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(54) Title: MODIFIED ATMOSPHERE, SKIN OR VACUUM PACKAGING MACHINE AND METHOD

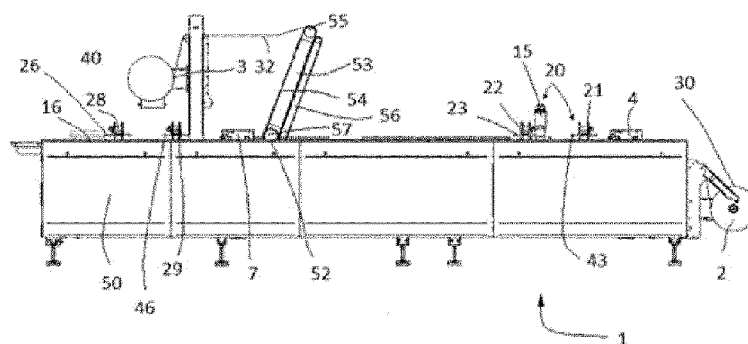


FIG. 1

(57) Abstract: A modified atmosphere, skin or vacuum packaging machine comprising first feed means (2) adapted for feeding a first film (30) to the machine (1), second feed means (3) adapted for feeding a second film (31) to the machine (1), and a sealing station (7) where the vacuum is formed and/or the modified atmosphere is introduced, and the second film (31) is sealed to the first film (30) to obtain a package (34). The machine comprises displacement means (20, 40) configured for moving at least the first film (20) a driving distance from an initial position, holding down and driving at least the first film (20) in the driving direction to an end position, said displacement means (20, 40) being configured for subsequently returning to the initial position when the machine is in operating mode.



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DESCRIPTION

“Modified atmosphere, skin or vacuum packaging machine and method”

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TECHNICAL FIELD

The present invention relates to a method and a machine, particularly a forming
10 machine adapted for packaging products in a modified atmosphere (also known as
MAP packaging), vacuum packaging products in a type of skin (also known as skin
packaging) or vacuum packaging products.

15 PRIOR ART

Vacuum or modified atmosphere packaging methods and packaging machines are
known.

20 Known packaging machines comprise first film feed means, a thermoforming station
where containers are made in the first film inside which the product to be packaged
will be introduced in a later step, second film feed means, and a sealing station that
is supplied with both films and where the vacuum is formed or the gas is introduced
in the container containing the product to be packaged. Subsequently in the sealing
25 station, the second film is sealed to the first film such that the package is obtained. In
a later step, cutting means comprised in the machine cut the films longitudinally and
transversely, separating the packages that have been formed.

Generally, as described in US2005/0173289A1, a packaging machine of this type
30 comprises chains guiding the movement of the first film, said first film being fixed to
said chains laterally, such that it remains taut.

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DISCLOSURE OF THE INVENTION

The object of the invention is to provide a modified atmosphere, skin or vacuum packaging machine and packaging method as described below.

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The modified atmosphere or vacuum packaging machine according to the invention comprises first feed means adapted for feeding a first film to the machine, second feed means adapted for feeding a second film to the machine, a sealing station where the vacuum is formed and/or the modified atmosphere is introduced between
10 both films and the second film is sealed to the first film to obtain a package, and displacement means adapted for moving the first film in a driving direction.

The displacement means are configured for moving at least the first film a driving distance from an initial position, holding down and driving at least the first film in the
15 driving direction to an end position, said displacement means being configured for subsequently returning to the initial position when the machine is in operating mode.

In addition, the modified atmosphere, skin or vacuum packaging method according to the invention comprises the following steps:

- 20
- feeding a first film to the machine through first feed means,
 - positioning a second film on the first film after placing the product to be packaged on the first film,
 - forming a vacuum and/or introducing the modified atmosphere between
25 both films,

25

Displacement means hold down and drive the first film a driving distance from an initial position to an end position through the preceding steps when the machine is in displacement mode, subsequently returning to the initial position when the machine is in an operating position.

30

A packaging machine and method that can reduce film waste produced during the packaging process to a minimum are obtained. Both the method and the machine are more efficient and at the same time cleaner than any known in the state of the art because they produce virtually no discarded film, using almost all the film. A
35 packaging machine and a packaging method that have less of an impact on the

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environment are obtained. Furthermore, it allows filling any type of skin package, including those packages containing a product that projects above said package.

These and other advantages and features of the invention will become evident in
5 view of the drawings and the detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

10 Figure 1 shows a side view of a skin packaging machine according to the invention.

Figure 2 shows a perspective view of the packaging machine shown in Figure 1.

Figure 3 shows a detailed view of the machine shown in Figure 1, in which a forming
15 station and displacement means of the machine are shown in detail.

Figure 4 shows a detailed view of the machine shown in Figure 1, in which a pre-
sealing station, a sealing station, cutting means and displacement means of the
20 machine are shown in detail.

Figure 5 shows a top view of a first film once it has gone through the thermoforming
step and the punching step.

25 DETAILED DISCLOSURE OF THE INVENTION

The packaging machine 1 according to the invention can be a modified atmosphere
packaging machine, also known as a MAP packaging machine, which wraps the
product to be packaged in a mixture of gases in the package, such that said mixture
30 meets the specific ventilation needs of the packaged product, or it can be a vacuum
packaging machine, or a skin packaging machine, being able to package both
products whose height is less than the height of a tray where the product is placed
and products projecting above the tray.

35 Figure 1 schematically shows a skin packaging machine 1 according to the invention.

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The machine 1 comprises first feed means 2 adapted for feeding a first film 30 to the machine 1, a thermoforming station 4 where at least one container 32 is made in the first film 30 inside which the product to be packaged is introduced in a filling station, second feed means 3 adapted for feeding a second film 31 to the packaging machine 1, and a sealing station 7 where a vacuum is formed and the second film 31 is sealed to the first film 30 to obtain a package 34. The vacuum allows adjusting the second film 31 to the shape of the product placed in the formed area 32, obtaining a skin-type package 34.

10 In addition, one embodiment of the skin packaging method according to the invention comprises the following steps:

- feeding the first film 30 to the machine 1 through the first feed means 2,
- positioning the second film 31 on the first film 30 after placing the product to be packaged on the first film 30,
- 15 • forming the vacuum between both films 30 and 31,
- sealing both films 30 and 31, obtaining a package 34, and
- separating the package 34.

When the machine 1 is in any of the preceding steps, it is in operating mode where displacement means 20 and 40 hold down the first film 30, retaining it in an initial position. When the machine is in displacement mode, the displacement means 20 and 40 hold down the first film 30 and pull it in the driving direction a driving distance to an end position. At said end position, the displacement means 20 and 40 immobilize the first film 30, while the displacement means 20 and 40 return to the initial position.

The feed means 2 comprise at least one reel and unwinding means driving the first film 30 to the thermoforming station 4. Said feed means 2 are known in the state of the art so they will not be described below.

30

In addition, films 30 and 31 can be made of any type of plastic known for MAP, vacuum or skin packaging applications.

In addition, the thermoforming station 4 comprises a male mold 5 and a female mold 6 adapted for obtaining the geometric shape of the container 32 and heating means

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not depicted in the drawings that heat the first film 30 in order to carry out the thermoforming process. Other thermoforming stations known in the state of the art, for example vacuum or pressure thermoforming stations, can be used in other embodiments. Containers 32 also known as trays are formed in the first film 30 in the thermoforming station 4, and are then separated from one another in areas referred to as non-formed areas 33.

If a single package 34 is going to be made, a single container 32 will be formed in the first film 30, the non-formed area 33 being the area on the perimeter of said container 32. Said non-formed area 33 will make up the border 35 of the package 34 that is obtained. If a plurality of packages 34 is going to be made, a plurality of containers 32 surrounded by non-formed areas 33 which will respectively form the border 35 of the corresponding package 34 that is obtained will be formed in the thermoforming station 4, reducing waste to a minimum in the first film 30.

In other non-depicted embodiments, the machine 1 may not include a thermoforming station. In said cases, the product to be packaged rests directly on the first film 30 or on a base that is arranged on said first film 30 and on which the product is supported.

The machine 1 comprises displacement means 20 and 40 adapted for moving the first film 30 in the driving direction.

Once the containers 32 are formed in the first film 30, said first film 30 is moved by first displacement means 20 in the driving direction to a filling station, where the product to be packaged is placed on each container 32. Said filling can be done either manually or automatically.

The first film 30 is then moved by second displacement means 40 to the sealing station 7. At the same time, the second feed means 3 feed the second film 31 to said sealing station 7. Said sealing station 7 comprises a top mold 8 and a bottom mold 9, heating means (not depicted in the drawings) adapted for heating the top mold 8, vacuum means (not depicted in the drawings) adapted for creating the vacuum, and aeration means (no shown in the drawings) acting on the top mold 8. When the second film 31 enters the sealing station 7, a vacuum is applied to the top mold 8

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such that said second film 31 is deformed towards the top mold 8 (which is previously heated), where said second film 31 is heated. At the same time, the first film 30 is positioned on the bottom mold 9. A vacuum is applied from the bottom mold 9, and then it is aerated from the top mold 8 such that the second film 31 is sealed to the first film 30 along the entire contact surface, deforming said second film 31 due to the effect of heating and adapting to the shape of the product placed in the container 31, such that a plurality of packages 34 are formed, that is, as many packages 34 are formed as containers 32 were made in the thermoforming station 4, such containers 34 being fixed to one another through the non-formed areas 33 corresponding with the border 35 of the package 34. In a later step, said packages 34 are separated from one another through the borders 35.

If the product to be packaged projects above the non-formed area 33 once the product is introduced, the second film 30 must be heated before being introduced in the sealing station 7 in order to adapt to the shape of the product to be packaged when it is positioned on the first film 30. To that end, the machine 1 further comprises a heating station where the second film 30 is heated before being introduced in the sealing station 7 to make the second film 31 more ductile. The machine 1 comprises auxiliary displacement means 53 keeping the second film 30 clamped as it moves through the heating station, preventing it from shrinking while it is heated. Said auxiliary displacement means 53 release the second film 30 when it comes out of the heating station. Said release occurs close to the area where both films 30 and 31 come into contact with one another for the first time.

The machine 1 further comprises pre-sealing means 52 arranged before the sealing station 7. Particularly, said pre-sealing means 52 are arranged where first contact between both films 30 and 31 occurs, i.e., where they leave the auxiliary displacement means 53. Said pre-sealing means 52 are adapted for sealing the second film 31 to the first film 30 longitudinally at discrete points. Sealing is preferably performed by heat sealing, although in other embodiments sealing could be performed by high-frequency welding or by other known sealing methods. Therefore, by keeping the films 30 and 31 aligned with one another by means of sealing at certain points from the moment both films 30 and 31 enter the sealing station, the second film 31 adapts to the product to be packaged better when products whose height exceeds the height of the corresponding container 32 are

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packaged. Once in the sealing station 7, the vacuum and sealing process is similar to that previously described.

In a preferred embodiment, the auxiliary displacement means 53 comprise a belt 54, 5 guide rollers 55 moving the belt 54 and a counter-belt 56 holding the second film 32, clamping it against the belt 54. The belt 54 moves in synchronization with the displacement means 20 and 40 of the machine 1. Furthermore, the pre-sealing means 53 comprise a first gear wheel 57 coupled to a guide roller 55 of the auxiliary displacement means 53 and a second wheel 58 arranged below the first film 30. The 10 second wheel 58 can be a gear wheel or a smooth welding roller. The first wheel 57 is arranged in the guide roller 55 arranged closest to the first film 30. The teeth of the first wheel 57 go through the belt 54 which has holes in it, being supported on the second wheel 58, thereby pressing the second film 31 against the first film 30. Said second wheel 58 is heated, both films 30 and 31 being welded to one another at 15 discrete points as both wheels 57 and 58 rotate, moving both films 30 and 31 towards the sealing station 7.

In other embodiments, the auxiliary displacement means can comprise a chain, clamps which fix the taut second film 31 to the chain and gear wheels adapted for 20 closing the clamps before entering the heating station 19 and for opening said clamps after exiting the heating station. The clamps can be covered with a ductile material which holds the second film 31 without leaving marks.

The pre-sealing means comprise a gear wheel arranged below the first film 30 such 25 that the teeth of the gear wheel of the auxiliary displacement means arranged closest to the first film 30 are supported on the respective teeth of the gear wheel arranged below the first film 30, thereby pressing the second film 31 against the first film 30, both films 30 and 31 being welded to one another at discrete points as both wheels rotate, moving both films 30 and 31 towards the sealing station 7.

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In other embodiments, gear wheels are not necessary, the pre-sealing being performed as both films 30 and 31 move forward using any known conventional welding means.

35 In addition, between the thermoforming station 4 and the sealing station 7, the

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packaging machine 1 comprises bearing means 10 for the first film 30 adapted for longitudinally bearing said first film 30.

In a preferred embodiment, the bearing means 10 comprise at least one longitudinal guide 11 on which the first film 30 is supported. The first film 30 is supported on said longitudinal guide 11 on the non-formed area 33 comprised between two consecutive containers 32. For every N containers 32 formed in the first film 30 transverse to the forward movement, N+1 non-formed areas 33 arranged between two consecutive containers 32 are formed, therefore N+1 longitudinal guides being arranged fixed to a bearing structure 50 of the machine 1 on which the first film 30 is supported.

In other embodiments, particularly when thermoforming a single package 34, the bearing means 10 comprise a bearing surface under the first film 30 on which a bottom 38 of the container 32 is supported. The bearing surface can be a planar surface, for example a table, over which the first film 30 slides with the product placed in the containers 32. In other embodiments, the bearing means 10 comprise a set of transversely arranged rollers (not depicted in the drawings) forming the bearing surface over which the first film 30 slides with products with minimum friction. The set of rollers is necessary when the products to be packaged are heavy in order to prevent high friction during movement. In addition, for said bearing means 10 to adapt to any depth of the containers 32, the height of the bearing surfaces can be adjusted.

In other embodiments, the bearing means can comprise both the longitudinal guides and the bearing surfaces.

In other embodiments, the bearing means can comprise a retractable conveyor belt adapted for moving together with the first film 30 with the products introduced therein into the sealing station 7, the conveyor belt being able to go back out of the sealing station 7 once the first film 30 with the products therein is placed on it.

In addition, the displacement means 20 and 40 are configured for retaining the first film 30 in a specific position when the machine 1 is in the operating mode, while they are adapted for driving the first film 30 in the driving direction when the machine 1 is

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in forward movement mode. Said displacement means 20 and 40 are configured for holding down and moving the first film 30 in displacement mode. In addition, the machine 1 is considered to be in the operating mode when it is performing a thermoforming, vacuum, sealing or cutting operation on the package.

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In the embodiment shown in the drawings, the first displacement means 20 are arranged between the thermoforming station 4 and the sealing station 7, particularly between the thermoforming station 4 and the filling station, and the second displacement means 40 are arranged after the sealing station 7.

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In the embodiment shown in the drawings, the first displacement means 20 comprise a first fixed bearing 22 fixed to the bearing structure 50 of the machine 1, between the thermoforming station 4 and the sealing station 7. The second displacement means 40 comprise a second fixed bearing 29 fixed to the bearing structure 50 of the machine 1 after the sealing station 7, a first movable bearing 21 movable in the driving direction with respect to the first fixed bearing 22, and a second movable bearing 28 movable in the driving direction with respect to the second fixed bearing 29.

15

20 Each fixed bearing 22 and 29 has a substantially bridge-shaped geometry. Each fixed bearing 22 and 29 comprises supports 24 and 27 on which the first film 30 is arranged and hold-down plates 23 and 26 configured for pressing the first film 30 against the corresponding support 24 and 27, keeping the first film 30 retained in the specific position when the machine 1 is in operating mode. Each hold-down plate 23 and 26 is arranged facing the corresponding support 24 and 27, the first film 30 being arranged between both.

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Each movable bearing 21 and 28 has a substantially bridge-shaped geometry. Each movable bearing 21 and 28 comprises supports 44 and 47 on which the first film 30 is arranged and hold-down plates 43 and 46 configured for pressing the first film 30 against the corresponding support 44 and 47. Each hold-down plate 43 and 46 is arranged facing the corresponding support 44 and 47, the first film 30 being arranged between both. Each movable bearing 21 and 28 comprises a vertical actuation drive (not depicted) acting on the corresponding hold-down plate 43 and 46, moving said hold-down plate 43 and 46 vertically with respect to the first film 30.

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- 10 -

Said drive is preferably a pneumatic cylinder.

The displacement means 20 and 40 further comprise guides 60 and 62 and a longitudinal actuation drive acting on the corresponding movable bearings 21 and 28, moving them in the driving direction through the guides. Both the guides and the drive are arranged below the first film 30. The drive can be pneumatic, hydraulic or any other type known in the state of the art. The displacement means 20 and 40 act in a synchronized manner, moving the first film 30 forward intermittently. When the machine 1 operates in the operating mode, the movable bearings 21 and 28 are arranged in the position furthest away from the fixed bearings 22 and 29, the vertical drives corresponding to the hold-down plates 23 and 26 of the fixed bearings 22 and 29 are activated, pressing the hold-down plates 23 and 26 against the first film 30, while the hold-down plates 43 and 46 of the movable bearings 21 and 28 are not active and are therefore separated from the first film 30. The package thermoforming, sealing, vacuum and cutting operation will be performed in that position. In order to move the first film 30, once the operating mode ends, the vertical drives corresponding to the hold-down plates 43 and 46 of the movable bearings 21 and 28 are activated, applying pressure on the first film 30 against the corresponding supports 44 and 47; the vertical drives corresponding to the hold-down plates 23 and 26 of the fixed bearings 22 and 29 are deactivated said hold-down plates 23 and 26 being separated from the first film 30; and the longitudinal drives are activated, moving the movable bearings 21 and 28 in the driving direction and therefore moving the first film 30 to the next position where the first film 30 is retained again. When the movable bearings 21 and 28 are arranged in the end position, the vertical actuator corresponding to the hold-down plates 43 and 46 of the movable bearings 21 and 28 are deactivated, releasing the first film 30, while the vertical actuator corresponding to the hold-down plates 23 and 26 of the fixed bearings 22 and 29 is activated, pressing said hold-down plates 23 and 26 against the corresponding supports, fixing the first film 30 in the end position. The movable bearings 21 and 28 are moved by the corresponding longitudinal actuator to the initial position, i.e., starting position, repeating the same forward movement cycle.

The hold-down plates 23, 26, 43 and 46 are always supported on the non-formed areas 33 of the first film 30, not on the containers 32 where the product to be packaged will later be placed. In the embodiment shown in the drawings, the hold-

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down plates 23, 26, 43 and 46 have an elongated, flat bar-type geometry. Said hold-down plates 23, 26, 43 and 46 are longitudinally aligned, acting on the non-formed areas 33 comprised on the edges of the first film 30.

5 In other embodiments, the displacement means 20 could comprise a hold-down plate 23, 26, 43 and 46 arranged longitudinally acting on the non-formed areas 33. So for every N containers 32 transversely formed in the first film 30, N+1 non-formed areas 33 are formed, N+1 hold-down plates 23, 26, 43 and 46 therefore being arranged.

10

Furthermore, the hold-down plates 23, 26, 43 and 46 have a length substantially equal to the pitch of the machine 1, pitch of the machine being understood as the distance that the first film 30 moves forward when the machine 1 is in the displacement mode, and a width substantially equal to the width of the
15 corresponding non-formed area 33. If the non-formed area 33 corresponds to a non-formed area 33 between two consecutive containers 32, the width of the hold-down plate will be substantially twice that of the previous one.

In other embodiments, the hold-down plates 23, 26, 43 and 46 could be arranged
20 transverse to the driving direction.

In other embodiments, the displacement means 20 can be included in the thermoforming station and in the sealing station, such that the top and bottom molds of each station perform movable bearing functions, the hold-down plates are the top
25 molds, while the bottom molds perform the support function.

In addition, the machine 1 comprises punching means 15 adapted for punching the first film 30 in a non-formed area 33. The punching operation is performed before said first film 30 reaches the sealing station 7, particularly before the step of
30 introducing the product in the container 31. In the embodiment shown in the drawings, the punching means 15 are comprised in the displacement means 20. The punching means 15 comprise at least one punch coupled to the fixed bearing 22 fixed to the bearing structure 50 of the machine 1 between the thermoforming station 5 and the sealing station 7.

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The punching means 15 make at least one hole 17 and/or a notch 18 in the non-formed area 33. In a preferred embodiment, the punching means 15 make a notch 18 or a hole 17 at the intersection of the non-formed areas 33 when the machine 1 is in the operating mode. The notches 18 are made on the edges of the first film 30 while the holes 17 are made at the intersections of the inner non-formed areas 33. The geometry of the holes 17 and/or notches 18 is such that it forms rounded corners 35b on the border 35 of the package 34. In one embodiment shown in the drawings, each hole 17 has a rosette-shaped geometry made at the intersection of two non-formed areas 33. Each notch 18 has a half rosette-shaped geometry.

10

In a preferred embodiment, the holes 17 are used for performing evacuation in the sealing station 7. The notches 18 further allow correctly positioning the second movable bearing 28, particularly the hold-down plates 46 of said second movable bearing 28, which allows moving the first film 30 forward a predetermined distance, such that it is positioned correctly inside the respective stations of the machine 1. To that end, the machine 1 further comprises detection means (not depicted) configured for detecting the notches 18 and control means which position the displacement means 20 and 40 in the place indicated according to the detected values.

20

When thermoforming a single container 32, and therefore intermittently forming a single package 34, the punching means 15 only make notches 18. Therefore, given that the non-formed areas 33 are held down during vacuum formation and sealing by the molds 8 and 9 of the sealing station 7, in order to form the vacuum, the bottom mold 9 includes side openings through which the vacuum is formed. Otherwise, the vacuum and sealing process is equal to that previously described. At the same time, excess pressure is applied from the top mold 8 such that the second film 31 is sealed to the first film 30 along the perimeter of the non-formed areas 33, deforming due to the effect of heating and adapting to the shape of the product.

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30

In another embodiment of the invention, the manufacturing method does not comprise the step of making holes 17 with the punching means 15. In this case, the second film 31 is sealed to the first film 30 longitudinally at discrete points by the pre-sealing means 52. Subsequently, in the sealing station 7 a nozzle is introduced through the openings formed between the sealed discrete points, forming the vacuum through said nozzles. The nozzles are then retracted. By providing aeration

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from the top mold and forming the vacuum from the bottom mold, the second film 31 is sealed along the entire contact surface of the first film 30 due to the compatibility of said films 30 and 31 and the prior heating of the second film 31 in the top mold 8.

- 5 In addition, the machine 1 comprises cutting means adapted for longitudinally and/or transversely cutting the films 30, 31, separating the formed packages 34 in the sealing station 7.

In the embodiment shown in the drawing, the cutting means comprise longitudinal
10 blades 16 coupled to the second fixed bearing 29 of the displacement means 20. Said longitudinal blades 16 longitudinally cut the films 30 and 31, going through the corresponding holes 17. The cutting means further comprise transverse blades coupled to the bearing structure 50 of the machine 1, adapted for transversely cutting the films 30 and 31, going through the holes 17 and/or the notches 18 and
15 separating the packages 34, placing them on a conveyor belt. In other embodiments, the transverse blades and longitudinal blades are arranged in the second fixed bearing 29 of the displacement means 20.

Although the described embodiments relate to skin packaging methods and
20 machines, the previous description can be applied to a vacuum or modified atmosphere packaging machine and method with the exception of that corresponding to the sealing station. In a modified atmosphere package manufacturing machine, the sealing station comprises a top mold, a bottom mold, sealing means for sealing the second film 31 to the first film 30, particularly around
25 the borders 35 of the package 34, evacuation means for evacuating gases from the package 34 that may exist and filling means introducing the desired gas or gases in the package 34. Such sealing stations are known in the state of the art, so they will not be described in detail. Once the first film 30 and the second film 31 are introduced in the sealing station, evacuation is performed and gases are injected
30 through the filling means, through the holes 17 made by the punching means 15, the second film 31 being sealed to the first film 30 along the non-formed areas 33. In order to assure that the second film 32 does not block said holes 17 during the evacuation operation and while the gas or gases are being introduced, the sealing station 7 comprises a tool or nozzle introduced through the hole 17 to allow
35 evacuating and introducing gas.

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If a single package 34 is manufactured, a leak-tight cavity in which the films 30 and 31 are placed is formed, taking into account that the molds do not close against the non-formed area 32, the vacuum means cause the second film 31 to swell up,
5 generating a gap between both films 30 and 31 where nozzles through which gas is injected are introduced. The nozzles are then retracted and both films 30 and 31 are sealed to one another along the non-formed area 32.

In one embodiment of the manufacturing method in which the punching means 15
10 only make notches 18 on the edges of the first film 30, the second film 31 is sealed to the first film 30 longitudinally at discrete points in the pre-sealing station 52. Then in the sealing station, nozzles are introduced through the openings formed between the sealed discrete points, performing evacuation and filling through said nozzles. Said nozzles are then retracted, both films 30 and 31 being sealed to one another.
15 Then in the cutting step, the corners 35b of the borders 35 of the package 34 are rounded.

The previous description relating to a modified atmosphere packaging machine can be applied to a vacuum packaging machine, with the difference that the process of
20 filling the package with gas after forming the vacuum is not performed.

The machine 1 is adapted for making one or more packages arranged in parallel and one or more series of packages in parallel in each operating mode, such that the machine can be readily adapted to different configurations of packages to be formed.
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CLAIMS

1. Modified atmosphere, skin or vacuum packaging machine comprising first feed means (2) adapted for feeding a first film (30) to the machine (1), second feed means (3) adapted for feeding a second film (31) to the machine (1), a sealing station (7) where the vacuum is formed and/or the modified atmosphere is introduced between both films (30, 31) and the second film (31) is sealed to the first film (30) to obtain a package (34), and displacement means (20, 40) adapted for moving the first film (30) in a driving direction, **characterized in that** the displacement means (20, 40) are configured for moving at least the first film (30) a driving distance from an initial position, holding down and driving at least the first film (30) in the driving direction to an end position, said displacement means (20, 40) being configured for subsequently returning to the initial position when the machine is in operating mode.
2. Modified atmosphere, skin or vacuum packaging machine according to the preceding claim, wherein the displacement means (20, 40) are configured for retaining the first film (30) when the machine is in the operating mode.
3. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, wherein the displacement means (20, 40) comprise at least one fixed bearing (22, 29) and at least one movable bearing (21, 28) movable in the driving direction with respect to said fixed bearing (22, 29), each movable bearing (21, 28) comprising at least one support (44, 47) on which the first film (30) is arranged and at least one hold-down plate (43, 46) configured for pressing the first film (30) against the corresponding support (44, 47) when the machine is operating in forward movement mode.
4. Modified atmosphere, skin or vacuum packaging machine according to the preceding claim, wherein each fixed bearing (22, 29) comprises at least one support (24, 27) on which the first film (30) is arranged and at least one hold-down plate (23, 26) configured for pressing the first film (30) against the corresponding support (24, 27) keeping the first film (30) in a specific position when the machine (1) is in operating mode.

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5. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, wherein the hold-down plates (23, 26, 43, 46) are supported on non-formed areas (33) of the first film (30).
- 5 6. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, comprising first displacement means (20) which are arranged before a filling station arranged before the sealing station (7) and/or second displacement means (40) which are arranged after the sealing station (7).
- 10 7. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, wherein the first displacement means (20) comprise punching means (15) adapted for punching the first film (30) in a non-formed area (33) of the first film (30).
- 15 8. Modified atmosphere, skin or vacuum packaging machine according to the preceding claim, wherein the punching means (15) comprise at least one punch coupled to the fixed bearing (22).
- 20 9. Modified atmosphere, skin or vacuum packaging machine according to any of claims 6 to 8, wherein the second displacement means (40) comprise cutting means (16, 19) adapted for longitudinally and/or transversely cutting the films (30, 31) and separating the packages (34) from one another.
- 25 10. Modified atmosphere, skin or vacuum packaging machine according to the preceding claim, wherein the cutting means (16) comprise at least one transverse blade (19) and/or one longitudinal blade (16) coupled to the fixed bearing (22).
- 30 11. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, comprising retractable bearing means arranged between the displacement means (20) and the sealing station (7), adapted for longitudinally bearing said first film (30) and moving together with the first film (30) into the sealing station (7).
- 35 12. Modified atmosphere, skin or vacuum packaging machine according to any of the

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preceding claims, comprising pre-sealing means (52) arranged where contact occurs between both films (30, 31) and adapted for longitudinally sealing the films (30, 31) to one another at discrete points.

- 5 13. Modified atmosphere, skin or vacuum packaging machine according to any of the preceding claims, comprising a heating station adapted for heating the second film (31) and auxiliary displacement means (53) adapted for clamping and moving the second film (31) through the heating station.
- 10 14. Modified atmosphere, skin or vacuum packaging method comprising the following steps:
- feeding a first film (30) to the machine (1) through first feed means (2),
 - positioning a second film (31) on the first film (30) after placing the product to be packaged on the first film (30),
 - 15 • forming a vacuum and/or introducing the modified atmosphere between both films (30, 31),
 - sealing both films (30, 31), obtaining a package (34), and
 - separating the package (34),
- 20 **characterized in that** the displacement means (20) holding down and pulling the first film (30) a driving distance from an initial position to an end position when the machine (1) is in displacement mode, subsequently returning to the initial position when the machine is in operating mode.
- 25 15. Modified atmosphere, skin or vacuum packaging method according to the preceding claim, wherein when the machine (1) is in displacement mode, at least one hold-down plate (43, 46) presses the first film (30) against one support (44, 47), both hold-down plate (43, 46) and support (44, 47) are moved in a driving direction and when the machine is in operating mode, at least another hold-down plate (23, 26) presses the first film (30) against another support (24, 27)
- 30 immobilizing the first film (30) in said position.
- 35 16. Modified atmosphere, skin or vacuum packaging method according to claim 14 or 15, wherein before introducing both films (30, 31) in a sealing station (7) where the vacuum is formed and/or the modified atmosphere is introduced between both films (30, 31) and they are sealed together, the second film (31) is sealed to

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the first film (30) longitudinally at discrete points.

17. Modified atmosphere, skin or vacuum packaging method according to claims 14 to 16, wherein before introducing both films (30, 31) in a sealing station (7) where the vacuum is formed and/or the modified atmosphere is introduced between both films (30, 31) and they are sealed together, holes (17) are made in the first film (30) in non-formed areas (32) of the first film (30) and/or notches (18) are made on the edges of the first film (30).
18. Modified atmosphere, skin or vacuum packaging method according to the preceding claim, wherein the holes (17) and/or notches (18) are made at the intersection of the non-formed areas (33).
19. Modified atmosphere, skin or vacuum packaging method according to any of claims 17 or 18, wherein the holes (17) and/or notches (18) have a geometry such that it forms rounded corners (35b) on a border (35) of the package (34).
20. Modified atmosphere, skin or vacuum packaging method according to claim 17 or 18, wherein the vacuum is formed and/or the modified atmosphere is introduced through at least one nozzle which is placed in each hole (17) and keeps the films (30, 31) separated while the vacuum is formed.
21. Modified atmosphere, skin or vacuum packaging method according to claims 14 to 20, wherein before positioning the second film (31) on the first film (30), the second film (31) is clamped by auxiliary displacement means (53), said second film (31) is subsequently heated with heating means, subsequently sealing the second film (31) to the first film (30) longitudinally at discrete points.
22. Modified atmosphere, skin or vacuum packaging method according to claim 16, wherein the vacuum is formed and/or the modified atmosphere is introduced through at least one retractable nozzle which is placed in each opening formed between the discrete sealing points.

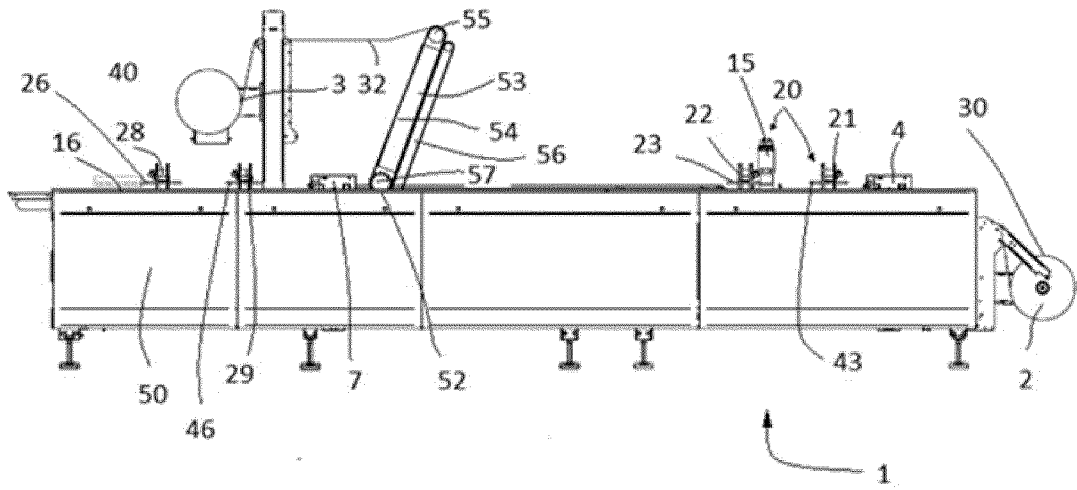


FIG. 1

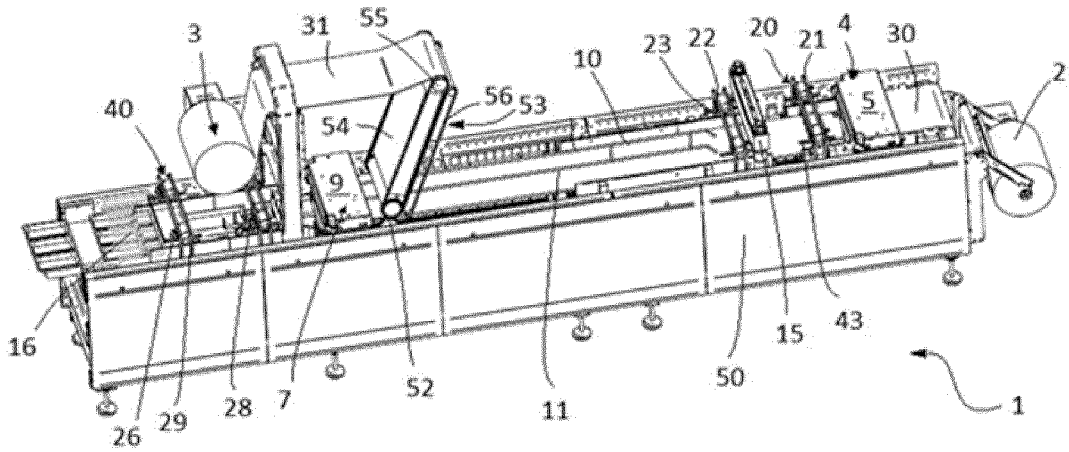


FIG. 2

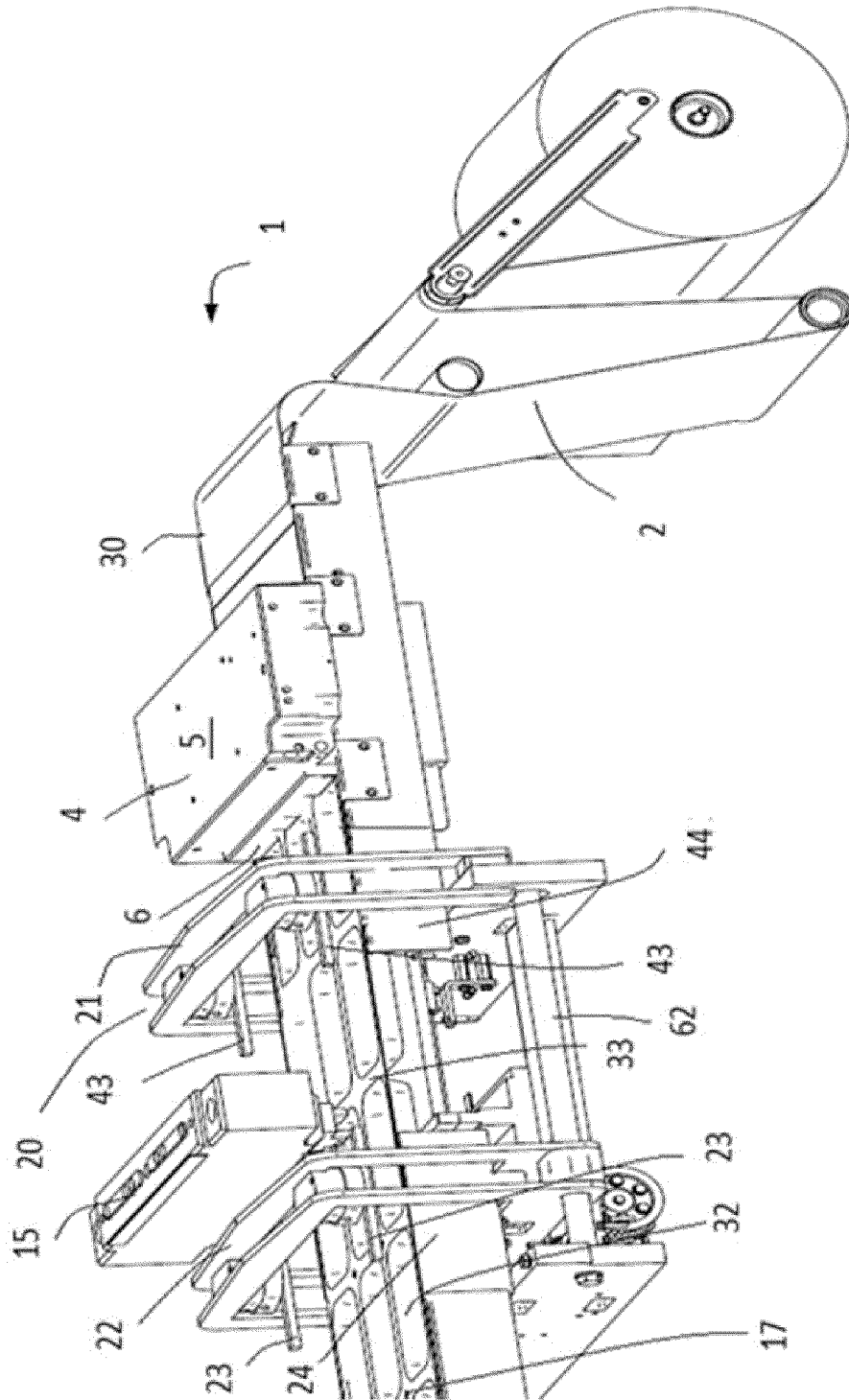


FIG. 3

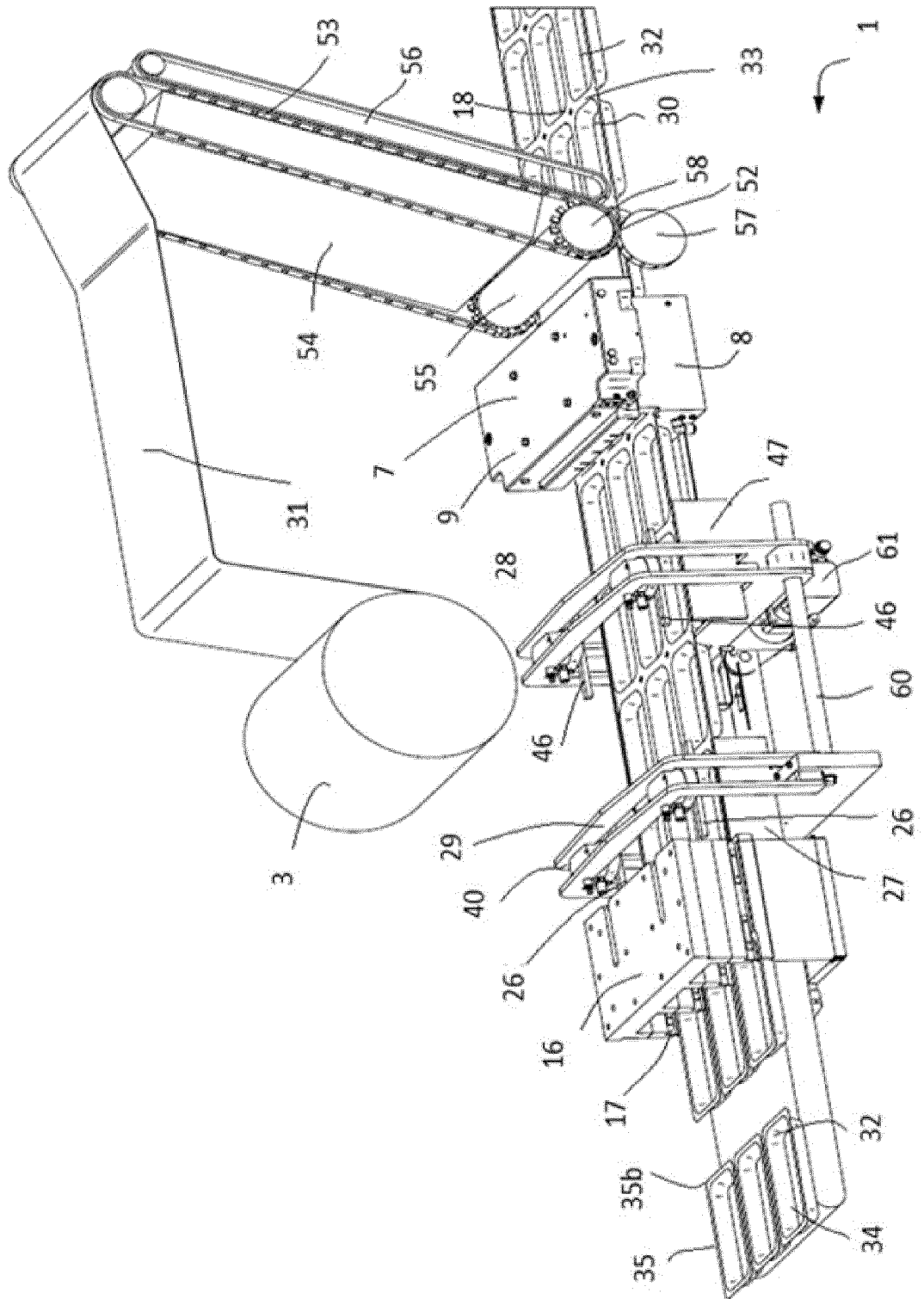


FIG. 4

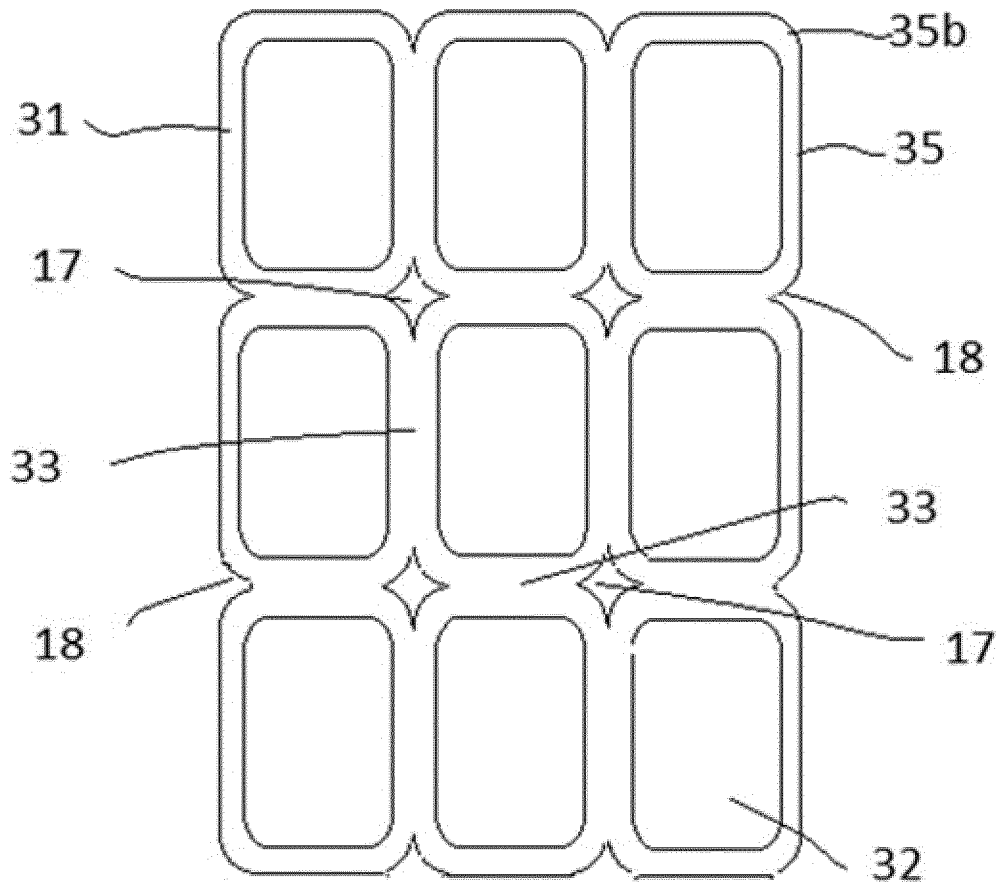


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/065588

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B65B11/52 B65B7/16 B65B5/02 B65B9/04 B65B31/02
 B65B47/00
 ADD. B65B31/04
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y A	GB 2 184 086 A (JEFFERIES FREDERICK WILLIAM) 17 June 1987 (1987-06-17) page 1, line 15 - line 18; figures 3,5,10 page 1, line 128 - page 2, line 17 page 3, line 68 - line 103 page 4, line 20 - line 28 page 4, line 75 - line 91	1-11, 13-15, 17-20,22 12,16,21
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 14 October 2014	Date of mailing of the international search report 24/10/2014
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Cardoso, Victor
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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