

(19)



(11)

**EP 3 705 411 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**09.09.2020 Bulletin 2020/37**

(51) Int Cl.:  
**B65B 7/28 (2006.01)**

(21) Application number: **19425013.0**

(22) Date of filing: **08.03.2019**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
 GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
 PL PT RO RS SE SI SK SM TR**  
 Designated Extension States:  
**BA ME**  
 Designated Validation States:  
**KH MA MD TN**

(71) Applicant: **ISEM S.r.l.  
 27029 Vigevano (PV) (IT)**  
 (72) Inventor: **PINTUCCI, Francesco  
 27029 Vigevano (IT)**  
 (74) Representative: **Zambardino, Umberto  
 Botti & Ferrari S.r.l.  
 Via Cappellini, 11  
 20124 Milano (IT)**

(54) **MACHINE FOR PLACING CLOSING LIDS ON BOXES OF VARIOUS SIZES CONTAINING PACKAGED PRODUCTS, IN PARTICULAR PERFUMERY ARTICLES AND/OR COSMETIC PRODUCTS**

(57) A machine (1) for placing closing lids (5) on box-like containers (6) containing packaged products is described, comprising a first conveyor belt (3) fed with a plurality of closing lids (5); a second conveyor belt (4) fed with a plurality of open box-like containers (6), a head (8) that is horizontally and vertically movable over the above belts (3,4) and having a gripping member (15) equipped with at least one suction cup (16); and a drive and control

unit to control the operativity of said movable head (8) so as to pick up each closing lid (5) from a gripping area (C) of said first conveyor belt (3) by means of the at least one suction cup (16) of said one gripping member (15) and transport it above an application area (D) of said second conveyor belt (4), and release said closing lid (5) on a respective box-like container (6) when it reaches said application area (D) of said second conveyor belt (4).

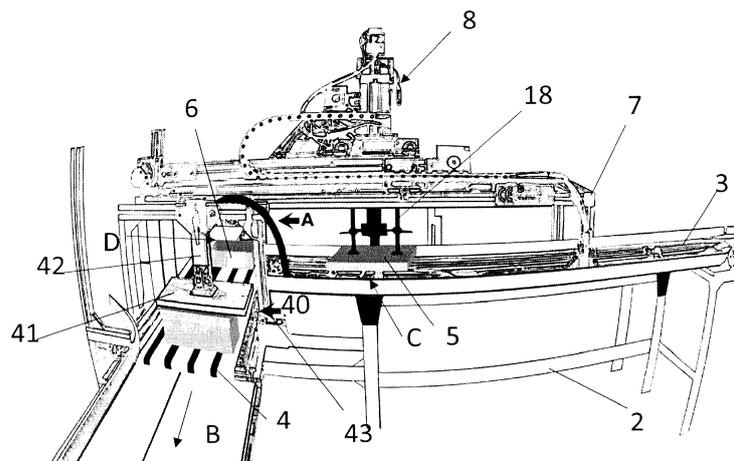


Fig. 3

**EP 3 705 411 A1**

## Description

### Field of application

**[0001]** The present invention relates to a machine for placing closing lids on boxes of various sizes containing packaged products, such as preferably perfumery articles and/or cosmetic products.

### Prior art

**[0002]** As it is known, for the packaging of perfumery articles or similar articles the use of box-like packages comprising a box-like container (or bottom), a closing lid and a support for the articles to be packaged inserted into the container is currently widely spread.

**[0003]** In general, the box-like container is made of cardboard, cardstock paper or similar paper materials and it has a base from which a plurality of side walls that form, together with the base, a housing compartment for the articles to be packaged, branch off at the top.

**[0004]** The closing lid as well is made of cardboard, cardstock paper or similar materials and it has a top wall from which a plurality of flanges that define, together with the top wall, a closing compartment wherein an upper portion of the box-like container is accommodated, branch off at the bottom.

**[0005]** The support that can be made of cardboard or a plastic material, for example by thermoforming, has usually an enbloc structure having one or more housing cavities with possible engagement of the articles to be packaged and it can be also equipped with means for engaging with the container body when the support is inserted into the box-like container.

**[0006]** In the packaging lines of these kinds of articles, the filling of the container with the insert containing the articles to be packaged in the respective recesses is traditionally performed in a manual or semi-automated manner while the following application of the closing lid is usually performed continuously by means of appropriate automated machines.

**[0007]** In an embodiment of these automated machines according to the prior art, the containers containing the articles to be packaged are fed in series on a conveyor belt in a predetermined orientation and transported by the belt to an applying station of the closing lid. A stack of closing lids is kept suspended over the above applying station by means of retractable and movable supports. In particular, the operation of these supports is such as to allow the separation and the lowering of the closing lid below from the stack of lids in such a position that it can be intercepted by the front edge of a container while advancing in the applying station and it can be pulled by the container itself in the advancement direction thereof until the lid flanges overlap an upper part of the container. A pressing station that provides for the application of a pressure on the lid with the respective container exiting the lid applying station is further provided

downstream so as to place the lid in the final closure position of the container. A solution of this type is described for example in the US patent 4,345,413.

**[0008]** However, an automated machine of this type has the drawback that the positioning of the closing lid that is lowered with respect to the intercepting container is often inaccurate, involving a not always correct placement of the lid on the container exiting the applying station as well as the possible damage of the resulting package in the following pressing station.

**[0009]** Accordingly, the above automated machine can be subject to continuous stops on the occurrence of the above drawback, strongly limiting the production capacity thereof.

**[0010]** Furthermore, the above automated machine, besides being inaccurate, proves to be structurally and functionally quite complex.

**[0011]** The main aim of the present invention is thus to provide a machine for placing closing lids on box-like containers of various sizes containing packaged products such as in particular perfumery articles, cosmetic products and the like, which has such structural and functional features as to overcome the drawbacks mentioned above with reference to the prior art.

**[0012]** Another aim is to provide an automated machine of the specified type that is relatively simple to manufacture and that allows the production capacity to be increased so as to reduce the production costs of the resulting packages.

### Summary of the invention

**[0013]** These aims are achieved by a machine for placing closing lids on box-like containers containing packaged products comprising:

- a first conveyor belt fed with a plurality of closing lids placed juxtaposed to each other,
- a second conveyor belt fed with a plurality of open box-like containers placed juxtaposed to each other,
- a head that is horizontally and vertically movable above said first conveyor belt and said second conveyor belt and having a gripping member equipped with at least one suction cup;
- a drive and control unit to control the operativity of said movable head so as to pick up each closing lid from a gripping area of said first conveyor belt by means of the at least one suction cup of said gripping member and transport it above an application area of said second conveyor belt, and release said closing lid on a respective box-like container when it reaches said application area of said second conveyor belt.

**[0014]** Further features and advantages of the present

invention will be more apparent from the detailed description given hereinafter of a preferred, but not exclusive, embodiment thereof, made with reference to the attached figures given by way of non-limiting examples.

#### Brief description of the drawings

**[0015]** In the drawings:

- Figure 1 represents a perspective schematic view of a machine for placing closing lids on box-like containers containing packaged products according to the present invention;
- Figure 2 shows a side view of the machine of Figure 1;
- Figures 3-5 show a perspective view of a portion of the machine of Figure 1 in respective operation steps;
- Figure 6 shows a view of a detail of the machine of Figure 1.

#### Detailed description

**[0016]** With reference to the above figures, an automated machine for placing closing lids on box-like containers containing packaged products, particularly perfumery articles and/or cosmetic products or the like, is globally indicated with 1.

**[0017]** The machine 1 comprises a lower frame 2 supporting thereon a first conveyor belt 3 that is movable along an advancement direction A and a second conveyor belt 4 that is movable along an advancement direction B that is substantially perpendicular to the advancement direction A of the first conveyor belt 3. In particular, the first conveyor belt 3 and the second conveyor belt 4 are placed substantially perpendicular to each other (essentially in a T form) with the downstream end of the first conveyor belt 3 (with reference to the advancement direction A) terminating close to the second conveyor belt 4.

**[0018]** The first conveyor belt 3 is fed with a plurality of closing lids 5 placed juxtaposed to each other, i.e. substantially alongside on one side thereof while the second conveyor belt 4 is fed with a plurality of open box-like containers 6 containing respective articles or packaged products placed juxtaposed to each other as well.

**[0019]** The movement of the first conveyor belt 3 and of the second conveyor belt 4 is performed by respective motorized means and it is intermittent as it will be better explained hereinafter.

**[0020]** The machine 1 further comprises an upper frame 7 extended above the first conveyor belt 3 and above a transverse portion of the second conveyor belt 4 close to the downstream end of the first conveyor belt 3. A head 8, that is horizontally and vertically movable

above the first conveyor belt 3 and the transverse portion of the second conveyor belt 4 from a first position above a gripping area C of the first conveyor belt 3 to a second position above an application area D of the second conveyor belt 4, is supported on the upper frame 7.

**[0021]** More particularly, the head 8 comprises a first body 10 fixed to the upper frame 7 and equipped with rail guides 12, and a second movable body 11 horizontally sliding as a whole above the first conveyor belt 3 and the second conveyor belt 4 along the guides 12 of the first fixed body 10. The second movable body 11 comprises in turn a plate 13 horizontally sliding in the guides 12 and a support 14 that is vertically movable (through a piston) between two limit stop positions and independently of the horizontal movement of the plate 13, the support 14 terminating at the bottom with a gripping member 15 having a plurality of suction cups 16 at the ends thereof. The horizontal movement of the plate 13 and the vertical movement of the support 14 bearing the gripping member 15 with the suction cups 16, are independent from each other and they are implemented by suitable motorized means (not shown) that are conventional per se. Furthermore, each suction cup 16 is connected and in communication with a duct 18 that can be in turn in communication with a manifold (not shown) formed in the body of the movable head 8. The ducts 18 are intended to be connected to suction means that are conventional per se for the activation of the suction cups 16 in the operations for gripping the closing lids 5 and transporting them towards the box-like containers 6.

**[0022]** The machine 1 further comprises a drive and control unit bidirectionally connected to at least the motorized means of the first conveyor belt 3 and of the second conveyor belt and to the movable head 8 so as to control the machine 1 in an appropriate manner in the various operating steps thereof as it will be better illustrated hereinafter.

**[0023]** In accordance with an aspect of the present invention, when a closing lid 5 reaches the gripping area C of the first conveyor belt 3, the drive and control unit controls the operation of the head 8 so that it is placed as a whole in the first position above the gripping area C and the closing lid is picked up by the gripping member 15 through the respective suction cups 16 from the gripping area C and transported above the application area D of the second conveyor belt 4. To this purpose, with the head 8 in the first position thereof above the gripping area C, the support 14 bearing the gripping member 15 is lowered and the suction cups 16, suitably activated by the suction means, couple with the closing lid 5. Therefore, the support 14 bearing the gripping member 15 is raised and the closing lid 5 picked up and held by the activated suction cups 16 is transported from above the gripping area C to above the application area D through the sliding of the movable body 11 of the head 8 towards the second position above the application area D.

**[0024]** In accordance with another aspect of the invention, when a box-like container 6 reaches the application

area D of the second conveyor belt 4, the closing lid 5 transported by the movable head 8 above the application area D is released by the gripping member 15 on the box-like container 6 thereby obtaining the closure of the container. In this regard, with the movable head 8 positioned above the application area D, the drive and control unit controls the lowering of the support 14 bearing the gripping member 15 so as to place the closing lid 5 on the box-like container 6 and arrange for the deactivation of the suction cups 16 by blowing in the ducts 18 thus obtaining the release of the closing lid 5.

**[0025]** Advantageously, a detection sensor 19 in bidirectional communication with a drive and control unit is placed on the support 14 of the vertically movable body 11. Upon attaining the coupling of a closing lid 5 located in the gripping area C through the suction cups 16, the sensor 19 sends a signal to the drive and control unit that provides to control the operation of the suction means and subsequently the activation of the suction cups 16 that is kept until the release of the closing lid 5 on a respective box-like container 6. Vice versa, upon attaining the placement of the closing lid 5 on a box-like container 6 located in the application area C, the sensor 19 sends a signal to the drive and control unit that provides to control the deactivation of the suction and the replacement of the latter by a blow thereby obtaining the deactivation of the grip of the suction cups 16 and the release of the closing lid 5 on the box-like container 6.

**[0026]** The machine 1 further comprises first locking means in bidirectional communication with the drive and control unit to keep in the gripping position each closing lid that has reached the gripping area C of the first conveyor belt 3. These first locking means comprise a plurality of fixed (limit stop) feet 20 placed on the first conveyor belt 3 at the gripping area C and a pusher 22 placed on one side of the gripping area C of the first conveyor belt 3 and cooperating with one side panel 23 located on the opposite side of the gripping area C, the pusher being movable between a rear position outside the gripping area C and an advancement operating position in the gripping area C to intercept each closing lid that is present in the gripping area C and keep it locked in abutment against the side panel 23 until the grip through the suction cups 16 of the gripping member 15. A detection sensor 24 is further provided, located sideways to the first conveyor belt 3 at the gripping area C thereof that is in bidirectional communication with the drive and control unit together with the pusher 22. Advantageously, the sensor 24 allows the presence of each closing lid 5 that has reached the gripping area C to be detected and, in that case, it sends a signal to the drive and control unit that provides to control the stopping of the movement of the first conveyor belt 3, the advancement of the pusher 22 in the gripping area C so as to lock the above closing lid 5, the gripping and transport operations of this lid 5 from above the gripping area C to above the application area D and the resumption of the movement of the first conveyor belt 3 after the closing lid 5 picked up by the gripping

member 15 has left the gripping area C to allow a following gripping cycle of the following lid.

**[0027]** The machine 1 further comprises second locking means in bidirectional communication with the drive and control unit to lock in the application position each box-like container 6 that has reached the application area D of the second conveyor belt 4. These second locking means comprise two sets of feet 30 placed below the second conveyor belt 4 and transversely thereto at gaps 4b between parallel strips 4a that form this second conveyor belt 4. In particular, a set of feet 30 is placed just (that is in close proximity) upstream of the application area D, the other set of feet 30 is placed just (that is in close proximity) downstream of the application area D, with reference to the advancement direction B of the second conveyor belt 4, and the feet 30 are movable between a retracted position wherein they are below the second conveyor belt 4 and an advanced operating position wherein they project at the top from the second conveyor belt 4 so as to intercept and lock in position each box-like container 6 that has reached the application area D until the application thereon of the respective closing lid 5 released by the suction cups 16 of the gripping member 15. A detection sensor 31 is further provided, located sideways to the second conveyor belt 4 close to the application area D thereof that is in bidirectional communication with the drive and control unit together with the movable feet 30. Advantageously, the sensor 31 allows the presence of each box-like container 6 that is reaching or has reached the application area D to be detected and, in that case, it sends a signal to the drive and control unit that provides to control the stopping of the movement of the second conveyor belt 4, the advancement of the feet 30 in the operating position thereof so as to lock the above box-like container 6, the release operation on the above box-like container 6 of the closing lid 5 picked up by the gripping member 15, the retraction of the feet 30 in the retracted (rest) position thereof and finally the resumption of the movement of the second conveyor belt 4 after releasing said closing lid 5.

**[0028]** The machine 1 further comprises a stop element 32 supported at the top above the second conveyor belt 4 upstream of the application area D (with reference to the advancement direction B of the belt 4), the stop element 32 being controlled by a piston so as to be vertically movable between respective limit stop positions departing from and approaching the second conveyor belt 4. The above sensor 31 is associated with this stop element 32 and they are both in bidirectional communication with the drive and control unit.

**[0029]** The sensor 31 detects, in an upstream zone close to the application area D, the passage of the foremost box-like container 6 of the row of box-like containers transported by the second conveyor belt 4 and, on the occurrence of this passage, it sends a signal to the drive and control unit that provides to control the operation (lowering) of the stop element 32 in the limit stop position approaching the second conveyor belt 4 so as to stop

the rearmost box-like containers of the row until the release of a closing lid 5 on the foremost box-like container 6 in the application area D and, after this release, the operation (raising) of the stop element 32 in the limit stop position departing from the second conveyor belt 4 so as to resume the movement of the box-like containers 6 on the second conveyor belt 4.

**[0030]** The risk of having several box-like containers 6 in the application area D at the same time is thereby advantageously reduced thus avoiding undesirable machine shutdowns.

**[0031]** The machine 1 further comprises a pressing station 40 placed above the second conveyor belt 4 downstream of the application area D of the closing lid.

**[0032]** The station 40 comprises a press 41 that is vertically movable through a piston 42 in communication with the drive and control unit between respective limit stop positions departing from and approaching the second conveyor belt 4 and a detection sensor 43 in communication as well with the drive and control unit. The entrance in the pressing station 40 of each box-like container 6 with the respective closing lid 5 on top coming from the application area D is detected by the sensor 43 that provides to send a signal to the drive and control unit. The drive and control unit provides therefore to control the lowering of the press 41 in the approaching position towards the second conveyor belt 4 so as to compress the closing lid 5 and, afterwards, the raising of the press 41 in the position departing from the second conveyor belt 4 upon exit of the box-like container 6 with the respective closing lid 5 from the pressing station 40.

**[0033]** Advantageously, the structured pressing station 40 thereby allows the complete closure of each box-like container 6 to be obtained with the flanges of the respective closing lid that overhang in a substantially complete manner an upper part of this container.

**[0034]** In view of the above, the machine according to the invention meets the above aims and it achieves considerable advantages compared to the prior art.

**[0035]** In fact, due to the adoption of a movable head equipped with gripping members of the closing lids suitably operating synchronously with the advancement of the open box-like containers and of the closing lids placed in a row on respective belts, the picking of the closing lids proves to be simple and the placement thereof on the containers can be performed in a correct and accurate manner. Hence it results that the machine according to the invention is less subject to malfunctions or shutdowns.

**[0036]** The machine according to the invention has also a high production capacity being in fact capable of accurately attaining a high number of lid application cycles per unit of time.

**[0037]** Furthermore, the machine according to the invention has relatively low manufacture and implementation costs.

**[0038]** A person skilled in the art will be allowed to bring several modifications and alternatives to the above-

scribed machine, for example to meet specific and contingent requirements, all however comprised in the scope of protection of the invention, as defined by the following claims.

## Claims

1. Machine (1) for placing closing lids (5) on box-like containers (6) containing packaged products comprising:

- a first conveyor belt (3) fed with a plurality of closing lids (5) placed juxtaposed to each other,
- a second conveyor belt (4) fed with a plurality of open box-like containers (6) placed juxtaposed to each other,
- a head (8) that is horizontally and vertically movable above said first conveyor belt (3) and said second conveyor belt (4) and having a gripping member (15) equipped with at least one suction cup (16);
- a drive and control unit to control the operativity of said movable head (8) so as to pick up each closing lid (5) from a gripping area (C) of said first conveyor belt (3) by means of the at least one suction cup (16) of said one gripping member (15) and transport it above an application area (D) of said second conveyor belt (4), and release said closing lid (5) on a respective box-like container (6) when it reaches said application area (D) of said second conveyor belt (4).

2. Machine (1) according to claim 1, wherein said first conveyor belt (3) and said second conveyor belt (4) are intermittently moved by respective motorized means controlled by the drive and control unit so as to stop the first conveyor belt (3) whenever a closing lid (5) reaches the gripping area (C) and resume the movement of the first conveyor belt (3) after the closing lid (5) picked up by the gripping member (15) has left the gripping area (C) and so as to stop the second conveyor belt (4) whenever a box-like container reaches the application area (D) and resume the movement of the second conveyor belt (4) after releasing the closing lid (5) on said box-like container (6) by said gripping member (15).

3. Machine (1) according to claim 1 or 2, further comprising a detection sensor (19) placed on said movable head (8) and in communication with said drive and control unit so that upon attaining the coupling of a closing lid (5) located in the gripping area (C) through the at least one suction cup (16), the drive and control unit controls the activation of the at least one suction cup (16) until the release of the closing lid (5) on a respective box-like container (6) and so that upon attaining the placement of the closing lid

- (5) on a box-like container (6) located in the area (C) the drive and control unit controls the deactivation of the grip of the at least one suction cup (16) so as to release said closing lid (5).
4. Machine (1) according to any one of the previous claims, further comprising first locking means in communication with the drive and control unit to keep in the gripping position each closing lid (5) that has reached the gripping area (C) of the first conveyor belt (3).
  5. Machine (1) according to claim 4, wherein said first locking means comprise a plurality of fixed feet (20) placed on the first conveyor belt (3) at the gripping area (C) and a pusher (22) placed on one side of the gripping area (C) of the first conveyor belt (3) and cooperating with a side panel (23) located on the opposite side of the gripping area (C), the pusher (22) being movable between a rear position outside the gripping area (C) and an advancement operating position in the gripping area (C) to intercept each closing lid (5) that is present in the gripping area (C) and keep it locked in abutment against the side panel (23) until the grip through the at least one suction cup (16) of the gripping member (15).
  6. Machine (1) according to claim 5, further comprising a detection sensor (24) located sideways to the first conveyor belt (3) at the gripping area (C) thereof and in communication with the drive and control unit so that, upon detection of the presence of a closing lid (5) in the gripping area (C), the drive and control unit provides for the control of the stopping of the movement of the first conveyor belt (3), the advancement of the pusher (22) in the gripping area (C) so as to lock said closing lid (5), the gripping and transporting operations of this lid (5) from above the gripping area (C) to above the application area (D) and finally the resumption of the movement of the first conveyor belt (3) after said closing lid (5) picked up by the gripping member (15) has left the gripping area (C).
  7. Machine (1) according to any one of the previous claims, further comprising second locking means in communication with the drive and control unit to lock in the application position each box-like container (6) that has reached the application area (D) of the second conveyor belt (4).
  8. Machine (1) according to claim 7, wherein said second locking means comprise two sets of feet (30) placed below the second conveyor belt 4 and transversely thereto just upstream and downstream of the application area (D) respectively, said feet (4) being movable between a retracted position wherein they are below the second conveyor belt (4) and an advanced operating position wherein they project at the top from the second conveyor belt (4) so as to intercept and lock in position each box-like container (6) that has reached the application area (D) until the application thereon of the respective closing lid (5) released by the at least one suction cup (16) of the gripping member (15).
  9. Machine (1) according to claim 8, further comprising a detection sensor (31) located sideways to the second conveyor belt (4) at the application area (D) thereof and in bidirectional communication with the drive and control unit so that, upon detection of each box-like container (6) that is reaching or has reached the application area (D), the drive and control unit controls the stopping of the movement of the second conveyor belt (4), the advancement of the feet (30) in the application area (D) so as to lock the above box-like container (6), the releasing operation on said box-like container (6) of the closing lid (5) picked up by said gripping member (15), the retraction of the feet (30) in the retracted position thereof and finally the resumption of the movement of the second conveyor belt (4) after releasing said closing lid (5).
  10. Machine (1) according to claim 9, further comprising a stop element (32) above said second conveyor belt (4) in a zone upstream of the application area (D) and that is vertically movable between respective limit stop positions departing from and approaching the second conveyor belt (4), said stop element (32) being in communication with said detection sensor (31) located sideways to the second conveyor belt (4) and with the drive and control unit so that, upon detection of the foremost box-like container (6) of the row of box-like containers transported by the second conveyor belt (4) by said sensor (31), the drive and control unit provides for the control of the operation of the stop element (32) in the limit stop position approaching the second conveyor belt (4) so as to stop the rearmost box-like containers of the row until the release of a closing lid (5) on the foremost box-like container (6) in the application area (D) and, after this release, the operation of the stop element (32) in the limit stop position departing from the second conveyor belt (4) so as to resume the movement of the box-like containers (6) on the second conveyor belt (4).
  11. Machine (1) according to any one of the previous claims, further comprising a pressing station (40) placed above the second conveyor belt (4) downstream of the application area (D) of the closing lid.
  12. Machine (1) according to claim 11, wherein said pressing station (40) comprises a press (41) that is vertically movable between respective limit stop positions departing from and approaching the second conveyor belt (4) and a detection sensor (43) both

associated in communication with the drive and control unit so that upon detection of the entrance in the station (40) of each box-like container (6) with the respective closing lid (5) on top coming from the application area (D), the drive and control unit controls the lowering of the press (41) in the approaching position towards the second conveyor belt (4) so as to compress the closing lid (5) and, afterwards, the raising of the press (41) in the position departing from the second conveyor belt (4) upon exit of the box-like container (6) with the respective closing lid (5) from the pressing station (40).

5

10

15

20

25

30

35

40

45

50

55

7

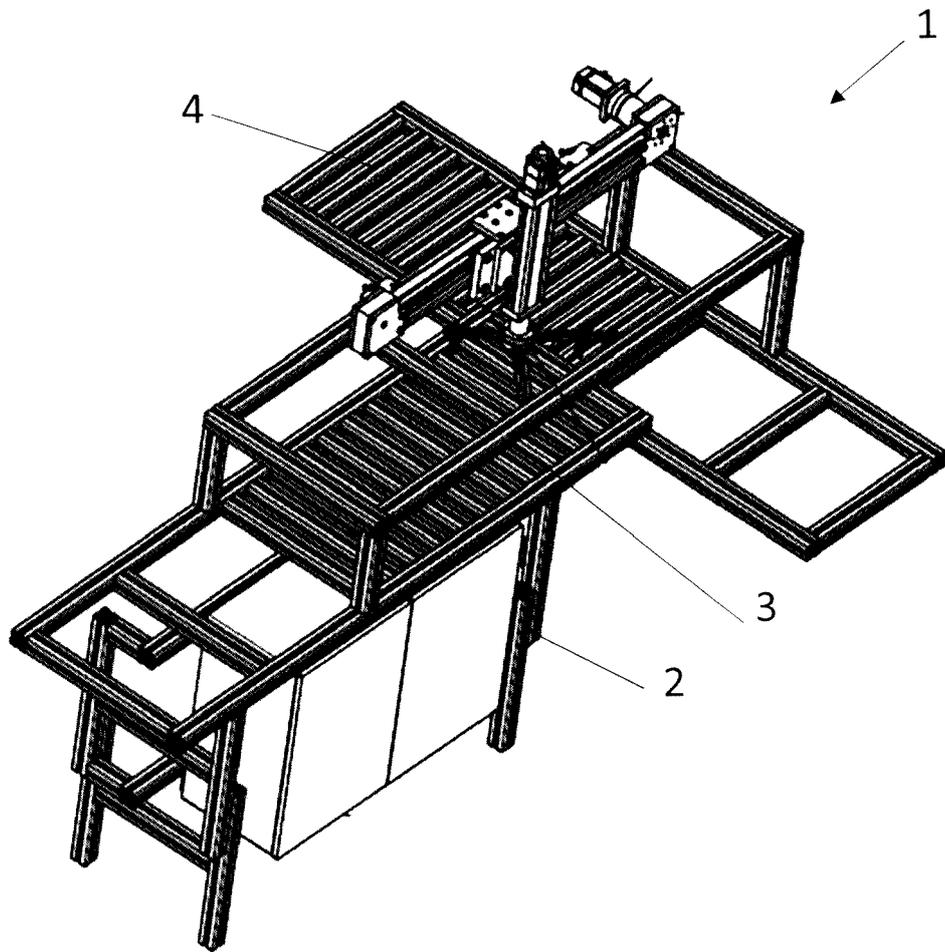


Fig. 1

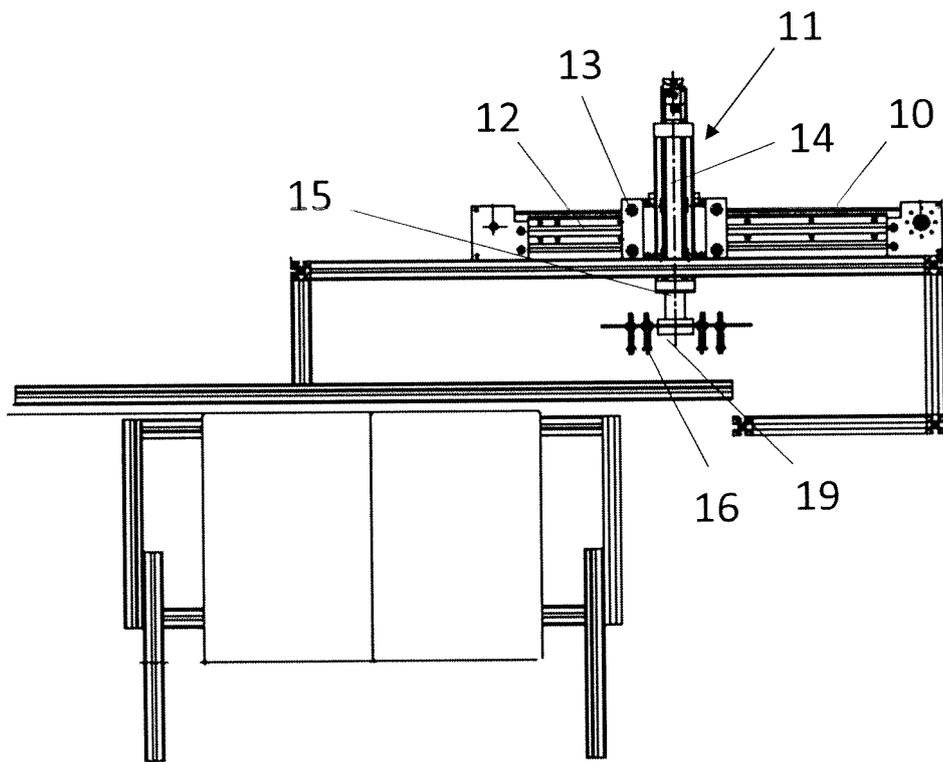


Fig. 2

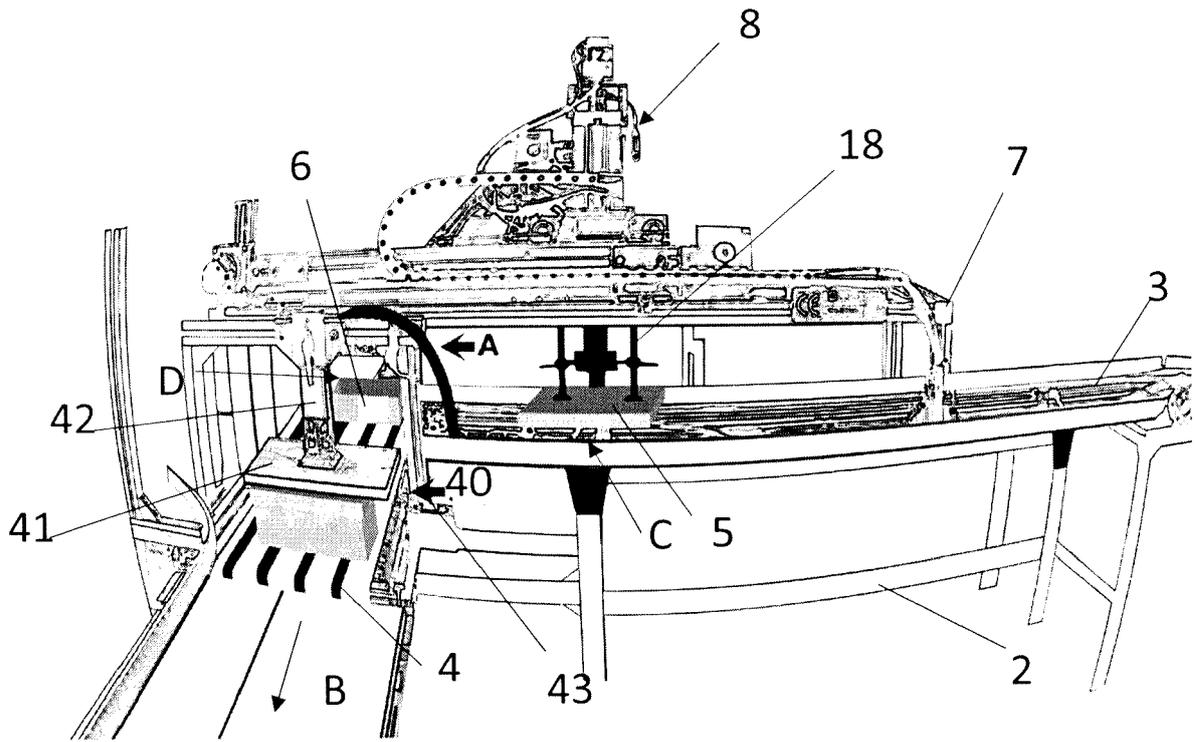


Fig. 3

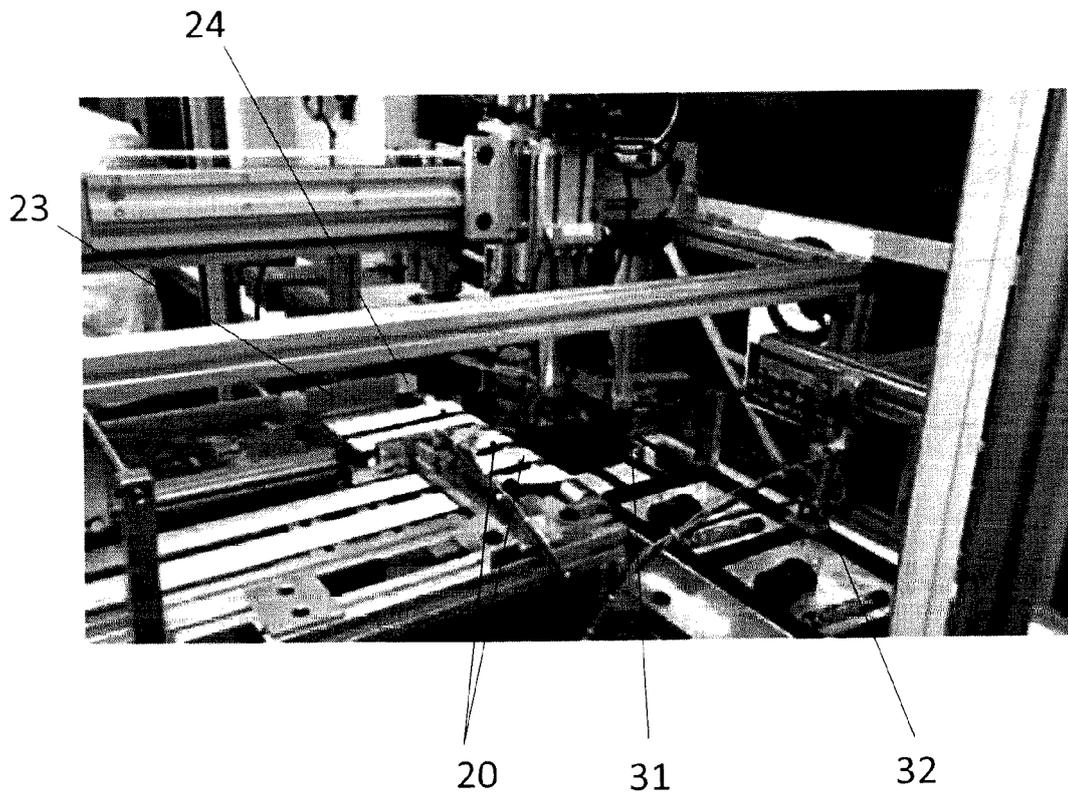
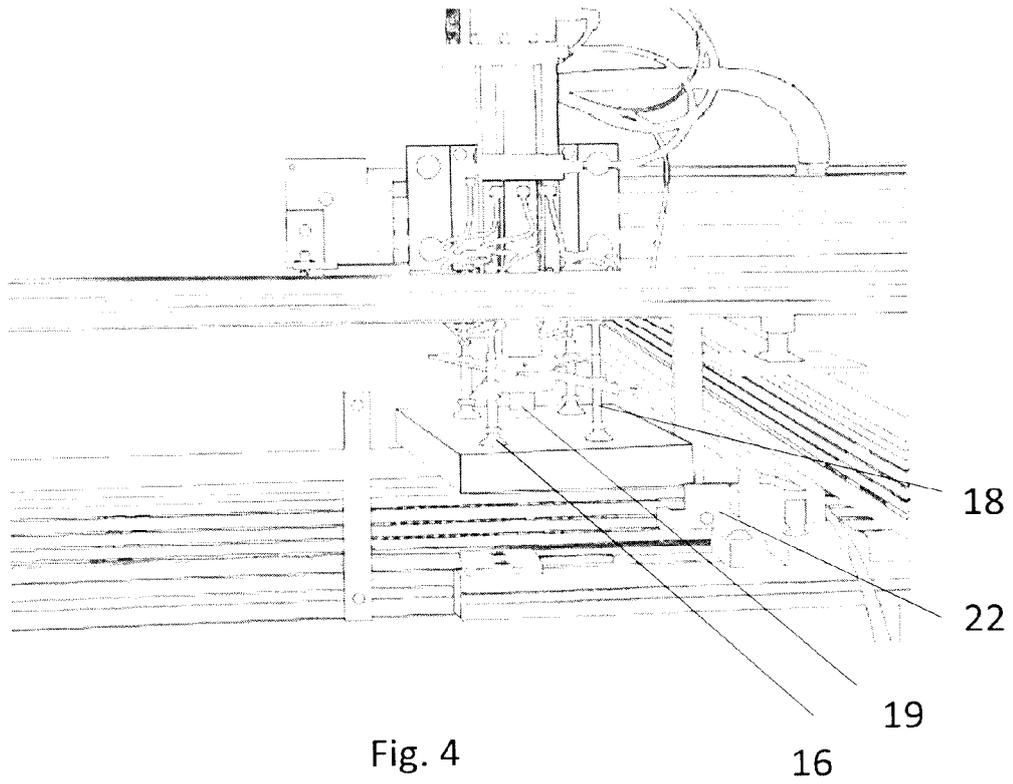


Fig. 5

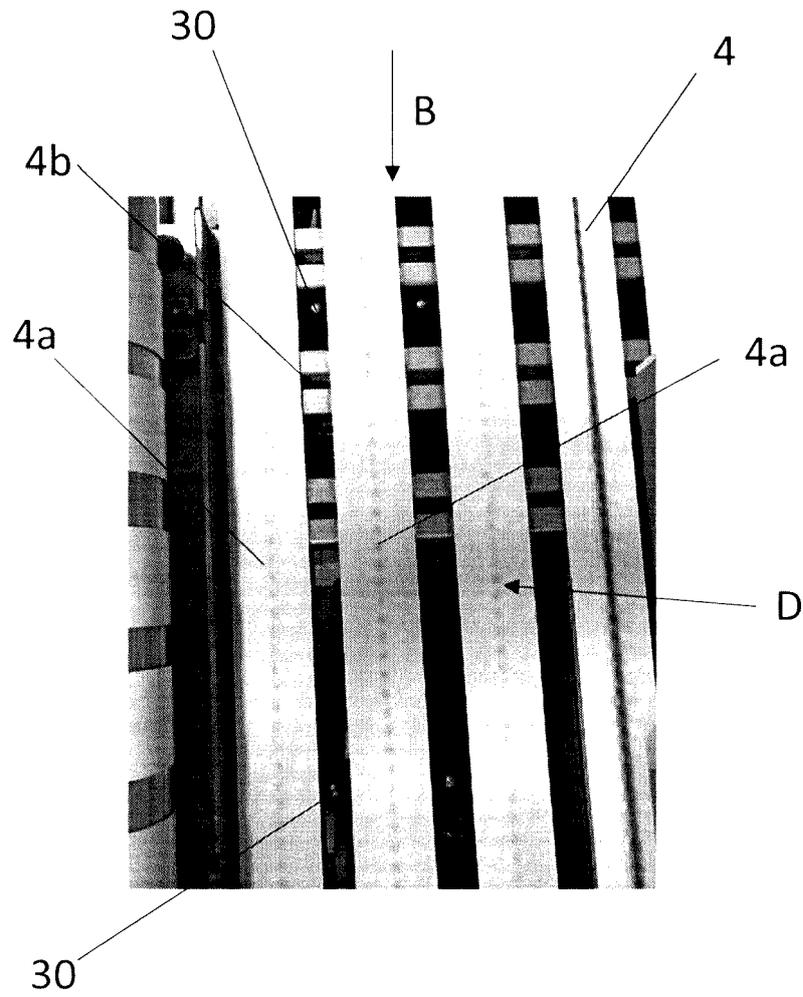


Fig. 6



EUROPEAN SEARCH REPORT

Application Number  
EP 19 42 5013

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2009/027878 A2 (KIMBERLY CLARK CO [US]; LONG LESLIE T [US] ET AL.) 5 March 2009 (2009-03-05)	1	INV. B65B7/28
A	* page 6, line 8 - page 8, line 22; figure 1 *	2-12	
Y	WO 02/096755 A1 (US POSTAL SERVICE [US]) 5 December 2002 (2002-12-05)	1	
A	* paragraphs [0021], [0022], [0040], [0041]; figures 1,5 *	2-12	
A	US 6 048 421 A (WHITE MICHAEL A [US]) 11 April 2000 (2000-04-11) * column 4, line 66 - column 5, line 51; figures 3a-3e *	1-12	TECHNICAL FIELDS SEARCHED (IPC) B65B
A	DE 38 06 512 A1 (WINKLER DUENNEBIER KG MASCH [DE]) 14 September 1989 (1989-09-14) * column 2, line 18 - column 3, line 13; figure 1 *	1-12	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 July 2019	Examiner KulhaneK, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 19 42 5013

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-07-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009027878 A2	05-03-2009	AU 2008291795 A1	05-03-2009
		BR PI0815241 A2	31-03-2015
		EP 2183159 A2	12-05-2010
		KR 20100051691 A	17-05-2010
		US 2009057390 A1	05-03-2009
		WO 2009027878 A2	05-03-2009
WO 02096755 A1	05-12-2002	US 2003009985 A1	16-01-2003
		US 2003196417 A1	23-10-2003
		WO 02096755 A1	05-12-2002
US 6048421 A	11-04-2000	CA 2249134 A1	29-11-1999
		US 6048421 A	11-04-2000
DE 3806512 A1	14-09-1989	DE 3806512 A1	14-09-1989
		US 4896480 A	30-01-1990

**REFERENCES CITED IN THE DESCRIPTION**

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

**Patent documents cited in the description**

- US 4345413 A [0007]