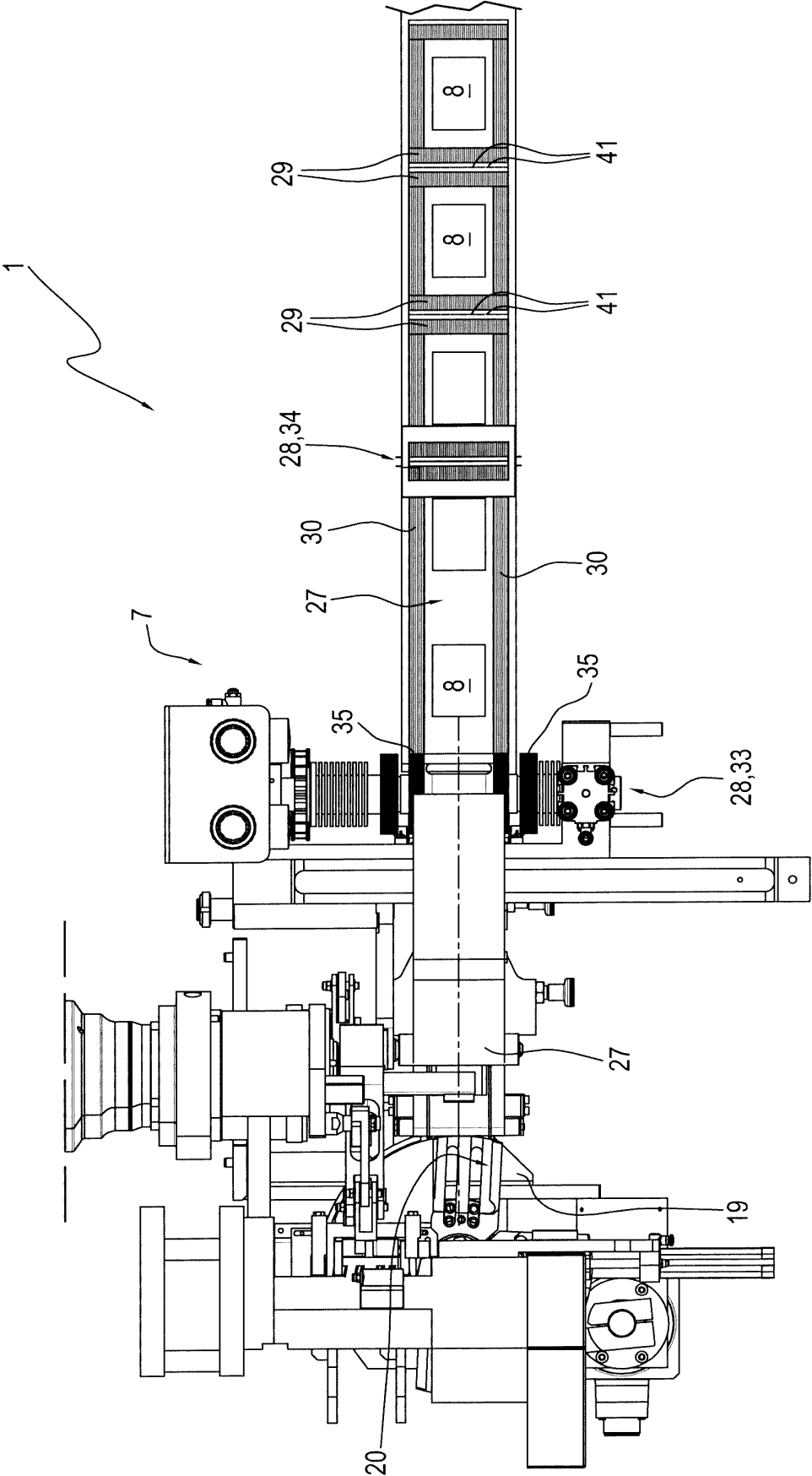


FIG.2



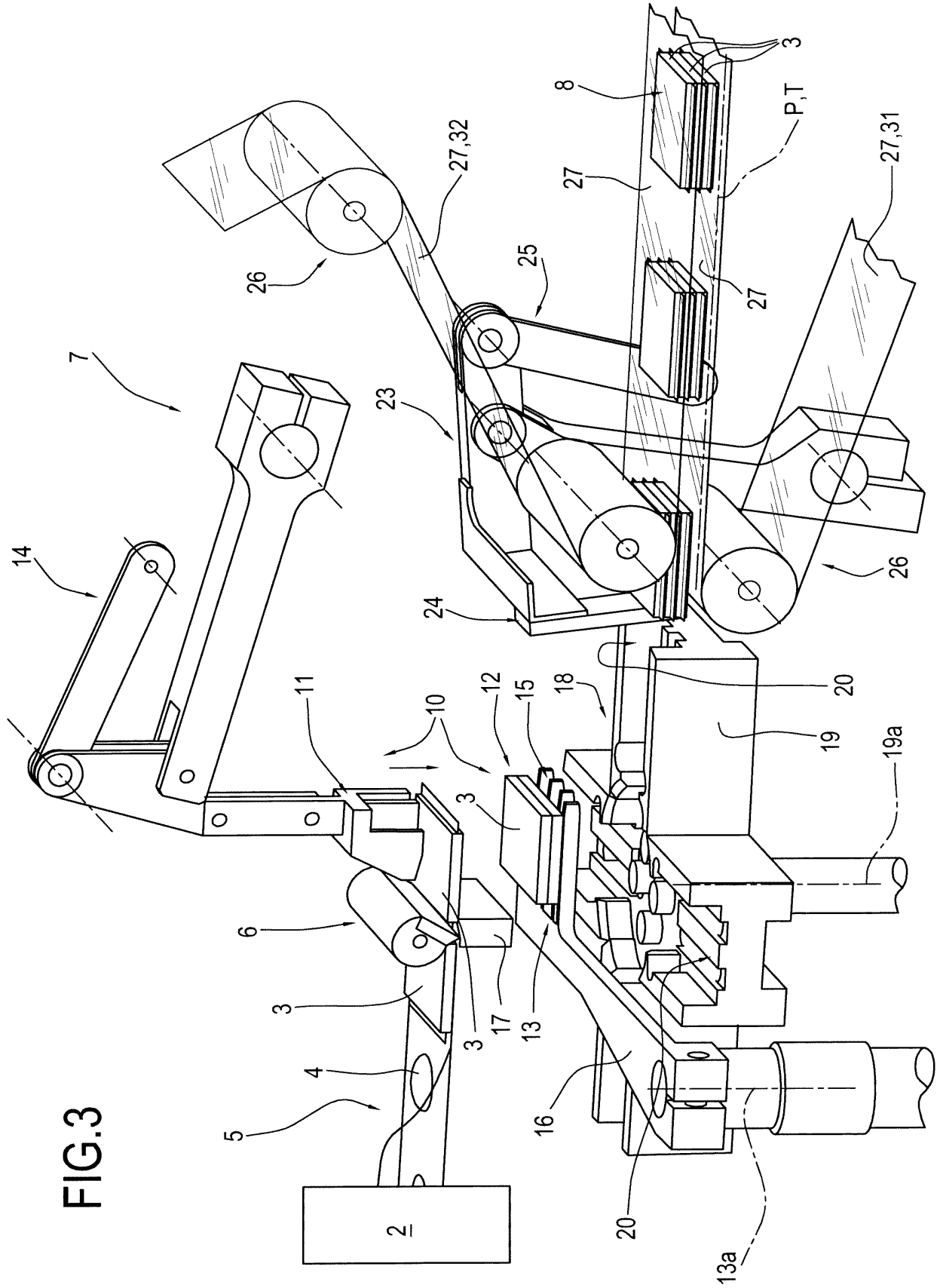


FIG.4

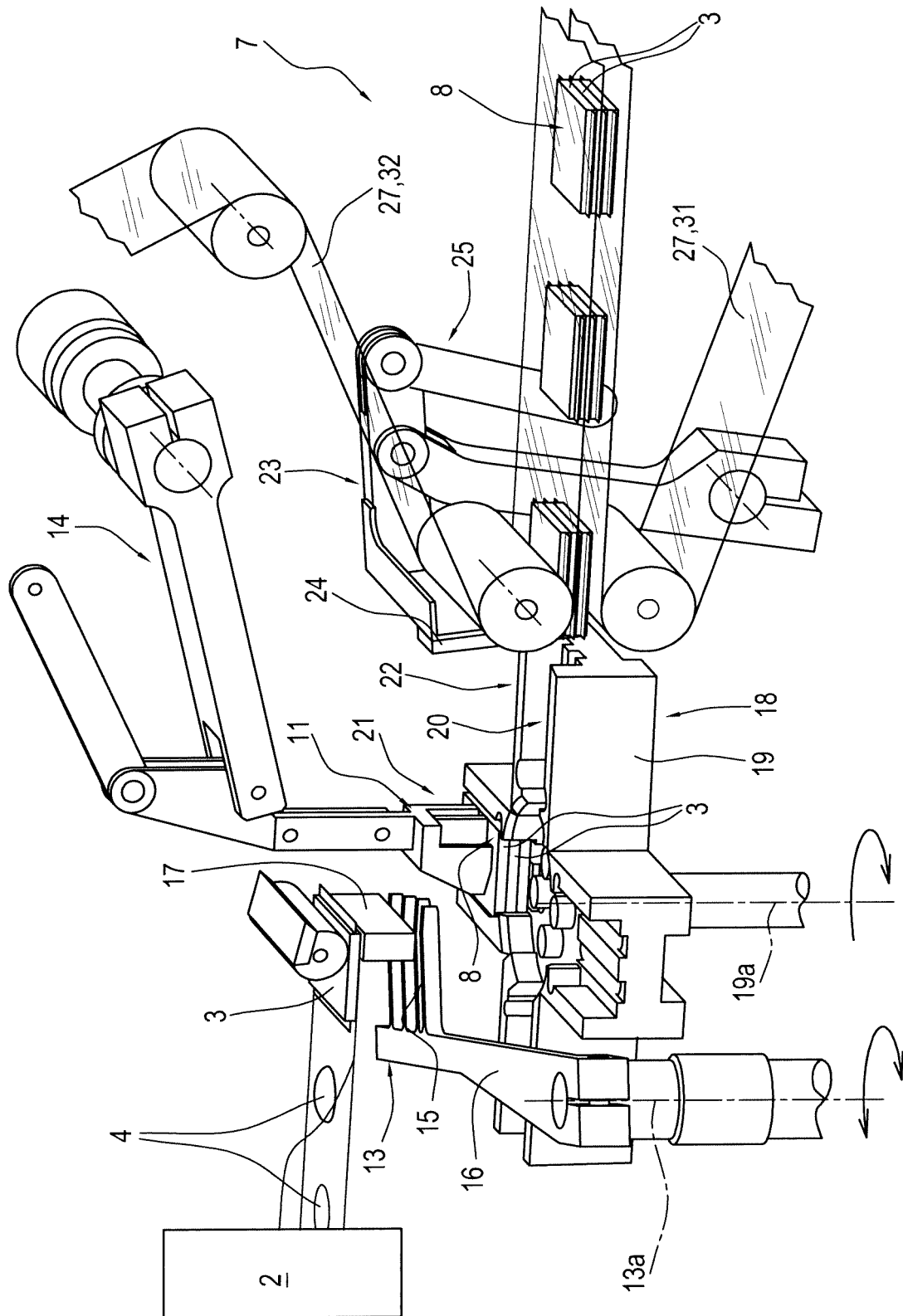
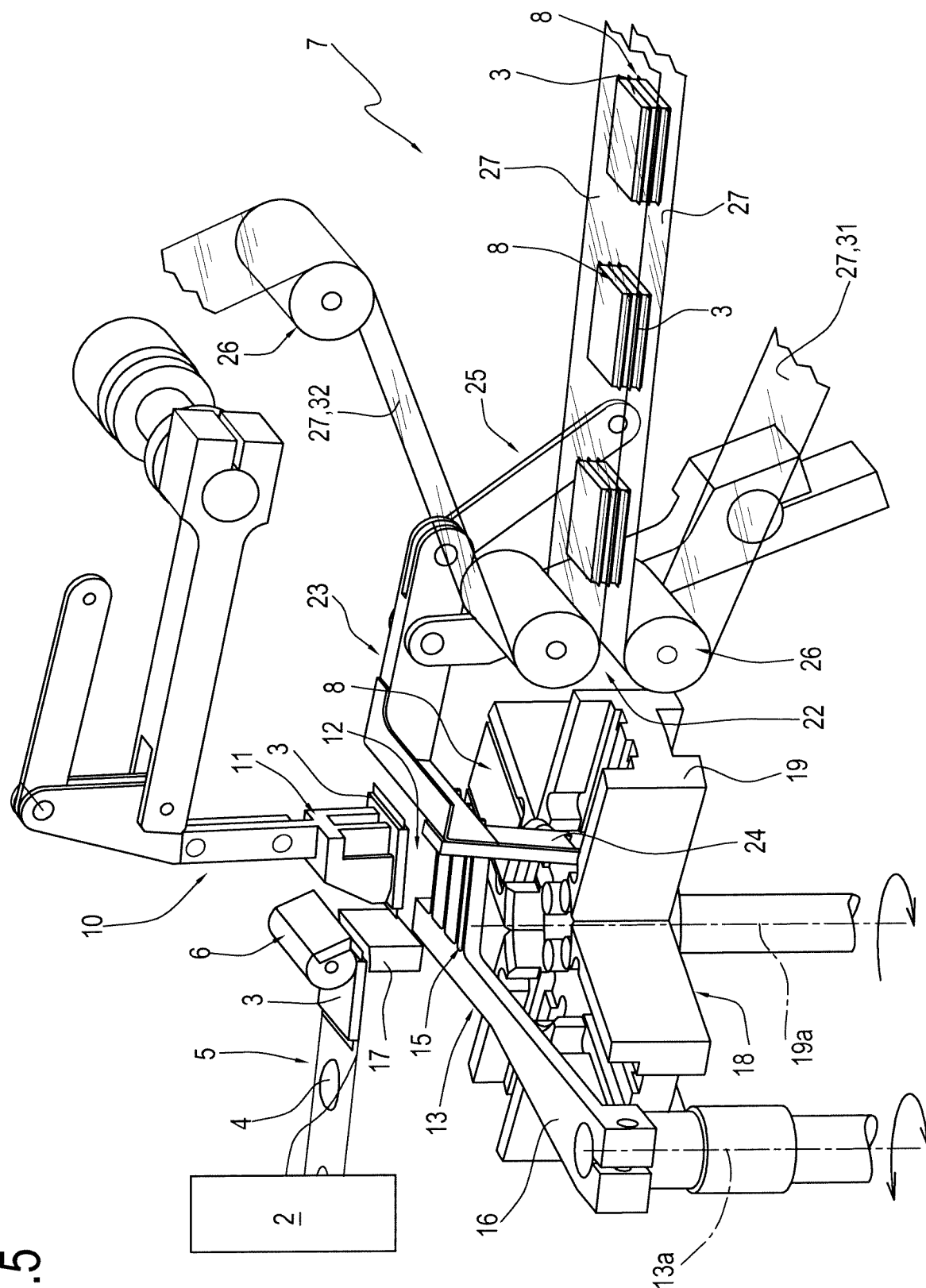


FIG.5



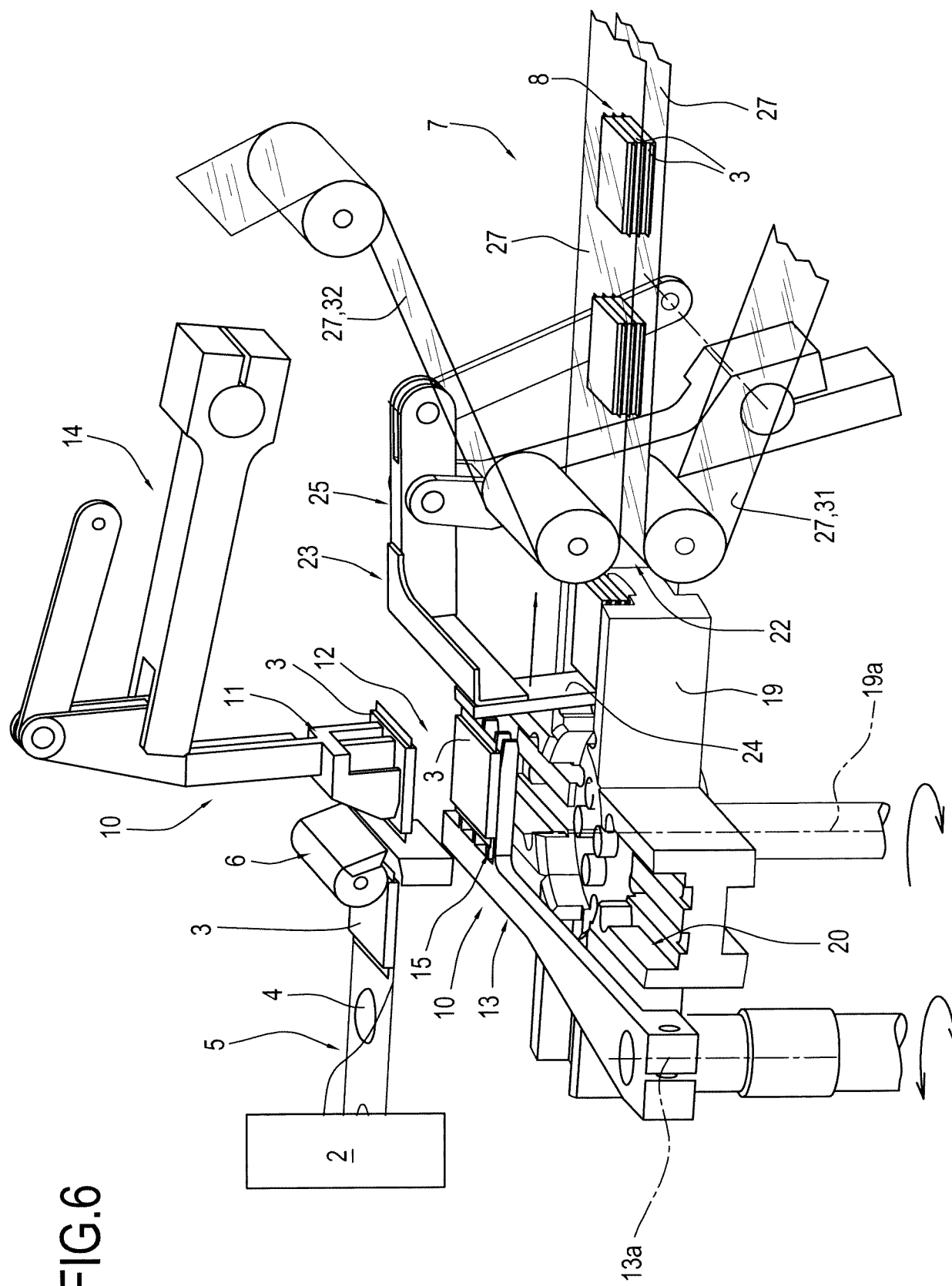
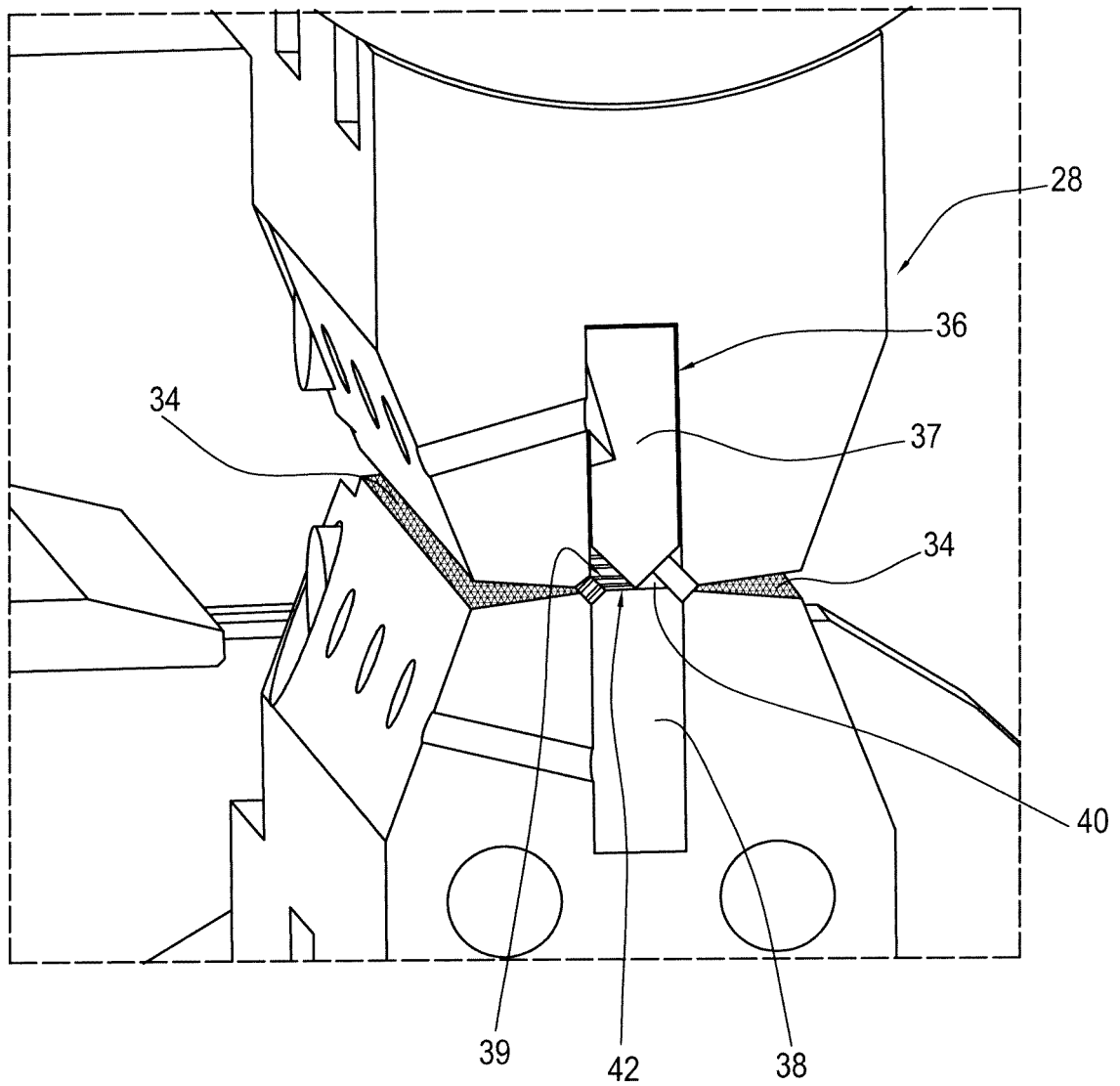


FIG.7



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2228912 A [0015]