



**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**09.02.2022 Bulletin 2022/06**

(51) International Patent Classification (IPC):  
**B65B 9/20** (2012.01) **B65B 9/207** (2012.01)  
**B65B 9/213** (2012.01) **B65B 59/04** (2006.01)

(21) Application number: **21189302.9**

(52) Cooperative Patent Classification (CPC):  
**B65B 9/2028; B65B 9/2049; B65B 9/207;**  
**B65B 9/213; B65B 59/04**

(22) Date of filing: **03.08.2021**

(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**

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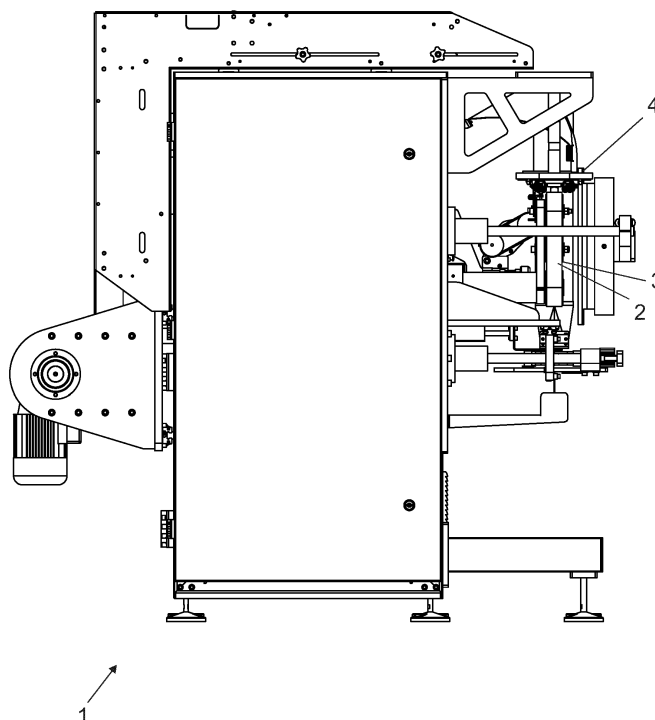
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(30) Priority: **06.08.2020 IT 202000019459**

(54) **BAGGING MACHINE**

(57) It is provided a bagging machine (1), comprising a constraint device (5) for auxiliary elements (2) of sheets on a forming tube (3) comprising a flange (4) transversal to the working direction of the forming tube (3), wherein the flange (4) is provided with a plurality of tracks (41)

lying on the flange (4), wherein the tracks (41) can be connected with freedom of movement to the auxiliary elements (2), and wherein the device (5) comprises adjustment means (21) of the position of the auxiliary elements (2) on the tracks (41).



*Fig. 1*

## Description

**[0001]** The present invention relates to a bagging machine comprising a constraint device for auxiliary elements near to forming tube of an automatic bagging machine of the type specified in the preamble of the first claim.

**[0002]** Automatic bagging machines are currently known which are capable of receiving a sheet of material unwound from a reel, for wrapping said sheet around a forming tube and for sealing said sheet with the product to be bagged inside.

**[0003]** Said machines, precisely in the phase of forming and welding the sheet around the forming tube, are often equipped with auxiliary elements, positioned adjacent to said forming tube, suitable for conveying said sheet in an appropriate manner around said forming tube and/or cooperating in the operations of welding.

**[0004]** The known technique provides, in particular in the case of rectangular packages, auxiliary, adjustable and movable elements, this because they must be calibrated in an extremely precise manner according to the thickness of the sheet, or in the case of jams or maintenance because they must be separated from the forming tube.

**[0005]** The auxiliary elements are connected screwed to a support flange of the forming tube and can be moved through slots, obtained in said flange, which allow to adjust their position for the aforementioned actions.

**[0006]** The known art described includes some important drawbacks.

**[0007]** In particular, the displacement of the auxiliary elements, which is an operation that can also take place several times in a day, involves downtime and therefore the time required for restoration affects the productivity of the line.

**[0008]** In addition, the unscrewing and re-screwing of said auxiliary elements on said flange requires tools such as Allen screws, feeler gauges and more, not always available to production workers with the need for intervention by personnel in charge of maintenance, with a further increase in terms of time and inefficiencies. Furthermore, the restoration and calibration of the position of said auxiliary elements are complex precision operations which require time and expertise. Finally, the slots on the flange are not precise guides and often induce fixing inaccuracies which further complicate the realignment with the forming tube.

**[0009]** In this situation, the technical task underlying the present invention is to devise a bagging machine comprising a constraint device for auxiliary elements near to forming tube capable of substantially obviating at least part of the aforementioned drawbacks.

**[0010]** Within the scope of said technical task, an important object of the invention is to devise a bagging machine capable of allowing the adjustment of the auxiliary elements without completely or partially disconnecting said auxiliary elements from said device.

**[0011]** Another important object of the present invention is to obtain a bagging machine that does not require instrumentation and/or specialized personnel for adjustment. Finally, another important object of the invention is to make a bagging machine designed to reduce machine downtime.

**[0012]** The technical task and the specified aims are achieved by a constraint device for auxiliary elements near to forming tube as claimed in the annexed claim 1. Preferred technical solutions are highlighted in the dependent claims.

**[0013]** The characteristics and advantages of the invention are clarified below by the detailed description of preferred embodiments of the invention, with reference to the accompanying figures, in which:

the **Fig. 1** shows a side view of the bagging machine according to the present invention;

the **Fig. 2** shows a perspective view of a portion of the bagging machine according to the present invention including a forming tube, illustrating an embodiment of the adjustment means of the position of auxiliary elements;

the **Fig. 3** illustrates, in an axonometric view, a track and a locking system and rapid unlocking of the auxiliary elements according to one embodiment of the device according to the present invention; and

the **Fig. 4** illustrates, in top view, a particular of Fig. 3.

**[0014]** In the present document, the measurements, values, shapes and geometric references (such as perpendicularity and parallelism), when associated with words like "about" or other similar terms such as "approximately" or "substantially", are to be considered as except for measurement errors or inaccuracies due to production and/or manufacturing errors, and, above all, except for a slight divergence from the value, measurements, shape, or geometric reference with which it is associated. For instance, these terms, if associated with a value, preferably indicate a divergence of not more than 10% of the value.

**[0015]** Moreover, when used, terms such as "first", "second", "higher", "lower", "main" and "secondary" do not necessarily identify an order, a priority of relationship or a relative position, but can simply be used to clearly distinguish between their different components.

**[0016]** The measurements and data reported in this text are to be considered, unless otherwise indicated, as performed in the International Standard Atmosphere ICAO (ISO 2533:1975).

**[0017]** With reference to the Figures, the bagging machine according to the invention is globally indicated with the number **1**.

**[0018]** The bagging machine **1** is capable of making containment bags starting from a flat sheet, containment bags. Such machines are known as packaging machines, bagging or vertical packaging machines.

**[0019]** Said bagging machine **1** is known per se, apart

from the details described below, and is suitable for making containment bags starting from flat sheets of preferably polymeric material generally wound in rolls. The said bags are made by rolling the sheets in the longitudinal direction, the welding, preferably thermal, in the longitudinal direction to form a closed tube, the double welding and cutting, in the transverse direction, of the said tube, to make the closed container. Said bagging machine 1 or packaging machine also allows the container to be filled during its formation.

**[0020]** Similar machines are described for example in patent application EP 2 607 243 A1. The bagging machine 1 comprises, briefly, a forming tube 3, around which said sheet is arranged during longitudinal sealing, at least one auxiliary element 2 of the sheet on said forming tube 3, a constraint device 5 of the auxiliary elements 2 to the bagging machine 1.

**[0021]** The constraint device 5 is therefore functionally and mechanically connected to the auxiliary elements 2. The auxiliary elements 2 are positioned in proximity to the forming tube 3 of the bagging machine 1 and are able to orient the sheet 2, or to cooperate in welding operations (in this case they are also called auxiliary welding elements) or to perform other known operations.

**[0022]** The device 5 is capable of allowing the adjustment by a user, or rather by a production worker, of the position of the auxiliary elements 2 around the forming tube 3.

**[0023]** The forming tube 3 is a tube, generally with a normal circular section, around which the sheet is arranged during its longitudinal welding and preferably partly during its transverse sealing and filling.

**[0024]** The shape of said auxiliary elements 2 is substantially prismatic, with a face adjacent to the forming tube 3, said adjacent face adapted to help positioning and maintaining the work sheet in position, acting as a guide during the movement of said work sheet around to said forming tube 3. They are also preferably able to form a prismatic-shaped package with a rectangular base, preferably comprising a welding on one of the four corners which unwind in the longitudinal direction. The face of the auxiliary element 2 adjacent to the forming tube 3 is therefore a shaped face adapted to reproduce the shape or at least a section of the shape of the forming tube 3, for example a flat face for one side of a square forming tube or a defining face an arc of circumference for a circular forming tube and so on. The distance between the face of the auxiliary element 2 adjacent to the forming tube 3 and the forming tube 3 is preferably between 1 mm and 5 mm.

**[0025]** Preferably, the device 5 comprises a flange 4 transversal to the working direction of said forming tube 3 and constrained to the machine 1 near the tube 3.

**[0026]** The flange 4 is supported, not in contact with the forming tube 3, by a random support structure.

**[0027]** Preferably, the flange 4 is provided with a plurality of tracks 41 lying on said flange 4.

**[0028]** Said tracks 41 can extend beyond the flange 4,

and be connected integrally with or formed in said flange 4.

**[0029]** The tracks 41 are therefore arranged substantially radial with respect to the substantially vertical axis defined by the forming tube 4.

**[0030]** Again, preferably according to the present invention, the tracks 41 can be connected with freedom of movement to the auxiliary elements 2.

**[0031]** The tracks 41 are therefore able to allow, by providing a directional guide, at least the displacement of the auxiliary elements 2 in a radial direction with respect to the forming tube 4.

**[0032]** Again, preferably, the track 41 is a shaped track and said auxiliary element 2 is provided with a counter-shaped surface suitable for housing said shaped track. Again, in a preferred embodiment of the present invention the track 41 further comprises at least one low-friction surface 411.

**[0033]** Preferably, the surface 411 is positioned between said auxiliary element 2 and said track 41.

**[0034]** The surface 411 can consist of a section of the same track 41, for example a surface that has undergone a surface treatment suitable for reducing a roughness parameter, or consist in a surface of added material having the desired friction characteristics, connectable to said track 41.

**[0035]** For example, according to the present invention, the low friction surface 411 is a teflon surface.

**[0036]** Again, alternatively, the low friction surface 411 is a graphite surface.

**[0037]** In addition, preferably the device 5 further comprises adjustment means 21 of the position of said auxiliary elements 2 on said tracks 41.

**[0038]** The adjusting means 21 are suitable for allowing the auxiliary element 2 to be locked in position and unlocked from said position, in order to allow the movement of an auxiliary element 2 on the respective track 41 in case of need.

**[0039]** In fact, the adjustment means 21 according to the present invention further comprise a system 211 for quick locking and unlocking of the connection between said auxiliary element 2 and said track 41.

**[0040]** The system 211 can for example be connected to the auxiliary element 2, in order to move integrally with said auxiliary element 2, as shown in Fig.2.

**[0041]** The rapid locking and unlocking system 211 can consist of a plurality of components suitable for creating interference between a component of the system 211 and the track 41.

**[0042]** For example, the system 211 can consist of a mechanical interference system operated manually by levers, or a hydraulic system able to move a component, capable of creating interference, operated by an actuator or something else.

**[0043]** The system 211 can be operated by a handle, by a button or by any operating means.

**[0044]** Again, preferably, the device 5 according to the present invention further comprises at least one slide

guide 212 between the auxiliary element 2 and the track 41. Preferably, the sliding guide 212 is a recirculating ball sliding guide, adapted to reduce the friction between the auxiliary element 2 and the track 41 during the relative motion between these two elements.

[0045] Again, in an alternative embodiment of the invention, not shown in the figures, the track 41 is a worm screw and said adjustment means 21 comprise a gear for adjusting the position of said auxiliary element 2 on said track 41.

[0046] Again, preferably, the device 5 can comprise at least one limit switch 213, as shown in Fig.2, adapted to ensure the right distance between the auxiliary element 2 and the forming tube 3 in a positioning step.

[0047] Finally, according to an alternative embodiment of the invention, adjustment means 21 of the position comprise sensors and control electronics.

[0048] The sensors and control electronics are adapted to adjust the position of said auxiliary elements 2 on said tracks 41.

[0049] Preferably, the sensors and control electronics are at least able to automatically adjust the position of said auxiliary elements 2 on said tracks 41.

[0050] The adjustment means 21 can further comprise an electric motor operatively connected to said electronics, in an embodiment not shown in the figures.

[0051] The sensors, for example, can generally consist of means suitable for automatically detecting the position of the auxiliary element 2 on the track 41, relative position with respect to the forming tube 3.

[0052] Said sensors are therefore sensors of the known art such as proximity sensors, photocells and more.

[0053] Said sensors are functionally connected to the electronics in order to transfer the detected data.

[0054] The control electronics can include one or more electronic cards, for example programmable cards and/or microcontrollers, known to the current state of the art and can define a basic logic, for example by means of suitable firmware.

[0055] Said control electronics is provided at least capable of allowing the control and coordination of at least the position of said auxiliary element 2 as a function of the information obtained from said sensors.

[0056] Said electronics can for example be programmed in order to memorize a series of programs that can be selected by an operator according to, for example, the characteristics of the worksheet or the shape of the forming tube 3, said programs able to automatically set and / or control the position of the auxiliary elements 2 on the tracks 41.

[0057] The operation and the advantages of the bagging machine 1 previously described in structural terms are as follows.

[0058] The device 5 is connected to an automatic bagging machine, in the section wherein a working sheet is positioned on a forming tube 3 of the bagging machine.

[0059] The device 5 described, by helping to convey

the work sheet onto said tube 3, allows, thanks to the locking and unlocking systems 211, the rapid repositioning of the auxiliary elements 2, for example after a malfunction, as in the case wherein the work sheet jams.

5 [0060] The above repositioning can advantageously be carried out by any operator of the forming machine, since the operator has to press a button or turn a handle to adjust the position of the auxiliary element 2.

10 [0061] Furthermore, advantageously, the intervention times are drastically reduced by not having to find tools to disassemble and reassemble the auxiliary element 2 from and on the flange 4 or on a generic support.

[0062] In addition, the innovative connection of the auxiliary elements 2 to the flange 4 by means of the tracks 41, allows to minimize errors in the repositioning of the auxiliary elements 2, since the angular position of the auxiliary element 2 is in fact constrained in a plane substantially transversal to the forming tube 3.

15 [0063] Again, thanks to the systems 211, and specifically thanks to the limit switch 213, errors in the repositioning of the auxiliary element 2 are minimized, which can therefore be implemented thanks to the present invention by any worker, once the necessary distance between auxiliary elements 2 and tube 3 has been defined, distance which uniquely determines the position of the limit switch 213.

20 [0064] A further advantage of the present invention is represented by the embodiment of the device 5 comprising sensors and control electronics.

25 [0065] Possibly, once the electronics have been programmed, an operator could simply select the program relating to a particular process and thanks to the sensors, said electronics would help, for example by means of an acoustic signal, to detect the exact position of the auxiliary element 2.

30 [0066] The invention is susceptible of variants falling within the scope of the inventive concept defined by the claims.

35 [0067] In this context, all the details can be replaced by equivalent elements and the materials, shapes and dimensions can be any.

## Claims

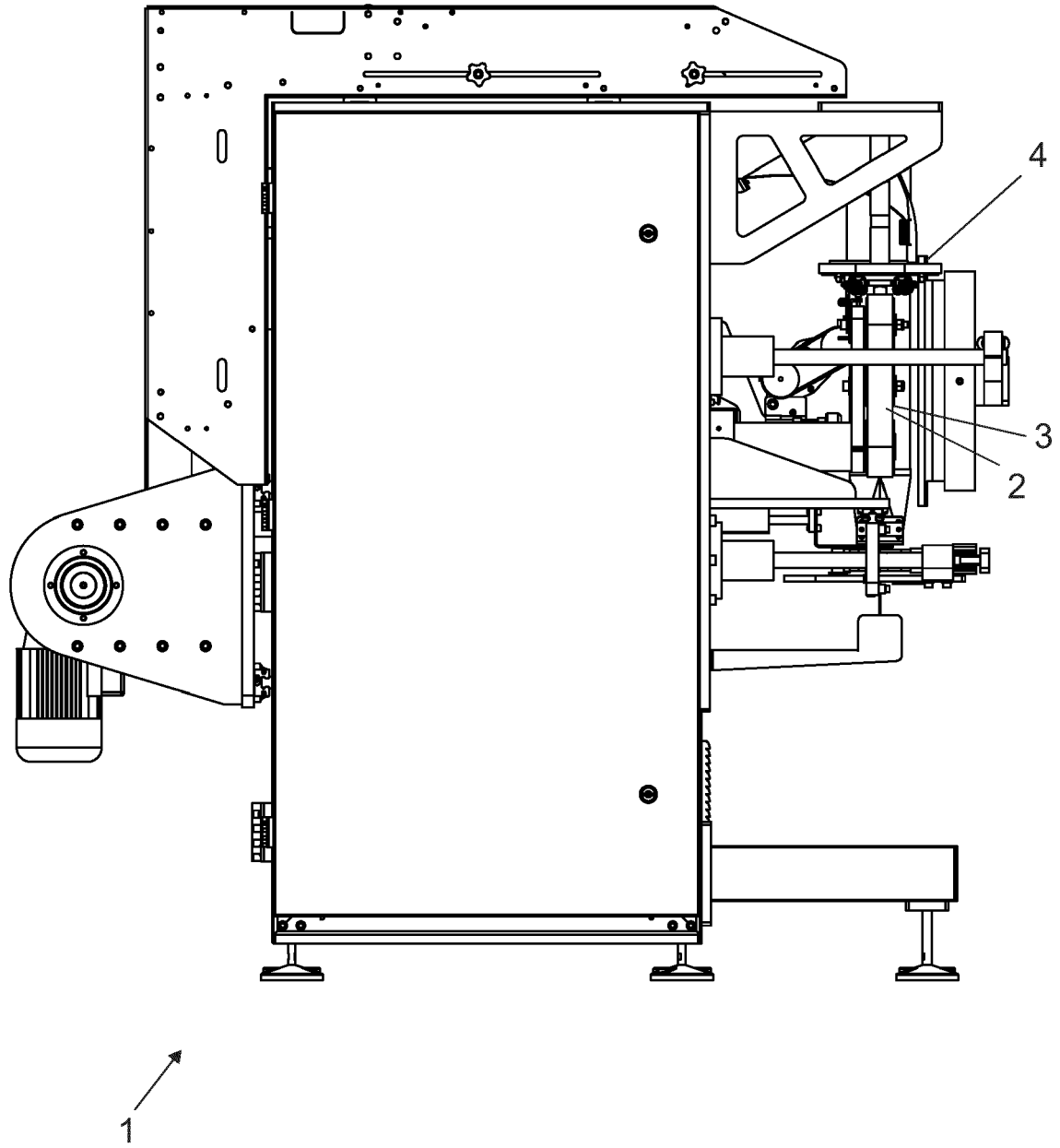
45 1. A bagging machine (1) designed to produce, beginning with flat sheets, containment bags, comprising:

- a forming tube (3), around which said sheet is arranged during longitudinal welding,
- at least one auxiliary element (2) of said sheet on said forming tube (3) comprising a face adjacent to the forming tube (3), designed to aid at least the positioning and the maintenance in position of said sheet between said forming tube (3) and said at least one auxiliary element (2),
- a constraint device (5) that attaches said auxiliary elements (2) to said bagging machine (1),

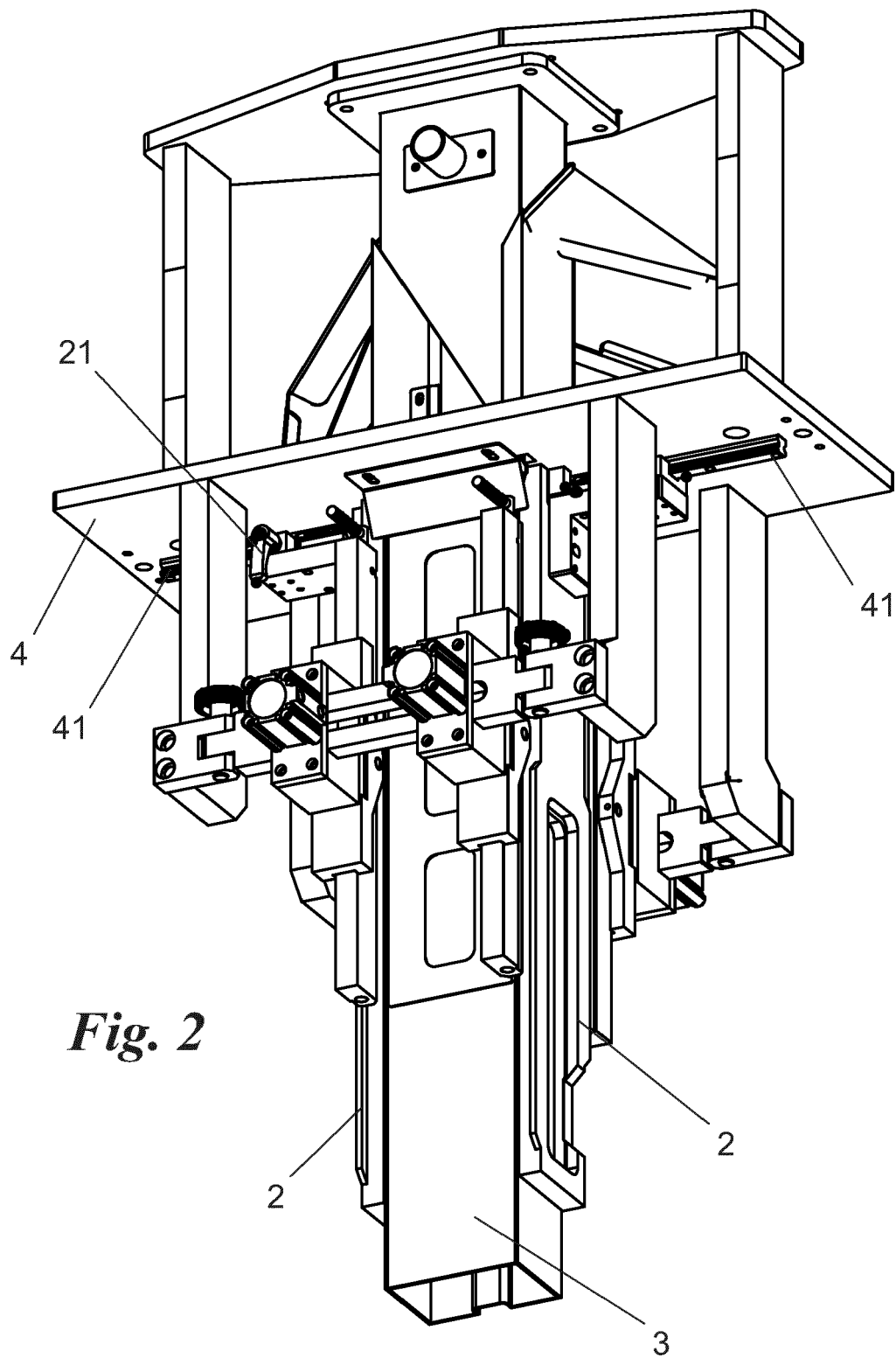
- a flange (4) transverse to the working direction of said forming tube (3), and bound to said bagging machine (1) near said forming tube (3) and **characterised by:**

- said flange (4) is provided with a plurality of tracks (41) lying on said flange (4),  
 - said tracks (41) can be connected with freedom of movement to said auxiliary elements (2), and  
 - said device (5) comprises adjustment means (21) for the position of said auxiliary elements (2) on said tracks (41).

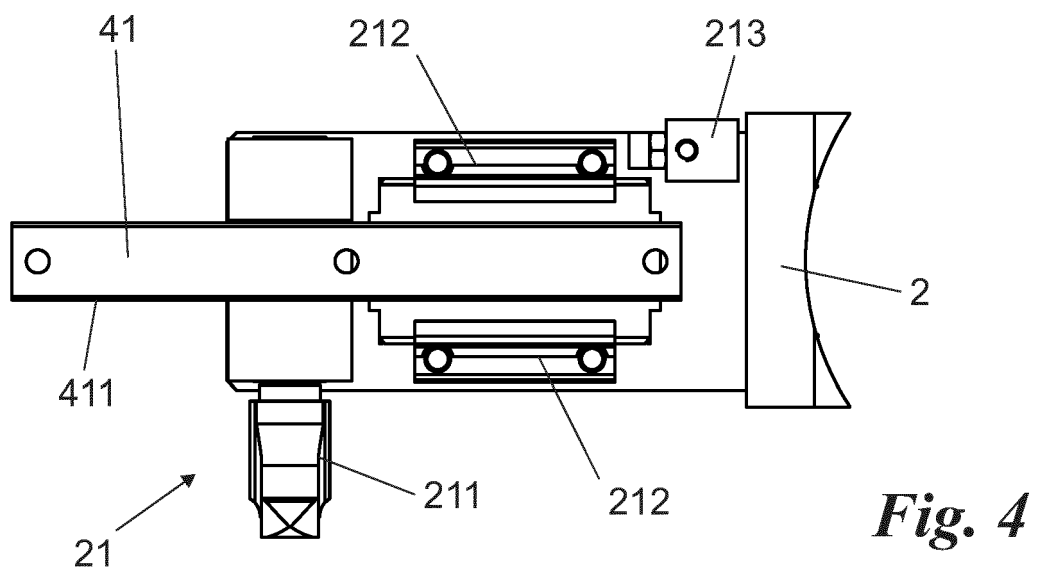
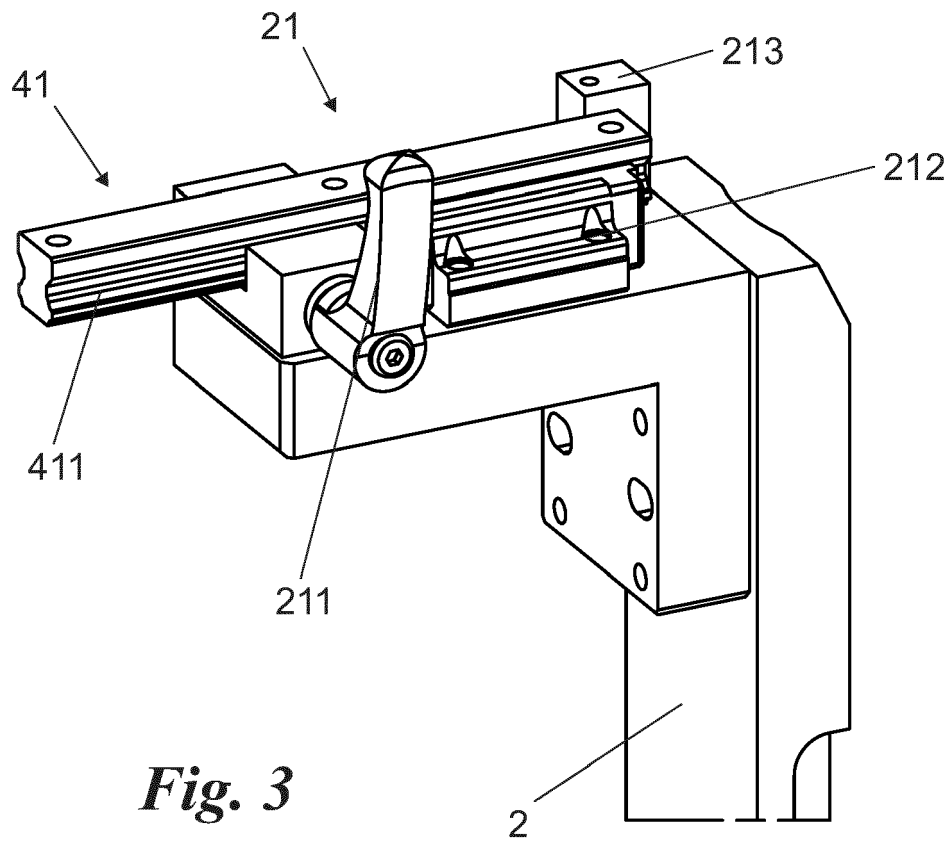
2. The bagging machine (1) according to claim 1, wherein said adjustment means (21) additionally comprise a system (211) for rapidly locking and unlocking the connection between said auxiliary element (2) and said track (41). 5
3. The bagging machine (1) according to any of the previous claims, where said track (41) is a shaped track and said auxiliary element (2) is provided with a counter-shaped surface designed to accommodate said shaped track. 10
4. The bagging machine (1) according to any of the previous claims, wherein said device (5) additionally comprises at least one slide guide (212) between said auxiliary element (2) and said track (41). 15
5. The bagging machine (1) according to any of the previous claims, wherein said at least one slide guide (212) is a recirculating ball slide guide. 20
6. The bagging machine (1) according to any of the previous claims, wherein said track (41) also comprises at least one surface (411) with low friction between said auxiliary element (2) and said track (41). 25
7. The bagging machine (1) according to any of the previous claims, wherein said low-friction surface (411) is a Teflon surface. 30
8. The bagging machine (1) according to any of the previous claims, wherein said low-friction surface (411) is a graphite surface. 35
9. The bagging machine (1) according to any of the previous claims, wherein said track (41) is a worm screw and said adjustment means (21) comprise a gear for adjusting the position of said auxiliary element (2) on said track (41). 40
10. The bagging machine (1) according to any of the previous claims, wherein said adjustment means (21) of the position comprise sensors and control electronics to adjust the position of said auxiliary elements (2) on said tracks (41). 45



*Fig. 1*



*Fig. 2*







## EUROPEAN SEARCH REPORT

Application Number  
EP 21 18 9302

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			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>15 October 2021</b>	Examiner <b>Lawder, M</b>
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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 21 18 9302

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