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(54) **CAPPING MACHINE FOR CLOSING BOTTLES WITH CROWN CAPS**

(57) Capping machine (100) for closing bottles (200) with crown caps (250), comprising a base (15), on which a bottom (203) of the bottle (200) rests, a fixed frame (10) comprising two uprights (11, 12) inside which the bottle (200) to be capped is positioned, and a movable frame (20) at the top of which a capping mechanism (50) is integrated comprising a control lever (51) adapted to operate a head (55) by imparting to said head (55) a vertical motion and a pressure force which is transferred to the crown cap (250) arranged on the mouth (201) of the bottle (200) to be capped, characterised in that said movable frame (20) is configured to be manually translated in a vertical direction along the fixed frame (10) so as to bring the capping mechanism (50) to the correct working height according to the height of the bottle (200) to be capped, and wherein said capping machine (100) comprises locking means (30) of a removable type, configured to engage/disengage simultaneously with the movable frame (20) and with the fixed frame (10) to lock said movable frame (20) in the working position.

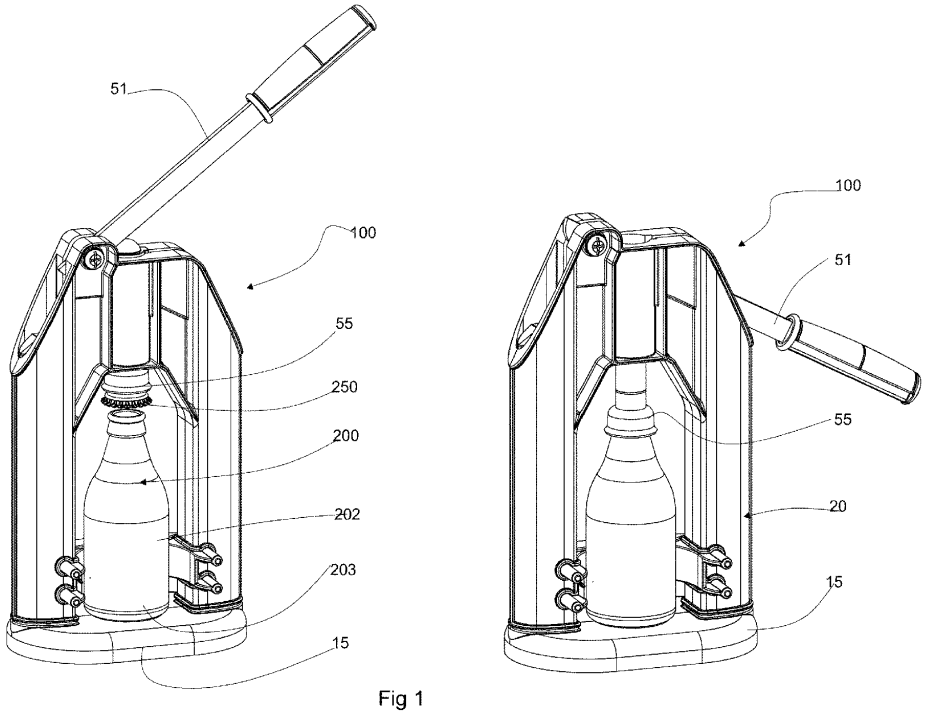

Fig 1

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Description

FIELD OF APPLICATION OF THE INVENTION

[0001] The present invention relates to the field of capping machines for closing bottles with crown caps.

[0002] These machines are also called capsuling machines, i.e., equipment for capping crown caps on the mouth of bottles.

[0003] In this particular case, it is of the manual type, thus hand-operated.

BACKGROUND

[0004] Several capping machines for closing bottles with crown caps are known in the art.

[0005] Said type of machine falls among those configured for small productions and is therefore generally of the manual type.

[0006] Said machines can be table-mounted, thus configured to be placed on a raised table top, or column-mounted, thus configured to be placed on the floor.

[0007] Generally the known machines comprise a base with a metal column on which the capping mechanism is installed.

[0008] The capping mechanism generally comprises a manoeuvring lever adapted to operate a head to which it imparts a vertical motion and a pressure force which is transferred to the crown cap placed on the mouth of the bottle to be capped.

[0009] Said capsuling machines are expensive both in terms of assembly and production, as they are made from several metal parts.

[0010] Furthermore, said capsuling machines have large dimensions which are not compatible with insertion, for example, inside fermenters in beer kits.

[0011] Document IT1137747 is known which describes a capping machine for hermetically sealing bottles of various sizes with crown caps. Said machine comprises a base from which two uprights rise, joined together vertically by a semi-cylindrical surface inside of which are a series of grooves are obtained, arranged at different heights, adapted to receive a plate which can be inserted to position bottles of different heights at the correct height with respect to the capping mechanism; concentric circular seats of different diameters are obtained in said plate for positioning the base of bottles of different diameters.

[0012] However, said solution does not ensure good stability of the bottle, as the clearance between the plate and the groove which receives it can cause the plate, and therefore the bottle, to tilt.

[0013] In particular, this is exacerbated when the bottle is subjected to the pushing force of the capping mechanism. Therefore, the axis of the bottle may be inclined with respect to the pressure force of the capping head, which has a vertical direction.

[0014] The wear of the grooves and/or the plate over time means that the machine cannot ensure a stable support for the bottle.

EXPOSURE AND ADVANTAGES OF THE INVENTION

[0015] The technical problem at the basis of the present invention is that of providing a capping machine for closing bottles with crown caps which is structurally and functionally designed to overcome one or more of the limits set out above with reference to the prior art.

[0016] In the context of the aforesaid problem, a main aim of the invention is to develop a capping machine for closing bottles with crown caps, as part of a flexible solution which allows to reliably work with bottles of different heights and sizes.

[0017] A further aim of the invention is also that of providing the art with a manual capping machine for closing bottles with crown caps, within the scope of a simple and rational solution, with limited size and cost.

[0018] In particular, an aim of the invention is a capping machine for closing bottles with crown caps.

[0019] Said machine preferably comprises a base, on which a bottom of the bottle rests.

[0020] Furthermore, it preferably comprises a fixed frame comprising two uprights inside which the bottle to be capped is positioned, and a movable frame at the top of which a capping mechanism is integrated.

[0021] Such a capping mechanism can comprise a manoeuvring lever adapted to operate a head by imparting a vertical motion and a pressure force to said head which is transferred to the crown cap arranged on the mouth of the bottle to be capped.

[0022] Said movable frame is configured to be manually translated in a vertical direction along the fixed frame so as to bring the capping mechanism to the correct working height according to the height of the bottle to be capped.

[0023] In particular, said capping machine comprises locking means of a removable type, configured to engage/disengage simultaneously with the movable frame and with the fixed frame to lock said movable frame in the working position.

[0024] Preferably said locking means are engaged by insertion into the movable and fixed frame in a direction orthogonal to the vertical capping direction.

[0025] In particular, the insertion of locking means in the movable and fixed frame occurs manually.

[0026] Preferably the two uprights are configured to slidably receive two columns of the movable frame.

[0027] Preferably the two columns of the movable frame externally embrace the two uprights of the fixed frame.

[0028] Preferably, the columns of the movable frame are internally hollow so as to contain therein the upright along which they can slide in a vertical direction.

[0029] Preferably the columns of the movable frame and the uprights of the fixed frame comprise a flat face, preferably facing the inside of the capping machine.

[0030] In particular, the locking means comprise at least one protrusion adapted to fit into a corresponding outer recess of the movable frame and into a corresponding inner recess of the fixed frame.

[0031] Preferably said outer recess is made on at least one column of the movable frame and said inner recess is made on at least one upright of the fixed frame.

[0032] Optionally the locking means comprise at least one pair of protrusions, adapted to fit into at least one pair of corresponding outer recesses, located on both uprights columns and into at least one pair of corresponding inner recesses, located on both uprights.

[0033] Optionally, each column comprises a number of outer recesses equal to the number of pairs of protrusions.

[0034] Optionally, each upright comprises a plurality of inner recesses distributed along the height of each upright.

[0035] Preferably the inner recesses are arranged in pitch on each upright and preferably said pitch is constant and equal to the vertical distance between the pairs of protrusions, of the locking means.

[0036] Preferably said inner recesses and said outer recesses are arranged towards the inside of the capping machine.

[0037] In particular, said inner recesses are holes preferably passing through the entire width of the uprights.

[0038] Preferably, said holes have a first opening extending along the entire depth of the hole and facing the inside of the capping machine, preferably up to the flat faces.

[0039] Optionally, said outer recesses are holes passing through the entire width of the columns.

[0040] Preferably, said holes have a second opening extending along the entire depth of the hole and facing the inside of the capping machine, preferably up to the flat faces.

[0041] Preferably the locking means comprise a connection element for connecting the protrusions of each pair with each other.

[0042] Preferably said connection element comprises an extension for connecting all the pairs of protrusions with each other.

[0043] In particular, the locking means are further configured for positioning the bottle in axis with the capping mechanism.

[0044] In particular, the connection element comprises a curved inner surface to contact the outer surface of the bottle placed in the capping position.

[0045] Preferably the locking means comprise adjustment means for adjusting the position thereof in a horizontal direction and to allow positioning the bottle in axis with the capping mechanism.

[0046] In particular, the adjustment means comprise a plurality of recessed seats preferably located on the connection element.

[0047] Said seats are preferably configured to cooperate with a relief located on the flat face of the columns facing the inside of the capping machine. The movable frame preferably comprises a crossbar, in which the capping mechanism is arranged.

[0048] In particular, the crossbar connects the columns of the movable frame above and is preferably curved.

[0049] Preferably the fixed frame and/or the movable frame and/or the locking means are made of plastic.

[0050] These and other objects are reached by the characteristics of the invention set forth in the independent claims. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

[0051] Said objects and advantages are all obtained by the manual capping machine for closing bottles with crown caps, according to the present invention, which is characterised according to the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] These and other features will be more apparent from the following description of certain embodiments illustrated by way of non-limiting example in the accompanying drawings.

- Figure 1: illustrates in axonometric view a capping machine in the positioning and capping steps with a short bottle;
- Figure 2: illustrates in axonometric view a capping machine in the positioning and capping steps with a tall bottle;
- Figure 3: illustrates in axonometric view a capping machine with the locking means not engaged;
- Figure 4: illustrates in axonometric view the fixed frame of a capping machine;
- Figure 5: illustrates in axonometric view the movable frame of a capping machine;
- Figure 6: illustrates in axonometric view the locking means of a capping machine;
- Figure 7: illustrates in sectional view the capping mechanism in the positioning and working steps;
- Figure 8: illustrates in axonometric view the lever in the positioning and working steps;
- Figure 9: illustrates an exploded view of a capping machine.

DESCRIPTION OF THE INVENTION

[0053] Figure 1 depicts a capping machine 100 for closing bottles 200 with crown caps 250.

[0054] Said machine in particular comprises a base 15, on which a bottom 203 of the bottle 200 rests.

[0055] In particular, the machine generally comprises a fixed frame 10 and a movable frame 20.

[0056] Preferably the fixed frame 10 comprises two uprights 11, 12 inside which the bottle 200 to be capped is positioned.

[0057] Said machines generally comprise a capping mechanism 50 comprising a manoeuvring lever 51

adapted to operate a head 55, imparting a vertical motion and a pressure force to said head 55 which is transferred to the crown cap 250 arranged on the mouth 201 of the bottle 200 to be capped.

[0058] Said capping mechanism 50 is placed on the top of the machine 100.

[0059] According to an aspect of said invention, the capping mechanism 50 comprises an engagement element 54 between the manoeuvring lever 51 of the head 55, preferably made of plastic, which transfers the pressure force exerted by the lever 51 to the crown cap 250.

[0060] Furthermore, the capping mechanism 50 comprises a fulcrum 53, around which the lever 51 rotates.

[0061] It may further comprise an elastic element 52, preferably a spring, which facilitates the return of the lever 51 to the initial position.

[0062] Figure 7 depicts a sectional view of the 50 capping mechanism, in particular in the two working steps:

- A first positioning step, in which the capping machine 100 is ready to receive the bottle 200 and the cap 250; in said step the lever is raised and the elastic element 52 is not compressed.
- A second capping step, in which the capping machine 100 caps the bottle 200 with the cap 250; in said step the lever is lowered and the elastic element 52 is compressed.

[0063] In particular, the object of the invention envisages that said capping mechanism 50 is integrated at the top of the movable frame 20.

[0064] According to an aspect of the invention, said movable frame 20 is configured to be manually translated in a vertical direction along the fixed frame 10 so as to bring the capping mechanism 50 to the correct working height according to the height of the bottle 200 to be capped.

[0065] Therefore, thanks to the sliding of the movable frame 20 the capping machine 100 adapts to the height of the bottle 200 to be capped.

[0066] In fact, the bottles 200 can have different heights, e.g., the machine 100 can tap bottles 200 of beer from 25 to 66 cc. with a crown cap diameter of 26.

[0067] Furthermore, the machine can also process wine bottle sizes up to a height of 313 mm.

[0068] Said measurements are only indicative, as any other bottle size can be processed using the same principle, e.g., 350, 400 etc.

[0069] By sliding the movable frame 20 upwards on the fixed frame 10, the capping mechanism 50 at the top of the movable frame 20 moves away from the base 15, allowing the insertion of a tall bottle 200.

[0070] Conversely, by sliding the movable frame 20 downwards on the fixed frame 10, the capping mechanism 50 at the top of the movable frame 20 moves closer to the base 15, allowing the insertion and capping of a short bottle 200.

[0071] Figures 1 and 2 show the capping machine 100 in the positioning and capping step with two bottles 200 of different heights.

[0072] Therefore, the movable frame 20 in fig. 1 is in a lowered position close to the base 15, to work with a short bottle, while the movable frame 20 in fig. 2 is in a raised position away from the base 15, to work with a tall bottle.

[0073] When the movable frame 20 is in the entirely lowered position, it can come to rest on the base 15.

[0074] This ensures a very compact solution of the capping machine 100.

[0075] Once said movable frame 20 has been manually translated vertically until reaching the correct working position, said movable frame 20 can be locked in said working position by means of the insertion of locking means 30.

[0076] In fact, the capping machine 100 preferably comprises said locking means 30, of a removable type.

[0077] In particular, said locking means 30 are configured to engage/disengage simultaneously with the movable frame 20 and with the fixed frame 10.

[0078] Preferably, the locking means 30 are engaged by insertion or mating in the movable 20 and fixed 10 frame in a direction orthogonal to the vertical capping direction.

[0079] In particular, said insertion of the locking means 30 in the movable frame 20 and fixed frame 10 occurs manually.

[0080] According to a preferred embodiment, the two uprights 11, 12 are configured to slidably receive two columns 21, 22 of the movable frame 20.

[0081] In particular, said uprights 11, 12 are integral with the base 15 and preferably made in one piece.

[0082] This reduces the assembly time and costs of the capping machine 100.

[0083] Furthermore, preferably the uprights 11, 12, and base 15 are made of plastic material, preferably obtained by moulding.

[0084] This allows to obtain a machine 100 which is light and easily transportable.

[0085] To allow to improve these advantages of lightness and transportability, the uprights 11, 12 as depicted in the figure are made with lattice ribs along their entire length. This reduces the amount of material used and therefore the weight, while ensuring good mechanical strength.

[0086] Preferably the two columns 21, 22 of the movable frame 20 externally embrace the two uprights 11, 12 of the fixed frame 10.

[0087] Therefore, the movable frame 20 is outside the fixed frame 10.

[0088] Preferably, the columns 21, 22 of the movable frame 20 are internally hollow so as to contain therein the upright 11, 12 along which they can slide in a vertical direction.

[0089] This allows a greater guiding surface of the movable frame 10 on the fixed frame 20 and thus improves the positioning stability of the movable frame 20

on the fixed frame 10, especially when the movable frame 20 is in the maximum position away from the base 15.

[0090] This also benefits the weight reduction of the machine 100 for better transportability.

[0091] According to a constructive embodiment depicted in the figure, the columns 21, 22 of the movable frame 20 and the uprights 11, 12 of the fixed frame 10 comprise a flat face 11s, 12s, 21s, 22s.

[0092] Preferably said flat face 11s, 12s, 21s, 22s faces the inside of the capping machine 100.

[0093] As will be better explained below, this allows to obtain an optimal and simple configuration of the locking means 30.

[0094] A preferred embodiment envisages that the movable frame 20 comprises a crossbar 25 in which the capping mechanism 50 is arranged.

[0095] Said crossbar 25 preferably connects the columns 21, 22 of the movable frame 20 above and is preferably curved.

[0096] Preferably as depicted in the figure, the crossbar 25 and columns 21, 22 are made in one piece.

[0097] This reduces the assembly time and costs of the capping machine 100.

[0098] Furthermore, preferably the columns 21, 22 and the crossbar 25 are made of plastic material, preferably obtained by moulding.

[0099] This allows to obtain lightweight and easily transportable components.

[0100] According to a preferred embodiment, the locking means 30 comprise at least one protrusion 31 adapted to fit into a corresponding outer recess 23 of the movable frame 20 and into a corresponding inner recess 13 of the fixed frame 10.

[0101] Preferably said outer recess 23 is made on at least one column 21, 22 of the movable frame 20.

[0102] Preferably said inner recess 13 is made on at least one upright 11, 12 of the fixed frame 10.

[0103] An embodiment depicted in the figure envisages that the locking means 30 comprise at least one pair of protrusions 310, adapted to fit into at least one pair of corresponding outer recesses 230, located on both columns 21, 22 and into at least one pair of corresponding inner recesses 130, located on both uprights 11, 12.

[0104] Therefore, the pair 310 comprises two protrusions 31, each engaging with a respective upright 11, 12 and a respective column 21, 22.

[0105] In the case depicted in figure 6, there are two pairs of protrusions 310, and therefore positioned one above the other.

[0106] The solution with two pairs of protrusions 310 ensures greater stability of the locking means 30, reducing possible rotations due to the construction and assembly tolerances of the protrusions 31, and of the inner recesses 13, and outer recesses 23.

[0107] The protrusions 31 of the pairs 310 are preferably all the same.

[0108] Likewise, the outer recesses 23 and inner recesses 13 of the pairs of recesses 230 and 130 are preferably all the same.

[0109] This simplifies the mechanical construction of the columns 21, 21, uprights 11, 12 and locking means 30.

[0110] In particular, a preferred embodiment envisages that each column 21, 22 comprises a number of outer recesses 23 equal to the number of pairs of protrusions 310, of the locking means 30.

[0111] Therefore if the locking means 30 envisage two pairs of protrusions 310, each column 21, 22 will comprise two outer recesses 23.

[0112] As depicted in figure 4, each upright 11, 12 can comprise a plurality of inner recesses 13 distributed along the height of each upright 11, 12.

[0113] Said inner recesses 13 are preferably arranged in pitch with each other.

[0114] In particular, the pitch between the inner recesses 13 on each upright 11, 12 is constant and equal to the vertical distance between the pairs of protrusions 310 of the locking means 30.

[0115] Said constant pitch allows a greater number of possible positionings of the locking means 30.

[0116] As depicted in the figure, preferably said inner recesses 13 and said outer recesses 23 are arranged towards the inside of the capping machine 100.

[0117] In particular, they can be positioned at the flat faces 11s, 12s, 21s, 22s.

[0118] One possible embodiment envisages that said inner recesses 13 are inner holes 14.

[0119] Preferably said internal holes 14 are passing through the entire width of the uprights 11, 12.

[0120] Preferably said inner holes 14 bear a first opening 14a extending along the entire depth of the inner hole 14.

[0121] Preferably said first opening 14a faces towards the inside of the capping machine 100, preferably up to the flat faces 11s, 12s, of the uprights 11, 12.

[0122] A possible embodiment envisages that the outer recesses 23 are outer holes 24.

[0123] Preferably said outer holes 24 are passing through the entire width of the columns 21, 22.

[0124] Preferably said outer holes 24 bear a second opening 24a extending along the entire depth of the outer hole 24.

[0125] Preferably said second opening 24a faces towards the inside of the capping machine 100, preferably up to the flat faces 21s, 22s of the columns 21, 22.

[0126] According to a preferred aspect of the invention, the locking means 30 comprise a connection element 32 for connecting the protrusions of each pair 310 with each other.

[0127] This allows to achieve the insertion of the two protrusions of the pair 310 with a single manoeuvre.

[0128] Preferably if there is more than one pair of protrusions 310, said connection element 32 comprises an extension 32a connecting the two pairs 310 located one above the other.

[0129] This further allows to achieve the insertion of all

the protrusions of the pair 310 with a single manoeuvre.

[0130] Furthermore, said locking means 30 can comprise at each protrusion 31, a rib 33 connecting the connection element 32 to the protrusion 31.

[0131] Said rib 33 preferably extends along the entire length of the protrusion 31.

[0132] Thanks to said rib 33 the protrusion is not cantilevered, but supported along its entire length by the connection element 32 and is therefore more robust and less prone to deformation and breakage.

[0133] This conformation is possible thanks to the presence of the first and second opening 14a and 24a respectively of the uprights 11, 12 and the columns 21, 22 which receive and act as guides for the ribs 33.

[0134] Furthermore, preferably the locking means 30 are configured to facilitate the positioning of the bottle 200 in axis with the capping mechanism 50.

[0135] In particular, a preferred embodiment envisages that the connection element 32 comprises an inner surface 32b which is curved so as to engage in contact with the outer surface 202 of the bottle 200 located in the capping position.

[0136] This makes the locking means 30 carry out the dual function of adjusting the capping to the diameter of the bottle 200 and to its height.

[0137] To better define the position of bottle 200, the locking means 30 comprise adjustment means 35.

[0138] Said adjustment means 35 allow to adjustment the position thereof in the horizontal direction for the positioning of the bottle 200 in axis with the capping mechanism 50.

[0139] Preferably such adjustment means 35 comprise a plurality of seats 34, preferably recessed.

[0140] Preferably said seats 34 are on the connection element 32

[0141] In particular, as depicted in the figure, the seats 34 are made on the extension 32a comprised between the ribs 33.

[0142] Said seats 34 are configured to cooperate with a relief 26 located on the flat face 21s, 22s of the columns 21, 22 facing the inside of the capping machine 100.

[0143] Said seats 34 are preferably at a constant pitch from each other to allow a step positioning of the locking means 30.

[0144] An alternative solution is also contemplated in which the seats are on columns 21, 22 while the relief is on the locking means 30.

[0145] Furthermore, preferably the locking means 30 are made of plastic material, preferably obtained by moulding.

[0146] It in any case is intended for that described above to be given by way of non-limiting example; therefore possible detail variants that may be required for technical and/or functional reasons are considered from now as to fall within the same protective scope defined by the claims below.

Claims

1. Capping machine (100) for closing bottles (200) with crown caps (250), comprising a base (15), on which a bottom (203) of the bottle (200) rests, a fixed frame (10) comprising two uprights (11, 12) inside which the bottle (200) to be capped is positioned, and a movable frame (20) at the top of which a capping mechanism (50) is integrated comprising a control lever (51) adapted to operate a head (55) by imparting to said head (55) a vertical motion and a pressure force which is transferred to the crown cap (250) arranged on the mouth (201) of the bottle (200) to be capped, **characterised in that** said movable frame (20) is configured to be manually translated in a vertical direction along the fixed frame (10), so as to bring the capping mechanism (50) to the correct working height according to the height of the bottle (200) to be capped, and wherein said capping machine (100) comprises locking means (30) of a removable type, configured to engage/disengage simultaneously with the movable frame (20) and with the fixed frame (10) to lock said movable frame (20) in the working position.

2. Capping machine (100) according to claim 2, wherein said locking means (30) are engaged by insertion into the movable (20) and fixed (10) frame in a direction orthogonal to the vertical capping direction.

3. Capping machine (100) according to any one of the preceding claims, wherein the two uprights (11, 12) are configured to slidably receive two columns (21, 22) of the movable frame (20).

4. Capping machine (100) according to claim 3, wherein the columns (21, 22) of the movable frame (20) are internally hollow so as to contain therein the upright (11, 12) along which they can slide in a vertical direction and preferably the columns (21, 22) of the movable frame (20) and the uprights (11, 12) of the fixed frame (10) comprise a flat face (11s, 12s, 21s, 22s), preferably facing the inside of the capping machine (100).

5. Capping machine (100) according to any one of the preceding claims, wherein the locking means (30) comprise at least one protrusion (31) adapted to fit into a corresponding outer recess (23) of the movable frame (20) and into a corresponding inner recess (13) of the fixed frame (10), wherein said outer recess (23) is preferably made on at least one column (21, 22) of the movable frame (20) and said inner recess (13) is made on at least one upright (11, 12) of the fixed frame (10).

6. Capping machine (100) according to any one of the preceding claims, wherein the locking means (30)

comprise at least one pair of protrusions (310), adapted to fit into at least one pair of corresponding outer recesses (230), located on both uprights (21, 22) and into at least one pair of corresponding inner recesses (130), located on both uprights (11, 12).

7. Capping machine (100) according to any one of claims 3 to 6, wherein each column (21, 22) comprises a number of outer recesses (23) equal to the number of pairs of protrusions (310), of the locking means (30).

8. Capping machine (100) according to any one of the preceding claims, wherein each upright (11, 12) comprises a plurality of inner recesses (13) distributed along the height of each upright (11, 12).

9. Capping machine (100) according to claim 8, wherein the inner recesses (13) are arranged in pitch on each upright (11, 12) and preferably said pitch is constant and equal to the vertical distance between the pairs of protrusions (310), of the clamping means (30).

10. Capping machine (100) according to any one of claims 5 to 9, wherein the locking means (30) comprise a connection element (32) for connecting the protrusions of each pair (310) with each other, and preferably said connection element (32) comprises an extension (32a) for connecting all the pairs of protrusions (310) with each other.

11. Capping machine (100) according to any one of the preceding claims, wherein the locking means (30) are further configured for positioning the bottle (200) in axis with the capping mechanism (50) and in particular the connection element (32) comprises a curved inner surface (32b) to contact the outer surface (202) of the bottle (200) placed in the capping position.

12. Capping machine (100) according to any one of the preceding claims, wherein the locking means (30) comprise adjustment means (35) for adjusting the position thereof in a horizontal direction and to allow positioning the bottle (200) in axis with the capping mechanism (50).

13. Capping machine (100) according to claim 12, wherein the adjustment means (35) comprise a plurality of recessed seats (34) preferably located on the connection element (32), said seats (34) configured to cooperate with a relief (26) located on the flat face (21s, 22s) of the columns (21, 22) facing the inside of the capping machine (100).

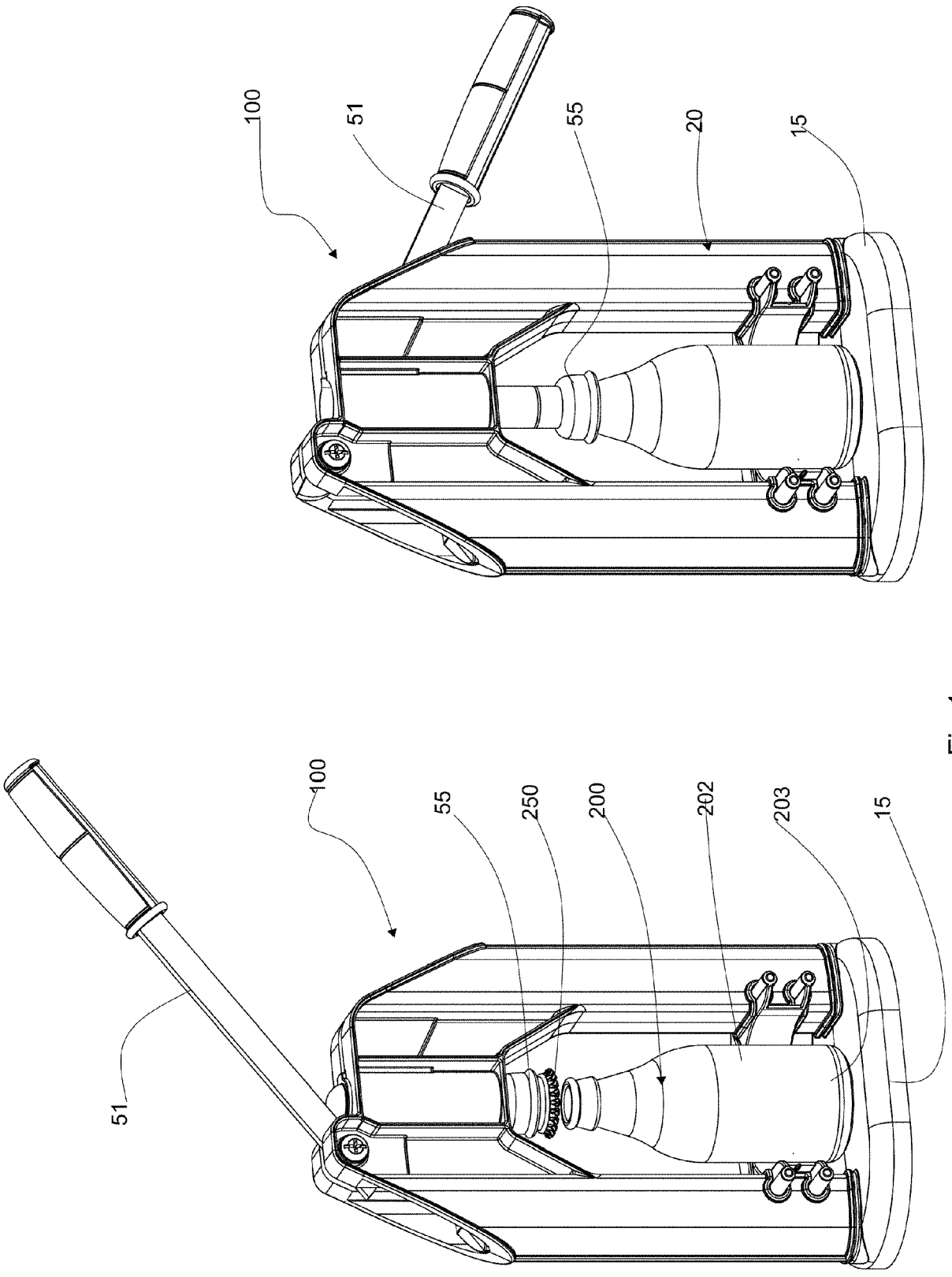

Fig 1

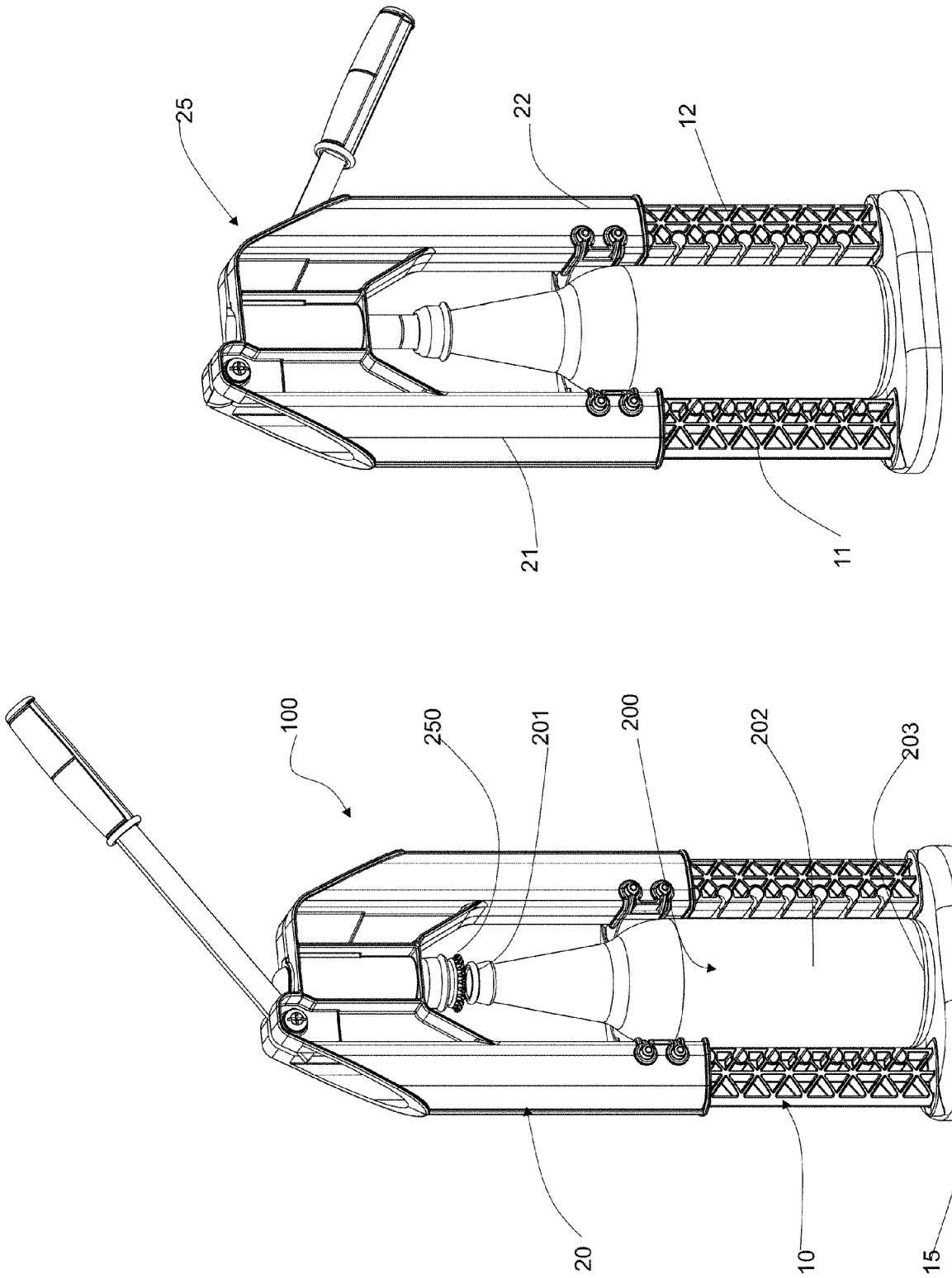

Fig 2

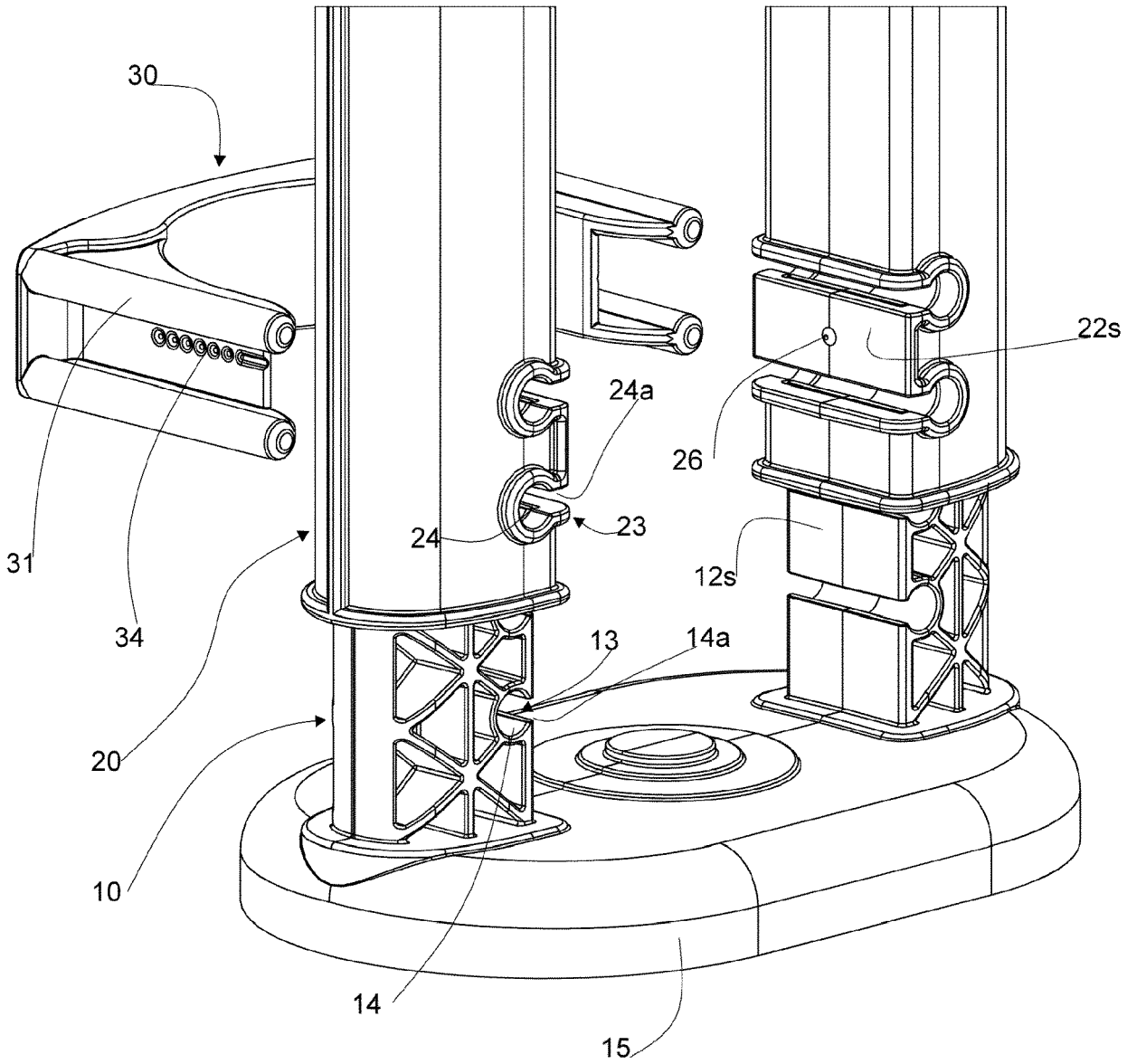

Fig 3

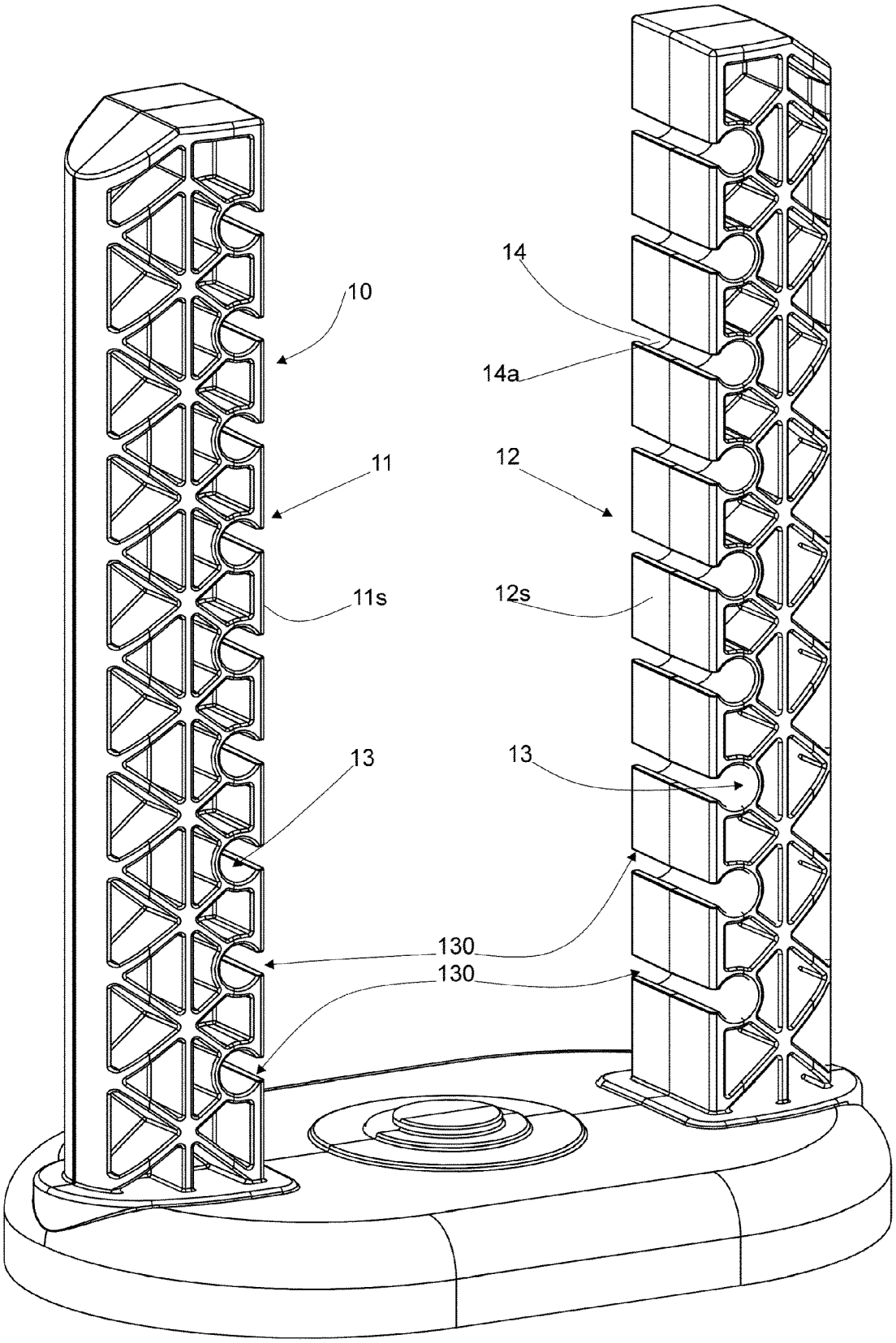

Fig 4

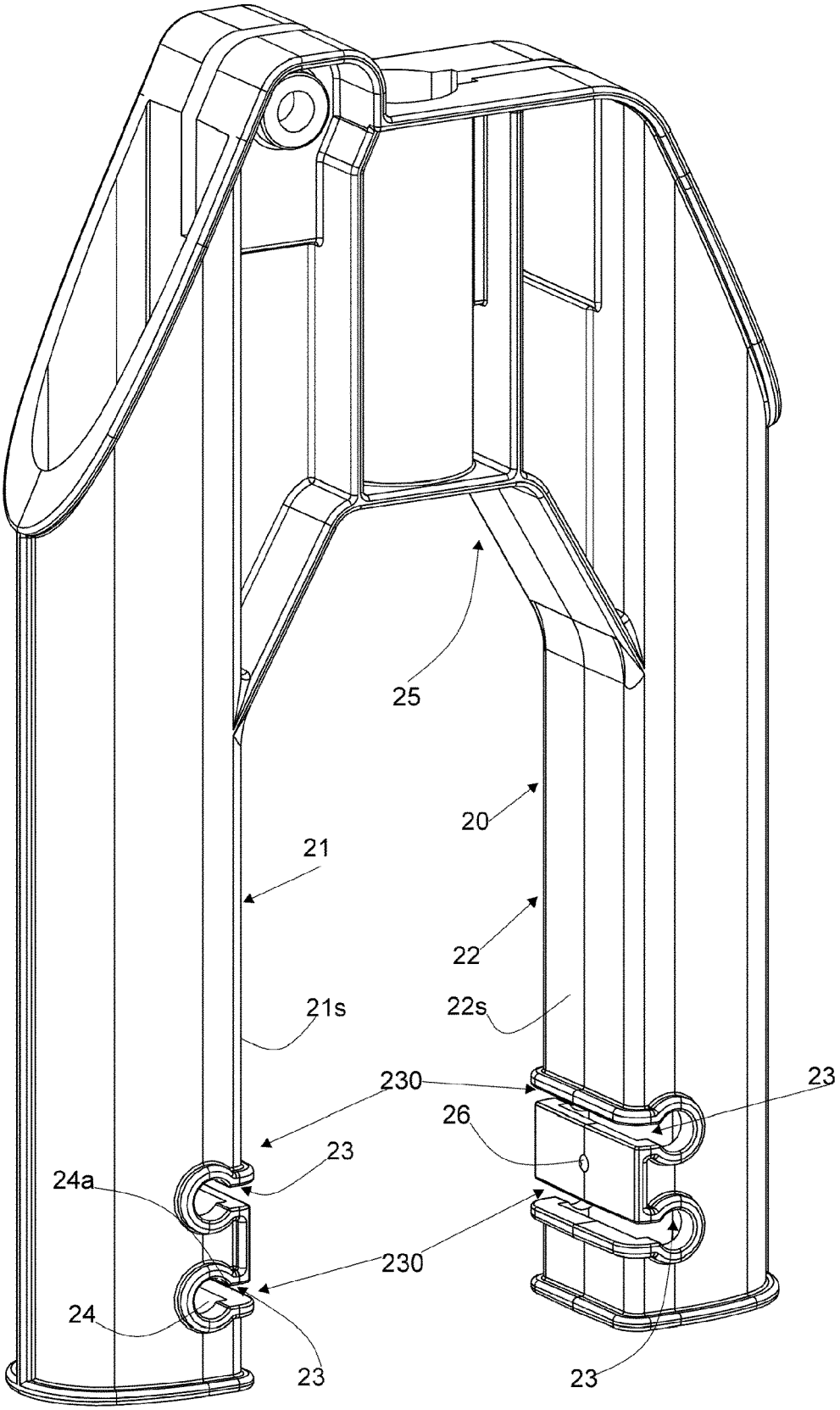

Fig 5

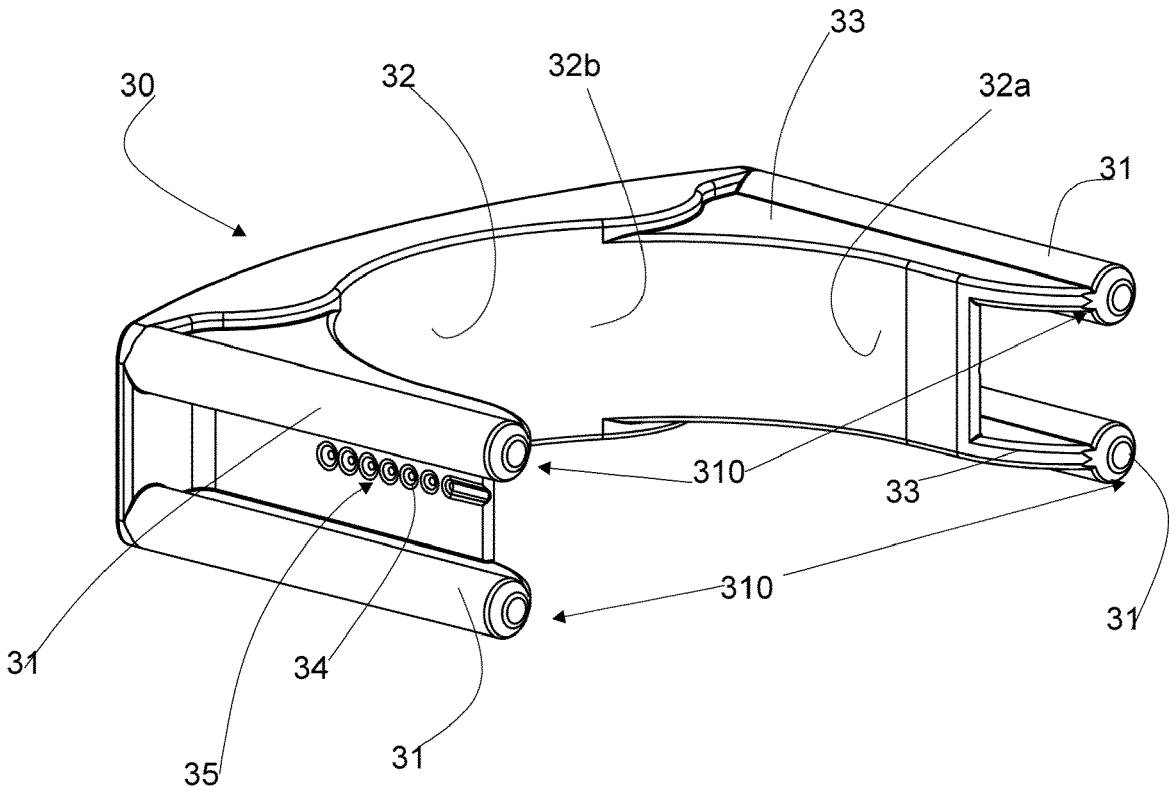

Fig 6

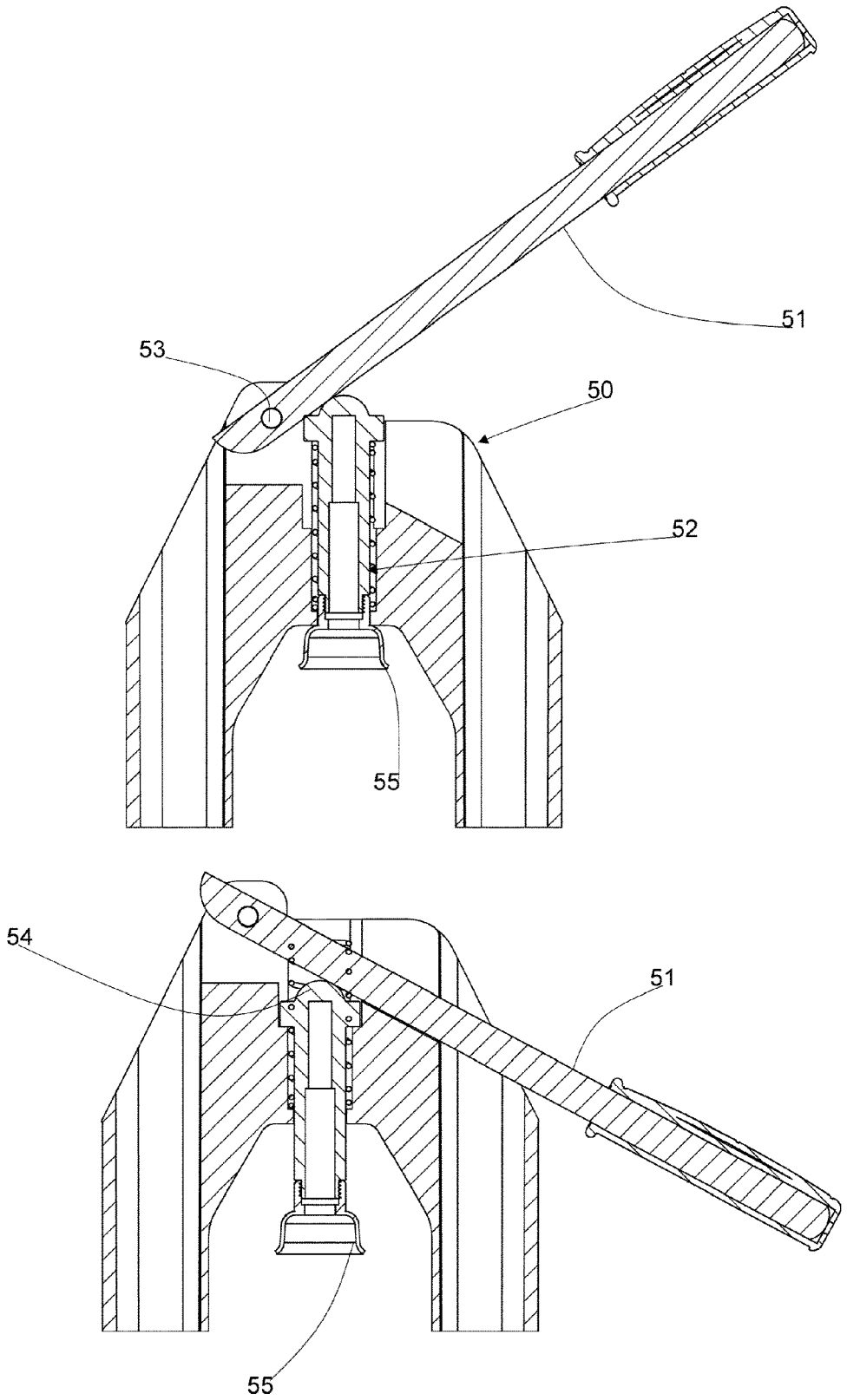

Fig 7

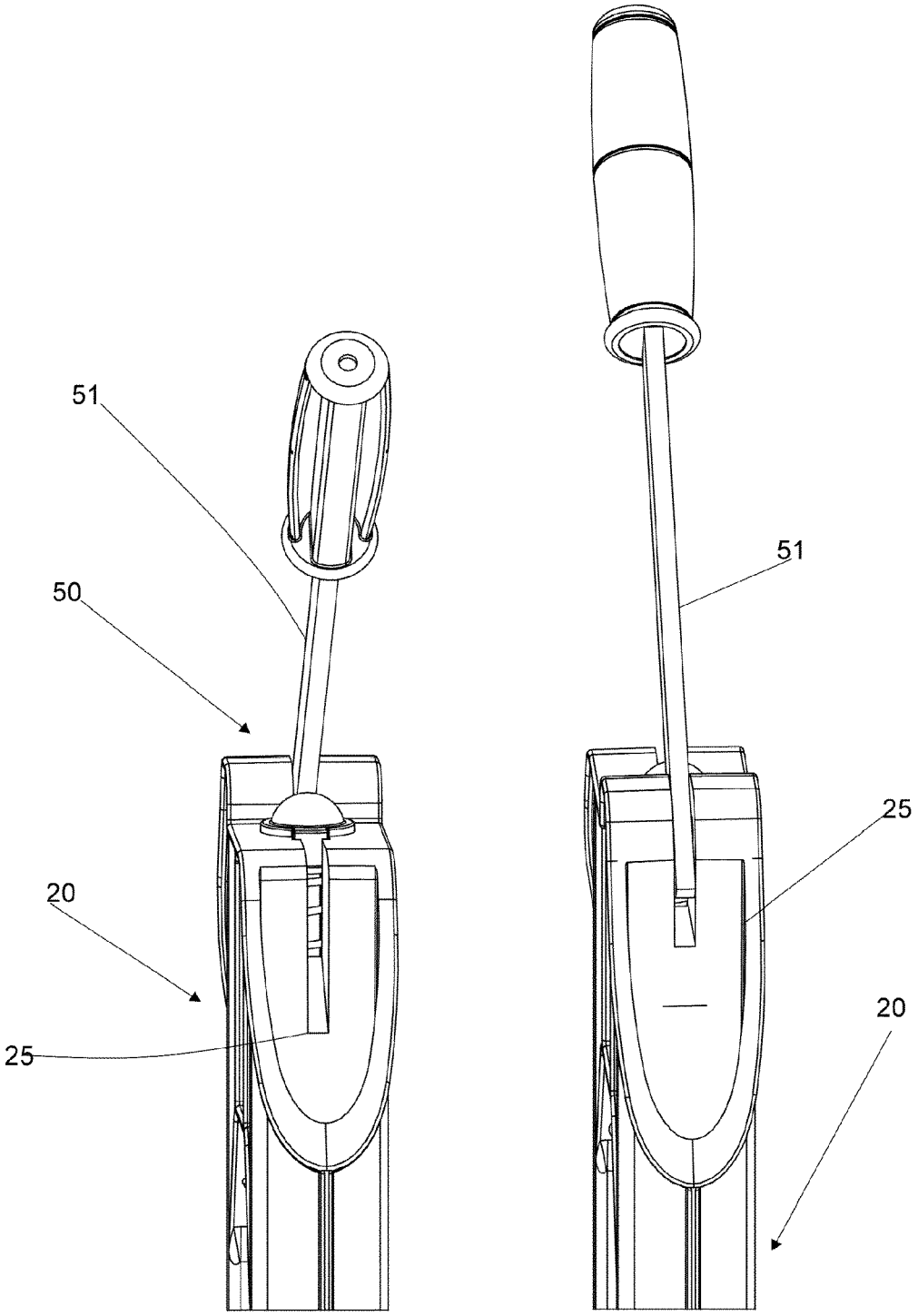

Fig 8

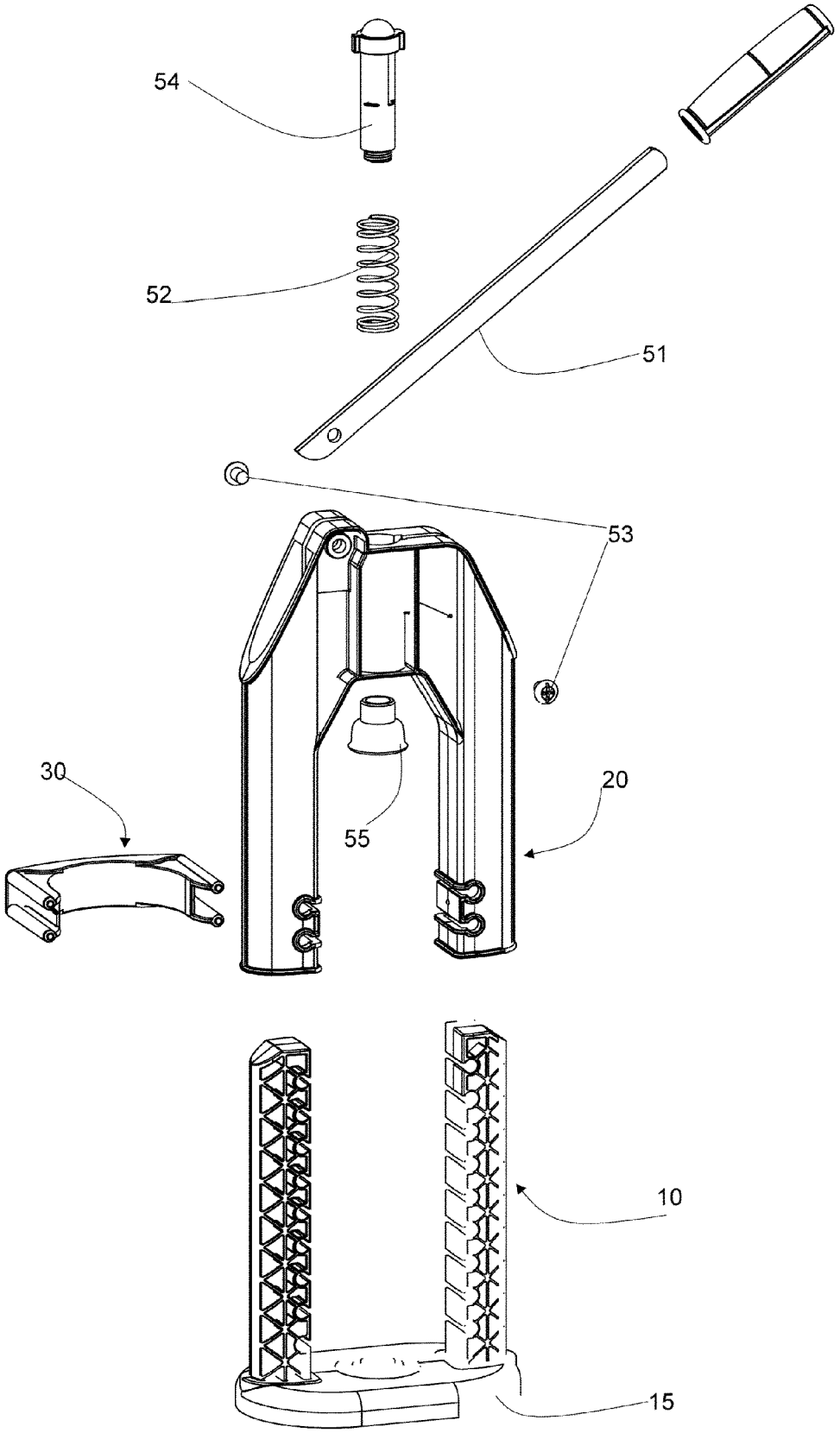

Fig 9

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EUROPEAN SEARCH REPORT

Application Number
EP 23 17 4172

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

B67B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 October 2023	Wartenhorst, Frank

CATEGORY OF CITED DOCUMENTS

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