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(54) **PACKAGING MACHINERY**

VERPACKUNGSMASCHINE

MACHINE A EMBALLER

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Description

[0001] The invention relates to machinery for packaging a plurality of articles, such as bottles or cans, in a carton. More particularly it relates to machinery for packaging cartons containing multiple layers or tiers of articles in a carton.

[0002] It is known from US 5246113 (Schuster) to provide a fully enclosed carton containing two layers of articles separated by a divider panel. In order to load the carton Schuster teaches that a lower array of articles is first formed, onto which a divider panel is packed prior to pushing an upper array of articles over the divider panel and then pushing the double layer arrangement into an end-loaded carton. Schuster also teaches the use of deformable portions in the divider to enable upper and lower articles to be nested at their adjacent ends. However, the adjacent articles and deformable portions are only nested after stacking which requires that the upper and lower groups of articles must be accurately aligned prior to nesting. Schuster does not teach how this is accurately done. Also, Schuster does not address, amongst other things, the problem of packaging stacked articles in wraparound cartons.

[0003] The present invention seeks to avoid or at least mitigate various problems of the prior art.

[0004] According to a first aspect of the invention there is provided a packaging machine for packaging layers of articles in a carton separated by a divider panel having deformable means for nesting between adjacent articles on opposite sides of said panel, which machine comprises means for locating said divider panel such that said divider panel is located in registry with the articles in first layer, means for deforming the deformable means such that the ends of said articles and said deformable means are at least partially nested and means to convey said divider panel and said first layer of articles together along a feed path and further comprising means for thereafter positioning a second article in nested relationship with the first layer of articles and said divider panel.

[0005] According to an optional feature of the first aspect of the invention said deforming means may comprise a device for simulating the end of the article to be nested in the divider panel deformable means thereby adapting the deformable means to the end of the first article so as to be nestable with the second article.

[0006] According to a further feature of the first aspect of the invention said simulating device may comprise a cup device for emulating the end of an article. Optionally, said deforming means comprises a plurality of said simulating devices in a continuous series. Preferably, two or more series of said simulating devices may be provided adjacent one another.

[0007] According to another optional feature of the first aspect of the invention said simulating device may further comprise means for mounting said series of said simulating devices for rotary movement toward and away from the first articles.

[0008] According to yet another optional feature of the first aspect of the invention said conveying means may comprise a conveyor having means for cooperating with the divider panel thereby to convey the divider panel in a predetermined manner, said conveying means comprising a lug for cooperating with at least one recess defined in the divider panel. Preferably, said lug may be conveyed through an endless path.

[0009] According to another optional feature of this aspect of the invention said locating means may comprise a member for effecting displacement of a displaceable part of the divider panel into an operative position in contact with the articles. Optionally, said member may comprise a finger mounted to radially extend from a rotatable device for entry into and exit from an aperture defined in said divider panel, and wherein said displaceable part comprises a tab struck from said aperture.

[0010] According to a further optional feature of the first aspect of the invention the positioning means may comprise means for stacking a second article in registry with the first article and the deformable means, wherein said stacking means comprises a means to enable the second article to drop onto said deformable means.

[0011] Another optional feature of the first aspect of the invention may further comprise means defining a first feed path for feeding first articles and means defining a second feed path for feeding second articles, and wherein said stacking means comprises a regulator to regulate the movement of the first and second article along respective ones of said feed paths. Preferably said regulator effects registry of the ends of the articles prior to stacking. More preferably, said regulator comprises a chute through which one of the articles moves in order to abut said divider panel and the other article in a stacked arrangement. Optionally, the regulator further comprises a star wheel.

[0012] According to another optional feature of the first aspect of the invention the lug may be adapted to positioning said divider panel at one end of a first article such that the deformable means is located in registry with an end of the first article.

[0013] A further optional feature of the first aspect of the invention provides means for applying a wraparound carton to stacked layers of first and second articles.

[0014] A second aspect of the invention provides a method of packaging in a carton layers of articles separated by a divider panel having deformable means for nesting between adjacent articles on opposite sides of the panel, comprising the steps of positioning a divider panel on a first layer of articles such that said deformable means is located in registry with the ends of the articles, and deforming the deformable means such that the ends of the articles and said deformable means are at least partially nested, and positioning a second layer of articles in nested relationship with said layer of articles and said divider panel.

[0015] According to an optional feature of the second

aspect of the invention the step of deforming said deforming means may be performed using a device which simulates the end of the article to be nested in said divider panel deformable means. Preferably, there may comprise the further step of using a plurality of said simulating devices to deform a plurality of said deformable means. More preferably, a series of said simulating devices may be used in a continuous series.

[0016] Optionally, said simulating device or, as the case may be, said series of simulating devices is rotated in use.

[0017] According to another optional feature of the second aspect of the invention, there may further comprise the steps of wrapping a carton blank having a series of hingably interconnected panels around the stacked group of articles and locking the ends of the blank together to form a packaged carton.

[0018] In a third aspect of the invention there is provided apparatus for locating and nesting a divider panel having deformable means for nesting between adjacent articles on opposite sides of said panel, which apparatus comprises means for locating said divider panel such that said divider panel is located in registry with the end of at least one article, means for deforming the deformable means such that the end of said at least one article and said deformable means are at least partially nested and a means to convey or to convey said divider panel and said first layer of articles together along a feed path.

[0019] According to an optional feature of the third aspect of the invention said deforming means may comprise a device for simulating the end of the article to be nested in the divider panel deformable means thereby adapting the deformable means to the end of the first article so as to be nestable with the second article.

[0020] According to another optional feature of the third aspect of the invention said simulating device comprises a cup device for emulating the end of an article.

[0021] According to yet another optional feature of the third aspect of the invention said deforming means may comprise a plurality of said simulating devices in a continuous series. Preferably. two or more series of said simulating devices are provided adjacent one another.

[0022] According to a further optional feature of the third aspect of the invention said simulating device may further comprise means for mounting said series of said simulating devices for rotary movement toward and away from the first articles.

[0023] According to a yet another optional feature of this aspect of the invention said locating means may comprise a member for effecting displacement of a displaceable part of the divider panel into an operative position in contact with the articles. Preferably, said member may comprise a finger mounted to radially extend from a rotatable device for entry into and exit from an aperture defined in said divider panel, and wherein said displaceable part comprises a tab struck from said aperture.

[0024] A further aspect of the invention provides a carton produced by any of the machine aspects or according to any of the method aspects of the invention.

[0025] An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

FIGURE 1 is a schematic perspective view of a packaging machine according to one embodiment of the invention;
FIGURES 2 to 5 are schematic perspective views of arrays of articles and a divider panel at various stages in the packaging process according to the invention;
FIGURE 6 is a schematic perspective view of a divider panel clipping part of the machinery shown in Figure 1;
FIGURE 7 is a schematic perspective view of a punch wheel part of the machine shown in Figure 1;
FIGURE 8 is a schematic perspective view of a stacking part of the machinery shown in Figure 1;
FIGURE 9 is an enlarged perspective view of part of the stacking device shown in Figure 8; and
FIGURE 10 is a schematic perspective view of a packaged carton produced using the machinery of Figures 1 to 9.

[0026] Referring to Figure 1 there is shown a packaging machine 10 according to one embodiment of the invention. In general terms, the machine takes an incoming feed of articles such as cans of drinks and divides these into upper and lower feed paths. A divider panel, or insert, is added to arrays of articles in the lower feed path and then the panel is manipulated to ensure that deformable portions of the divider panel are properly nested with the tops of articles. The upper layer of articles is then stacked on top of the divider panel in register with a lower article such that the bottom of an upper article nests in the deformable portion of the divider panel which is nested in the upper part of the lower article. The stacked, divided, double layer of articles are then packaged in a carton, which in this example is of the wraparound type.

[0027] The fact that the upper and lower articles are nested, described more fully later on with reference to Figures 2 to 5, means that the stacked articles will not settle significantly in the packaged carton during storage or transportation. Accordingly the articles should be retained in a tight fit within a wraparound carton. Of course, the divider panel 13 also ensures that the tops and bottoms of adjacent articles do not rub against one another in a packaged carton which would otherwise create unsightly marking of the ends of at least one of the articles. For example, where the articles A are made of aluminum, constant rubbing of adjacent ends of stacked articles can lead to an unsightly deposit containing aluminum oxide, on one of the ends. Additionally, movement of the articles can lead to damage to the

ends of the articles, including to ring pulls at the end of a can.

[0028] Referring more specifically to the components of machine 10 as shown in Figure 1, it can be seen that two lower rows of articles 38 are fed along a conveyor 36 into the machine. The flow of articles A in rows 38 is regulated by a pair of so-called star wheels 40. A feeder mechanism 16 draws divider panels, or inserts, 13 from a hopper 12, which in this example comprises an extension feature 14 for holding a large number of inserts 13. The feeder mechanism 16 may comprise vacuum cups for example which pick up the front divider panel 13 from the hopper and transport it to a position adjacent the tops of articles A in lower rows 38.

[0029] As can be seen in Figure 2, the divider panels 13 comprise lateral recesses 60 which enable the panel to be carried by lug chains 42 provided adjacent the tops of articles A on each side of the rows 38. Thus, by synchronising the movement of lug chains 42 with the regulated flow of rows 38 and feeder 16, an array of articles and a divider panel 13 can be brought together with the deformable portion 62 of divider panel 13 being in register with the tops of articles A in the array.

[0030] The arrays of articles and the divider panel are then conveyed along the lower feed path to an insert clipping wheel 18 which causes locking tabs 64 defined in insert 13 to be forced out of the plane of the divider panel such that they wedge between the tops of adjacent articles in the lower array. In this example, the articles A are cans which have an upper rim R which is of lesser diameter than the main body diameter of the substantially cylindrical cans. The locking tabs 64 can therefore be positioned in the gap between rims of adjacent articles thereby to hold the divider panel 13 in place during movement of the lower array of articles.

[0031] Insert clipping device 18 is shown in greater detail in Figure 6 which shows that the device comprises a cylindrical wheel 74 which is driven by means not shown to cause radially extending figures 70 to rotate about the central axis of wheel 74. The shaped end portion 72 of a finger 70 abuts the upper surface of a locking tab 64 of divider panel 13 as the fingers rotate to a lowermost position. Advantageously, the end portions 72 can be rounded to enable easy entry and exit of the fingers from the apertures surrounding tab 64 in the divider panel 13.

[0032] An array of articles as shown in Figure 3 is then conveyed to a punch wheel 20 which is shown in greater detail in Figure 7. The punch wheel comprises a cylindrical wheel 84 which is driven about its cylindrical axis by a means not shown. The cylindrical surface of wheel 84 comprises two rows of hollow cylindrical cups 80 which each have a rim 82 to simulate the base of an article. The movement of punch wheel 20 is again synchronised with the movement of the lower arrays of articles and divider panels such that individual cups 80 cause the deformable portion 62 in panels 30 to deform and thus nest in the top of the article A. As can be seen in Figure 5 for example, the articles comprise an upper end which is longitudinally recessed with a respect to upper rim R. Thus, the deformable portion 62 provides a cuplike structure between the rim R and the end of an article. This arrangement is shown in Figure 4. Thus, the divider panel 13 can be held in place on a lower array of articles due to the effects of one or both of the tabs 64 and the deformable portion 62. Additionally, lug chains 42 can still engage recesses 60 thereby ensuring that individual divider panels 13 are accurately positioned with respect to an array of articles.

[0033] An upper array of articles is now created ready to be stacked on top of an array such as shown in Figure 4. In this example (see Fig. 1), two upper rows 44 of articles are conveyed along conveyors 22. The rows can be guided by fixed rails not shown in the attached drawings. The flow of a row of articles 44 can be regulated by a star wheel 46. As shown in Figure 8 the rows 44 are brought together over a dividing plate 91.

[0034] The movement of both the upper and lower arrays of articles is then regulated by a device 48 shown more clearly in Figure 9. In this example regulator 48 which effects the stacking of an upper and lower pair of articles comprises a pair of star wheels 90 and 92. The star wheels comprise a series of toothed plates 94. The plates 94 comprise recesses 98 separated by teeth 96 which acts to engage part of the circumference of an article. A lower and upper set of plates is provided to engage lower and upper articles. The upper and lower sets of plates are separated by a gap 99 to allow for dividing plate 91.

[0035] As can be seen in Figure 9 aligned recesses in the upper and lower sets of plates 94 effect an alignment of an upper and lower article such that as the star wheel 90 or 92 rotates it provides an effective chute through which an upper article falls under gravity into the cup defined by deformable portion 62 in the top of the lower article. By repeating this process, a stacked array as shown in Figure 5 is created. Of course, the number of articles in a stacked group can be anything from a stacked pair, three or four stacked articles and so on. The arrays can of course comprise any number of rows.

[0036] The stacked array can be conveyed as a unit, for example, using a conventional conveyor beneath the lower array of articles, to a carton loading station.

[0037] In this example, the stacked array of articles are loaded into a wraparound carton to provide a packaged carton 100 as shown in Figure 10. Referring to Figure 1, machine 10 comprises a hopper 24 for a stack of cartons 26. An individual carton 100 can be withdrawn from the front of the stack 26 using a feeder mechanism 28 similar to mechanism 16 described earlier. A carton 100 can thus be moved from hopper 24 to a feed chain 30 which can comprise lugs for example which engage cooperating parts of the carton to enable it to be conveyed to an overhead boom chain 34. At front section 50 of the boom chain 34 a device initially

presses the top panel 110 of the carton against the upper ends of the upper articles. The sides 114 and 124 of the carton 100 are then folded downwardly using folding wheel 32. The sides of the cartons are then guided by a carton side lug chain 52 along to an article heel expander device 54 which causes known article heel engaging devices 104, provided by the carton, to be expanded prior to pressing the sides of the carton 114 and 124 against the sides of the array of stacked articles. Boom chain 34 continues to press the top of the carton against the array of articles whilst a known locking mechanism 56 effects the folding of heel panels 116 and 122 and base panel portion 118 and 120 about the underside of the stacked array of articles. Alternatively, the base panel portions may be glued.

[0038] Of course, individual stations, or parts of the machinery, are independently operable and could be used in other types of carton packaging machinery such as for end loaded cartons for example.

Claims

1. A packaging machine (10) for packaging layers of articles (38, 44) in a carton (100) separated by a divider panel (13) having deformable means (62) for nesting between adjacent articles (A) on opposite sides of said panel (13), which machine (10) comprises means for locating said divider panel such that said divider panel is located in registry with the articles in first layer, means for deforming the deformable means (62) such that the ends of said articles (A) and said deformable means are at least partially nested and means to convey said divider panel and said first layer (38) of articles together along a feed path, further comprising means for thereafter positioning a second article (44) in nested relationship with the first layer of articles and said divider panel.

2. A packaging machine according to claim 1 wherein said deforming means comprises a device (20) for simulating the end of the article to be nested in the divider panel deformable means thereby adapting the deformable means to the end of the first article so as to be nestable with the second article.

3. A machine according to claim 2 wherein said simulating device (20) comprises a cup device (80) for emulating the end of an article.

4. A machine according to claims 2 or 3 wherein said deforming means comprises a plurality of said simulating devices (20) in a continuous series.

5. A machine according to claim 4 wherein two or more series of said simulating devices are provided adjacent one another.

6. A machine according to any of claims 2 to 4 wherein said simulating device (20) further comprises means (84) for mounting said series of said simulating devices for rotary movement toward and away from the first articles.

7. A machine according to any preceding claim wherein said conveying means comprises a conveyor (42) having means for cooperating with the divider panel thereby to convey the divider panel in a predetermined manner, said conveying means comprising a lug for cooperating with at least one recess (60) defined in the divider panel (13).

8. A machine according to claim 7 wherein said lug is conveyed through an endless path.

9. A machine according to claim 7 or claim 8 wherein the lug is adapted to positioning said divider panel at one end of a first article such that the deformable means is located in registry with an end of the first article.

10. A machine according to any one of the preceding claims wherein said locating means comprises a member (18) for effecting displacement of a displaceable part (64) of the divider panel into an operative position in contact with the articles (A).

11. A machine according to claim 10 wherein said member (18) comprises a finger (70) mounted to radially extend from a rotatable device (74) for entry into and exit from an aperture defined in said divider panel (13), and wherein said displaceable part comprises a tab (64) struck from said aperture.

12. A packaging machine according to claim 11 wherein the positioning means comprises means for stacking a second article in registry with the first article and the deformable means, wherein said stacking means comprises a means to enable the second article to drop onto said deformable means.

13. A machine according to claim 12 further comprising means defining a first feed path (42) for feeding first articles and means (22, 91) defining a second feed path for feeding second articles, and wherein said stacking means comprises a regulator to regulate the movement of the first and second article along respective ones of said feed paths.

14. A machine according to claim 13 wherein said regulator effects registry of the ends of the articles prior to stacking.

15. A machine according to claim 14 wherein said regulator comprises a chute through which one of the articles moves in order to abut said divider panel

and the other article in a stacked arrangement.

16. A machine according to claim 14 or claim 15, wherein the regulator further comprises a star wheel (90, 92).

17. A machine according to any of claims 12 to 16 further comprising means (28, 30, 52. 54) for applying a wraparound carton (100) to stacked layers of first and second articles.

18. A method of packaging in a carton (100) layers of articles (A) separated by a divider panel (13) having deformable means (62) for nesting between adjacent articles on opposite sides of the panel, comprising the steps of positioning a divider panel (13) on a first layer of articles such that said deformable means (62) is located in registry with the ends of the articles, and deforming the deformable means such that the ends of the articles and said deformable means are at least partially nested, and positioning a second layer of articles in nested relationship with said layer of articles and said divider panel.

19. A method according to claim 18 wherein the step of deforming said deforming means is performed using a device (20) which simulates the end of the article to be nested in said divider panel deformable means.

20. A method according to claim 19 comprising the further step of using a plurality of said simulating devices (20) to deform a plurality of said deformable means.

21. A method according to claim 20 wherein a series of said simulating devices is used in a continuous series.

22. A method according to any of claims 19 to 21 wherein said simulating device or, as the case may be, said series of simulating devices is rotated in use.

23. A method according to any one of claims 19 to 22 further comprising the steps of wrapping a carton blank (100) having a series of hingably interconnected panels around the stacked group of articles and locking the ends of the blank together to form a packaged carton.

24. A carton produced according to any of claims 18 to 23..

25. Apparatus for locating and nesting a divider panel (13) having deformable means (62) for nesting between adjacent articles (A) on opposite sides of said panel, which apparatus comprises means (18) for locating said divider panel such that said divider panel is located in registry with the end of at least one article, means (20) for deforming the deformable means such that the end of said at least one article and said deformable means are at least partially nested and a means (42) to convey said deformed divider panel and said first layer of articles together along a feed path.

26. Apparatus according to claim 25 wherein said deforming means comprises a device (20) for simulating the end of the article (A) to be nested in the divider panel deformable means (62) thereby adapting the deformable means to the end of the first article so as to be nestable with the second article.

27. Apparatus according to claim 26 wherein said simulating device comprises a cup device (80) for emulating the end of an article.

28. Apparatus according to claims 26 or 27 wherein said deforming means comprises a plurality of said simulating devices (22) in a continuous series.

29. Apparatus according to claim 28 wherein two or more series of said simulating devices (20) are provided adjacent one another.

30. Apparatus according to any one of claims 26 to 27 wherein said simulating device further comprises means (84) for mounting said series of said simulating devices for rotary movement toward and away from the first articles.

31. Apparatus according to any one of claims 25 to 30 wherein said locating means comprises a member (18) for effecting displacement of a displaceable part (64) of the divider panel into an operative position in contact with the articles (A).

32. Apparatus according to claim 31 wherein said member comprises a finger (70) mounted to radially extend from a rotatable device (74) for entry into and exit from an aperture defined in said divider panel (13), and wherein said displaceable part comprises a tab (64) struck from said aperture.

Patentansprüche

1. Verpackungsmaschine (10) zur Verpackung von Lagen von Gegenständen (38, 44) in einer Schachtel (100), die durch eine Trennwandfläche (13), die eine verformbare Einrichtung (62) aufweist, und zwar zum In-Eingriff-Nehmen angrenzender Gegenstände (A) an gegenüberliegenden Seiten der Wandfläche (13), getrennt ist, wobei die

Maschine (10) eine Einrichtung zum Plazieren der Trennwandfläche umfaßt, derart, daß die Trennwandfläche paßgenau mit den Gegenständen der ersten Lage angeordnet ist, ferner eine Einrichtung zum Verformen der verformbaren Einrichtung (62), derart, daß die Enden der Gegenstände (A) und die verformbare Einrichtung wenigstens teilweise in Eingriff gebracht sind, und eine Einrichtung zum Fördern der Trennwandfläche und der ersten Lage (38) von Gegenständen zusammen entlang eines Zuführweges, sowie ferner eine Einrichtung für das nachfolgende Positionieren eines zweiten Gegenstands (44) in einer in Eingriff nehmenden Beziehung mit der ersten Lage von Gegenständen und der Trennwandfläche.

2. Verpackungsmaschine gemäß Anspruch 1, wobei die Verformungseinrichtung eine Vorrichtung (20) umfaßt, zur Simulation des Gegenstandsendes, das von der verformbaren Einrichtung der Trennwandfläche in Eingriff genommen werden soll, wodurch die verformbare Einrichtung an das Ende des ersten Gegenstands angepaßt wird, so daß sie den zweiten Gegenstand in Eingriff nehmen kann.

3. Maschine gemäß Anspruch 2, wobei die Simulationsvorrichtung (20) eine Napfvorrichtung (80) zur Simulation des Gegenstandsendes umfaßt.

4. Maschine gemäß Anspruch 2 oder 3, wobei die Verformungseinrichtung eine Vielzahl der Simulationsvorrichtungen (20) in einer kontinuierlichen Reihe umfaßt.

5. Maschine gemäß Anspruch 4, wobei zwei oder mehr Reihen der Simulationsvorrichtungen aneinander angrenzend bereitgestellt sind.

6. Maschine gemäß einem der Ansprüche 2 bis 4, wobei die Simulationsvorrichtung (20) weiter eine Einrichtung (84) umfaßt, und zwar zur Befestigung der Reihen der Simulationsvorrichtungen für eine Drehbewegung auf die ersten Gegenstände zu und von ihnen weg.

7. Maschine gemäß einem der vorstehenden Ansprüche, wobei die Fördereinrichtung eine Förderanlage (42) umfaßt, wobei die Förderanlage eine Einrichtung zum Zusammenwirken mit der Trennwandfläche aufweist, wodurch die Trennwandfläche in einer vorbestimmten Weise gefördert wird, und wobei die Fördereinrichtung eine Nase umfaßt, und zwar zum Zusammenwirken mit wenigstens einer Ausnehmung (60), die in der Trennwandfläche (13) definiert ist.

8. Maschine gemäß Anspruch 7, wobei die Nase durch einen Endlosweg gefördert wird.

9. Maschine gemäß Anspruch 7 oder 8, wobei die Nase angepaßt ist, um die Trennwandfläche an einem Ende eines ersten Gegenstands zu positionieren, so daß die verformbare Einrichtung paßgenau mit einem Ende des ersten Gegenstands angeordnet ist.

10. Maschine gemäß einem der vorstehenden Ansprüche, wobei die Anordnungseinrichtung ein Element (18) umfaßt, um eine Verschiebung eines verschiebbaren Teils (64) der Trennwandfläche in eine wirksame Position in Kontakt mit den Gegenständen (A) zu bewirken.

11. Maschine gemäß Anspruch 10, wobei das Element (18) einen Finger (70) umfaßt, wobei der Finger so befestigt ist, daß er sich radial von einer drehbaren Vorrichtung (74) erstreckt, und zwar zum Eintritt in und zum Rückzug aus einer Öffnung, die in der Trennwandfläche (13) definiert ist, und wobei der verschiebbare Teil einen Streifen (64) umfaßt, der aus der Öffnung ausgestanzt ist.

12. Verpackungsmaschine gemäß Anspruch 11, wobei die Positionierungseinrichtung eine Einrichtung zum paßgenauen Stapeln eines zweiten Gegenstands mit dem ersten Gegenstand und der verformbaren Einrichtung umfaßt, wobei die Stapeleinrichtung eine Einrichtung umfaßt, die den zweiten Gegenstand auf die verformbare Einrichtung fallen läßt.

13. Maschine gemäß Anspruch 12, weiter umfassend eine Einrichtung, die einen ersten Zuführweg (42) zur Zuführung von ersten Gegenständen definiert und eine Einrichtung (22, 91), die einen zweiten Zuführweg zur Zuführung von zweiten Gegenständen definiert, und wobei die Stapeleinrichtung einen Regler zur Regelung der Bewegung des ersten und zweiten Gegenstands entlang der jeweiligen Zuführwege umfaßt.

14. Maschine gemäß Anspruch 13, wobei der Regler die paßgenaue Anordnung der Gegenstandsenden vor dem Stapeln bewirkt.

15. Maschine gemäß Anspruch 14, wobei der Regler ein Leitblech umfaßt, durch welches sich einer der Gegenstände bewegt, um die Trennwandfläche und den anderen Gegenstand in eine gestapelte Anordnung zu stoßen.

16. Maschine gemäß Anspruch 14 oder 15, wobei der Regler weiter ein Sternrad (90, 92) umfaßt.

17. Maschine gemäß einem der Ansprüche 12 bis 16, weiter umfassend eine Einrichtung (28, 30, 52, 54) zum Anbringen einer Schachtel des Umwickel-Typs

(100) an gestapelten Lagen von ersten und zweiten Gegenständen.

18. Verfahren zur Verpackung von Lagen von Gegenständen (A) in einer Schachtel (100), die durch eine Trennwandfläche (13), die eine verformbare Einrichtung (62) aufweist, und zwar zum In-Eingriff-Nehmen zwischen angrenzenden Gegenständen an gegenüberliegenden Seiten der Wandfläche, getrennt sind, wobei das Verfahren die Schritte Positionieren einer Trennwandfläche (13) auf einer ersten Lage von Gegenständen umfaßt, derart, daß die verformbare Einrichtung (62) paßgenau mit den Gegenstandsenden angeordnet ist, und Verformen der verformbaren Einrichtung, derart, daß die Gegenstandsenden und die verformbare Einrichtung wenigstens teilweise in Eingriff genommen sind, und Positionieren einer zweiten Lage von Gegenständen in einer in Eingriff nehmenden Beziehung mit der Lage von Gegenständen und der Trennwandfläche.

19. Verfahren gemäß Anspruch 18, wobei der Schritt des Deformierens der verformbaren Einrichtung unter Verwendung einer Vorrichtung (20) durchgeführt wird, die das Ende des Gegenstands, der mit der verformbaren Einrichtung der Trennwandfläche in Eingriff genommen werden soll, simuliert.

20. Verfahren gemäß Anspruch 19, umfassend den weiteren Schritt der Verwendung einer Vielzahl der Simulationsvorrichtungen (20), um eine Vielzahl der verformbaren Einrichtung zu verformen.

21. Verfahren gemäß Anspruch 20, wobei eine Reihe der Simulationsvorrichtungen in einer kontinuierlichen Reihe verwendet wird.

22. Verfahren gemäß einem der Ansprüche 19 bis 21, wobei die Simulationsvorrichtung oder, je nach dem, die Reihe von Simulationsvorrichtungen beim Gebrauch gedreht wird.

23. Verfahren gemäß einem der Ansprüche 19 bis 22, weiter umfassend die Schritte des Umwickelns eines Schachtelzuschnitts (100), der eine Reihe von gelenkig miteinander verbundenen Wandflächen um die gestapelte Gruppe von Gegenständen aufweist, sowie das Miteinanderverschließen der Zuschnittsenden zur Ausbildung einer Verpakkungsschachtel.

24. Schachtel, die gemäß einem der Ansprüche 18 bis 23 hergestellt ist.

25. Vorrichtung zur Anordnung und zum In-Eingriff-Nehmen einer Trennwandfläche (13), die eine verformbare Einrichtung (62) zur In-Eingriff-Nahme zwischen angrenzenden Gegenständen (A) an gegenüberliegenden Seiten der Wandfläche aufweist, wobei die Vorrichtung eine Einrichtung (18) zur Anordnung der Trennwandfläche umfaßt, derart, daß die Trennwandfläche paßgenau mit dem Ende von wenigstens einem Gegenstand angeordnet ist, ferner eine Einrichtung (20), um die verformbare Einrichtung zu verformen, derart, daß das Ende von wenigstens einem Gegenstand und der verformbaren Einrichtung wenigstens teilweise in Eingriff genommen sind, und eine Einrichtung (42), um die verformte Trennwandfläche und die erste Lage von Gegenständen zusammen entlang eines Zuführweges zu fördern.

26. Vorrichtung gemäß Anspruch 25, wobei die Verformungseinrichtung eine Vorrichtung (20) umfaßt, um das Ende des Gegenstands (A), der mit der verformbaren Einrichtung (62) der Trennwandfläche in Eingriff gebracht werden soll, zu simulieren, wodurch die verformbare Einrichtung an das Ende des ersten Gegenstands angepaßt wird, so daß sie mit dem zweiten Gegenstand in Eingriff gebracht werden kann.

27. Vorrichtung gemäß Anspruch 26, wobei die Simulationsvorrichtung eine Napfvorrichtung (80) zur Simulation des Gegenstandsendes umfaßt.

28. Vorrichtung gemäß Anspruch 26 oder 27, wobei die Verformungseinrichtung eine Vielzahl der Simulationsvorrichtungen (22) in einer kontinuierlichen Reihe umfaßt.

29. Vorrichtung gemäß Anspruch 28, wobei zwei oder mehr Reihen der Simulationsvorrichtungen (20) aneinander angrenzend bereitgestellt sind.

30. Vorrichtung gemäß einem der Ansprüche 26 bis 29, wobei die Simulationsvorrichtung weiter eine Einrichtung (84) umfaßt, zur Befestigung der Reihen der Simulationsvorrichtungen für eine Drehbewegung auf die ersten Gegenstände zu und von ihnen weg.

31. Vorrichtung gemäß einem der Ansprüche 25 bis 30, wobei die Anordnungseinrichtung ein Element (18) umfaßt, um eine Verschiebung eines verschiebbaren Teils (64) der Trennwandfläche in eine wirksame Position in Kontakt mit den Gegenständen (A) zu bewirken.

32. Vorrichtung gemäß Anspruch 31, wobei das Element einen Finger (70) umfaßt, der so befestigt ist, daß er sich radial von einer drehbaren Vorrichtung (74) erstreckt, und zwar zum Eintritt in und zum Rückzug aus einer Öffnung, die in der Trennwandfläche (13) definiert ist, und wobei der verschieb-

bare Teil einen Streifen (64) umfaßt, der aus der Öffnung ausgestanzt ist.

Revendications

1. Machine d'emballage (10) destinée à emballer des couches d'articles (38, 44) dans un carton (100) séparées par un panneau séparateur (13) comportant un moyen déformable (62) destiné à s'emboîter entre des articles adjacents (4) sur des faces opposées dudit panneau (13), laquelle machine (10) comprend un moyen destiné à positionner ledit panneau séparateur de façon que ledit panneau séparateur soit positionné en correspondance avec les articles de la première couche, un moyen destiné à déformer le moyen déformable (62) de façon que les extrémités desdits articles (4) et ledit moyen déformable soient au moins en partie emboîtés, et un moyen destiné à transporter ledit panneau séparateur et ladite première couche (38) d'articles ensemble suivant un trajet d'alimentation, comprenant en outre un moyen destiné à positionner ensuite un second article (44) en relation d'emboîtement avec la première couche d'articles et ledit panneau séparateur.

2. Machine d'emballage selon la revendication 1, dans laquelle ledit moyen de déformation comprend un dispositif (20) destiné à simuler l'extrémité de l'article devant être emboîté dans le moyen déformable du panneau séparateur, en adaptant ainsi le moyen déformable à l'extrémité du premier article de manière à ce qu'il puisse être emboîté avec le second article.

3. Machine selon la revendication 2, dans laquelle ledit dispositif de simulation (20) comprend un dispositif en coupelle (80) destiné à imiter l'extrémité d'un article.

4. Machine selon les revendications 2 ou 3, dans laquelle ledit moyen de déformation comprend une pluralité desdits dispositifs de simulation (20) suivant une série continue.

5. Machine selon la revendication 4, dans laquelle deux ou plusieurs séries desdits dispositifs de simulation sont disposées à proximité l'une de l'autre.

6. Machine selon l'une quelconque des revendications 2 à 4, dans laquelle ledit dispositif de simulation (20) comprend en outre un moyen (84) destiné à supporter ladite série desdits dispositifs de simulation en vue d'un mouvement rotatif vers les premiers articles et à l'écart de ceux-ci.

7. Machine selon l'une quelconque des revendications précédentes, dans laquelle ledit moyen de transport comprend un transporteur (42) comportant un moyen destiné à coopérer avec le panneau séparateur afin de transporter ainsi le panneau séparateur d'une façon prédéterminée, ledit moyen de transport comprenant une banette destinée à coopérer avec au moins un évidement (60) défini dans le panneau séparateur (13).

8. Machine selon la revendication 7, dans laquelle ladite barrette est transportée suivant un trajet sans fin.

9. Machine selon la revendication 7 ou la revendication 8, dans laquelle la barrette est conçue afin de positionner ledit panneau séparateur au niveau d'une première extrémité d'un premier article de façon que le moyen déformable soit placé en correspondance avec une extrémité du premier article.

10. Machine selon l'une quelconque des revendications précédentes, dans laquelle ledit moyen de positionnement comprend un élément (18) destiné à provoquer un déplacement d'une partie déplaçable (64) du panneau séparateur jusque dans une position fonctionnelle en contact avec les articles (A).

11. Machine selon la revendication 10, dans laquelle ledit élément (18) comprend un doigt (70) monté de façon à s'étendre suivant un rayon à partir d'un dispositif pouvant être entraîné en rotation (74) de façon à pénétrer dans une ouverture définie dans ledit panneau séparateur (13) et à ressortir de celle-ci, et dans laquelle ladite partie déplaçable comprend une languette (64) découpée à partir de ladite ouverture.

12. Machine d'emballage selon la revendication 11, dans laquelle le moyen de positionnement comprend un moyen destiné à empiler un second article en correspondance avec le premier article et le moyen déformable, dans laquelle ledit moyen d'empilement comprend un moyen destiné à permettre au second article de tomber sur ledit moyen déformable.

13. Machine selon la revendication 12, comprenant en outre un moyen définissant un premier trajet d'alimentation (42) destiné à alimenter des premiers articles et un moyen (22, 91) définissant un second trajet d'alimentation destiné à alimenter des seconds articles, et dans laquelle ledit moyen d'empilement comprend un régulateur destiné à réguler le déplacement des premiers articles et des seconds articles le long de trajets respectifs parmi lesdits trajets d'alimentation.

14. Machine selon la revendication 13, dans laquelle ledit régulateur réalise la mise en correspondance des extrémités des articles avant l'empilement.

15. Machine selon la revendication 14, dans laquelle ledit régulateur comprend une goulotte à travers laquelle l'un des articles se déplace de manière à venir buter sur ledit panneau séparateur et l'autre article suivant un agencement empilé.

16. Machine selon la revendication 14 ou la revendication 15, dans laquelle le régulateur comprend en outre une roue-étoile (90, 92).

17. Machine selon l'une quelconque des revendications 12 à 16, comprenant en outre un moyen (28, 30, 52, 54) destiné à appliquer un carton enveloppant (100) sur des couches empilées de premier et second articles.

18. Procédé d'emballage dans un carton (100) de couches d'articles (4) séparées par un panneau séparateur (13) comportant un moyen déformable (62) destiné à s'emboîter entre des articles adjacents sur des faces opposées du panneau, comprenant les étapes consistant à positionner un panneau séparateur (13) sur une première couche d'articles de façon que ledit moyen déformable (62) soit positionné en correspondance avec les extrémités des articles, et à déformer le moyen déformable de façon que les extrémités des articles et ledit moyen déformable soient au moins en partie emboîtés, et à positionner une seconde couche d'articles en relation d'emboîtement avec ladite couche d'articles et ledit panneau séparateur.

19. Procédé selon la revendication 18, dans lequel l'étape de déformation dudit moyen à déformation est exécutée en utilisant un dispositif (20) qui simule l'extrémité de l'article devant être emboîté dans ledit moyen déformable du panneau séparateur.

20. Procédé selon la revendication 19, comprenant l'étape supplémentaire consistant à utiliser une pluralité desdits dispositifs de simulation (20) afin de déformer une pluralité desdits moyens déformables.

21. Procédé selon la revendication 20, dans lequel une série desdits dispositifs de simulation est utilisée suivant une série continue.

22. Procédé selon l'une quelconque des revendications 19 à 21, dans lequel ledit dispositif de simulation ou, selon le cas, ladite série de dispositifs de simulation est entraînée en rotation en utilisation.

23. Procédé selon l'une quelconque des revendications 19 à 22, comprenant en outre les étapes consistant à envelopper une ébauche de carton (100) comportant une série de panneaux reliés l'un à l'autre par charnières autour du groupe empilé d'articles, et à verrouiller les extrémités de l'ébauche l'une à l'autre afin de former un carton conditionné.

24. Carton produit selon l'une quelconque des revendications 18 à 23.

25. Dispositif destiné à positionner et à emboîter un panneau séparateur (13) comportant un moyen déformable (62) destiné à s'emboîter entre des articles adjacents (A) sur des faces opposées dudit panneau, ledit dispositif comprend un moyen (18) destiné à positionner ledit panneau séparateur de façon que ledit panneau séparateur soit positionné en correspondance avec l'extrémité d'au moins un article, un moyen (20) destiné à déformer le moyen déformable de façon que l'extrémité dudit au moins un article et ledit moyen déformable soient au moins en partie emboîtés, et un moyen (42) destiné à transporter ledit panneau séparateur déformé et ladite première couche d'articles ensemble suivant un trajet d'alimentation.

26. Dispositif selon la revendication 25, dans lequel ledit moyen de déformation comprend un dispositif (20) destiné à simuler l'extrémité de l'article (A) devant être emboîtée dans le moyen déformable (62) du panneau séparateur en adaptant ainsi le moyen déformable à l'extrémité du premier article de manière à ce qu'il puisse être emboîté avec le second article.

27. Dispositif selon la revendication 26, dans lequel ledit dispositif de simulation comprend un dispositif en coupelles (80) destiné à imiter l'extrémité d'un article.

28. Dispositif selon les revendications 26 ou 27, dans lequel ledit moyen de déformation comprend une pluralité desdits dispositifs de simulation (22) suivant une série continue.

29. Dispositif selon la revendication 28, dans lequel deux ou plusieurs séries desdits dispositifs de simulation (20) sont disposées à proximité l'une de l'autre.

30. Dispositif selon l'une quelconque des revendications 26 à 27, dans lequel ledit dispositif de simulation comprend en outre un moyen (84) destiné à supporter ladite série desdits dispositifs de simulation en vue d'un mouvement rotatif vers les premiers articles et à l'écart de ceux-ci.

31. Dispositif selon l'une quelconque des revendications 25 à 30, dans lequel ledit moyen de positionnement comprend un élément (18) destiné à provoquer un déplacement d'une partie déplaçable (64) du panneau séparateur jusque dans une position fonctionnelle en contact avec les articles (A).

32. Dispositif selon la revendication 31, dans lequel ledit élément comprend un doigt (70) monté de façon à s'étendre suivant un rayon à partir d'un dispositif pouvant être entraîné en rotation (74) en vue de pénétrer dans une ouverture définie dans ledit panneau séparateur (13) et de ressortir de celle-ci, et dans lequel ladite partie déplaçable comprend une languette (64) découpée à partir de ladite ouverture.

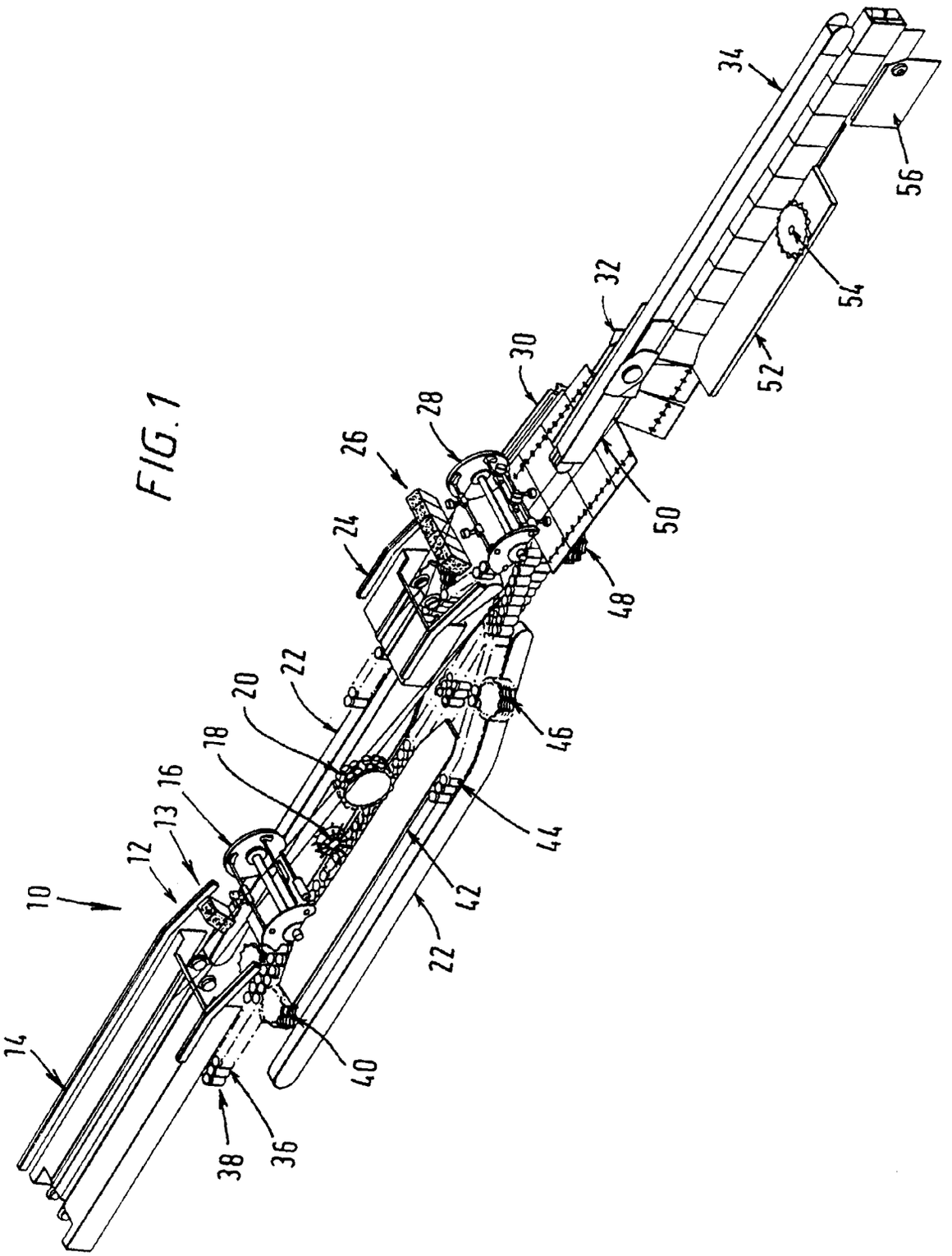
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FIG. 1

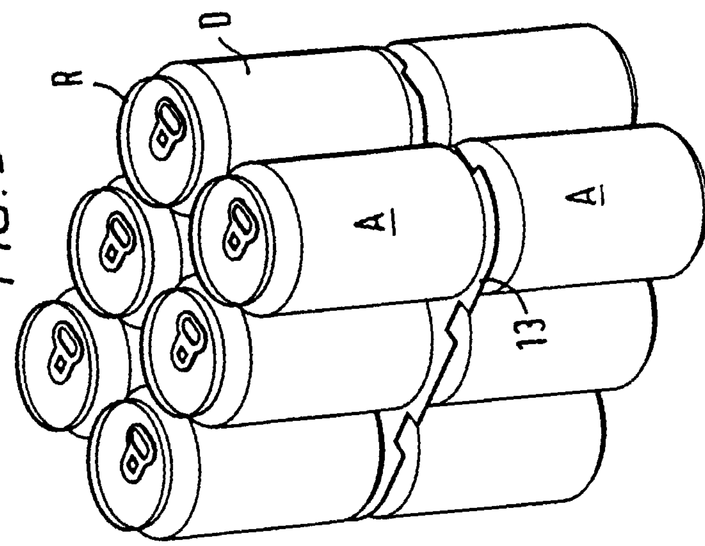

FIG. 5

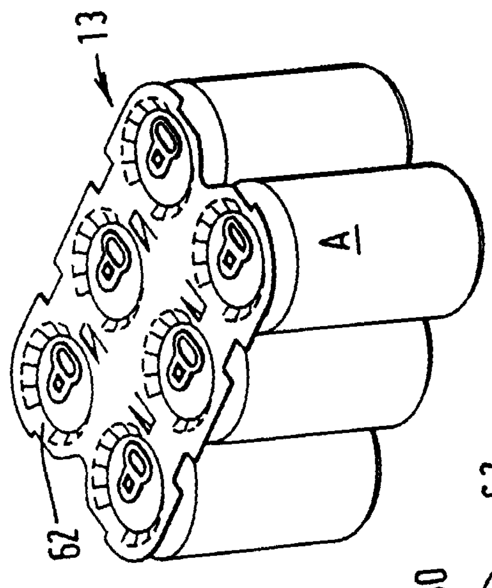

FIG. 4

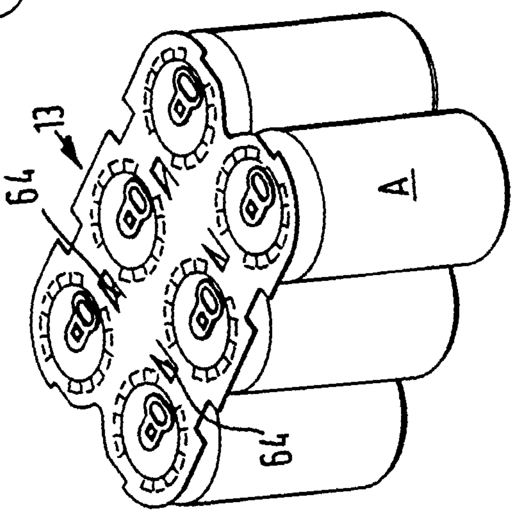

FIG. 3

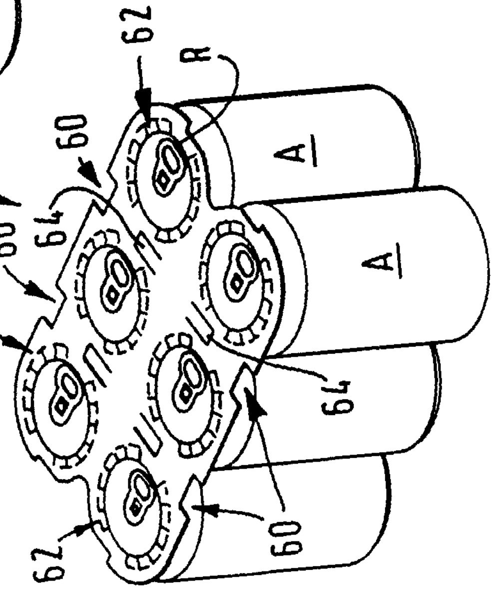

FIG. 2

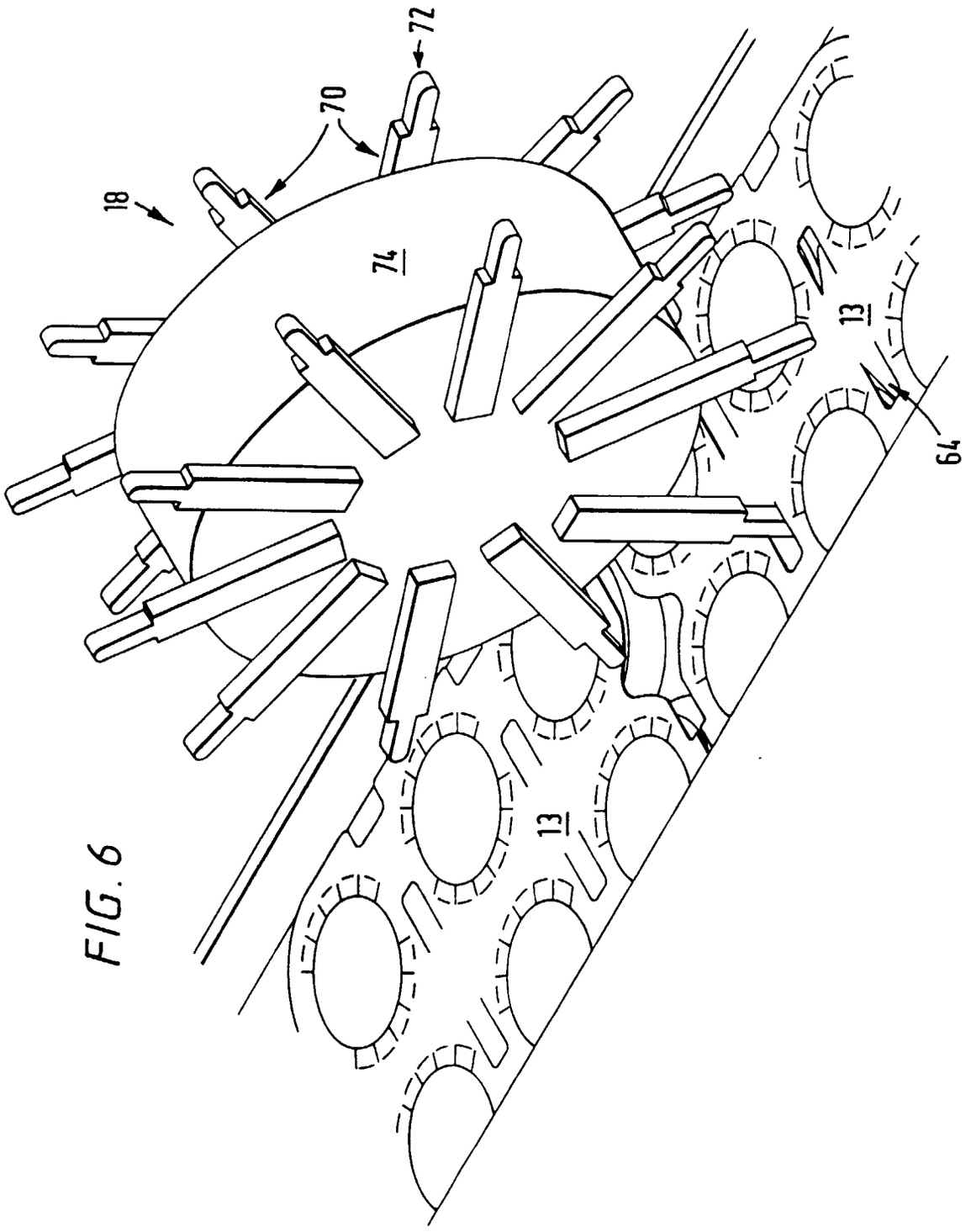

FIG. 6

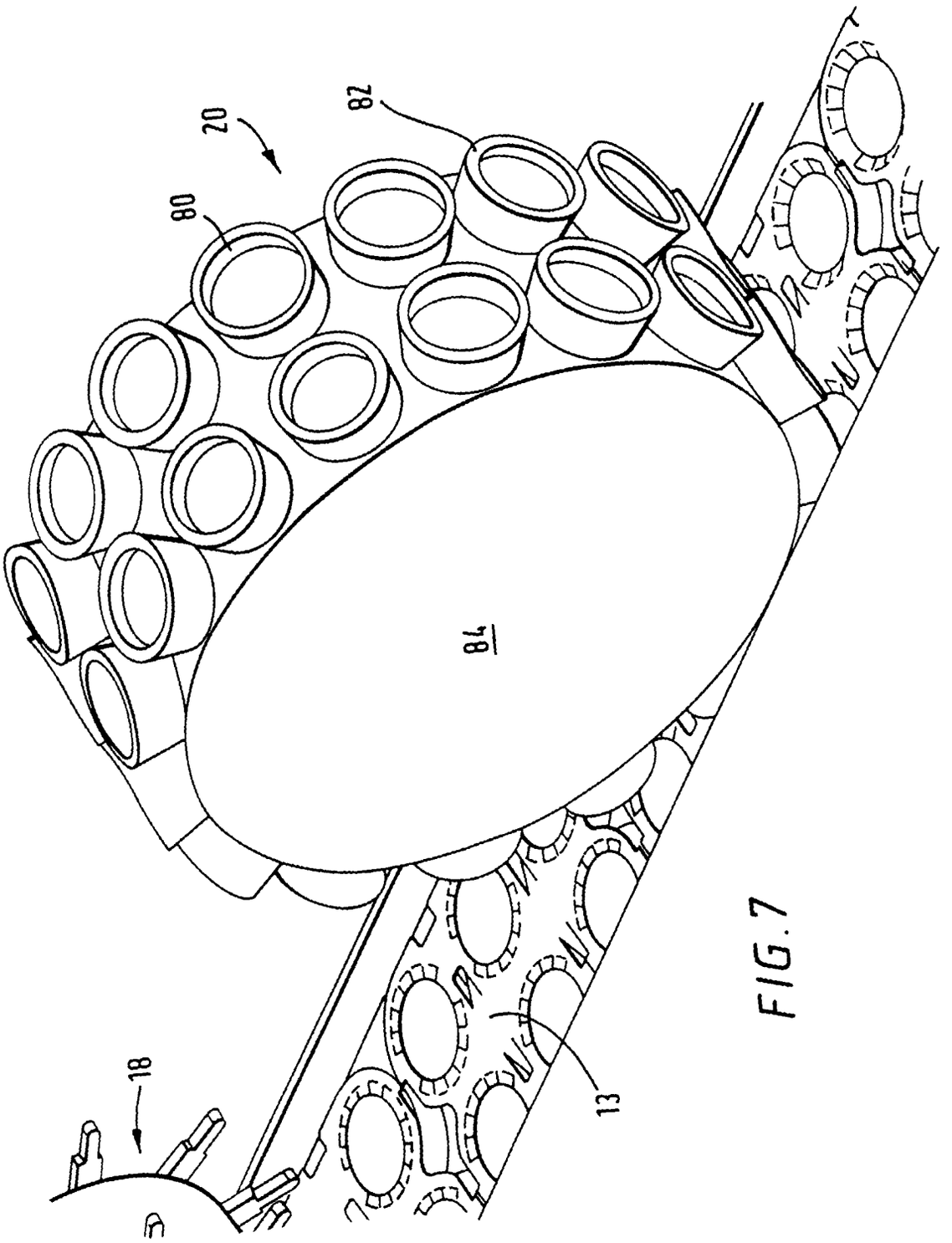

FIG.7

FIG.8

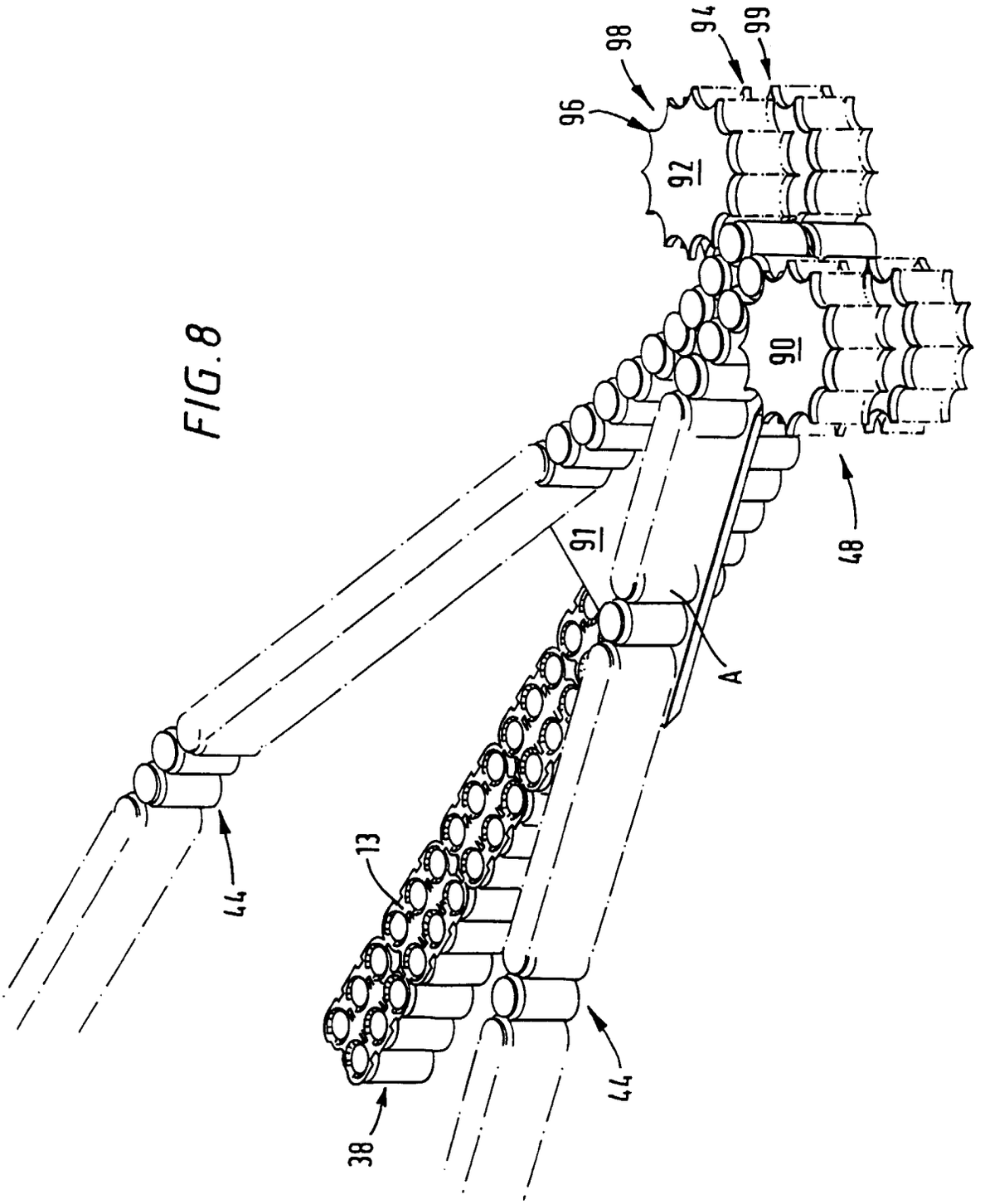

FIG. 9

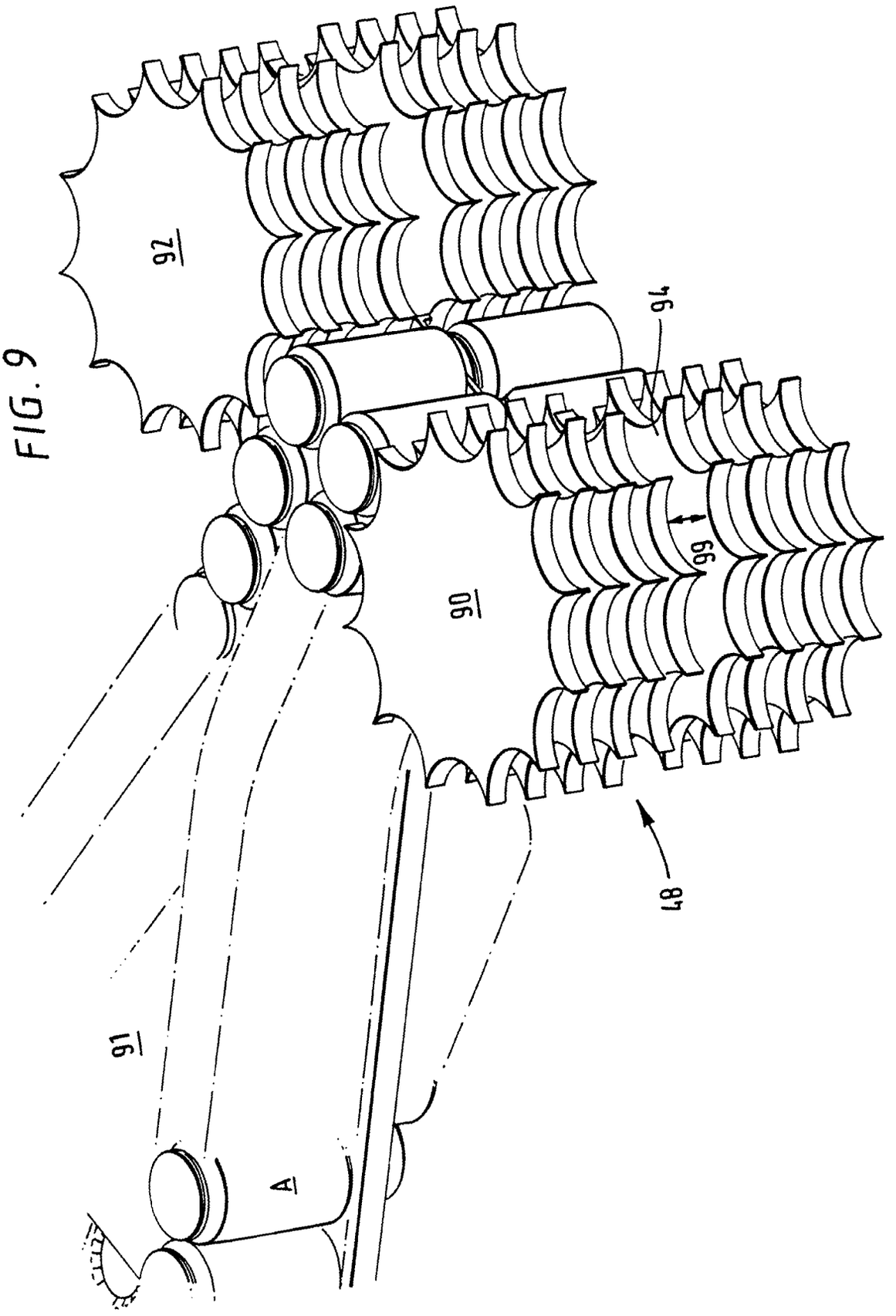

FIG. 10