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(54) **PACKAGING MACHINE WITH INCREASED FUNCTIONALITY, PARTICULARLY FOR SMALL PREFORMED BAGS**

VERPACKUNGSMASCHINE MIT ERHÖHTER FUNKTIONALITÄT, INSBESONDERE FÜR KLEINE VORGEFORMTE BEUTEL

MACHINE D'EMBALLAGE À FONCTIONNALITÉ AMÉLIORÉE, PARTICULIÈREMENT POUR DE PETITS SACS PRÉFORMÉS

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Description

[0001] The present invention relates to a packaging machine with increased functionality, particularly for small preformed bags, and a packaging method, particularly for packaging small preformed bags, which can be carried out with the packaging machine.

[0002] Conventional packaging machines are generally provided with discharge outlets that are designed as a function of the size or of the shape of the bags to be filled and which must be totally or at least partially substituted with every change of format.

[0003] With such conventional packaging machines, disassembly operations are therefore necessary in order to be able to adapt the outlet to the format of the bag to be filled during operation.

[0004] In fact, the packaging lines present on the market are not capable of packaging all the kinds of bags (of different types, sizes and materials) that are present on the market with a single model of machine.

[0005] For example, some of these conventional packaging machines process the bag to be filled while leaving it standing isolated along the advancement line, hence not permitting the processing of all kinds of bags, because some kinds of bags are not self-supporting.

[0006] Other conventional packaging machines, for filling the bag, necessitate the deformation of the lateral accordion portions, which must then be restored along the advancement line. This type of execution is reliable enough when the bags are made of paper and the sizes do not differ greatly; but it is impossible to process all the other types of bags, made from different materials or with bottoms that do not allow the bag to remain in the vertical position.

[0007] In addition, another drawback common to all kinds of conventional packaging machines consists in the fact that a large amount of air remains inside the packages and, no systems being available which are adapted to the elimination thereof, the packages must be perforated, with the consequence that the package is no longer perfectly sealed, thus losing its fragrance and emitting unpleasant odors to the outside.

[0008] BE 515 333 A, FR 2 780 027 A1, DE 2629065 A1 and EP 2078674 A1 disclose packaging machines having a plurality of processing stations which are arranged along at least one advancement line and which are provided with retention means and opening means for at least one bag to be filled which are connected functionally to means for the advancement of the bag to be filled along the advancement line, said processing stations comprising at least one filling station that is provided with at least one filling cone that is adapted to discharge loose products into the bag to be filled, which is opened and shaped beforehand. The filling cone can move between a minimum opening, in which the filling cone assumes a substantially pyramid-like shape with an acute angle, and a maximum opening, means being also provided for lifting and lowering either or both of the bag to

be filled and the filling cone for a partial insertion of the filling cone into the bag to be filled.

In addition to these features, EP 2078674 A1 discloses that the filling cone in the maximum opening assumes a substantially parallelepiped shape and is defined by two half-shells, which are pivoted at an outlet of a duct for feeding the loose products and are substantially shaped like an open vat, which is delimited by a central wall substantially parallel to a discharge direction of said loose products and by two side walls.

These two side walls are inserted one inside the other and delimit laterally the filling cone in all of its active configurations and are shaped so as to define, at an outlet of the filling cone, two beaks adapted to be inserted into the bag to be filled during the step for filling.

EP 2078674 A1 also discloses two mutually opposite suckers that can move toward and away from each other at right angles to the advancement line so as to open the bag before it is moved to the filling cone. EP 2078674 A1 also discloses the use of grippers according to JP2002-302227A, which retain the bag at the lateral portions and are movable toward and away from each other parallel to the advancement line.

EP 0082955 A2 discloses a bag filling apparatus with means for gripping bags adjacent to their top and side edges, vacuum cups for pulling the top edges apart and a filling cone with half shells, which bear vacuum pipes on their rear walls and are hinged on respective axes transverse to the line connecting the grippers. The arrangement is such that, in the filling position and with the bag gripped by the grippers, the top edge of the bag is tensioned so that no dust can escape on the sides.

[0009] The aim of the present invention consists in providing a packaging machine with increased functionality which is capable of overcoming the above-mentioned drawbacks and limitations.

[0010] Within this aim, an object of the present invention consists in providing a packaging machine that is particularly adapted to the packaging of small preformed bags.

[0011] Another object of the present invention consists in providing a packaging machine that is capable of offering the widest guarantees of reliability and safety of use.

[0012] In accordance with the invention, there is provided a packaging machine as defined in the appended claims.

[0013] Further characteristics and advantages of the present invention will become more apparent from the detailed description of a preferred embodiment of a packaging machine with increased functionality, particularly for small preformed bags, which is illustrated for the purposes of example with the assistance of the accompanying drawings wherein:

Figure 1 is a schematic side elevation view of the packaging machine according to the present invention;

Figure 2 is a schematic plan view from above of the packaging machine shown in Figure 1;

Figures 3 and 4 are two schematic side elevation views of the filling cone of the packaging machine shown in the previous figures, respectively, before and after its insertion into the bag to be filled in its active configuration of opening;

Figure 5 is a schematic side elevation view of the filling cone shown in the previous figures during the step of discharging the product into the bag to be filled;

Figure 6 is a schematic plan view from above of the bag to be filled during the discharging step mentioned previously;

Figure 7 is a schematic side elevation view of the filling cone shown in the previous figures, illustrating its operation;

Figure 8 is a schematic side elevation view of the bag to be filled during the step of sealing and elimination of the remaining air contained in it;

Figure 9 is a schematic view of the mouth of the bag to be filled.

[0014] With reference to the figures, the packaging machine with increased functionality, particularly for small preformed bags, generally designated with the reference numeral 1, comprises a plurality of processing stations which are arranged along at least one advancement line 2 and which are provided with retention means 3 and opening means 4 for at least one bag 5 to be filled which are connected functionally to means for the advancement of the bag 5, which are not shown since they are conventional.

[0015] For example, the bag 5 can be a preformed bag of the type with an open mouth with or without lateral accordion portions, an open mouth with or without a bottom, an open mouth with or without a handle, or an open mouth of the Doy Pack type, or stand-up pouch, or Top Slider, etc.

[0016] These preformed bags can furthermore be made from materials of different types, and the sizes of the bags that can be processed can vary from 300 grams up to 7 kilograms.

[0017] More precisely, the processing stations comprise at least one filling station that is provided with at least one filling cone 6 that is adapted to discharge loose products 7 into the bag 5, which is opened and shaped beforehand.

[0018] In the embodiment proposed, there are two filling stations which are arranged in series in order to increase the productivity of the packaging machine 1.

[0019] According to the invention, each filling cone 6 is of the type with variable opening so that it can move between an active configuration of minimum opening, in which it assumes a substantially pyramid-like shape with an acute angle as shown in Figures 3 and 4, and an active configuration of maximum opening, in which it assumes a shape substantially like a parallelepiped with a rectan-

gular cross-section as shown in Figures 5 and 7.

[0020] Furthermore, also according to the invention, means are provided, also not shown, for lifting and lowering either or both of the bag 5 and the filling cone 6 in order to partially insert the filling cone 6 into the bag 5 along a line of ascent/descent 18.

[0021] Advantageously, each filling cone 6 is defined by at least two half-shells 8 and 9, which are pivoted at the outlet 10 of a duct 11 for feeding the loose products 7 so that they can move between the active configuration of minimum opening, in which these half-shells 8 and 9 are closed against each other so as to give the filling cone 6 the substantially pyramid-like shape with an acute angle, and the active configuration of maximum opening, in which the two half-shells 8 and 9 are open with respect to each other so as to give the filling cone 6 substantially the shape of a parallelepiped with a rectangular cross-section.

[0022] More precisely, the two half-shells 8 and 9 are both substantially shaped like an open vat, which is delimited by a central wall 12, which extends substantially parallel to the discharge direction of the loose products 7, and by two side walls 13, with the central walls 12 being mutually opposite and the central walls mutually offset so as to define a male-female coupling and allow the insertion of the two half-shells 8 and 9 one inside the other and delimit laterally each filling cone 6 in all of its active configurations.

[0023] It is important to note that the above-mentioned walls 12 and 13 are furthermore shaped so as to define, at the outlet of each filling cone 6, two beaks 14 and 15 which define the vertex of the filling cone 6 and are adapted to be inserted into the bag 5 during the step for filling it.

[0024] Conveniently, means 16 are provided for adjusting the opening angle of the two half-shells 8 and 9, which comprise, for each half-shell 8 and 9, a pneumatic actuator 17 that is interposed between an abutment 19 that is integral with the feeding duct 11 and an element 20 for supporting the respective half-shell 8 or 9.

[0025] The acute angle of the filling cone 6, which is directed downward, penetrates the bag 5 with extreme ease, allowing the coupling and the packaging of a plurality of bags, some of which are increasingly in demand by the European market; for example bags that have the lateral accordion portions locked into place, or mini packs of formats varying from 300 grams to 800 grams. The filling mouth that is defined enables the packaging, with high productivity, of any bag, irrespectively of the shape, type and size.

[0026] The above-mentioned opening means 4 comprise at least two mutually opposite sets of suckers 21 that can move toward and away from each other at right angles to the advancement line 2, so as to grip the bag 5 by adhering to the lateral surfaces 23 thereof, following their mutual approach, and so as to open the selvage 24 thereof, following their mutual spacing.

[0027] As far as the retention means 3 are concerned, they comprise at least two sets of grippers 25 which are

mutually opposite and movable toward and away from each other at right angles with respect to the advancement line 2 so as to retain the bag 5 to be filled at its lateral accordion portions 26.

[0028] As will be described in more detail later, the two sets of grippers 25 are movable toward and away from each other parallel to the advancement line 2 so as to allow the complete opening of the bag 5 with the lateral accordion portions 26 retained by the sets of grippers 25 following the thrust applied on the selvage 24 by the beaks 14 and 15 that are inserted into the bag 5, so as to make the selvage 23 adhere to the entire external perimeter of the filling cone 6.

[0029] With particular reference to Figure 8, at least one sealing station is provided which is arranged behind the filling station or stations and is provided with at least one set of heat-sealing bars 27, which are provided with liquid cooling means of the heat-sealing, for the heat-sealing of the selvage 24 of the bag 5.

[0030] Conveniently, means are provided for the height adjustment of the heat-sealing bars 27 so as to be able to provide a plurality, for example up to four, of types of closure for different types of bags and/or to be able to provide a plurality, for example three, of different types of closure on the same bag.

[0031] Also with particular reference to Figure 8, advantageously, air removal means 28 are provided for removing the residual air contained in the bag 5, in the transfer thereof from the filling station to the sealing station, which comprise, at their upper part, a series of pressers 29 that are adapted to retain the bag 5 and to make the selvage 24 descend and, at their lower part, a pair of rollers 30 that are adapted to operate vertically on the lateral surfaces 23 of the bag 5, until they reach the level of the product contained therein, so as to eliminate the air between the product and the selvage 24.

[0032] The packaging method, obtainable with the packaging machine 1 described above, particularly for packaging small preformed bags, is described below.

[0033] According to the invention, the packaging method comprises the following steps:

- retaining the bag 5 to be filled by way of the retention means 3,
- advancing the bag 5 to be filled until it is arranged in at least one of the filling stations described previously,
- opening the selvage 24 of the bag 5 to be filled by way of the opening means 4, an operation that can also occur before or during the previous step of advancement.

[0034] More precisely, the retention means 3 and the opening means 4 comprise respectively the sets of grippers 25 for retaining the lateral accordion portions of the bag 5 to be filled and the sets of suckers 21 for opening the bag 5; the former operate on the sides of the selvage 24 of the bag 5 to keep the accordion portions closed,

and move toward each other on the horizontal axis while, simultaneously, the latter once adhered to the bag 5 move away from each other so that it can be opened in order to make the selvage 5 define an oval-shaped opening.

[0035] Subsequently, after the advancement, the following steps are executed:

- partially inserting each filling cone 6 into the bag 5 to be filled by way of the lifting and lowering means,
- opening each filling cone 6, and moving the retention means 3 so as to make the selvage 24 adhere to the entire external perimeter of the filling cone 6,
- discharging the loose products 7 into the bag 5 to be filled.

[0036] Advantageously, at least two steps of:

- the step of partially inserting the filling cone 6,
- the step of opening the filling cone 6,
- the step of discharging the loose products 7,

can also occur simultaneously.

[0037] More precisely, the outlet of each filling cone 6 and the selvage 6 of the bag 5 to be filled can be mutually coupled and uncoupled thanks to the vertical and horizontal movements of the mouth or of the retention means 3 of the bag 5 which are connected to the supporting frame of the outlet 10.

[0038] After the bag 5 to be filled, with the selvage 24 open in an oval shape, has been positioned under the outlet of the respective filling cone 6, it is gripped and held by an additional set of bag-retaining grippers, which are positioned under the discharge outlet or outlets.

[0039] The filling cone 5 can thus partially penetrate the bag 5 and then open horizontally toward the accordion portions and discharge the product 7 into the bag 5.

[0040] During the step of opening, the outlet of the filling cone 6 deforms the initially oval cross-section of the selvage 24 causing it to take on the shape of the outlet itself, i.e. a shape very similar to that of the transverse cross-section of the bag 5 that is now filled, almost rectangular.

[0041] In this way, the outlet of the filling cone 5, during the step of opening, moves a part of the accordion portions that are not held in place by the retention means 3 so that the outlet of the filling cone 6 can define a bigger opening, thus exploiting approximately 80% of the width of the selvage 24 of the bag 5.

[0042] More precisely, during the step of opening the filling cone 6 and of discharging the products 7, the retention means 3 that hold the selvage 24 of the bag 5 with the accordion portions held in place move apart in order to put the selvage 24 of the bag under tension and make it adhere to the entire external perimeter of the outlet of the filling cone 6.

[0043] In this way, the opening of the outlet of the filling cone 6, in addition to allowing the product 7 to enter the

bag 5, also modifies the original, oval-shaped opening of the selvage 24 by making it take on an almost rectangular shape.

[0044] When the filling is completed, the filling cone 6 and the selvage 24 are separated and the bag 5 is then gripped by the retention means 3, so that they can hold, align and transport the bag 5, which retention means have a pair of claws or jaws that rotate on a vertical falling plane, in moving apart and coming together.

[0045] More precisely, such means of retention, alignment and transport enable the alignment of the selvage 24, by way of a mutual spacing movement along the horizontal axis, and the alignment can be achieved both under the outlet of the filling cone 6, and in a subsequent station.

[0046] Subsequently, the bag is translationally moved to the subsequent station, for the operations of discharging the air contained in the bag 5 to be filled by way of the air removal means 28 and to heat-seal the selvage 24 by way of the set of heat-sealing bars 27.

[0047] More precisely, such translational motion occurs by way of the grippers for retaining, alignment and transport, accompanied by auxiliary movement means which operate on the bottom of the bag, such as for example conveyor belts and moving arms.

[0048] The bag is moved to the heat-sealing station directly by the air removal means 28.

[0049] Once the operations of the air removal means 28 are completed, the bag 5 is immediately heat-sealed by way of the set of heat-sealing bars 27.

[0050] Such heat-sealing stations can be one or more in number, and on each assembly it is possible to have sets of bars that are adjustable in height, so as to be able to execute up to four different types of closure for different types of bags, or to be able to execute up to three different types of closure for the same bag.

[0051] In practice it has been found that the packaging machine with increased functionality, particularly for small preformed bags, and the packaging method obtainable with it, achieve the intended aim and objects since they allow the packaging of different kinds of bags, without the necessity of changing the discharge outlets, so that the machine is adapted for the packaging of both food and chemical products, as well as pet food.

[0052] For example, it enables the packaging of bags of different types such as: bags with accordion portions, or without accordion portions, bags with outer handles, bags with punched handles, Doy Pack bags, Stand-Up Pouch bags, Single Life Top Zip bags, Mini Pet Pack bags, Internal Front Zipper bags, Top Slider bags, Hidden Front Slider bags, Easy Open bags.

[0053] Furthermore, it is possible to process bags of any shape, size and material.

[0054] Another advantage of the packaging machine, according to the present invention, consists in the fact that the handling of the bags on the advancement line always occurs with the accordion portions held in place, so as to ensure the 100% perfect closure of the package.

[0055] In fact, the handling of the bags on the advancement line occurs while they are constantly kept in grip and with the accordion portions held in place, so as to ensure a production process that is reliable and without interruptions, and a perfect packaging of the bags.

[0056] Another advantage of the packaging machine, according to the present invention, consists in the fact that it allows an optimal sealing of the bags which is such as to preserve the fragrance and quality of the product.

[0057] In fact, thanks to the air removal means, oxygen is removed from inside the sealed package; thus it is not necessary to perforate the package in order to palletize it.

[0058] Furthermore, thanks to the presence of the liquid cooling means of the heat-sealing, it is possible to prevent the material of the bag from deforming with the heat, thus taking on an unpleasant appearance; furthermore the system prevents variation in the colors of the bag in contact with the heat sources.

[0059] Another advantage of the packaging machine, according to the present invention, consists in the fact that it is easy to use and quick to effect the change of format, being furthermore reliable from the point of view both of the process and of the work elements over time.

[0060] The packaging machine with increased functionality, particularly for small preformed bags, and the packaging method obtainable with it, thus conceived, are susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0061] Moreover, all the details may be substituted by other, technically equivalent elements.

[0062] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements.

[0063] Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

1. A packaging machine (1) with increased functionality, particularly for small preformed bags, comprising a plurality of processing stations which are arranged along at least one advancement line (2) and which are provided with retention means (3) and opening means (4) for at least one bag (5) to be filled which are connected functionally to means for the advancement of said at least one bag (5) to be filled along said advancement line (2), said processing stations comprising at least one filling station that is provided with at least one filling cone (6) that is adapted to discharge loose products (7) into said at least one

bag (5) to be filled, which is opened and shaped beforehand, said at least one filling cone (6) being of the type with variable opening, so that it can move between an active configuration of minimum opening, in which said at least one filling cone (6) assumes a substantially pyramid-like shape with an acute angle, and an active configuration of maximum opening, means being also provided for lifting and lowering either or both of said at least one bag (5) to be filled and said at least one filling cone (6) for a partial insertion of said at least one filling cone (6) into said at least one bag (5) to be filled, wherein in said active configuration of maximum opening said at least one filling cone (6) assumes a shape substantially like a parallelepiped with a rectangular cross-section, said at least one filling cone (6) being defined by at least two half-shells (8, 9), which are pivoted at an outlet (10) of a duct (11) for feeding said loose products (7) so that they can move between said active configuration of minimum opening, in which said at least two half-shells (8, 9) are closed against each other so as to give said at least one filling cone (6) said substantially pyramid-like shape with an acute angle, and said active configuration of maximum opening, in which said at least two half-shells (8, 9) are open with respect to each other so as to give said at least one filling cone (6) said shape substantially like a parallelepiped with a rectangular cross-section, said at least two half-shells (8, 9) being both substantially shaped like an open vat, which is delimited by a central wall (12), which extends substantially parallel to a discharge direction of said loose products (7), and by two side walls (13), said central walls (12) of said at least two half-shells (8, 9) being mutually opposite and said central walls (12) of said at least two half-shells (8, 9) being mutually offset so as to allow an insertion of said at least two half-shells (8, 9) one inside the other and delimit laterally said at least one filling cone (6) in all of its active configurations, said walls (12, 13) of said at least two half-shells (8, 9) being furthermore shaped so as to define, at an outlet of said at least one filling cone (6), two beaks (14, 15), which define a vertex of said at least one filling cone (6) and are adapted to be inserted into said at least one bag (5) to be filled during the step for filling said bag;

wherein said opening means (4) comprise at least two mutually opposite sets of suckers (21) that can move toward and away from each other at right angles to said advancement line (2), so as to grip said at least one bag (5) to be filled by adhering to lateral surfaces (26) of said at least one bag (5) to be filled, following their mutual approach, and so as to open a selvage (24) of said at least one bag (5) to be filled, following their mutual spacing;

wherein said retention means (3) comprise at least two sets of mutually opposite grippers (25) that can move toward and away from each other at right an-

gles to said advancement line (2) so as to retain said at least one bag (5) to be filled at its lateral accordion portions (26), said at least two sets of grippers (25) being furthermore movable toward and away from each other parallel to said advancement line (2) so as to allow a complete opening of said at least one bag (5) to be filled with said lateral accordion portions (26) being retained by said at least two sets of grippers (25) following a thrust applied to said selvage (24) by said beaks (14, 15) that are inserted in said at least one bag (5) to be filled, so as to make said selvage (24) adhere to a entire external perimeter of said at least one filling cone (6);

and wherein, during the step of opening the filling cone (6) and of discharging the products (7), the sets of grippers (25) that hold the selvage (24) of the bag (5) with the accordion portions held in place move apart in order to put the selvage (24) of the bag under tension and make it adhere to the entire external perimeter of the outlet of the filling cone (6).

2. The packaging machine (1) according to claim 1, **characterized in that** it comprises means (16) for adjusting an opening angle of said at least two half-shells (8, 9), which comprise, for each one of said at least two half-shells (8, 9), a pneumatic actuator (17) interposed between an abutment (19) that is integral with said feeding duct (11), and an element (20) for supporting said half-shell (8, 9).
3. The packaging machine (1) according to one or more of the preceding claims, **characterized in that** it comprises at least one sealing station that is arranged behind said filling station and is provided with at least one set of heat-sealing bars (27) for heat-sealing said selvage (24).
4. The packaging machine (1) according to claim 3, **characterized in that** it comprises means for a height adjustment of said heat-sealing bars (27) so as to be able to provide a plurality of types of closure for different types of bags and/or to be able to provide a plurality of different types of closure on the same bag.
5. The packaging machine (1) according to claim 4, **characterized in that** it comprises air removal means (28) for removing residual air contained in said at least one bag (5) in a transfer of said at least one bag (5) from said at least one filling station to said sealing station.
6. The packaging machine (1) according to claim 5, **characterized in that** said air removal means (28) comprise, at their upper part, a series of pressers (29) that are adapted to retain said at least one bag (5) to be filled and to make said selvage (24) descend and, at their lower part, a pair of rollers (30) that are

adapted to operate vertically on the lateral surfaces (23) of said at least one bag (5), until they reach the level of the product contained therein, so as to eliminate the air between said products (7) and said selva (24).

7. The packaging machine (1) according to claim 6, **characterized in that** it comprises two filling stations arranged in series.

8. A packaging method, particularly for packaging small preformed bags, using a packaging machine (1) according to one or more of the preceding claims, **characterized in that** it comprises the following steps:

- retaining said at least one bag (5) to be filled by way of said retention means (3),
- advancing said at least one bag (5) to be filled until it is arranged in at least one of said filling stations,
- opening said selva (24) of said at least one bag (5) to be filled by way of said opening means (4),
- partially inserting said at least one filling cone (6) into said at least one bag (5) to be filled by way of said lifting and lowering means,
- opening said at least one filling cone (6), and moving said retention means (3) so as to make said selva (24) adhere to the entire external perimeter of said at least one filling cone (6),
- discharging said loose products (7) into said at least one bag (5) to be filled,
- eliminating the air contained in said at least one bag (5) by way of said air removal means (28),
- heat-sealing said selva (24) by way of said at least one set of heat-sealing bars (27).

9. The packaging method according to claim 8, **characterized in that** said step of opening said selva (24) occurs before said step of advancing said at least one bag (5) to be filled.

10. The packaging method according to claim 8, **characterized in that** at least two steps of:

- said step of partially inserting said at least one filling cone (6),
 - said step of opening said at least one filling cone (6),
 - said step of discharging said loose products (7),
- occur simultaneously.

Patentansprüche

1. Eine Verpackungsmaschine (1) mit erhöhter Funktionalität, insbesondere für kleine vorgeformte Beutel, die eine Vielzahl von Verarbeitungsstationen umfasst, welche entlang mindestens einer Vorschublinie (2) angeordnet und mit Haltemitteln (3) und Öffnungsmitteln (4) für mindestens einen zu füllenden Beutel (5) ausgestattet sind, welche funktionell mit Mitteln für den Vorschub des mindestens einen zu füllenden Beutels (5) entlang der Vorschublinie (2) verbunden sind, wobei die Verarbeitungsstationen mindestens eine Füllstation umfassen, die mit mindestens einem Füllkegel (6) ausgestattet ist, welcher ausgebildet ist, um lose Produkte (7) in den mindestens einen zu füllenden Beutel (5) zu geben, der zuvor geöffnet und geformt wird, wobei der mindestens eine Füllkegel (6) von der Art mit variabler Öffnung ist, so dass er sich zwischen einer aktiven Konfiguration mit minimaler Öffnung, in welcher der mindestens eine Füllkegel (6) eine im Wesentlichen pyramidenähnliche Form mit spitzem Winkel annimmt, und einer aktiven Konfiguration mit maximaler Öffnung bewegen kann, wobei auch Mittel bereitgestellt sind zum Anheben und Senken des mindestens einen zu füllenden Beutels (5) und/oder des mindestens einen Füllkegels (6) zum partiellen Einsetzen des mindestens einen Füllkegels (6) in den mindestens einen zu füllenden Beutel (5), wobei der mindestens eine Füllkegel (6) in der aktiven Konfiguration mit maximaler Öffnung eine Form im Wesentlichen gleich der eines Parallelepipeds mit rechteckigem Querschnitt annimmt, wobei der mindestens eine Füllkegel (6) durch mindestens zwei Halbschalen (8, 9) bestimmt ist, die drehgelenkig an einem Auslass (10) einer Leitung (11) zum Zuführen der losen Produkte (7) angeordnet sind, so dass sie sich bewegen können zwischen der aktiven Konfiguration mit minimaler Öffnung, in welcher die mindestens zwei Halbschalen (8, 9) aufeinander geschlossen sind, um dem mindestens einen Füllkegel (6) die im Wesentlichen pyramidenähnliche Form mit spitzem Winkel zu verleihen, und der aktiven Konfiguration mit maximaler Öffnung, in welcher die mindestens zwei Halbschalen (8, 9) offen zueinander sind, um dem mindestens einen Füllkegel (6) die Form im Wesentlichen gleich der eines Parallelepipeds mit rechteckigem Querschnitt zu verleihen, wobei die mindestens zwei Halbschalen (8, 9) beide im Wesentlichen wie ein offener Trog geformt sind, der von einer zentralen Wand (12) begrenzt ist, welche sich im Wesentlichen parallel zu einer Auslassrichtung der losen Produkte (7) erstreckt, und von zwei Seitenwänden (13), wobei die zentralen Wände (12) der mindestens zwei Halbschalen (8, 9) einander gegenüberliegen und die zentralen Wände (12) der mindestens zwei Halbschalen (8, 9) zueinander versetzt sind, um ein Einsetzen der mindestens zwei

Halbschalen (8, 9) ineinander zu ermöglichen und den mindestens einen Füllkegel (6) in all seinen aktiven Konfigurationen seitlich zu begrenzen, wobei die Wände (12, 13) der mindestens zwei Halbschalen (8, 9) weiter geformt sind, um an einem Auslass des mindestens einen Füllkegels (6) zwei Schnäbel (14, 15) zu bestimmen, die einen Scheitelpunkt des mindestens einen Füllkegels (6) bestimmen und ausgebildet sind, um in den mindestens einen Beutel (5) eingeführt zu werden, der während des Schritts zum Füllen des Beutels gefüllt werden soll; wobei die Öffnungsmittel (4) mindestens zwei einander gegenüberliegende Sätze von Saugnäpfen (21) umfassen, die sich in rechten Winkeln zu der Vorschublinie (2) aufeinander zu und voneinander weg bewegen können, um den mindestens einen zu füllenden Beutel (5) zu greifen durch Anhaften an Seitenflächen (26) des mindestens einen zu füllenden Beutels (5) nach ihrer Annäherung aneinander, und um nach ihrer Beabstandung voneinander eine Kante (24) des mindestens einen zu füllenden Beutels (5) zu öffnen; wobei die Haltemittel (3) mindestens zwei Sätze einander gegenüberliegender Greifer (25) umfassen, die sich in rechten Winkeln zu der Vorschublinie (2) aufeinander zu und voneinander weg bewegen können, um den mindestens einen zu füllenden Beutel (5) an seinen seitlichen Falte wandabschnitten (26) zu halten, wobei die mindestens zwei Sätze von Greifern (25) des Weiteren parallel zu der Vorschublinie (2) aufeinander zu und voneinander weg beweglich sind, um eine vollständige Öffnung des mindestens einen zu füllenden Beutels (5) zu ermöglichen, wobei die seitlichen Falte wandabschnitte (26) von den mindestens zwei Sätzen von Greifern (25) gehalten werden, nach einem Schub, der von den Schnäbeln (14, 15), die in den mindestens einen zu füllenden Beutel (5) eingeführt sind, auf die Kante (24) ausgeübt wird, um die Kante (24) an einem gesamten äußeren Umfang des mindestens einen Füllkegels (6) zumhaften zu bringen; und wobei während dem Schritt des Öffnens des Füllkegels (6) und der Abgabe der Produkte (7) die Sätze von Greifern (25), welche die Kante (24) des Beutels (5) mit den festgehaltenen Falte wandabschnitten halten, sich voneinander weg bewegen, um die Kante (24) des Beutels unter Druck zu setzen, so dass sie an dem gesamten Außenumfang des Auslasses des Füllkegels (6) anhaftet.

2. Die Verpackungsmaschine (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sie Mittel (16) zur Anpassung eines Öffnungswinkels der mindestens zwei Halbschalen (8, 9) umfasst, welche für jede der mindestens zwei Halbschalen (8, 9) einen Pneumatik Antrieb (17) umfassen, der zwischen einem Widerlager (19), das integral mit der Zuführleitung (11) ist, und einem Element (20) zum Tragen der Halb-

schale (8, 9) angeordnet ist.

3. Die Verpackungsmaschine (1) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** sie mindestens eine Versiegelungsstation umfasst, die hinter der Füllstation angeordnet und mit mindestens einem Satz von Heißsiegelstäben (27) zum Heißsiegeln der Kante (24) ausgestattet ist.
4. Die Verpackungsmaschine (1) gemäß Anspruch 3, **dadurch gekennzeichnet, dass** sie Mittel für eine Höheneinstellung der Heißsiegelstäbe (27) umfasst, um eine Vielzahl von Verschlussarten für verschiedene Arten von Beuteln und/oder eine Vielzahl verschiedener Arten von Verschlüssen für denselben Beutel bereitstellen zu können.
5. Die Verpackungsmaschine (1) gemäß Anspruch 4, **dadurch gekennzeichnet, dass** sie Luftentnahmemittel (28) zum Entfernen von Restluft, die in dem mindestens einen Beutel (5) enthalten ist, während eines Transfers des mindestens einen Beutels (5) von der mindestens einen Füllstation zu der Versiegelungsstation umfasst.
6. Die Verpackungsmaschine (1) gemäß Anspruch 5, **dadurch gekennzeichnet, dass** die Luftentnahmemittel (28) in ihrem oberen Teil eine Reihe von Pressvorrichtungen (29) umfassen, die ausgebildet sind, um den mindestens einen zu füllenden Beutel (5) zu halten und die Kante (24) absinken zu lassen, und in ihrem unteren Teil ein Paar von Rollen (30), die ausgebildet sind, um vertikal an den Seitenflächen (23) des mindestens einen Beutels (5) zu arbeiten, bis sie das Niveau des darin enthaltenen Produkts erreichen, um die Luft zwischen den Produkten (7) und der Kante (24) zu entfernen.
7. Die Verpackungsmaschine (1) gemäß Anspruch 6, **dadurch gekennzeichnet, dass** sie zwei seriell angeordnete Füllstationen umfasst.
8. Ein Verpackungsverfahren, insbesondere zum Verpacken kleiner vorgeformter Beutel mit Hilfe einer Verpackungsmaschine (1) gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** es folgende Schritte umfasst:
 - Halten des mindestens einen zu füllenden Beutels (5) durch die Haltemittel (3),
 - Vorwärtsbewegen des mindestens einen zu füllenden Beutels (5), bis er sich in mindestens einer der Füllstationen befindet,
 - Öffnen der Kante (24) des mindestens einen zu füllenden Beutels (5) durch die Öffnungsmittel (4),
 - partielles Einführen des mindestens einen Füll-

kegels (6) in den mindestens einen zu füllenden Beutel (5) durch die Anhebungs- und Senkungsmittel,

- Öffnen des mindestens einen Füllkegels (6) und Bewegen der Haltemittel (3), um die Kante (24) an dem gesamten äußeren Umfang des mindestens einen Füllkegels (6) zum Haften zu bringen, 5
- Ablassen der losen Produkte (7) in den mindestens einen zu füllenden Beutel (5), 10
- Entfernen der in dem mindestens einen Beutel (5) enthaltenen Luft durch die Luftentnahmemittel (28),
- Heißsiegeln der Kante (24) durch den mindestens einen Satz von Heißsiegelstäben (27). 15

9. Das Verpackungsverfahren gemäß Anspruch 8, **dadurch gekennzeichnet, dass** der Schritt des Öffnens der Kante (24) vor dem Schritt des Vorwärtsbewegens des mindestens einen zu füllenden Beutels (5) stattfindet. 20

10. Das Verpackungsverfahren gemäß Anspruch 8, **dadurch gekennzeichnet, dass** mindestens zwei Schritte: 25

- des Schritts des partiellen Einführens des mindestens einen Füllkegels (6),
 - des Schritts des Öffnens des mindestens einen Füllkegels (6), 30
 - des Schritts des Ablassens der losen Produkte (7),
- gleichzeitig stattfinden. 35

Revendications

1. Machine d'emballage (1) ayant une fonctionnalité améliorée, en particulier pour de petits sacs préformés, comprenant une pluralité de stations de traitement qui sont agencées le long d'au moins une ligne d'avancée (2) et qui sont munies de moyens de rétention (3) et de moyens d'ouverture (4) pour au moins un sac (5) à remplir qui sont connectés de manière fonctionnelle à des moyens destinés à faire avancer ledit au moins un sac (5) à remplir le long de ladite ligne d'avancée (2), lesdites stations de traitement comprenant au moins une station de remplissage qui est munie d'au moins un cône de remplissage (6) qui est conçu pour décharger des produits en vrac (7) dans ledit au moins un sac (5) à remplir, qui est ouvert et mis en forme au préalable, ledit au moins un cône de remplissage (6) étant du type à ouverture variable, de sorte qu'il peut se déplacer entre une configuration active d'ouverture minimale, dans laquelle ledit au moins un cône de remplissage (6) adopte une forme sensiblement pyramidale ayant un angle aigu, et une configuration active 40

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d'ouverture maximale, des moyens étant également prévus pour soulever et abaisser l'un ou les deux parmi ledit au moins un sac (5) à remplir et ledit au moins un cône de remplissage (6) pour une insertion partielle dudit au moins un cône de remplissage (6) dans ledit au moins un sac (5) à remplir, dans laquelle, dans ladite configuration active d'ouverture maximale, ledit au moins un cône de remplissage (6) adopte une forme sensiblement semblable à un parallélépipède ayant une section transversale rectangulaire, ledit au moins un cône de remplissage (6) étant défini par au moins deux demi-coquilles (8, 9), qui pivotent au niveau d'une sortie (10) d'un conduit (11) pour amener lesdits produits en vrac (7) de sorte qu'elles peuvent se déplacer entre ladite configuration active d'ouverture minimale, dans laquelle lesdites au moins deux demi-coquilles (8, 9) sont fermées l'une contre l'autre de manière à donner audit au moins un cône de remplissage (6) ladite forme sensiblement pyramidale ayant un angle aigu, et ladite configuration active d'ouverture maximale, dans laquelle lesdites au moins deux demi-coquilles (8, 9) sont ouvertes l'une par rapport à l'autre de manière à donner audit au moins un cône de remplissage (6) ladite forme sensiblement semblable à un parallélépipède ayant une section transversale rectangulaire, lesdites au moins deux demi-coquilles (8, 9) étant toutes deux sensiblement en forme de cuve ouverte, qui est délimitée par une paroi centrale (12), qui s'étend sensiblement parallèlement à une direction de décharge desdits produits en vrac (7), et par deux parois latérales (13), lesdites parois centrales (12) desdites au moins deux demi-coquilles (8, 9) étant mutuellement opposées et lesdites parois centrales (12) desdites au moins deux demi-coquilles (8, 9) étant mutuellement décalées de manière à permettre une insertion desdites au moins deux demi-coquilles (8, 9) l'une à l'intérieur de l'autre et délimitent latéralement ledit au moins un cône de remplissage (6) dans toutes ses configurations actives, lesdites parois (12, 13) desdites au moins deux demi-coquilles (8, 9) étant en outre formées de manière à définir, au niveau d'une sortie dudit au moins un cône de remplissage (6), deux becs (14, 15), qui définissent un sommet dudit au moins un cône de remplissage (6) et sont conçus pour être insérés dans ledit au moins un sac (5) à remplir pendant l'étape de remplissage dudit sac ;

dans lequel lesdits moyens d'ouverture (4) comprennent au moins deux ensembles de ventouses (21) mutuellement opposés qui peuvent se rapprocher et s'éloigner l'un de l'autre à des angles droits par rapport à ladite ligne d'avancée (2), de manière à saisir ledit au moins un sac (5) à remplir par adhérence aux surfaces latérales (26) dudit au moins un sac (5) à remplir, après leur rapprochement mutuel, et de manière à ouvrir une lisière (24) dudit au moins un sac (5) à remplir, après leur éloignement mutuel ;

- dans lequel lesdits moyens de rétention (3) comprennent au moins deux ensembles de moyens de saisie (25) mutuellement opposés qui peuvent se rapprocher et s'éloigner l'un de l'autre à des angles droits par rapport à ladite ligne d'avancée (2) de manière à retenir ledit au moins un sac (5) à remplir au niveau de ses portions en accordéon latérales (26), lesdits au moins deux ensembles de moyens de saisie (25) pouvant en outre être rapprochés et éloignés l'un de l'autre parallèlement à ladite ligne d'avancée (2) de manière à permettre une ouverture complète dudit au moins un sac (5) à remplir, lesdites portions en accordéon latérales (26) étant retenues par lesdits au moins deux ensembles de moyens de saisie (25) après une poussée appliquée à ladite lisière (24) par lesdits becs (14, 15) qui sont insérés dans ledit au moins un sac (5) à remplir, de manière à faire adhérer ladite lisière (24) sur un périmètre externe entier dudit au moins un cône de remplissage (6) ; et dans lequel, durant l'étape d'ouverture du cône de remplissage (6) et de décharge des produits (7), les ensembles de moyens de saisie (25) qui tiennent la lisière (24) du sac (5) avec les portions en accordéon tenues en place s'écartent pour mettre la lisière (24) du sac sous tension et la faire adhérer à la totalité du périmètre externe de la sortie du cône de remplissage (6).
2. Machine d'emballage (1) selon la revendication 1, **caractérisée en ce qu'elle** comprend des moyens (16) pour ajuster un angle d'ouverture desdites au moins deux demi-coquilles (8, 9), qui comprennent, pour chacune desdites au moins deux demi-coquilles (8, 9), un actionneur pneumatique (17) interposé entre une butée (19) qui est d'un seul tenant avec ledit conduit d'amenée (11), et un élément (20) destiné à supporter ladite demi-coquille (8, 9).
 3. Machine d'emballage (1) selon une ou plusieurs des revendications précédentes, **caractérisée en ce qu'elle** comprend au moins une station de scellage qui est disposée derrière ladite station de remplissage et est munie d'au moins un ensemble de barres de thermo-scellage (27) pour sceller à chaud ladite lisière (24).
 4. Machine d'emballage (1) selon la revendication 3, **caractérisée en ce qu'elle** comprend des moyens pour ajuster en hauteur lesdites barres de thermo-scellage (27) afin de pouvoir fournir une pluralité de types de fermeture pour différents types de sacs et/ou afin de pouvoir fournir une pluralité de types différents de fermeture sur le même sac.
 5. Machine d'emballage (1) selon la revendication 4, **caractérisée en ce qu'elle** comprend des moyens d'élimination d'air (28) pour éliminer de l'air résiduel contenu dans ledit au moins un sac (5) lors d'un transfert dudit au moins un sac (5) depuis ladite au moins une station de remplissage vers ladite station de scellage.
 6. Machine d'emballage (1) selon la revendication 5, **caractérisée en ce que** lesdits moyens d'élimination d'air (28) comprennent, au niveau de leur partie supérieure, une série de moyens de pression (29) qui sont conçus pour retenir ledit au moins un sac (5) à remplir et faire descendre ladite lisière (24) et, au niveau de leur partie inférieure, une paire de rouleaux (30) qui sont conçus pour agir verticalement sur les surfaces latérales (23) dudit au moins un sac (5), jusqu'à ce qu'ils atteignent le niveau du produit contenu dans celui-ci, de manière à éliminer l'air entre lesdits produits (7) et ladite lisière (24).
 7. Machine d'emballage (1) selon la revendication 6, **caractérisée en ce qu'elle** comprend deux stations de remplissage disposées en série.
 8. Procédé d'emballage, en particulier pour emballer de petits sacs préformés, utilisant une machine d'emballage (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce qu'il** comprend les étapes suivantes consistant à :
 - retenir ledit au moins un sac (5) à remplir par l'intermédiaire desdits moyens de rétention (3),
 - faire avancer ledit au moins un sac (5) à remplir jusqu'à ce qu'il soit disposé dans au moins une desdites stations de remplissage,
 - ouvrir ladite lisière (24) dudit au moins un sac (5) à remplir par l'intermédiaire desdits moyens d'ouverture (4),
 - insérer partiellement ledit au moins un cône de remplissage (6) dans ledit au moins un sac (5) à remplir par l'intermédiaire desdits moyen de levage et d'abaissement,
 - ouvrir ledit au moins un cône de remplissage (6), et déplacer lesdits moyens de rétention (3) de manière à faire adhérer ladite lisière (24) sur le périmètre externe entier dudit au moins un cône de remplissage (6),
 - décharger lesdits produits en vrac (7) dans ledit au moins un sac (5) à remplir,
 - éliminer l'air contenu dans ledit au moins un sac (5) par l'intermédiaire desdits moyens d'élimination d'air (28),
 - sceller à chaud ladite lisière (24) par l'intermédiaire dudit au moins un ensemble de barres de thermo-scellage (27).
 9. Procédé d'emballage selon la revendication 8, **caractérisé en ce que** ladite étape d'ouverture de ladite lisière (24) a lieu avant ladite étape d'avancée dudit au moins un sac (5) à remplir.

10. Procédé d'emballage selon la revendication 8, **caractérisé en ce qu'**au moins deux étapes parmi :

- ladite étape d'insertion partielle dudit au moins un cône de remplissage (6), 5
- ladite étape d'ouverture dudit au moins un cône de remplissage (6),
- ladite étape de déchargement desdits produits en vrac (7), 10
- ont lieu simultanément.

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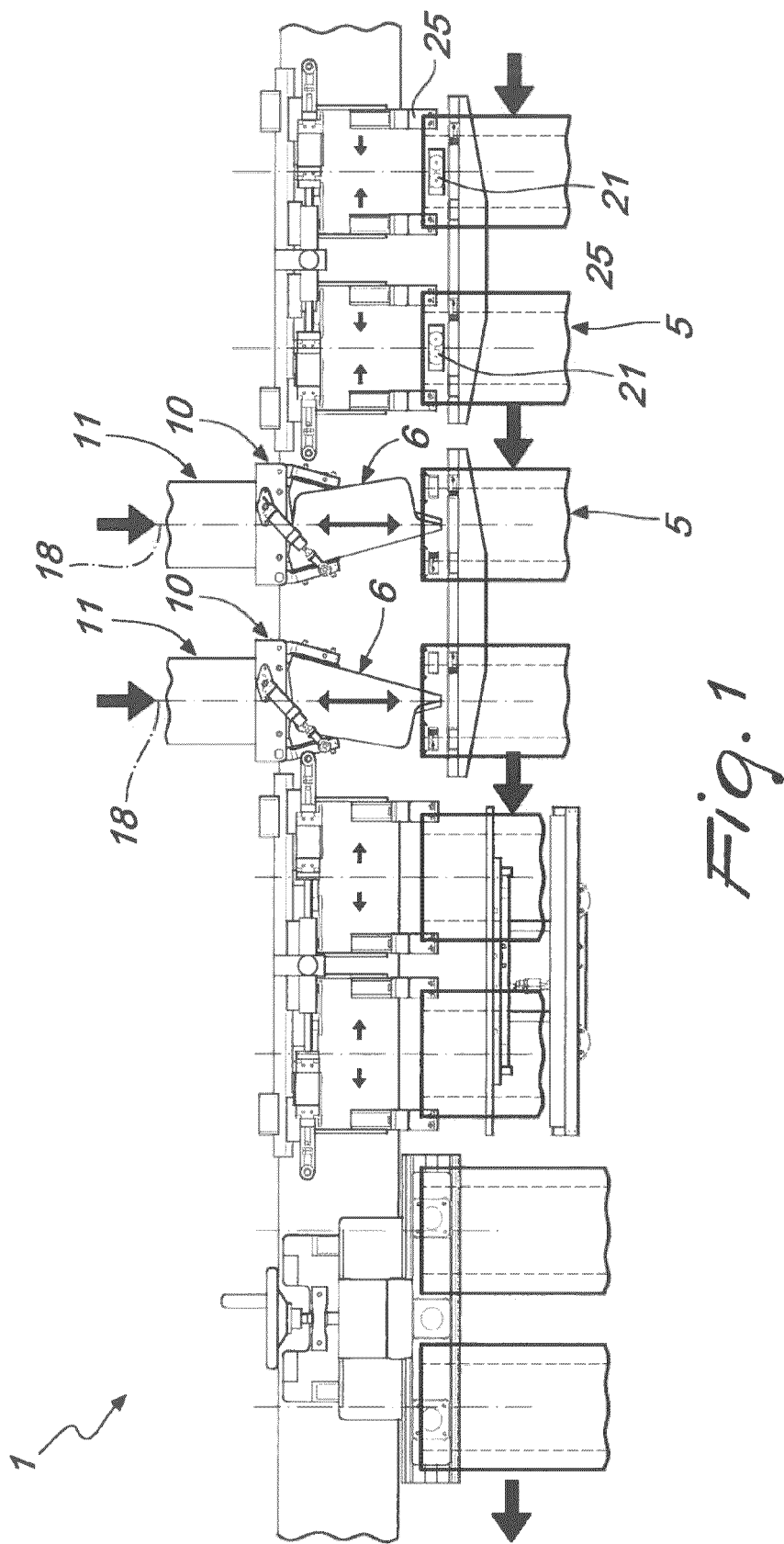


Fig. 1

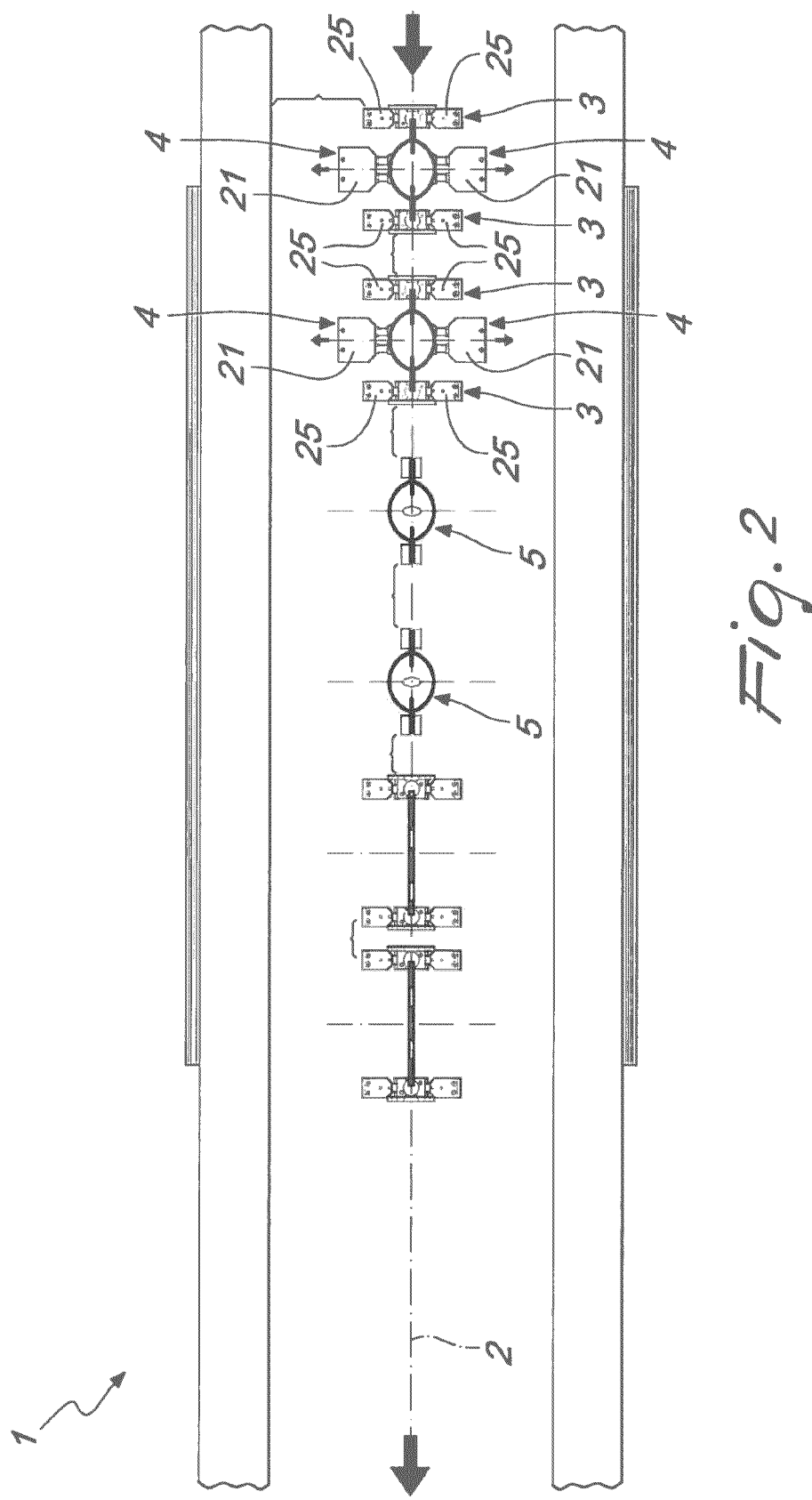


Fig. 2

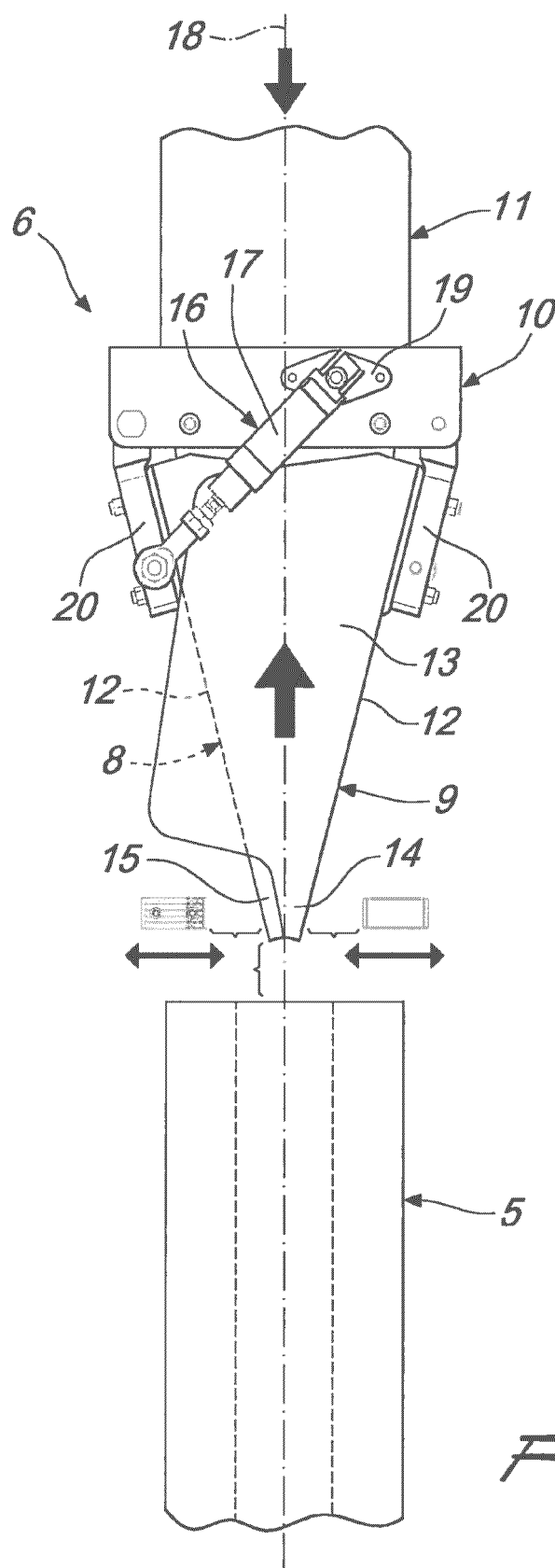


Fig. 3

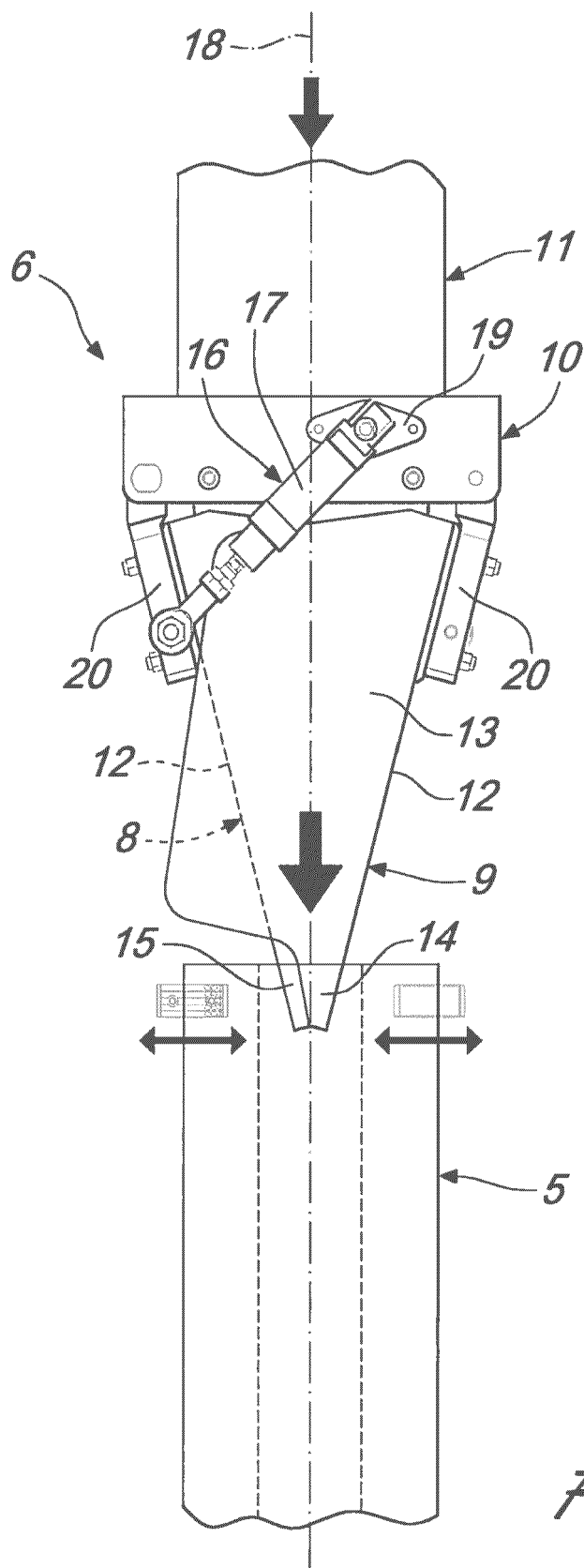


Fig. 4

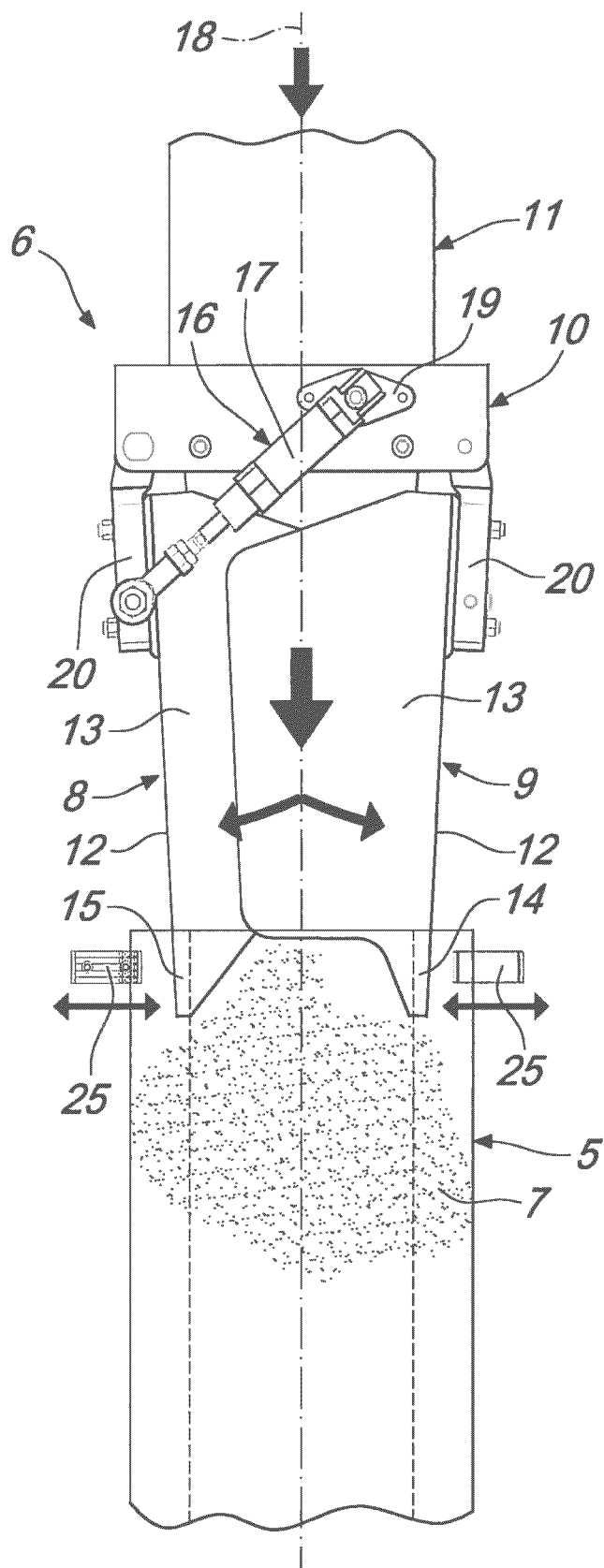


Fig. 5

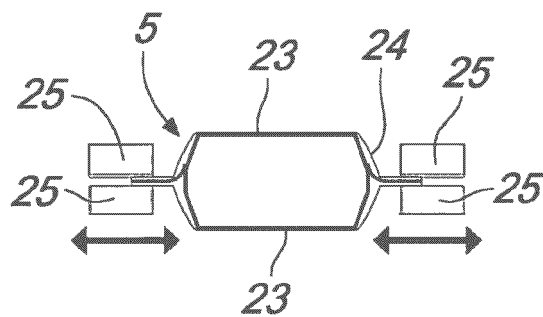


Fig. 6

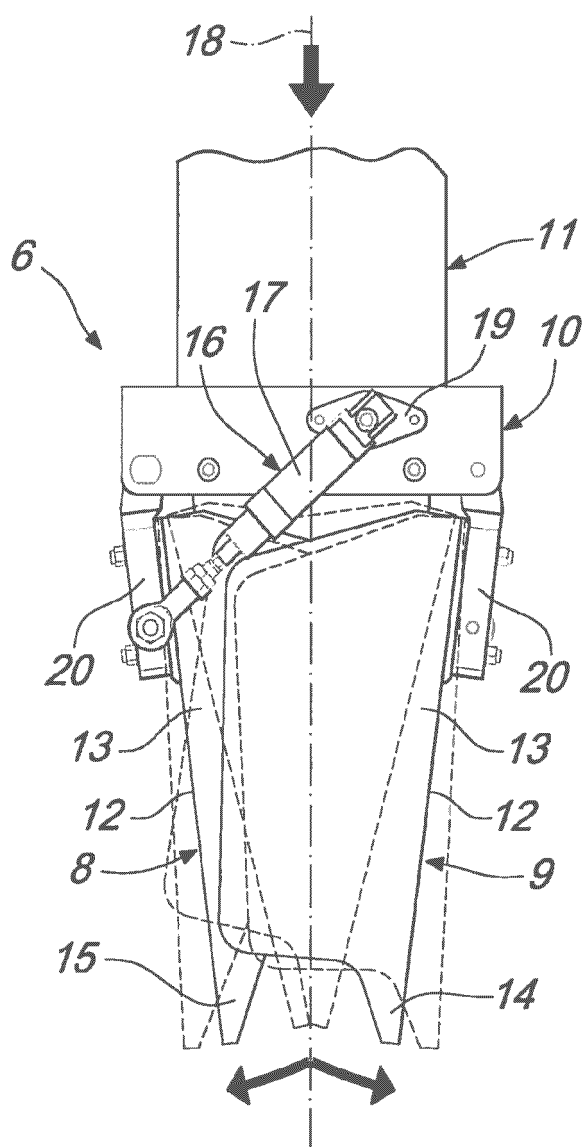
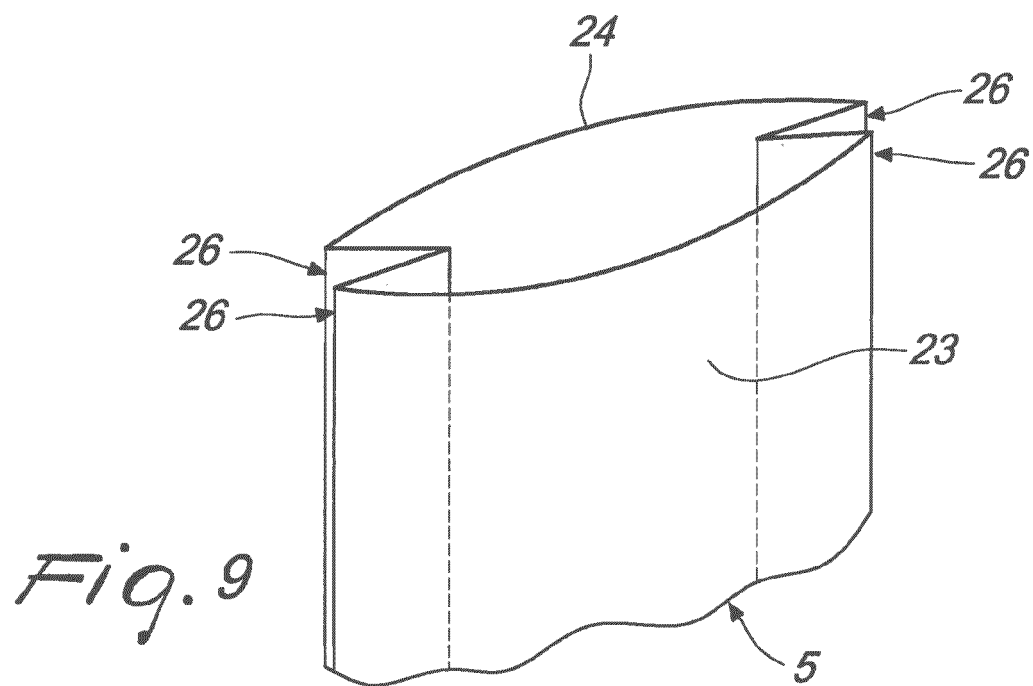
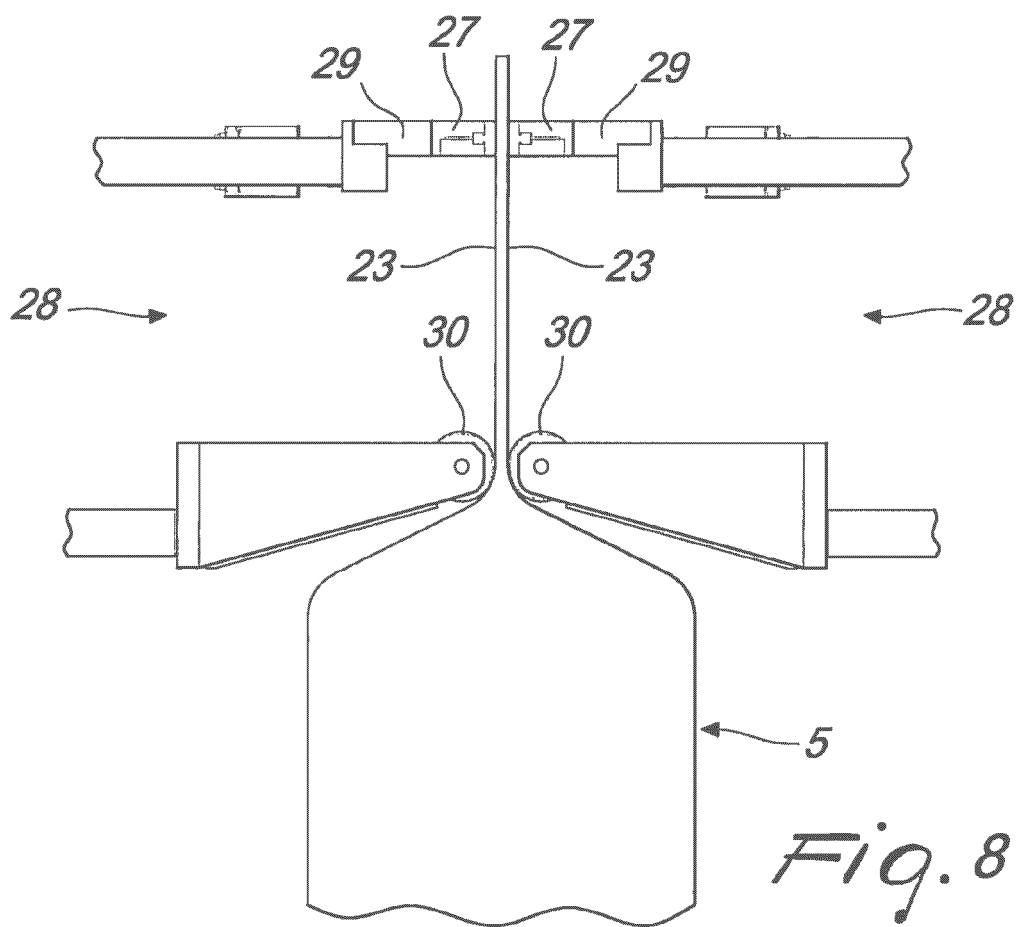


Fig. 7



REFERENCES CITED IN THE DESCRIPTION

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