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(54) METHOD AND MACHINE FOR FORMING A SEALED WRAPPING ABOUT AN ARTICLE

VERFAHREN UND MASCHINE ZUR UMHÜLLUNG UND VERSIEGELUNG EINES GEGENSTANDS

PROCÉDÉ ET MACHINE DE FORMATION D'UNE ENVELOPPE SCELLÉE AUTOUR D'UN ARTICLE

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Description

TECHNICAL FIELD

[0001] The present invention relates to a method and machine for forming a sealed wrapping about an article, and to a package so formed.

BACKGROUND ART

[0002] On packing machines, a sealed wrapping is formed about an article using a wrapping unit, which is fed with a succession of articles for wrapping, and with a continuous strip of normally airtight, heat-seal wrapping material.

[0003] The sealed wrappings about the respective articles are normally formed by sealing the free longitudinal edges of the strip to define a tubular wrapping about the articles; transversely sealing the tubular wrapping at the ends of each article to form a respective "pillow pack"; and then separating the individual sealed wrappings.

[0004] Though widely used for its simplicity, the above method has serious drawbacks, by being normally inaccurate in terms of both handling of the articles during the wrapping process, and the look of the finished sealed wrappings. That is, it is difficult to achieve a sealed wrapping that adheres firmly about the article; which problem is further compounded when working with delicate, fragile articles.

[0005] Various methods have recently been proposed comprising a number of folding steps and seals, but have proved unsuccessful, on account of certain steps involving folding and/or heating a large number of superimposed layers of the wrapping material; in which case, folding and/or heat transmission to stabilize and seal the wrapping prove/s unsatisfactory.

[0006] US 2003192287 discloses a method for hermetically sealing a bulk article wherein a strip of wrapping material is initially positioned onto an article such that extending ends of the wrapping material strip extend from away from an edge of the article, each end having a different length. The article is rotated to cause the ends of the strip to cover an uncovered side of the article with a fin-like section extending therefrom away from the article which can be sealed without contacting the article. The fin-like section is cooled and folded onto the top of the article so as to form an axial seam. Lateral ends of the wrapping material strip are then sealed to complete the hermetic sealing process.

[0007] GB2141395 discloses a method for wrapping batches of products, in particular candies, and for forming sealed packets, which envisages: a batch of products being supplied to a wrapping wheel; a sheet of heat-sealing material with two lateral downward turned borders being placed above the batch; the said borders being welded one to the other in order to form a tube, the opposite extremities of which are first flattened through the insertion in between them of divarication means; the said

extremities then being sealed by welding/pre-folding grippers designed to make, on each welded tubular extremity, weakening lines that aid the subsequent folding of the said extremities.

[0008] EP1357039 discloses a method and device for end closing tubular wrappings of products, whereby the arms of a scissor-type parting device, once inserted in a closed position inside an end portion of a tubular wrapping, are allowed to part, and are pushed by springs into a fully open position throughout an extraction stroke to crease the end portion and enable the end portion to be pressed taut and accurately by the opposing thrust of two folding-sealing members.

DISCLOSURE OF INVENTION

[0009] It is an object of the present invention to provide a method, machine, and package designed to eliminate at least some of the drawbacks of the known art, and which at the same time are cheap and easy to implement.

[0010] According to the present invention, there are provided a machine, a method, and a package as claimed in the accompanying independent Claims, and preferably in any one of the Claims depending directly or indirectly on the independent Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic side view, with parts removed for clarity, of a machine in accordance with the present invention;

Figures 2 to 7 show successive steps in a method of forming a wrapping about an article in accordance with the present invention;

Figure 8 shows a schematic top plan view of parts of the Figure 1 machine in two different operating positions (indicated by a dash line and a continuous line);

Figure 9 shows a schematic front view of parts of the Figure 1 machine in two different operating positions (indicated by a dash line and a continuous line);

Figure 10 shows a schematic front view of parts of the Figure 1 machine;

Figure 11 shows a schematic side view of parts of the Figure 1 machine;

Figures 12 to 15 show schematically, with parts removed for clarity, a number of steps in forming the wrapping at part of the Figure 1 machine;

Figure 16 shows the Figure 13 step from a different perspective;

Figure 17 shows a larger-scale portion of Figure 1.

PREFERRED EMBODIMENTS OF THE INVENTION

[0012] Number 1 in Figure 1 indicates as a whole a machine for forming a sealed wrapping 2 about a substantially parallelepiped-shaped article 3.

[0013] With particular reference to Figure 2, article 3 comprises two opposite end walls 4 (only one shown in Figure 2); two opposite major lateral walls 5 (only one shown in Figure 2) crosswise (in particular, perpendicular) to end walls 4; and two opposite minor lateral walls 6 crosswise (in particular, perpendicular) to end walls 4 and major lateral walls 5.

[0014] Machine 1 (in Figure 1) forms wrapping 2 from a sheet 7 of wrapping material in the steps shown in Figures 2 to 7, and as article 3 is fed along a path P. Sheet 7 is substantially rectangular and preferably made of air-tight, heat-seal material.

[0015] With reference to Figure 7, the wrapping 2 formed about article 3 substantially adheres to article 3, and comprises two major lateral portions 8; two minor lateral portions 9 crosswise to major lateral portions 8; and two end portions 10 crosswise to major lateral portions 8 and minor lateral portions 9. Wrapping 2 is sealed hermetically about article 3 along three sides by means of respective seals : one at a major lateral portion 8, and the other two at respective end portions 10. Wrapping 2 and article 3 together define a package that may either undergo further processing or be retailed as it is.

[0016] In the embodiment shown, major lateral portions 8 have a larger surface area than minor lateral portions 9. In variations not shown, major lateral portions 8 have substantially the same surface area as minor lateral portions 9.

[0017] As shown in Figure 1, machine 1 comprises a conveyor 11 for feeding article 3 to a folding device 12 comprising a push unit 13 and a wrapping wheel 14.

[0018] Wrapping wheel 14 rotates in steps about an axis 15 perpendicular to the Figure 1 plane, and comprises a number of pockets 16 equally spaced about axis 15, and each for receiving a respective article 3 at a loading station 17, and conveying article 3 along a semicircular portion of path P to an unloading station 17'.

[0019] Push unit 13 feeds article 3 in a direction A crosswise (in particular, perpendicular) to axis 15, so article 3 engages sheet 7 and is inserted together with sheet 7 inside respective pocket 16. As article 3 is inserted inside pocket 16, sheet 7 is folded into a U, so that two pairs of flaps 18, at opposite ends of article 3, and a pair of flaps 19, 19' of sheet 7 project from the free sides of article 3. The flaps 18, 19 and 19' in each pair face each other and are substantially parallel (Figure 2). Flaps 18 project, parallel to axis 15, from respective end walls 4 of article 3; flaps 19 and 19' project, crosswise to axis 15, from a minor lateral wall 6; and flap 19 is wider than flap 19'.

[0020] Machine 1 (Figures 1 and 17) also comprises a sealing device 20 for superimposing and sealing flaps 19 and 19' to form a substantially tubular partial wrapping

21 having two open ends 22, and a sealing flap 23 projecting outwards crosswise to partial wrapping 21 (Figure 3). Partial wrapping 21 comprises major and minor lateral portions 8 and 9, which are connected to one another by respective lateral edges 24; and sealing flap 23 projects outwards from, and extends along, a respective lateral edge 24.

[0021] Sealing device 20 (Figures 1 and 17) comprises a substantially fixed member 25 at loading station 17; and a member 26 which is movable, in a direction crosswise to direction A, between an open position (shown by the continuous line in Figure 17) and a closed position (shown by the dash line in Figure 17). At least one of members 25, 26 is a heat-seal member (i.e. for transferring heat to sheet 7 to seal flaps 19 and 19'). Advantageously, both members 25, 26 are heat-seal members. In actual use, when inserting article 3 inside pocket 16, member 26 is in the open position; and once article 3 is inside pocket 16, member 26 is moved towards member 25 to fold flap 19 onto flap 19', so flaps 19 and 19' are gripped between members 25 and 26.

[0022] Sealing device 20 also comprises a heat-seal member 27, downstream from loading station 17 and upstream from unloading station 17', for preferably fluidtight sealing flaps 19 and 19' to each other to form sealing flap 23. In actual use, member 27 oscillates about a respective axis (not shown) substantially parallel to axis 15, to contact flaps 19 and 19' when wheel 14 is stationary.

[0023] In a variation not shown, machine 1 comprises a number of members 27 arranged successively between loading station 17 and unloading station 17'.

[0024] In an embodiment not shown, machine 1 has no member 27, and flaps 19 and 19' are sealed to each other by members 25 and 26 at loading station 17.

[0025] In other variations, neither of members 25, 26 is a heat-seal member, and flaps 19, 19' are sealed to each other by member/s 27.

[0026] Machine 1 also comprises a folding device 28 for folding sealing flap 23 onto a major lateral portion 8. Folding device 28 comprises a known fixed plate (not shown) located along the periphery of wheel 14 to fold sealing flap 23 crosswise (in particular, perpendicularly) to respective major lateral portion 8; and a pusher 29 to feed article 3 in a substantially radial direction with respect to axis 15, so sealing flap 23 is folded onto respective major lateral portion 8 by contrast with a fixed folding member 30. Pusher 29 is located at unloading station 17'; and folding device 28 also comprises a heating head 31 located at a stabilizing station 32 along path P, and which is movable crosswise to path P to engage and stabilize sealing flap 23 on major lateral portion 8.

[0027] Machine 1 also comprises a conveyor 33 for feeding article 3 in direction A along a substantially straight portion of path P from stabilizing station 32; through a closing station 34 where open ends 22 of partial wrapping 21 are closed to form sealing flaps 35; to a folding station 36 where sealing flaps 35 are folded.

[0028] Conveyor 33 comprises a belt (shown partly in

Figure 1) having a work branch 37 and looped about two known pulleys (not shown) rotating about respective axes parallel to axis 15. Articles 3 are positioned on conveyor 33 with open ends 22, sealing flap 23, and minor lateral portions 9 crosswise to direction A.

[0029] On each side of conveyor 33 at closing station 34, a retractor 38 deforms a respective open end 22 of partial wrapping 21 to form two facing flaps, and a sealing device 39 grips and preferably fluidtight seals the facing flaps to form respective closed end portion 10 and relative sealing flap 35, which projects from and defines a seal of end portion 10.

[0030] Retractor 38 comprises two arms 40 movable between a closed rest position (shown by the dash line in Figure 8), and an open taut position (shown by the continuous line in Figure 8).

[0031] Sealing device 39 comprises a gripper unit in turn comprising two heat-seal jaws 41 movable between an open rest position (shown by the dash line in Figure 8), and a closed sealing position (shown by the continuous line in Figure 8).

[0032] In actual use, when arms 40 are moved into the open taut position inside respective open end 22, jaws 41 are moved up. And just before jaws 41 reach the closed sealing position, arms 40 are returned to the closed rest position, so a complete seal is formed along the whole of sealing flap 35.

[0033] With particular reference to Figures 10 and 11, machine 1 also comprises a folding device 42 at folding station 36, to fold sealing flaps 35 onto respective end portions 10. Folding device 42 comprises a conveyor 43 for feeding article 3 along a substantially straight portion of path P; and two substantially fixed plates 44 (only one shown) located on opposite sides of path P to fold sealing flaps 35 onto respective end portions 10 (as shown particularly in Figures 12, 13 and 16).

[0034] More specifically, conveyor 43 comprises an elevator 45 for moving article 3 crosswise to major lateral portions 8 in a direction, in particular a substantially vertical direction, crosswise to direction A.

[0035] In the embodiment shown, sealing flaps 35 are of such a length that, once folded, each extends up to a respective edge 24' connecting respective end portion 10 to a major lateral portion 8 (as shown particularly in Figures 6 and 7). In variations not shown, sealing flaps 35 are shorter and fall short of respective edges 24'.

[0036] Once folded onto respective end portion 10, each of sealing flaps 35 comprises two tabs 46 projecting from opposite sides of respective end portion 10.

[0037] Folding device 42 also comprises four flip-over rails 47, each designed so that each tab, as it slides along respective rail 47, is folded roughly 180° onto respective end portion 10 (as shown particularly in the Figure 13 to 15 sequence).

[0038] More specifically, each rail 47 comprises a first portion 48 for folding respective tab 46 roughly 90° into a position substantially perpendicular to respective end portion 10 (Figure 14); and a second portion 49, after

portion 48, for folding tab 46 onto end portion 10 (Figure 15).

[0039] Machine 1 also comprises a conveyor 50, downstream from folding device 42, to feed article 3, crosswise to minor lateral walls 6, along a substantially straight, horizontal portion of path P from folding station 36 to an output station 51. Two known heating plates (not shown) are located on opposite sides of the conveyor to stabilize sealing flaps 35 and tabs 46 on respective end portions 10.

[0040] Operation of machine 1 will now be described as of when article 3 is located inside respective pocket 16, and sheet 7 is folded into a U about article 3. At this point, member 25 folds flap 19 onto flap 19', and wheel 14 moves a first step forward to bring article 3 up to heat-seal member 27, which moves into contact with sealing flap 23. During this movement, said plate (not shown) folds sealing flap 23 by contrast into a position perpendicular to respective major lateral portion 8.

[0041] When article 3 reaches unloading station 17', pusher 29 expels article 3 from pocket 16 onto conveyor 33. As article 3 is fed onto conveyor 33, sealing flap 23 is folded onto major lateral portion 8 by folding member 30, and is stabilized in that position by heating head 31.

[0042] At this point, retractors 38 deform open ends 22; sealing devices 39 form end portions 10 and sealing flaps 35; and conveyor 33 feeds article 3 to folding device 42.

[0043] When article 3 reaches folding station 36, elevator 45 moves article 3 upwards, so each sealing flap 35 is intercepted by respective plate 44 and folded onto respective end portion 10. As article 3 is raised, tabs 46 slide along, and are folded roughly 180° by, respective rails 47.

[0044] At this point, conveyor 50 feeds article 3 between two known heating plates (not shown) to stabilize sealing flaps 35 and tabs 46 on respective end portions 10 and so obtain package 2.

[0045] The advantages of the present invention with respect to the state of the art will be clear from the above description.

[0046] In this connection, it is important to note, for example, that the location of sealing flap 23 on major lateral portion 8 provides for particularly good sealing of open ends 22. If sealing flap 23 were to be located on one of minor lateral portions 9, deformation by retractor 38 and sealing by sealing device 39 would be more problematic, on account of the greater thickness of the wrapping material involved, and there would be more risk of sealing flap 23 becoming detached from respective minor lateral portion 9 (especially when deforming open ends 22).

[0047] Also, rails 47 for folding tabs 46 roughly 180° are particularly advantageous in terms of faster production and compactness.

Claims

1. A method of forming a sealed wrapping (2) about an article (3), the method comprising the steps of:

folding a sheet (7) of wrapping material about the article (3), so the folded sheet (7) has a pair of facing, substantially parallel, projecting flaps (19, 19');
 superimposing and sealing the pair of flaps (19, 19') to form a substantially tubular partial wrapping (21) having two open ends (22), and a first sealing flap (23) projecting outwards crosswise to the partial wrapping (21);
 folding the first sealing flap (23) onto an outer surface of the partial wrapping (21);
 successively gripping and sealing the open ends (22) of the partial wrapping (21);
 deforming at least one of the open ends (22) of the partial wrapping (21) by means of a retractor (38), to form two facing flaps; and gripping and sealing the facing flaps to form a respective closed end portion (10) and a second sealing flap (35), which projects from the end portion (10) and defines a seal of the end portion (10);
 folding the second sealing flap (35) onto the end portion (10) so that two tabs (46) of the second sealing flap (35) project laterally from the end portion (10) and on opposite sides of the end portion (10); and
 folding each tab (46) onto the end portion (10); wherein the sheet (7) of wrapping material is folded and sealed about the article (3) so that the partial wrapping (21) comprises two major lateral portions (8) on opposite sides of the article (3); and two minor lateral portions (9) which are located on opposite sides of the article (3), are crosswise to the major lateral portions (8), and are connected to the major lateral portions (8) by respective lateral edges (24); the first sealing flap (23) extending substantially along a respective lateral edge (24), and being folded onto one of the major lateral portions (8) of the partial wrapping (21); and the open ends (22) of the partial wrapping (21) being closed and sealed by gripping them to form the two second sealing flaps (35) substantially crosswise to the first sealing flap (23) and to the minor lateral portions (9);
 wherein the tabs (46) are folded onto the end portion as the sheet (7), folded about the article (3), is fed in a direction substantially parallel to said end portion (10) and to said tabs (46), and in particular crosswise to the major lateral portions (8).

2. A method as claimed in Claim 1, wherein a rail (47) comprises a first portion (48) which folds a respective

tab (46) approximately 90° into a position substantially perpendicular to respective end portion (10); and a second portion (49), after portion (48), for folding tab (46) onto end portion (10).

3. A method as claimed in Claim 1 or 2, wherein a folding device (42) for folding the tabs comprises four flip-over rails (47), each designed so that each tab, as it slides along respective rail (47), is folded roughly 180° onto respective end portion (10).
4. A method as claimed in one of the foregoing Claims, wherein the first sealing flap (23) is first folded to project substantially perpendicularly to the relative said major lateral portion (8), is maintained in that position, and is subsequently folded onto the relative major lateral portion (8).
5. A method as claimed in one of the foregoing Claims, wherein the article (3) comprises two substantially opposite end walls (4); two substantially opposite major lateral walls (5) crosswise to the end walls (4); and two minor lateral walls (6) crosswise to the end walls (4) and to the major lateral walls (5); the sheet (7) being folded and sealed so each major lateral portion (8) of the partial wrapping (21) is located at a respective major lateral wall (5), and each minor lateral portion (9) of the partial wrapping is located at a respective minor lateral wall (6).
6. A method as claimed in one of the foregoing Claims, wherein the tabs (46) are substantially folded roughly 180° onto the end portion (10), by each sliding along a respective rail (47) of a folding device (42).
7. A machine for forming a sealed wrapping (2) about an article (3), the machine (1) comprising:

a first folding device (12) for folding a sheet (7) of wrapping material into a U about the article (3), so the folded sheet (7) has a pair of facing, substantially parallel, projecting flaps (18, 19, 19') on each free side of the article (3);
 a first sealing device (20) for superimposing and sealing the flaps (19, 19') in one pair to form a substantially tubular partial wrapping (21) having two open ends (22), and a first sealing flap (23) projecting outwards crosswise to the partial wrapping (21);
 a second folding device (28) for folding the first sealing flap (23) onto an outer surface of the sheet (7); and
 two second sealing devices (39) for sealing the open ends (22) of the partial wrapping (21);
 at least one retractor (38) for deforming at least one of the open ends (22) of the partial wrapping (21) to define two facing flaps; each second sealing device (39) gripping and sealing said facing

- flaps to form a respective closed end portion (10) and a second sealing flap (35), which projects from the end portion (10) and defines a seal of the end portion (10); and
 a third folding device (42) for folding the second sealing flap (35) onto the relative end portion (10) so that two tabs (46) of the second sealing flap (35) project laterally on opposite sides of the end portion (10); the third folding device (42) also folding each tab (46) onto the end portion (10);
 wherein the first folding device (12) and the first sealing device (20) fold and seal the sheet (7) about the article (3) so that the partial wrapping (21) comprises two major lateral portions (8) on opposite sides of the article (3); and two minor lateral portions (9) which are located on opposite sides of the article (3), are crosswise to the major lateral portions (8), and are connected to the major lateral portions (8) by respective lateral edges (24); the first sealing flap (23) extending along a respective lateral edge (24); the second folding device (28) folding the first sealing flap onto one of the major lateral portions (8) of the partial wrapping (21); and each second sealing device (39) comprising at least one gripping unit for closing and sealing the open ends (22) of the partial wrapping (21) to form two second sealing flaps (35) crosswise to the first sealing flap (23) and to the minor lateral portions (9);
 wherein the tabs (46) are folded onto the end portion as the sheet (7), folded about the article (3), is fed in a direction substantially parallel to said end portion (10) and to said tabs (46), and in particular crosswise to the major lateral portions (8).
8. A machine as claimed in Claim 7, and comprising a rail (47), which comprises a first portion (48) for folding a respective tab (46) roughly 90° into a position substantially perpendicular to respective end portion (10); and a second portion (49), after portion (48), for folding tab (46) onto end portion (10).
9. A machine as claimed in Claim 7 or 8, wherein the gripping unit comprises two heat-seal jaws (41).
10. A machine as claimed in one of Claims 7 to 9, wherein the first folding device (12) comprises at least one pocket (16); and a push unit (13) for feeding the article (3), crosswise to the sheet (7), into the pocket (16), so the sheet (7) is pushed into the pocket (16) by the article (3) and folded into a U about the article (3).
11. A machine as claimed in Claim 10, and comprising a conveyor (43) for feeding the article (3), in a direction crosswise to the second sealing flap (35) pro-

jecting from the end portion (10), along a portion of a feed path (P), which portion is located downstream from the second sealing devices (39) and at the third folding device (42); the third folding device (42) comprising at least one substantially fixed member (44) which intercepts the second sealing flap (35) to fold the second sealing flap (35) onto the end portion (10).

12. A machine as claimed in one of Claims 7 to 11, wherein the third folding device (42) comprises at least two rails (47) designed so that each tab (46), as it slides along the relative rail (47), is folded roughly 180° onto the relative end portion (10).

Patentansprüche

1. Verfahren zum Bilden einer abgedichteten Hülle (2) um einen Artikel (3), wobei das Verfahren die Schritte umfasst:

Falten einer Lage (7) aus Einwickelmaterial um den Artikel (3), so dass die gefaltete Lage (7) ein Paar zueinander zeigender, im Wesentlichen paralleler vorstehender Klappen (19, 19') aufweist;

Übereinanderlegen und Abdichten des Paares Klappen (19, 19'), um eine im Wesentlichen rohrförmige Teilumhüllung (21), die zwei offene Enden (22) aufweist, und eine erste Dichtungsklappe (23), die quer zu der Teilumhüllung (21) nach außen vorsteht, zu bilden;

Falten der ersten Dichtungsklappe (23) auf eine äußere Oberfläche der Teilumhüllung (21);

schrittweises Ergreifen und Abdichten der offenen Enden (22) der Teilumhüllung (21);

Verformen wenigstens eines der offenen Enden (22) der Teilumhüllung (21) mittels eines Retraktors (38), um zwei zueinander zeigende Klappen zu bilden; und Ergreifen und Abdichten der zueinander zeigenden Klappen, um einen entsprechenden geschlossenen Endabschnitt (10) und eine zweite Dichtungsklappe (35), die von dem Endabschnitt (10) vorsteht und eine Dichtung des Endabschnitts (10) definiert, zu bilden;

Falten der zweiten Dichtungsklappe (35) auf den Endabschnitt (10), so dass zwei Laschen (46) der zweiten Dichtungsklappe (35) von dem Endabschnitt (10) und an gegenüberliegenden Seiten des Endabschnitts (10) seitlich vorstehen; und

Falten jeder Lasche (46) auf den Endabschnitt (10);

wobei die Lage (7) aus Einwickelmaterial so um den Artikel (3) gefaltet und abgedichtet wird, dass die Teilumhüllung (21) zwei größere seitliche Abschnitte (8) an gegenüberliegenden Seiten des Artikels (3) umfasst; und wobei zwei klei-

- nere seitliche Abschnitte (9), die sich an gegenüberliegenden Seiten des Artikels (3) befinden, quer zu den größeren seitlichen Abschnitten (8) liegen und mit den größeren seitlichen Abschnitten (8) durch entsprechende seitliche Kanten (24) verbunden sind; wobei sich die erste Dichtungsklappe (23) im Wesentlichen entlang einer entsprechenden seitlichen Kante (24) erstreckt und auf einen der größeren seitlichen Abschnitte (8) der Teilumhüllung gefaltet wird; und wobei die offenen Enden (22) der Teilumhüllung (21) dadurch geschlossen und abgedichtet werden, dass sie ergriffen werden, um die zwei zweiten Dichtungsklappen (35) im Wesentlichen quer zu der ersten Dichtungsklappe (23) und zu den kleineren seitlichen Abschnitten (9) zu bilden; wobei die Laschen (46) auf den Endabschnitt gefaltet werden, wenn die Lage (7), die um den Artikel (3) gefaltet ist, in einer Richtung im Wesentlichen parallel zu dem Endabschnitt (10) und zu den Laschen (46) und insbesondere quer zu den größeren seitlichen Abschnitten (8) zugeführt wird.
2. Verfahren nach Anspruch 1, wobei eine Schiene (47) einen ersten Abschnitt (48), der eine entsprechende Lasche (46) um etwa 90° in eine Position im Wesentlichen senkrecht zu einem entsprechenden Endabschnitt (10) faltet; und einen zweiten Abschnitt (49) nach Abschnitt (48) zum Falten der Lasche (46) auf den Endabschnitt (10) umfasst.
3. Verfahren nach Anspruch 1 oder 2, wobei eine Faltvorrichtung (42) zum Falten der Laschen vier Umschlagschienen (47) umfasst, wovon jede so entworfen ist, dass jede Lasche dann, wenn sie entlang einer entsprechenden Schiene (47) gleitet, um etwa 180° auf den entsprechenden Endabschnitt (10) gefaltet wird.
4. Verfahren nach einem der vorhergehenden Ansprüche, wobei die erste Dichtungsklappe (23) zuerst so gefaltet wird, dass sie zu dem relativ größeren seitlichen Abschnitt (8) im Wesentlichen senkrecht vorsteht, in dieser Position gehalten wird und danach auf den relativ größeren seitlichen Abschnitt (8) gefaltet wird.
5. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Artikel (3) zwei im Wesentlichen einander gegenüberliegende Endwände (4); zwei im Wesentlichen einander gegenüberliegende größere seitliche Wände (5) quer zu den Endwänden (4); und zwei kleinere seitliche Wände (6) quer zu den Endwänden (4) und zu den größeren seitlichen Wänden (5) umfasst; wobei die Lage (7) so gefaltet und abgedichtet wird, dass sich jeder größere seitliche Abschnitt (8) der Teilumhüllung (21) an einer jeweiligen größeren seitlichen Wand (5) befindet und dass sich jeder kleinere seitliche Abschnitt (9) der Teilumhüllung an einer jeweiligen kleineren seitlichen Wand (6) befindet.
6. Verfahren nach einem der vorhergehenden Ansprüche, wobei die Laschen (46) im Wesentlichen um etwa 180° auf den Endabschnitt (10) gefaltet werden, durch jeweiliges Gleiten entlang einer entsprechenden Schiene (47) einer Faltvorrichtung (42).
7. Maschine zum Bilden einer abgedichteten Hülle (2) um einen Artikel (3), wobei die Maschine (1) umfasst:
- eine erste Faltvorrichtung (12) zum Falten einer Lage (7) eines Einwickelmaterials in eine U-Form um den Artikel (3), so dass die gefaltete Lage (7) ein Paar zueinander zeigender, im Wesentlichen paralleler vorstehender Klappen (18, 19, 19') an jeder freien Seite des Artikels (3) aufweist;
- eine erste Abdichtvorrichtung (20) zum paarweisen Übereinanderlegen und Abdichten der Klappen (19, 19'), um eine im Wesentlichen rohrförmige Teilumhüllung (21), die zwei offene Enden (22) aufweist, und eine erste Dichtungsklappe (23), die quer zu der Teilumhüllung (21) nach außen vorsteht, zu bilden;
- eine zweite Faltvorrichtung (28) zum Falten der ersten Dichtungsklappe (23) auf eine äußere Oberfläche der Lage (7); und
- zwei zweite Abdichtvorrichtungen (39) zum Abdichten der offenen Enden (22) der Teilumhüllung (21);
- wenigstens einen Retraktor (38) zum Verformen wenigstens eines der offenen Enden (22) der Teilumhüllung (21), um zwei zueinander zeigende Klappen zu bilden; wobei jede zweite Abdichtvorrichtung (39) die zueinander zeigenden Klappen ergreift und abdichtet, um einen entsprechenden geschlossenen Endabschnitt (10) und eine zweite Dichtungsklappe (35), die von dem Endabschnitt (10) vorsteht und eine Dichtung des Endabschnitts (10) definiert, zu bilden; und
- eine dritte Faltvorrichtung (42) zum Falten der zweiten Dichtungsklappe (35) auf den relativen Endabschnitt (10), so dass zwei Laschen (46) der zweiten Dichtungsklappe (35) seitlich an gegenüberliegenden Seiten des Endabschnitts (10) vorstehen; wobei die dritte Faltvorrichtung (42) ebenfalls jede Lasche (46) auf den Endabschnitt (10) faltet;
- wobei die erste Faltvorrichtung (12) und die erste Abdichtvorrichtung (20) die Lage (7) so um den Artikel (3) falten und abdichten, dass die Teilumhüllung (21) zwei größere seitliche Abschnitte (8) an gegenüberliegenden Seiten des

- Artikels (3) umfasst; und wobei zwei kleinere seitliche Abschnitte (9), die sich an gegenüberliegenden Seiten des Artikels (3) befinden, quer zu den größeren seitlichen Abschnitten (8) liegen und mit den größeren seitlichen Abschnitten (8) durch jeweilige seitliche Kanten (24) verbunden sind; wobei sich die erste Dichtungsklappe (23) entlang einer entsprechenden seitlichen Kante (24) erstreckt; wobei die zweite Faltvorrichtung (28) die erste Dichtungsklappe auf einen der größeren seitlichen Abschnitte (8) der Teilumhüllung (21) faltet; und wobei jede zweite Abdichtvorrichtung (39) wenigstens eine Greifereinheit umfasst, um die offenen Enden (22) der Teilumhüllung (21) zu ergreifen und abzudichten, um zwei zweite Dichtungsklappen (35) quer zu der ersten Dichtungsklappe (23) und zu den kleineren seitlichen Abschnitten (9) zu bilden; wobei die Laschen (46) auf den Endabschnitt gefaltet werden, wenn die Lage (7), die um den Artikel (3) gefaltet ist, in einer Richtung im Wesentlichen parallel zu dem Endabschnitt (10) und zu den Laschen (46) und insbesondere quer zu den größeren seitlichen Abschnitten (8) durchgeführt wird.
8. Maschine nach Anspruch 7, die eine Schiene (47) umfasst, die einen ersten Abschnitt (48) zum Falten einer entsprechenden Lasche (46) um etwa 90° in eine Position im Wesentlichen senkrecht zu dem jeweiligen Endabschnitt (10) faltet; und einen zweiten Abschnitt (49) nach Abschnitt (48) zum Falten der Lasche (46) auf den Endabschnitt (10) umfasst.
9. Maschine nach Anspruch 7 oder 8, wobei die Greifereinheit zwei Backen (41) zum Heißversiegeln umfasst.
10. Maschine nach einem der Ansprüche 7 bis 9, wobei die erste Faltvorrichtung (12) wenigstens eine Tasche (16); und eine Schiebeeinheit (13) zum Zuführen des Artikels (3) quer zu der Lage (7) in die Tasche (16), so dass die Lage (7) durch den Artikel (3) in die Tasche (16) geschoben und in ein U um den Artikel (3) gefaltet wird, umfasst.
11. Maschine nach Anspruch 10, die einen Förderer (43) zum Zuführen des Artikels (3) in einer Richtung quer zu der zweiten Dichtungsklappe (35), die von dem Endabschnitt (10) vorsteht, entlang eines Abschnitts eines Zuführpfads (P) umfasst, wobei sich der Abschnitt stromabwärts der zweiten Abdichtvorrichtungen (39) und bei der dritten Faltvorrichtung (42) befindet; wobei die dritte Faltvorrichtung (42) wenigstens ein im Wesentlichen feststehendes Element (44) umfasst, das die zweite Dichtungsklappe (35) aufnimmt, um die zweite Dichtungsklappe (35) auf den Endabschnitt (10) zu falten.
12. Maschine nach einem der Ansprüche 7 bis 11, wobei die dritte Faltvorrichtung (42) wenigstens zwei Schienen (47) umfasst, die so entworfen sind, dass jede Lasche (46) dann, wenn sie entlang der entsprechenden Schiene (47) gleitet, um etwa 180° auf den entsprechenden Endabschnitt (10) gefaltet wird.

Revendications

1. Procédé pour former une enveloppe scellée (2) autour d'un article (3), le procédé comprenant les étapes consistant à :

plier une feuille (7) de matériau d'emballage autour de l'article (3), de sorte que la feuille (7) pliée a une paire de rabats en saillie se faisant face, sensiblement parallèles (19, 19') ; superposer et sceller la paire de rabats (19, 19') pour former une enveloppe partielle (21) sensiblement tubulaire ayant deux extrémités ouvertes (22), un premier rabat d'étanchéité (23) faisant saillie vers l'extérieur transversalement par rapport à l'enveloppe partielle (21) ; plier le premier rabat d'étanchéité (23) sur une surface externe de l'enveloppe partielle (21) ; saisir et sceller successivement les extrémités ouvertes (22) de l'enveloppe partielle (21) ; déformer au moins l'une des extrémités ouvertes (22) de l'enveloppe partielle (21) au moyen d'un rétracteur (38), afin de former deux rabats en vis-à-vis ; et saisir et sceller les rabats en vis-à-vis afin de former une partie d'extrémité (10) fermée respective et un second rabat d'étanchéité (35) qui fait saillie à partir de la partie d'extrémité (10) et définit un joint d'étanchéité de la partie d'extrémité (10) ; plier le second rabat d'étanchéité (35) sur la partie d'extrémité (10) de sorte que deux languettes (46) du second rabat d'étanchéité (35) font saillie latéralement à partir de la partie d'extrémité (10) et sur les côtés opposés de la partie d'extrémité (10) ; et plier chaque languette (46) sur la partie d'extrémité (10) ; dans lequel la feuille (7) du matériau d'emballage est pliée et scellée autour de l'article (3), de sorte que l'enveloppe partielle (21) comprend deux parties latérales majeures (8) sur les côtés opposés de l'article (3), et deux parties latérales mineures (9) qui sont positionnées sur les côtés opposés de l'article (3), sont transversales par rapport aux parties latérales majeures (8) et sont raccordées aux parties latérales majeures (8) par des bords latéraux (24) respectifs ; le premier rabat d'étanchéité (23) s'étendant sensiblement le long d'un bord latéral (24) respectif, et étant plié sur l'une des parties latérales ma-

- jeunes (8) de l'enveloppe partielle (21) ; et les extrémités ouvertes (22) de l'enveloppe partielle (21) étant fermées et scellées pour les saisir afin de former les deux seconds rabats d'étanchéité (35) sensiblement transversalement par rapport au premier rabat d'étanchéité (23) et aux parties latérales mineures (9) ; dans lequel les languettes (46) sont pliées sur la partie d'extrémité lorsque la feuille (7), pliée autour de l'article (3), est alimentée dans une direction sensiblement parallèle à ladite partie d'extrémité (10) et auxdites languettes (46), et en particulier transversalement par rapport aux parties latérales majeures (8).
2. Procédé selon la revendication 1, dans lequel un rail (47) comprend une première partie (48) qui plie une languette (46) respective approximativement à 90° dans une position sensiblement perpendiculaire à une partie d'extrémité (10) respective ; et une seconde partie (49), après la partie (48), pour plier la languette (46) sur la partie d'extrémité (10) .
 3. Procédé selon la revendication 1 ou 2, dans lequel un dispositif de pliage (42) pour plier les languettes comprend quatre rails rabattables (47), chacun conçu de sorte que chaque languette, lorsqu'elle coulisse le long du rail (47) respectif, est pliée approximativement à 180° sur la partie d'extrémité (10) respective.
 4. Procédé selon l'une des revendications précédentes, dans lequel le premier rabat d'étanchéité (23) est tout d'abord plié pour faire saillie sensiblement perpendiculairement à ladite partie latérale majeure (8) relative, est maintenue dans cette position et est ensuite pliée sur la partie latérale majeure (8) relative.
 5. Procédé selon l'une des revendications précédentes, dans lequel l'article (3) comprend deux parois d'extrémité (4) sensiblement opposées ; deux parois latérales majeures (5) sensiblement opposées transversalement par rapport aux parois d'extrémité (4), et deux parois latérales mineures (6) transversalement par rapport aux parois d'extrémité (4) et aux parois latérales majeures (5) ; la feuille (7) étant pliée et scellée de sorte que chaque partie latérale majeure (8) de l'enveloppe partielle (21) est positionnée au niveau d'une paroi latérale majeure (5) respective, et chaque partie latérale mineure (9) de l'enveloppe partielle est positionnée au niveau d'une paroi latérale mineure (6) respective.
 6. Procédé selon l'une des revendications précédentes, dans lequel les languettes (46) sont sensiblement pliées approximativement à 180° sur la partie

d'extrémité (10), en couissant chacune le long d'un rail (47) respectif d'un dispositif de pliage (42).

7. Machine pour former une enveloppe scellée (2) autour d'un article (3), la machine (1) comprenant :

un premier dispositif de pliage (12) pour plier une feuille (7) de matériau d'emballage en U autour de l'article (3), de sorte que la feuille pliée (7) a une paire de rabats en saillie, en vis-à-vis, sensiblement parallèles (18, 19, 19') sur chaque côté libre de l'article (3) ; un premier dispositif d'étanchéité (20) pour superposer et sceller les rabats (19, 19') en une paire afin de former une enveloppe partielle (21) sensiblement tubulaire ayant deux extrémités ouvertes (22), et un premier rabat d'étanchéité (23) faisant saillie vers l'extérieur transversalement par rapport à l'enveloppe partielle (21) ; un deuxième dispositif de pliage (28) pour plier le premier rabat d'étanchéité (23) sur une surface externe de la feuille (7) ; et deux seconds dispositifs d'étanchéité (39) pour sceller les extrémités ouvertes (22) de l'enveloppe partielle (21) ; au moins un rétracteur (38) pour déformer au moins l'une des extrémités ouvertes (22) de l'enveloppe partielle (21) afin de définir deux rabats en vis-à-vis ; chaque second dispositif d'étanchéité (39) saisissant et scellant lesdits rabats en vis-à-vis afin de former une partie d'extrémité (10) fermée respective et un second rabat d'étanchéité (35), qui fait saillie de la partie d'extrémité (10) et définit un joint d'étanchéité de la partie d'extrémité (10) ; et un troisième dispositif de pliage (42) pour plier le second rabat d'étanchéité (35) sur la partie d'extrémité (10) relative de sorte que deux languettes (46) du second rabat d'étanchéité (35) font saillie latéralement sur les côtés opposés de la partie d'extrémité (10) ; le troisième dispositif de pliage (42) pliant également chaque languette (46) sur la partie d'extrémité (10) ; dans lequel le premier dispositif de pliage (12) et le premier dispositif d'étanchéité (20) plient et scellent la feuille (7) autour de l'article (3) de sorte que l'enveloppe partielle (21) comprend deux parties latérales majeures (8) sur les côtés opposés de l'article (3) ; et deux parties latérales mineures (9) qui sont positionnées sur les côtés opposés de l'article (3), sont transversales par rapport aux parties latérales majeures (8), et sont raccordées aux parties latérales majeures (8) par des bords latéraux (24) respectifs ; le premier rabat d'étanchéité (23) s'étendant le long d'un bord latéral (24) respectif ; le second dispositif de pliage (28) pliant le premier rabat d'étanchéité sur l'une des parties latérales ma-

- jeunes (8) de l'enveloppe partielle (21) ; et chaque second dispositif d'étanchéité (39) comprenant au moins une unité de préhension pour fermer et sceller les extrémités ouvertes (22) de l'enveloppe partielle (21) afin de former deux second rabats d'étanchéité (35) transversalement par rapport au premier rabat d'étanchéité (23) et aux parties latérales mineures (9) ; dans lequel les languettes (46) sont pliées sur la partie d'extrémité lorsque la feuille (7), pliée autour de l'article (3), est alimentée dans une direction sensiblement parallèle à ladite partie d'extrémité (10) et auxdites languettes (46), et en particulier transversalement par rapport aux parties latérales majeures (8).
8. Machine selon la revendication 7, et comprenant un rail (47) qui comprend une première partie (48) pour plier une languette (46) respective approximativement à 90° dans une position sensiblement perpendiculaire à la partie d'extrémité (10) respective ; et une seconde partie (49), après la partie (48), pour plier la languette (46) sur la partie d'extrémité (10).
9. Machine selon la revendication 7 ou 8, dans laquelle l'unité de préhension comprend deux mâchoires de thermosoudage (41).
10. Machine selon l'une des revendications 7 à 9, dans laquelle le premier dispositif de pliage (12) comprend au moins une poche (16) ; et une unité de poussée (13) pour alimenter l'article (3), transversalement par rapport à la feuille (7), dans la poche (16), de sorte que la feuille (7) est poussée dans la poche (16) par l'article (3) et pliée en U autour de l'article (3) .
11. Machine selon la revendication 10, et comprenant un transporteur (43) pour alimenter l'article (3), dans une direction transversale par rapport au second rabat d'étanchéité (35) faisant saillie de la partie d'extrémité (10), le long d'une partie d'une trajectoire d'alimentation (P), laquelle partie est positionnée en aval des seconds dispositifs d'étanchéité (39) et au niveau du troisième dispositif de pliage (42) ; le troisième dispositif de pliage (42) comprenant au moins un élément (44) sensiblement fixe qui intercepte le second rabat d'étanchéité (35) pour plier le second rabat d'étanchéité (35) sur la partie d'extrémité (10) .
12. Machine selon l'une des revendications 7 à 11, dans laquelle le troisième dispositif de pliage (42) comprend au moins deux rails (47) conçus de sorte que chaque languette (46), lorsqu'elle coulisse le long du rail (47) relatif, est pliée approximativement à 180° sur la partie d'extrémité (10) relative.

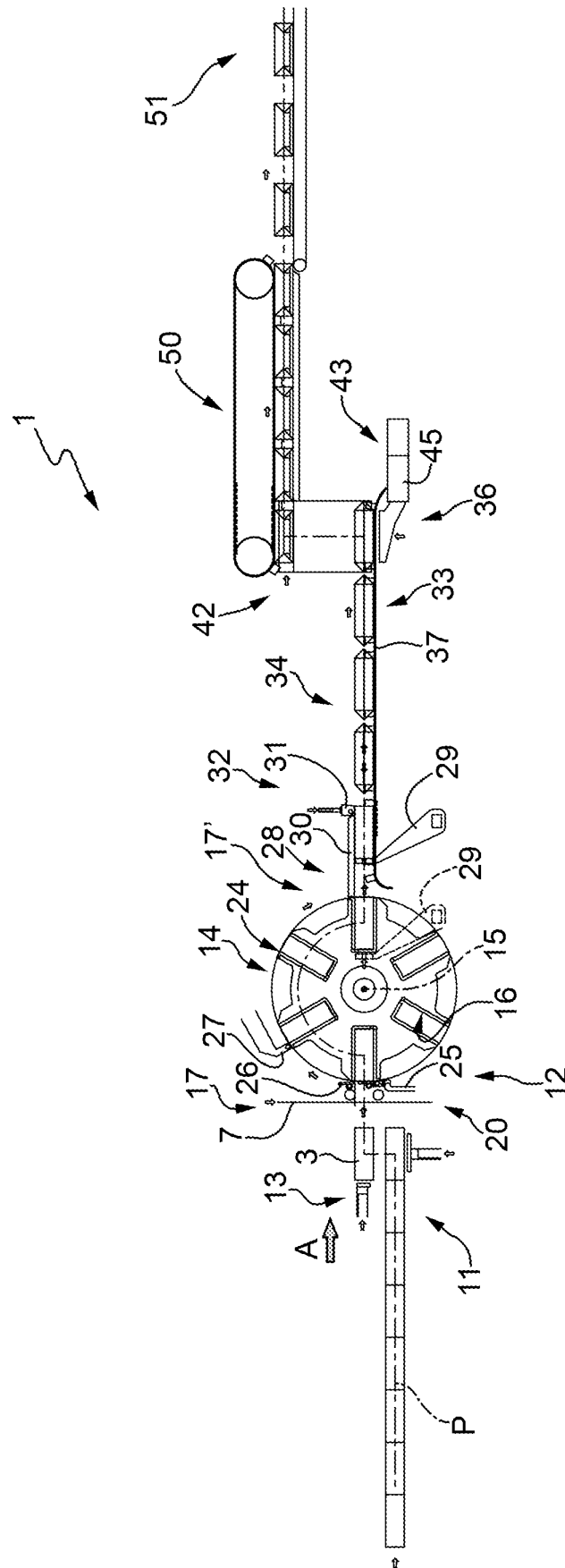


FIG.1

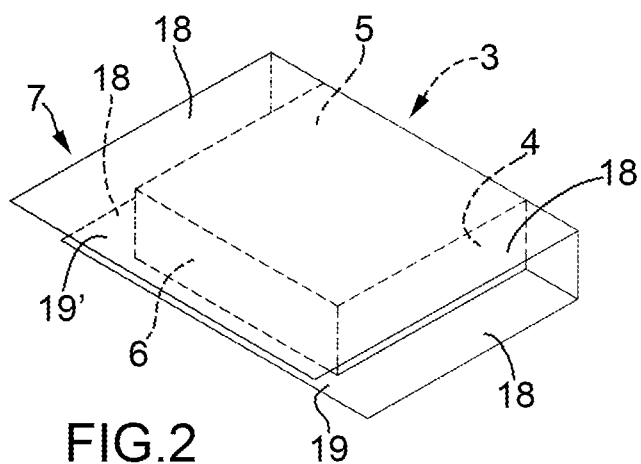


FIG. 2

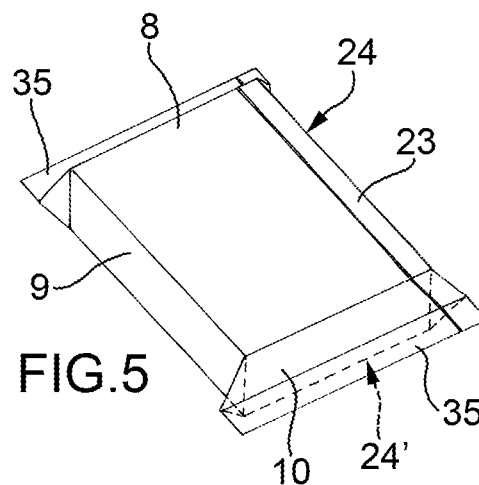


FIG. 5

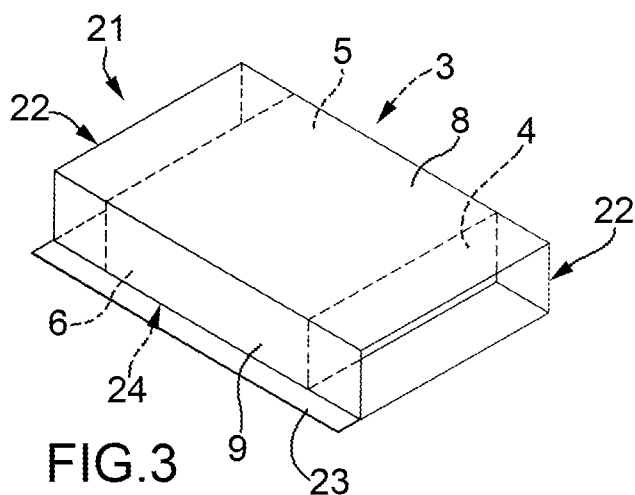


FIG. 3

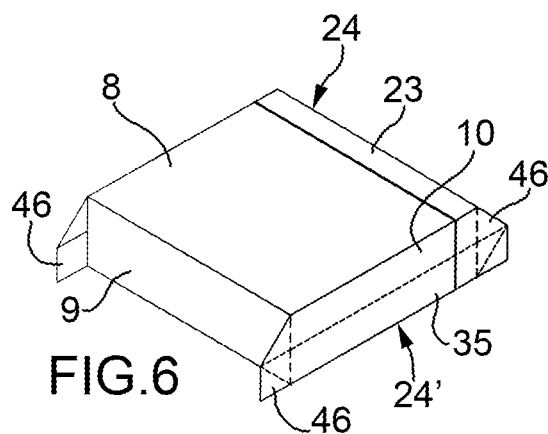


FIG. 6

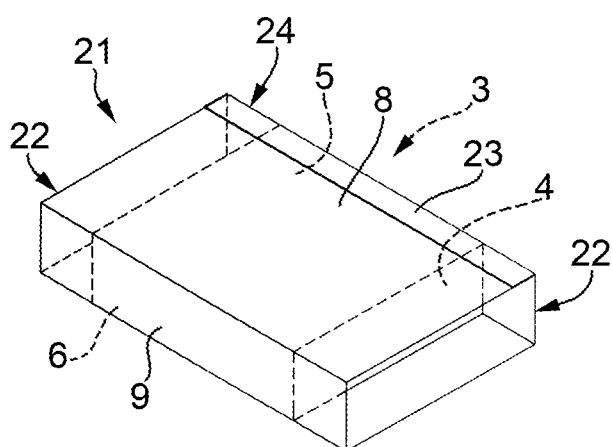


FIG. 4

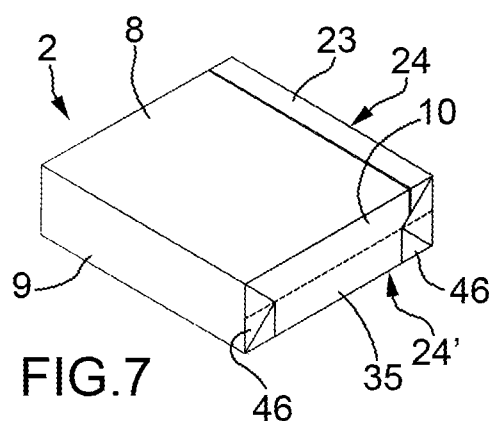
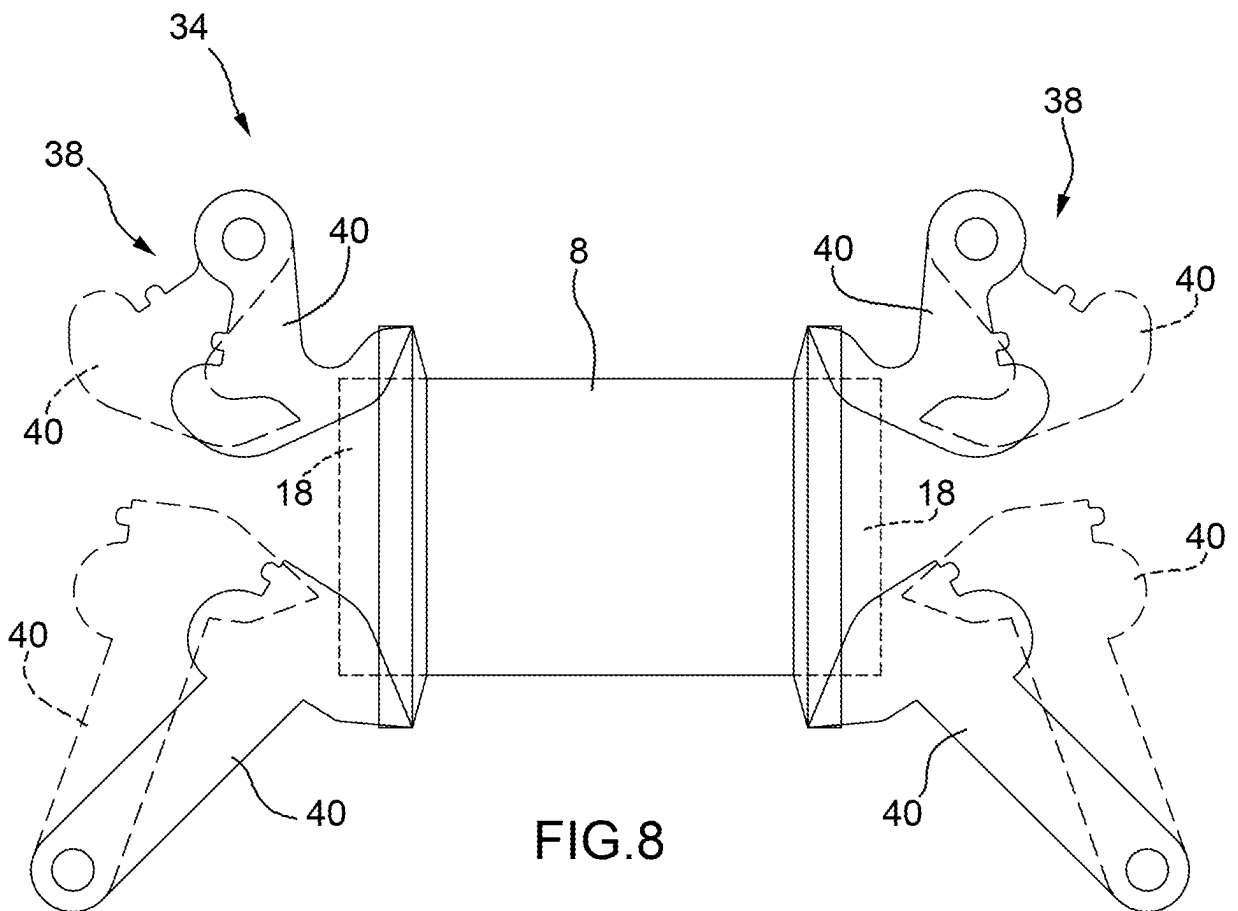
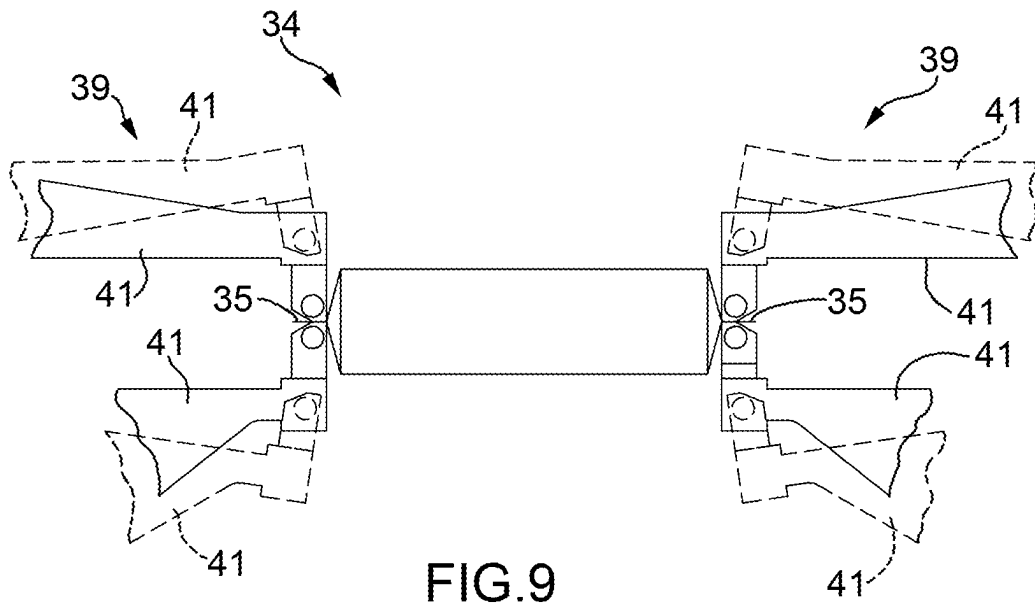
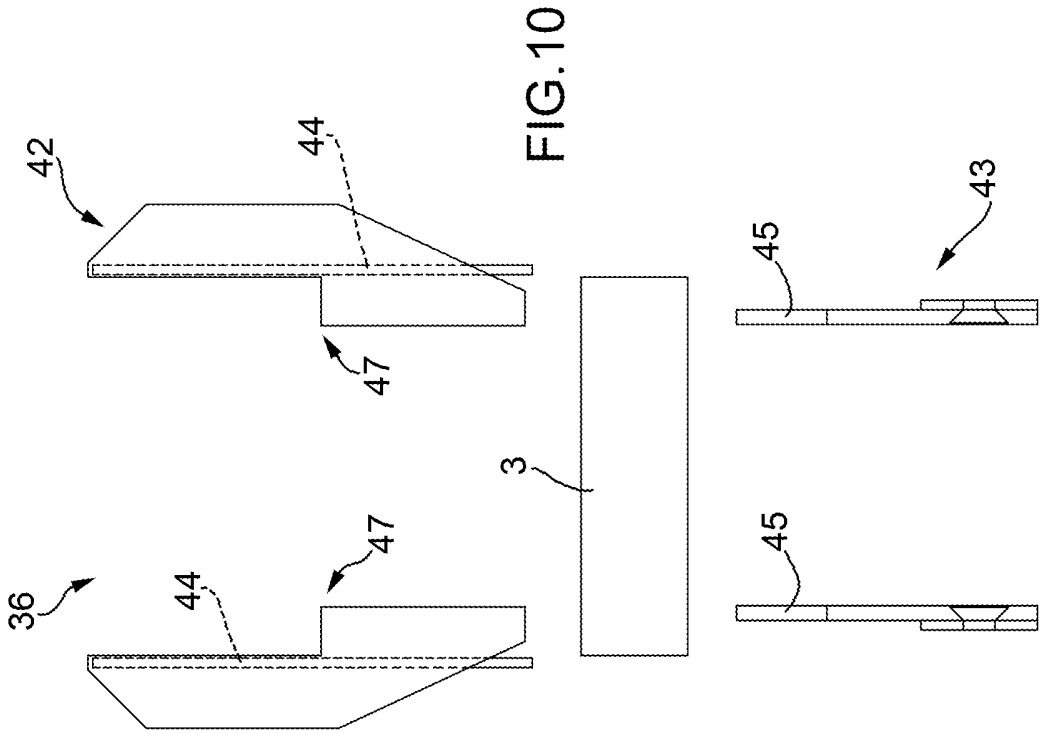
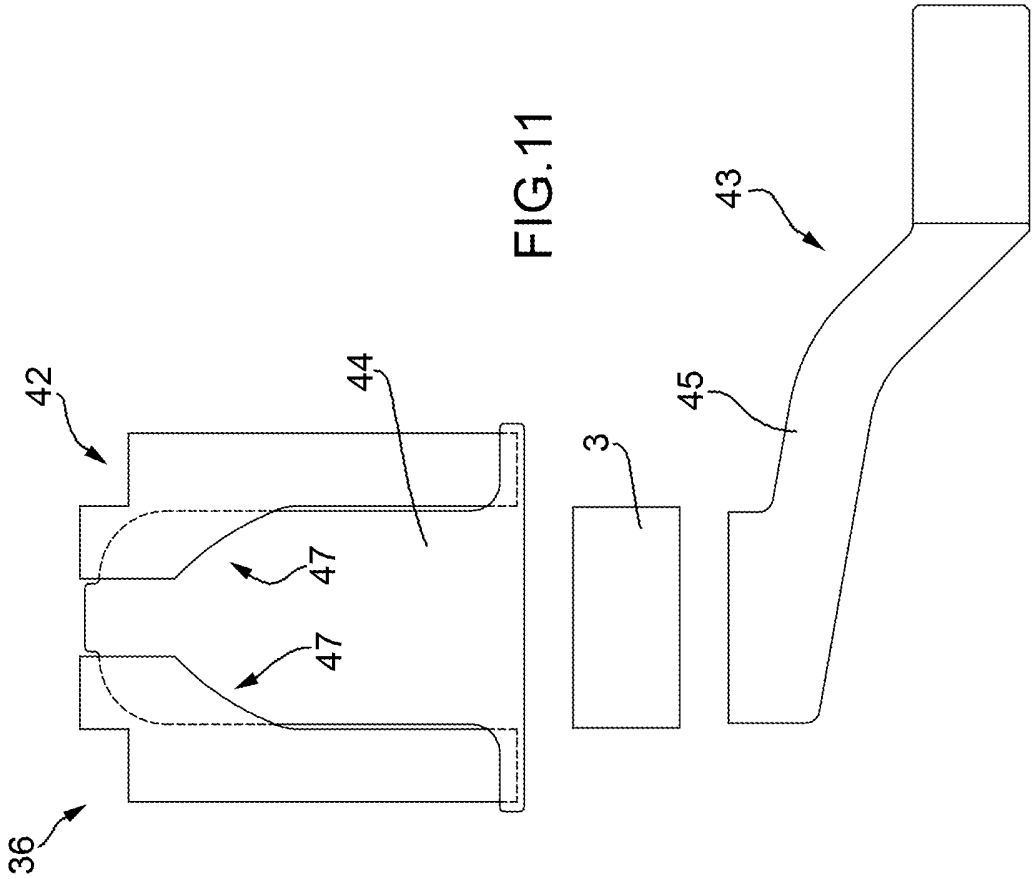
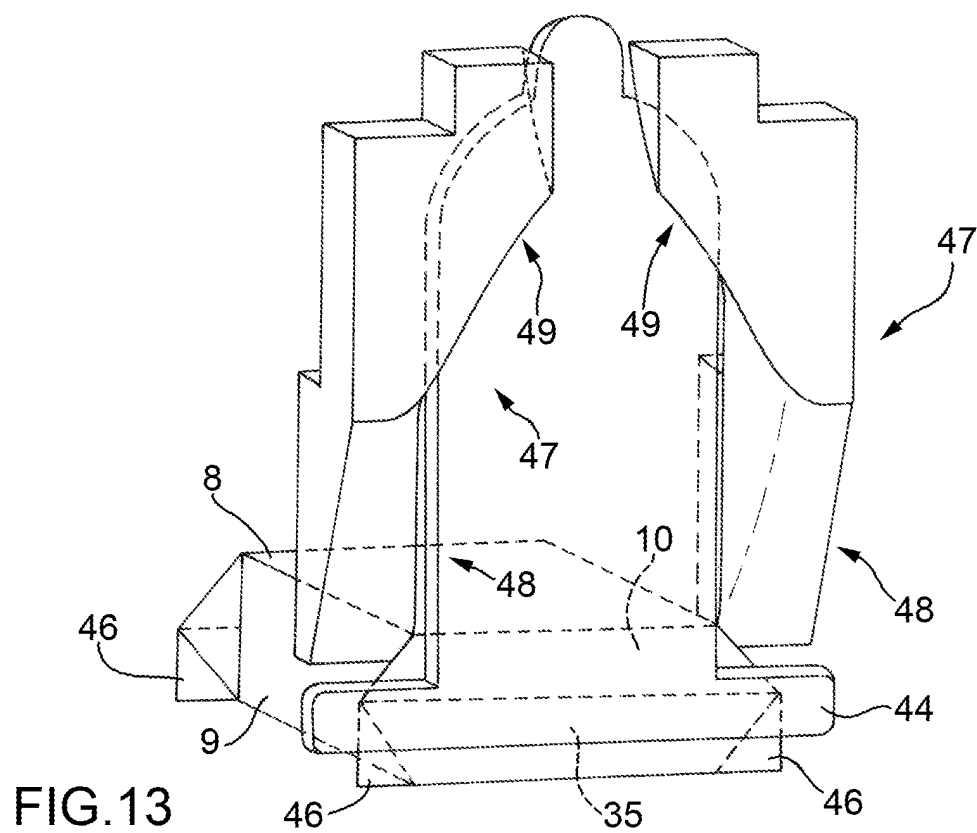
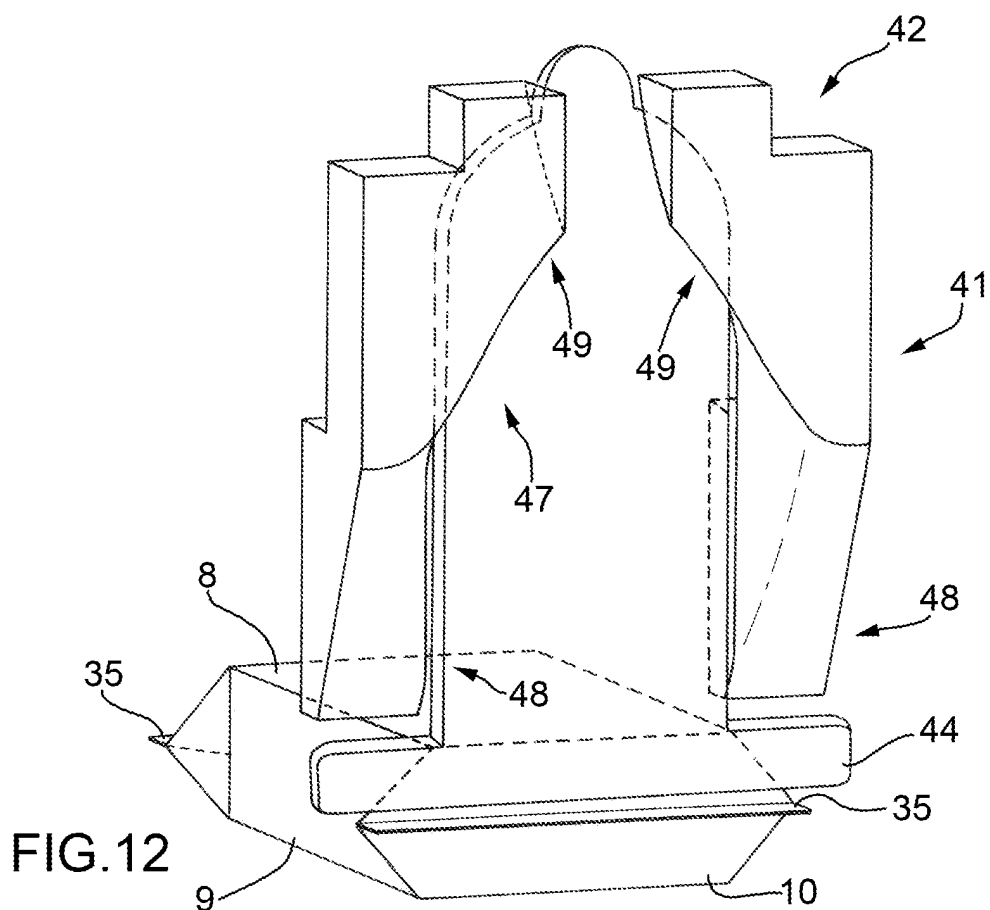
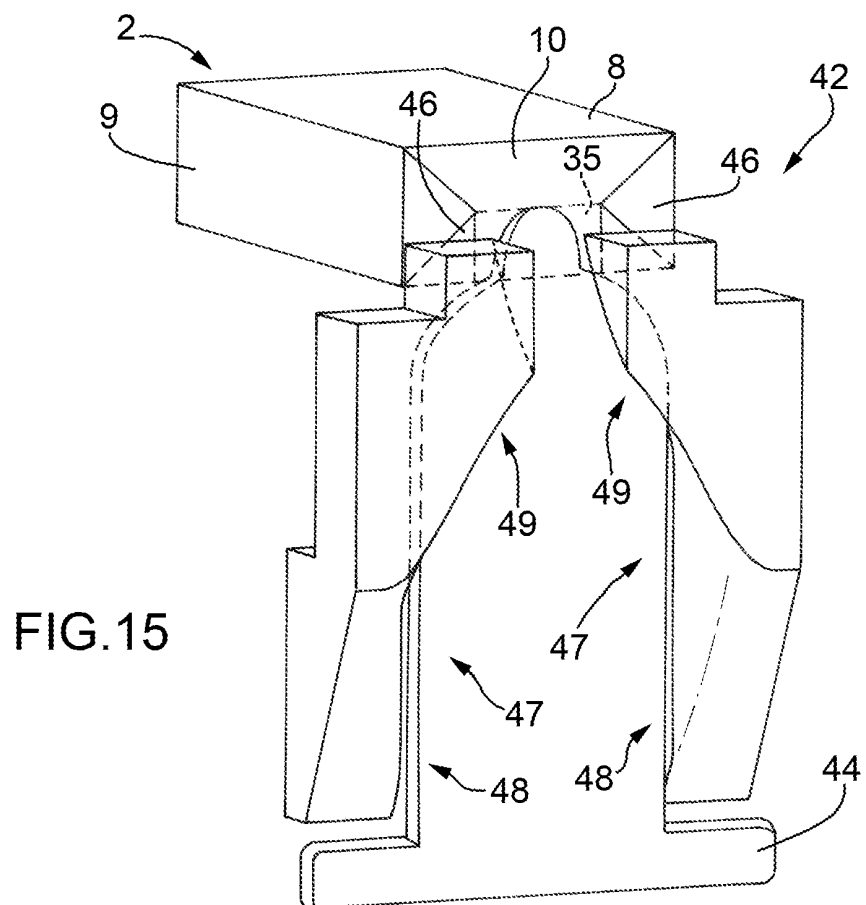
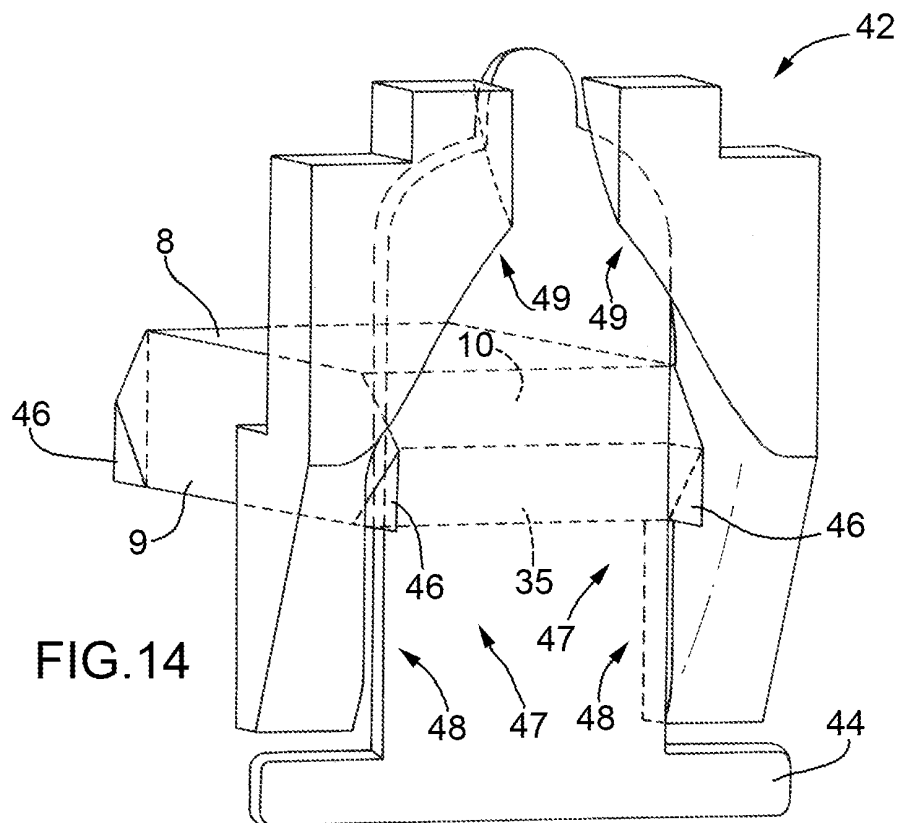


FIG. 7









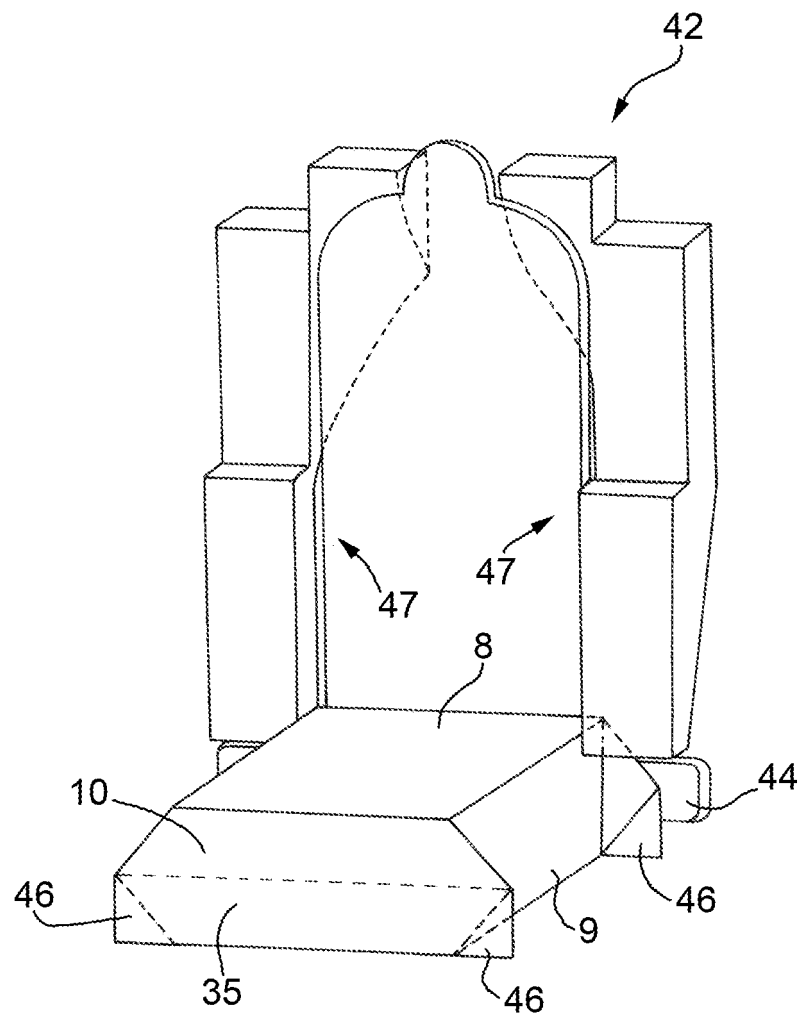


FIG.16

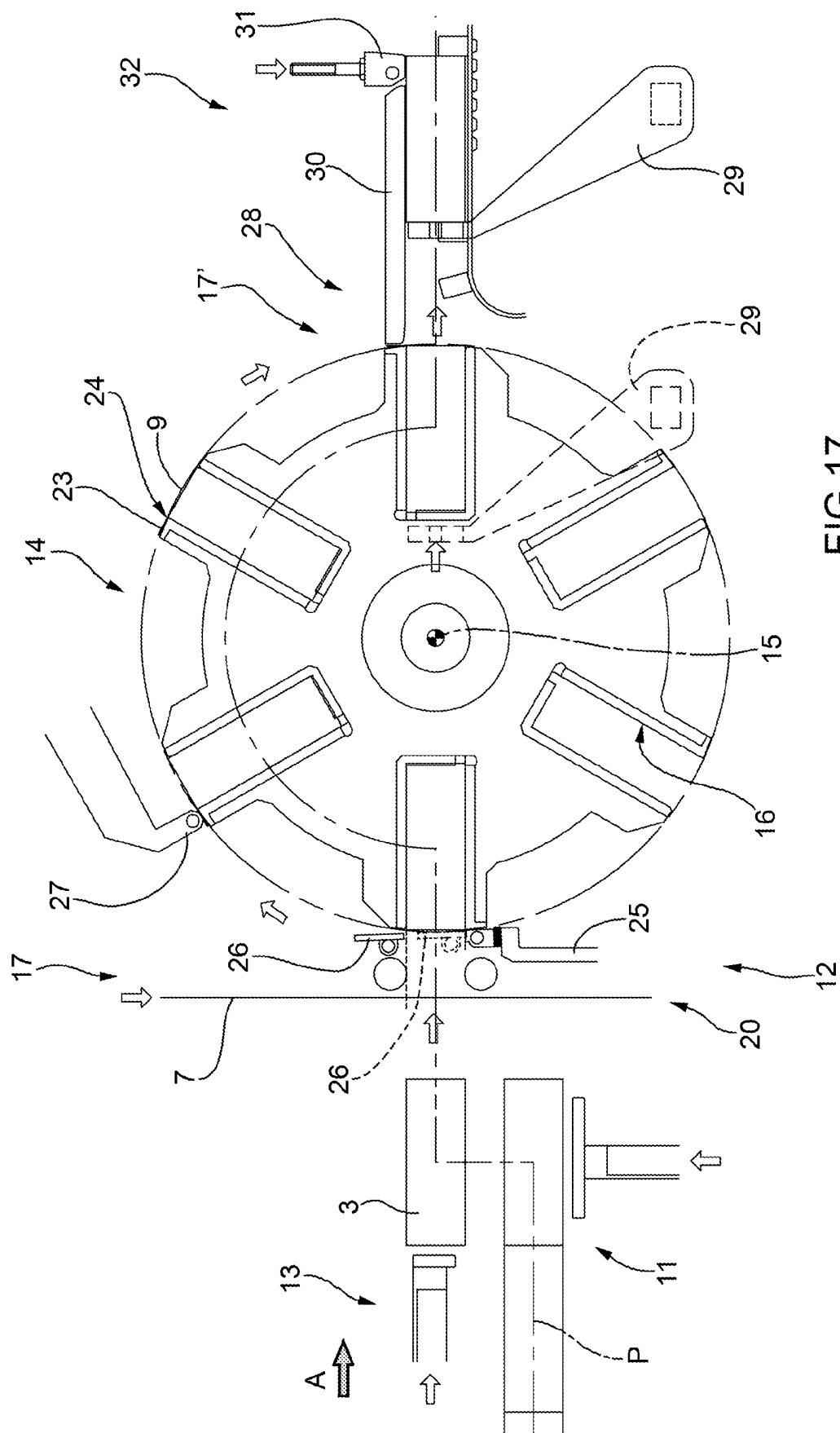


FIG.17

REFERENCES CITED IN THE DESCRIPTION

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