



(11) **EP 2 736 025 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.05.2014 Bulletin 2014/22

(51) Int Cl.:
G07D 11/00 (2006.01) B65H 31/22 (2006.01)

(21) Application number: **13194340.9**

(22) Date of filing: **25.11.2013**

(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

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(30) Priority: **26.11.2012 IT TO20121022**

(54) **Orderly storing device for banknotes in sack**

(57) An orderly storing device (31) for banknotes (32) in sack comprising a pair of edge retaining members (34A, 34B) for holding a sack (33) in a substantially vertical position. The input edges (36a, 36b) of the sack can be spaced away one another for receiving the banknotes (32) by fall and in condition of substantial stacking into a basin portion (43). The storing device (31) comprises a platform (38) with a slot (39) provided to be crossed by a section (41) of the sack (33) below the input edges. The basin portion (43) forms a narrowing portion alongside the slot and has the function of receiving the falling banknotes, while the platform (38) supports temporarily the banknotes received into the basin portion. The platform is moveable vertically between a high position (HP), for loading the banknotes in an empty sack, and a low position (LP) of maximum filling. Moving means (46) move the platform (38) downwards, following the progressive storage of the banknotes in the basin portion (43) while welding means (47) weld opposing faces (48a, 48b) of the sack at the end of storage of the banknotes.

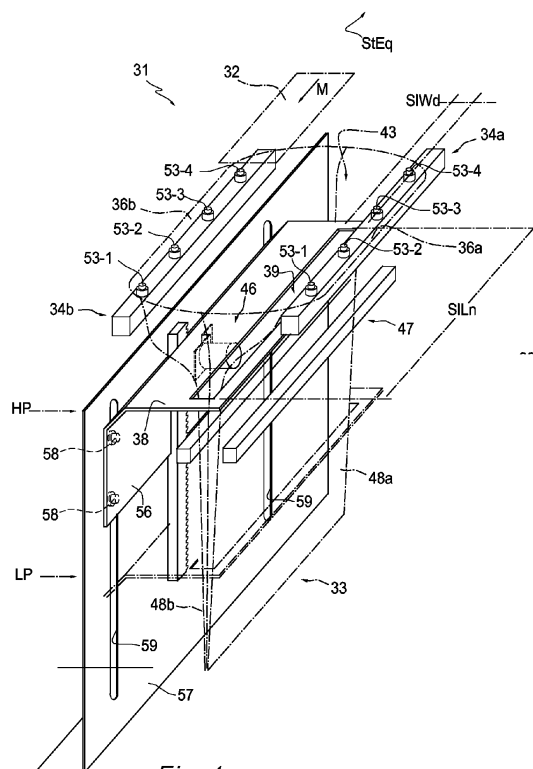


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an orderly storing device for banknotes in sack.

[0002] More specifically, the invention relates to an orderly storing device for banknotes in sack in which the sack is arranged in a substantially vertical position and has input edges which can be spaced away one another for receiving the banknotes by fall and in condition of substantial stacking, in agreement with the introductory part of the main claim.

BACKGROUND OF THE INVENTION

[0003] Devices for storing banknotes and values in sealable sacks are present in supermarkets, commercial centers, and banks or similar in association with collecting devices for the values. After sealing, the sacks can be removed and transported by personnel of transport cash institutions (CIT) in other places, usually counting and accounting rooms. These devices make easy the transport of banknotes and prevent fraudulent subtractions without evidences of the tampering in the sacks.

[0004] The banknotes are generally stored in bulk. Their arrangement in an orderly way, necessary for following treatment steps, is effected in the counting and accounting rooms, in a manual mode, after the opening of the sacks. This requires, by the personnel of the counting and accounting rooms, not negligible treatment times and costs. From here, the need of obtaining an orderly storage of the banknotes in the transport sacks.

[0005] To reduce the pre-counting times of the banknotes transported in sack, storing equipments that store the banknotes in bundled stacks and with already counted values. However, such equipment are expensive and suitable only for facilities of high commercial activities.

[0006] Banknote storing devices are also known, which arrange the banknotes in an orderly way and a given stacking in specialized sacks. In summary, these sacks are pre-shaped so as to obtain support bases on the bottom of the sack for a progressive stacking of banknotes, which are received by fall.

[0007] These devices are quite complex and require the use of pre-formed sacks which are rather expensive.

SUMMARY OF THE INVENTION

[0008] An object of the invention is to provide an orderly storing device for banknotes in sack, which results of a relatively low cost and uses sacks of simple structure.

[0009] In accordance with this object, the storing device of the present invention comprises a platform which defines a slot provided to be crossed by a section of the sack below the input edges and such as to form on the sack a narrowing portion alongside the slot and a basin portion in a section of the sack above said platform and

in which the basin portion has the function of receiving the falling banknotes in a stacking condition, while the platform supports temporarily the banknotes received into the basin portion, in agreement with the characteristic part of the main claim.

BRIEF DESCRIPTION OF THE FIGURES:

[0010]

The characteristics of the invention will become clear from the following description, given purely by way of non-limiting example, with reference to the appended drawings in which:

Fig 1 is a perspective view of an orderly storing device for banknotes in sack according to the invention;

Fig 2 shows a sack used by the device of Fig 1; Fig 3 is a schematic front view of the device of Fig 1;

Fig 4 is a schematic plan view of the device of Fig 1;

Fig 4a is a schematic view, in enlarged scale, of some details of the storing device of Fig 4;

Fig 5 represents a perspective view of the storing device of Fig 1, in an operating configuration; Fig 6 is a schematic side view of the device of Fig 5;

Fig 7 represents a perspective view of the storing device of Fig 1, in another operative configuration;

Fig 8 shows a schematic side view of the storing device represented in Fig 7;

Fig 9 is a schematic side view of the device in accordance with the invention in a further operative configuration; and

Fig 10 shows a sack used by the device of Fig 1 after storage of the banknotes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] An orderly storing device 31 for banknotes 32 in sack is represented in Fig 1. The device 31 can be used in a collecting equipment StEq for banknotes 32, not represented in the figures. The banknotes 32 emerge from an output port of the equipment StEq, with movement in a direction M parallel to the longer edge of the banknotes.

[0012] The storing device 31 comprises schematically a pair of edge retaining members 34a and 34b for holding the sack 33 in a substantially vertical position and in which input edges 36a and 36b of the sack can be spaced away one another for receiving the banknotes 32 by fall and in condition of substantial stacking in a stack 37 (Fig. 5).

[0013] In accordance with the invention, the storing device 31 includes a platform 38 defining a slot 39 (Fig. 1)

which extends for a length SIL_n slightly greater than the width W of the sack 33 and a width SIW_d smaller than the height of the banknotes 32 of smaller dimensions.

[0014] The slot 39 is provided for being crossed by a section 41 (Fig. 5) of the sack 33 below the edges 36a, 36b and so as to form a narrowing 42 and allow the formation of a basin portion 43 in a section of the sack above the platform 38. The basin portion 43 has the function of receiving the banknotes 32 in the fall and in stacking, while the platform 38 temporarily supports the stack 37 of banknotes received in the basin portion 43.

[0015] The platform 38 is liable of moving vertically between a high position HP of loading for the banknotes, when the sack is empty, and a low position LP of maximum filling for the sack.

[0016] The storing device 31 (Fig. 1) comprises moving means 46 and sealing means 47. The moving means 46 are provided for moving the platform 38 between the high position HP and the low position LP, following the progressive storing of banknotes 32 in the basin portion 43. The sealing means 47 are provided for welding opposing faces 48a, 48b of the sack 33 at the end of the storing, while the moving means 46 also ensure the return of the platform 38 into the high position HP, after removal of the welded sack 33.

[0017] The sack 33 used by the device 31 is formed by an envelope container (See Fig 2) which, therefore, has no gussets between the opposing faces 48a, 48b. The sack 33 is of plastic material and can be of a flattened tubular type, with lateral edges 49l and 49r and a lower edge 51. The edges 49l and 49r have respective bends devoid of bellows, while the lower edge 51 is obtained by welding, with a minimal cost. The sack 33 has respective mounting elements to be hooked 52-1, 52-2, 52-3 and 52-4 close to each of the input edges 36a, 36b, for a functional engagement with corresponding fastening elements 53-1, 53-2, 53-3 and 53-4 of the edge retaining members 34a and 34b.

[0018] In the storing device 31, the fastening elements 53-1, 53-2, 53-3 and 53-4 are formed by substantially vertical pins. In turn, the envelope-like bags, which constitute the sacks 33, define, as mounting elements to be hooked 52-1, 52-2, 52-3 and 52-4, respective holes or slots to be coupled with the pins.

[0019] In particular, for the envelope-like bag which constitutes the sack 33 of width W , the elements to be hooked 52-1, 52-2, 52-3 and 52-4 extend for an internal fraction, for example $3/4$ of the width W . The aim is to leave free the parts close to the side edges 49l and 49r. It allows the unfolding of the folds for the shaping of the basin portion 43 in the condition in which the edges 36a, 36b are spaced away with the elements to be hooked 52-1, 52-2, 52-3 and 52-4 retained by the fastening elements 53-1, 53-2, 53-3 and 53-4.

[0020] The storing device 31 also comprises vertical guide elements for the platform, a motor for a downhill movement and an ascent return of the platform and a motion converter for converting a rotary motion generat-

ed by the motor to the downhill movement and the ascent return of the platform. These components can be of any known type.

[0021] In the herein described embodiment of the invention, the platform 38 is part of a shelf member including a vertical section or sections 56 having the possibility of sliding vertically on a support wall 57 of the device 31. For guiding the movement of the platform 38, a pin and slot connection between the vertical section or sections 56 of the shelf member and the support wall 57 is provided. By way of example, this connection comprises two slots 59 on the wall 57 and a series of pins 58 on the section or sections 56 of the shelf member, and in which the pins 58 have respective retaining heads.

[0022] The movement means 46 comprise, for example, a motor 61 and a pinion 62 and rack 63 mechanism. The motor 61 is mounted on the vertical section or on one of the vertical sections 56 of the shelf member and is operatively connected with the pinion 62, while the rack 63 is fixed on the support wall 57.

[0023] In alternative, the movement means for the shelf member include a screw-nut screw coupling. The screw is driven by a respective motor and extends vertically on the support 57. The motor is mounted on the support 57, while the screw nut is fixedly mounted with respect to the platform 38.

[0024] The device 31 also includes level sensing means, not shown, for detecting the level of the stack 37 of the stored banknotes 32, and respective control means, also not shown, for the movement means 46. For example, the level sensing means can comprise photo-electric sensors or counting means for the number of the stored banknotes. The sealing means 47 can include a pair of pressure and welding bars 66a and 66b operative on the faces 48a and 48b of the sack 33.

[0025] Optionally, the storing device 31 can also include guide fins and urging elements with actuating mechanisms, not shown, for improving the stacking by fall of the banknotes 32 in the basin portion 43 of the sack 33.

[0026] The operation of the device 31 provides an initialization phase with insertion of the lower part of the sack 33 in the slot 39 (Fig. 5), at the high position HP of the platform 38. Then, the elements to be hooked 52-1, 52-2, 52-3 and 52-4 are engaged to the fasteners 53-1, 53-2, 53-3 and 53-4 of the edge retaining members 34a and 34b, forming an inlet port of the sack 33. The slot 39 determines the narrowing 42 and allows the formation of the basin portion 43 on the sack 33. It can be adjusted manually or by means of the guide fins, if present.

[0027] In alternative to the narrowing defining slot on the platform 38 of fixed value, a slot of variable width is provided. A manual or power driven mechanism provides to enlarge the width of the slot to make easier the positioning of an empty sack 33 on the device 31 and to fix the width of the slot at the optimized value when the sack is correctly mounted.

[0028] The storing device 31 is now ready for receiving,

by fall, the banknotes 32 emerging from the collecting equipment StEq and in condition of substantial stacking, forming the stack 37 on the bottom of the basin portion 43, with support of the platform 38.

[0029] With the increasing of the height of the stack 37, the respective control means operate on the movement means 46 by gradually lowering the platform 38 so as to maintain the top of the stack 37 at a substantially constant level with respect to the output port of the apparatus StEq. As a consequence of the weight of the stack 37 and / or the action of the urging elements, the narrowing 42 moves downwardly up to the height LP of maximum filling. The banknotes 32 continue the filling of the sack 33, while the side edges 49l and 49r approach the edges of the smaller size of the banknotes 32, conforming the shape of the sack 33 to the block constituted by the stack 37, as shown in Fig 7.

[0030] The platform 38 is further lowered at the end of the storing, or when the height LP corresponding to the maximum capacity of the sack 33 has been reached. The sack 33 is now free and the bottom of the stack 37 is supported by the lower edge 51, conforming its shape to the bottom of the stack 37.

[0031] The storing of the banknotes is completed by the operation of the pressure and welding bars 66a and 66b in a welding area 67 of the sack 33 above the stack 37. In this area, the bars 66a and 66b move the faces 48a, 48b, one towards the other, and provide to weld the sack 33, together with an action of pressure, in a manner known per se, resulting in the configuration shown in Fig 10.

[0032] Conveniently, the sack 33 is provided of a pair of stiffening strips 69a and 69b welded to the faces 48a, 48b (Fig. 2) below the welding area 67 to avoid transversal ripples on the sack close to the welding area. For example, the strips 69a and 69b can be constituted by strips of Mylar or similar material.

[0033] Naturally, the principle of the invention remaining the same, the embodiments and the details of construction can broadly be varied with respect to what has been described and illustrated, by way of non-limitative example, without by this departing from the ambit of the present invention.

Claims

1. An orderly storing device for banknotes in sack comprising a pair of edge retaining members for holding a sack in a substantially vertical position and in which the input edges of the sack can be spaced away one another for receiving the banknotes by fall and in condition of substantial stacking, said storing device being **characterized in that** it comprises a platform which defines a slot provided to be crossed by a section of the sack below the input edges and such as to form on the sack a narrowing portion alongside the slot and a basin portion in a section of the sack

above said platform, in which

the basin portion has the function of receiving the falling banknotes in a stacking condition, while the platform supports temporarily the banknotes received into the basin portion, and

the platform is capable of moving vertically between a high position, for loading the banknotes in an empty sack, and a low position of maximum filling of the sack; and in which said storing device further comprises:

moving means for moving said platform downwards following the progressive storage of the banknotes in the basin portion and for return towards the high position, and

welding means for welding opposing faces of the sack at the end of storage of the banknotes.

2. Storing device according to claim 1 **characterized in that** it uses, as a sack, an envelope-like bag with input edges having respective mounting elements to be hooked, for a functional engagement, with corresponding fastening elements of the edge retaining members.

3. Storing device according to claim 2 **characterized in that** the fastening elements comprise substantially vertical pins and in which the envelope-like bag defines, as mounting elements, holes or slots close to input edges and which can be coupled with said pins.

4. Storing device according to claim 2 or 3 **characterized in that** it uses an envelope-like bag of a given width with folds on side edges, and in which the mounting elements extend for a fraction of said given width such as to leave free parts of the input edges adjacent to the side edges to allow the unfolding of said folds, functional to the formation of the basin portion in the condition of the input edges spaced away one another.

5. Storing device according to one of the preceding claims **characterized in that** it further comprises vertical guide elements for the platform, a motor for a downhill movement and an ascent return of the platform and a motion converter for converting a rotary motion generated by the motor to the downhill movement and the ascent return of the platform.

6. Storing device according to one of the claims 1 to 4 **characterized in that** said platform is part of a bracket with a vertical section or sections, in which said storing device further comprises a substantially vertical support wall for the vertical section or sections of the bracket and in which, for guiding the vertical movement of the platform, pin and slot connections are provided between the vertical section or sections

of the bracket and said support wall.

7. Storing device according to claim 6 **characterized in that** the moving means comprise a screw-nut screw coupling and a motor, in which the screw is driven by said motor and extends vertically on the support wall, while the screw nut is fixedly mounted with respect to the platform. 5
8. Storing device according to claim 6 **characterized in that** the moving means comprise a rack and pinion mechanism and a motor, which is mounted on a vertical section of the bracket and is operatively connected with said pinion, and in which said rack is fixed on the support wall. 10
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9. Storing device according to one of the preceding claims **characterized in that** it comprises detecting means for detecting the level of the stored banknotes and in which said detecting means control said moving means. 20
10. Storing device according to one of the preceding claims **characterized in that** the welding means comprise a pair of pressure and welding bars and in which said pressure and welding bars are operative on opposite faces of the sack. 25
11. Storing device according to one of the preceding claims **characterized in that** it optionally comprises guide fins and urging elements for improving the stacking by fall of the banknotes into the basin portion of the sack. 30
12. Storing device according to one of the preceding claims **characterized in that** said platform defines a slot which extends for a length slightly greater than the width of the sack and a width smaller than the height of the banknotes of smaller dimensions. 35
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13. Storing device according to one of the claims 1 to 12 **characterized in that** said slot is of variable width and a manual or power driven mechanism is provided for enlarging the width of the slot of variable width to make easier the positioning of an empty sack and to fix the width of the slot at an optimized value when the sack is mounted on the storing device. 45
14. Storing device according to one of the preceding claims **characterized in that** it uses sacks including a pair of stiffening strips welded to opposite faces of the sack, below the welding area, to avoid transversal ripples on the sack close to the welding area. 50

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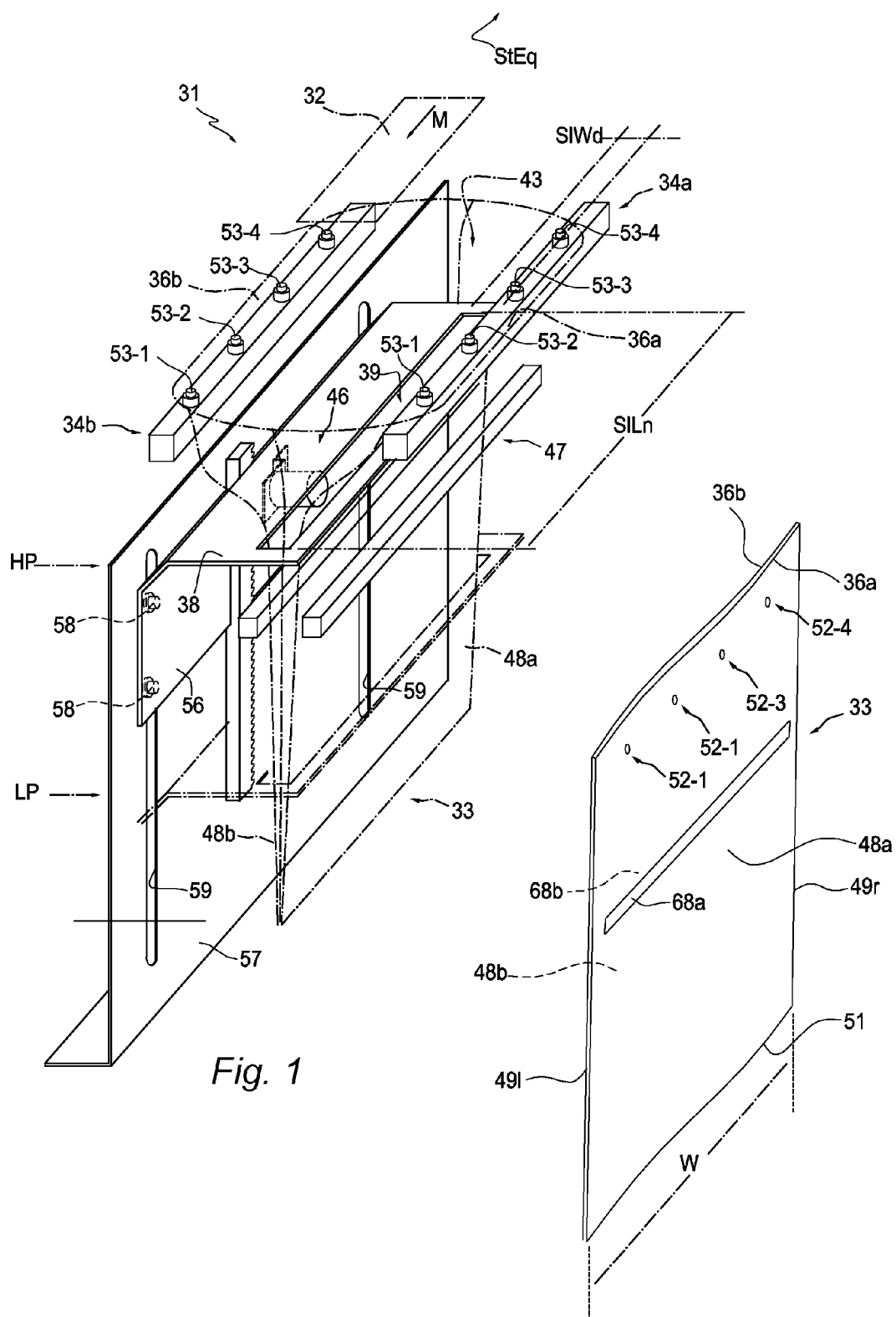
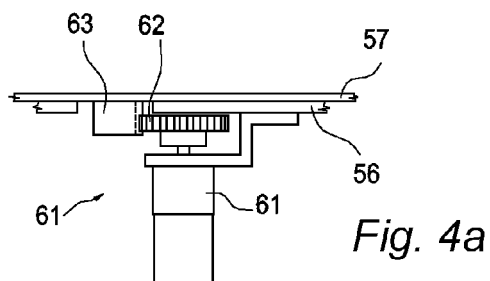
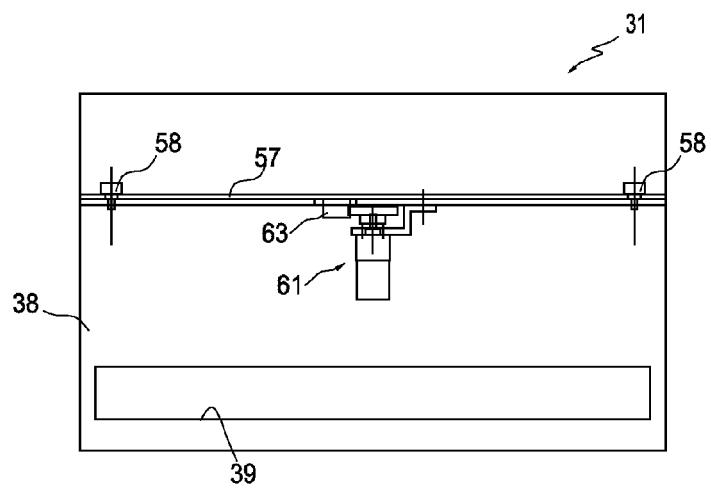
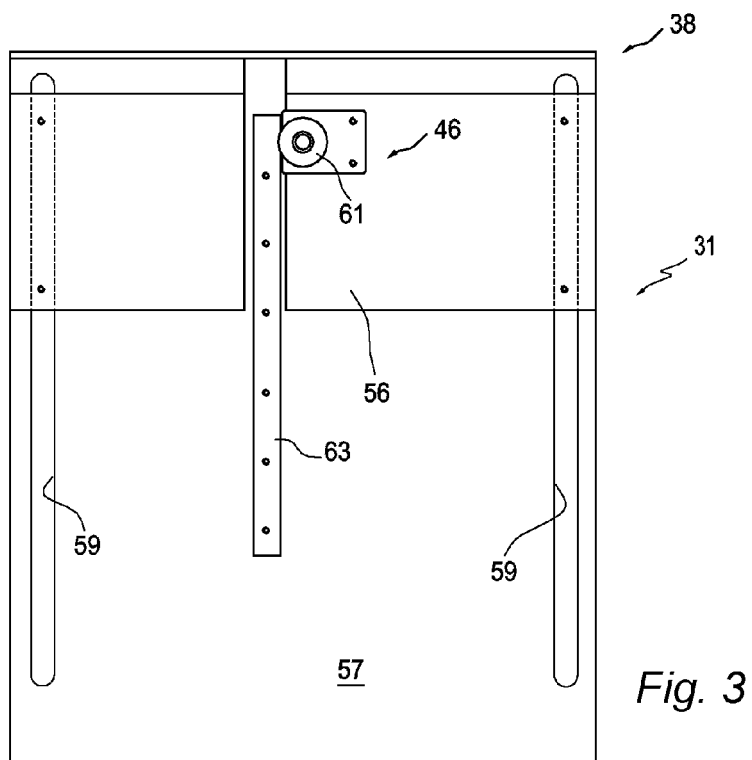
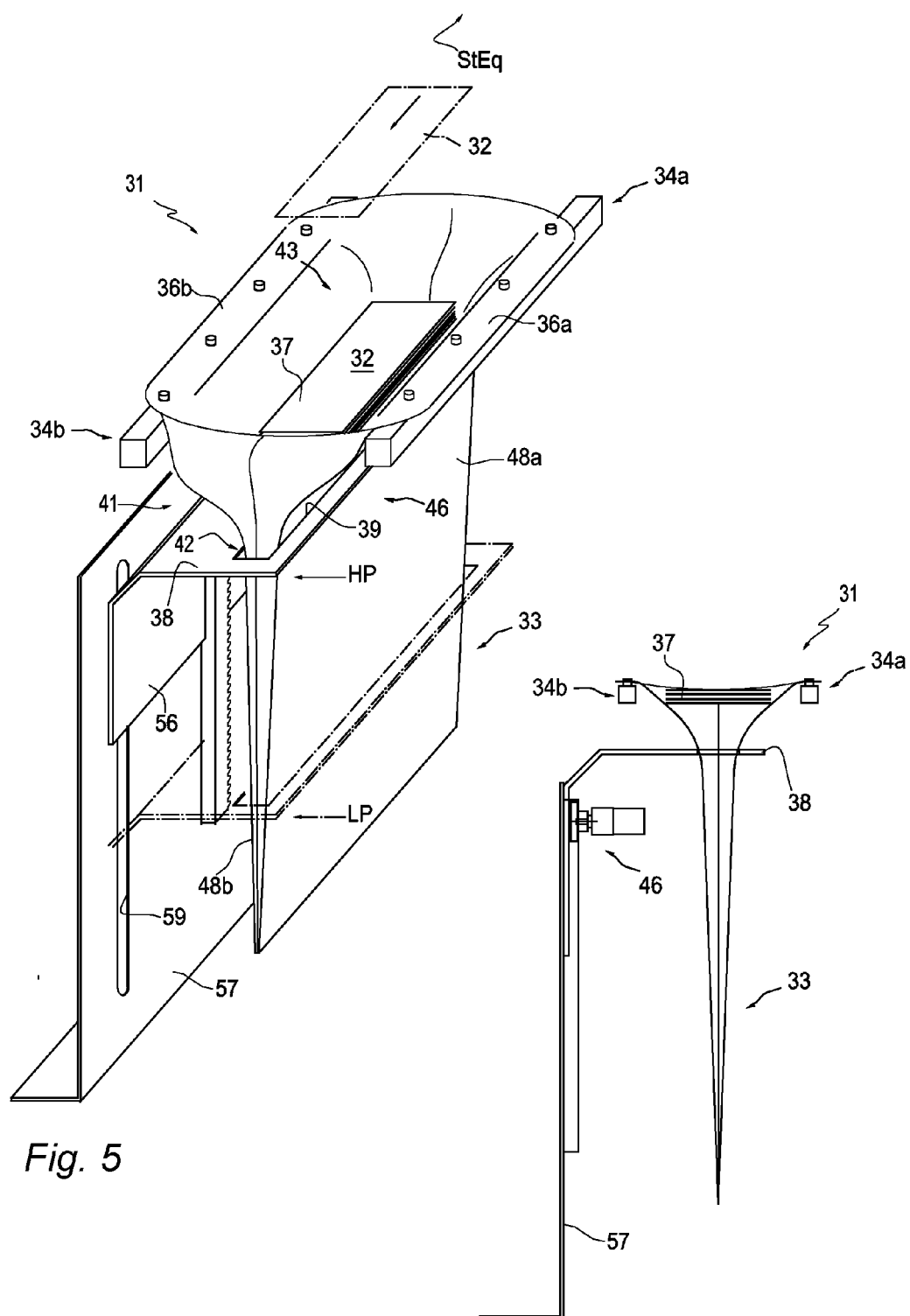
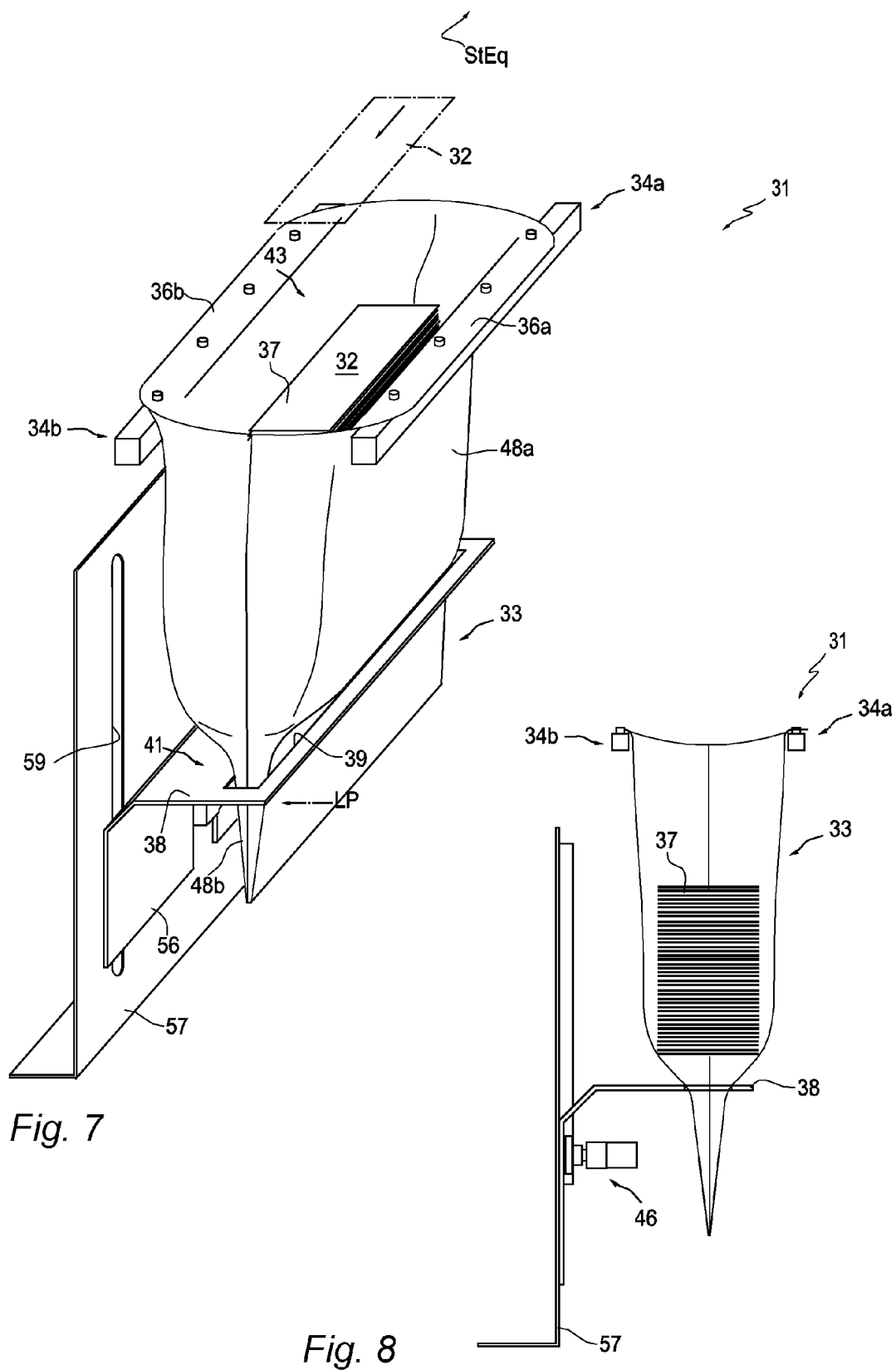


Fig. 2







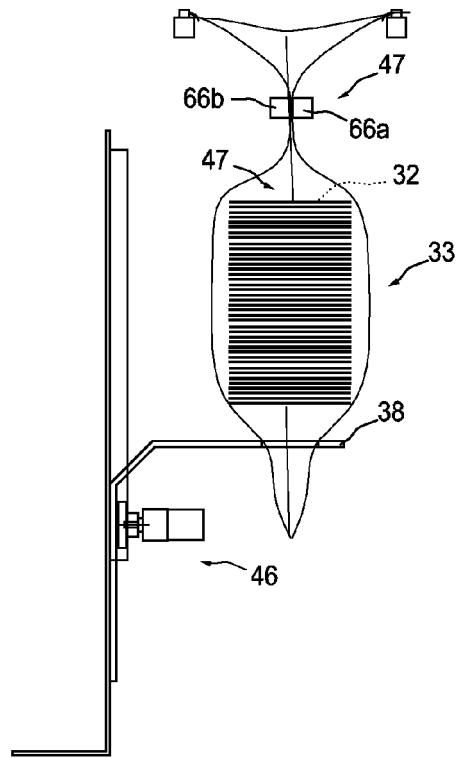


Fig. 9

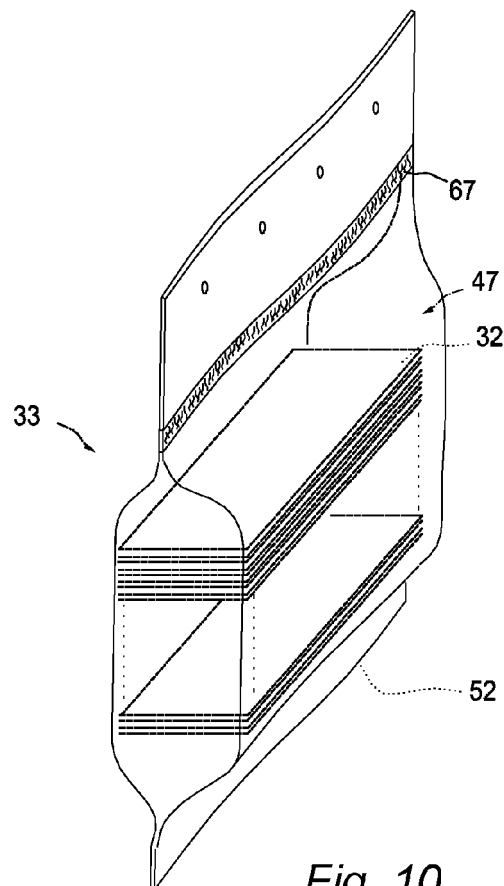


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 13 19 4340

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 January 2014	Examiner Espuela, Vicente
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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