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(54) A system for automatic cutlery dispensing

(57) A system for automatic cutlery dispensing, comprising: a plurality of items of cutlery (10), each of which comprises an elongate gripping handle (11) which at an end thereof bears a shaped appendage (12) for holding food and/or drinks, the shaped appendage (12) projecting with respect to a surface of the gripping handle (11); a container body (2) defining a vertically-developing corridor (20) in which a stack of the items of cutlery (10) is housed and held, the stack of cutlery (10) being free to slide vertically internally of the corridor (20), the corridor (20) being inferiorly closed by a retaining surface (34, 131) which restingly receives a lowest item of cutlery (10) of the stack, placing said item close to a lateral opening (25, 25') of the container body (2), and a mobile pusher element (35, 132) which acts against a longitudinal flank of the handle (11) of the lowest item of cutlery (10) in order to cause the item to slide contacting against an item (10) superior thereto in the stack, and to expel the lowest item of cutlery (10) from the corridor (20) through the lateral opening (25, 25') of the container body (2).

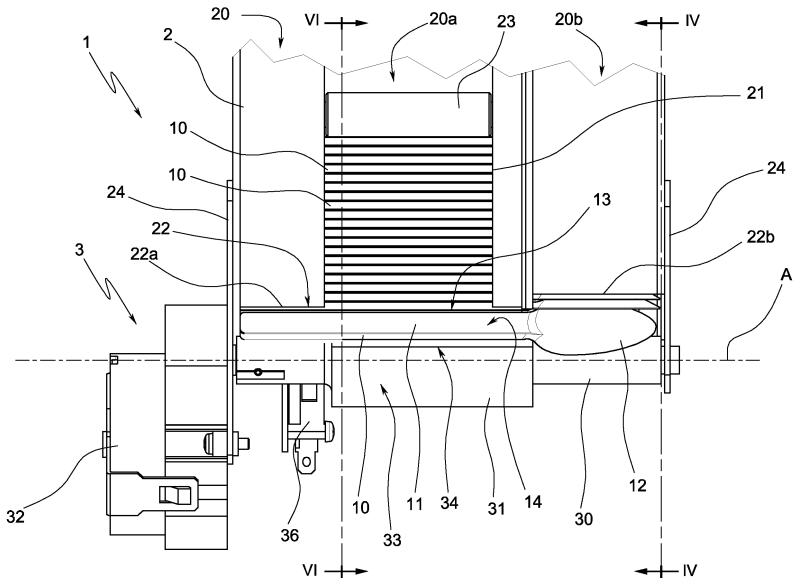

FIG.3

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Description

[0001] The invention relates in general to a system for automatic cutlery dispensing.

[0002] In more detail, the invention relates to a system for dispensing cutlery, a typical use of which is in automatic dispensers of liquid or semi-solid commestible products.

[0003] The term "liquid or semi-solid commestible products" generally relates to drinks, viscous products, fluids containing solid parts internally thereof, such as for example broths and soups.

[0004] The prior art includes automatic hot drinks dispensers provided with an automatic system for dispensing sticks which are used to stir the drink and dissolve the sugar which might be present in it.

[0005] The sticks are flat and straight, with a constant transversal section, and are released directly into the empty cups destined to contain the drink.

[0006] The known stick dispensing systems generally comprise a vertical loader, which contains a pile of stacked sticks and guides the sticks as they fall.

[0007] Below the loader there is an extractor group which removes a stick at a time, and releases it internally of a cup.

[0008] A typical extractor group comprises a horizontal retaining plane which on which the lowest stick in the pile rests, and a pusher slide which alternates above the retaining plane.

[0009] The pusher slide acts against the lowest stick in the pile in order to cause the stick to pass through a lateral opening afforded in the loader and to cause it to drop into the cup.

[0010] Alternatively, the prior art describes an extractor group which comprises a rotating cylinder located vertically below the loader.

[0011] The rotating cylinder has a horizontal rotation axis which is parallel to the sticks of the overlying stack, and is provided with at least a full-length longitudinal flat part located adjacent to an abutment.

[0012] The flat part restingly receives the lowest stick in the stack, and locates it close to the lateral opening of the loader.

[0013] In this way, the rotation of the cylinder engages the abutment and causes it to perform a circular trajectory, in which it pushes the lowest stick, causing it to pass through the opening and causing it to fall internally of the cup.

[0014] Automatic stick dispenser systems are very efficient, reliable and inexpensive; however, the sticks enable only mixing of a product, while they do not enable food to be brought to the mouth.

[0015] Thus they cannot be used for eating food such as broths and soups, which require consumption with the aid of proper spoons.

[0016] At present, spoons are packed into special sealed envelopes, possibly together with a fork, knife and moistened serviettes.

[0017] The envelopes are provided separately from the food product, for example by means of usual rotating-spiral dispensers, in which the envelopes are arranged in a line along a storage corridor, and are advanced in sequence by a spiral body towards a drop section, through which the envelopes reach a collection chamber which is accessible from the outside.

[0018] A drawback of this system consists in the fact that it is constructionally very complicated, expensive and usually considerably large.

[0019] In particular, it requires predisposition of automatic dispensers specially dedicated to cutlery, or significant spaces internal of food product dispensers set aside for cutlery, considerably reducing the economic profitability of the dispensers.

[0020] The aim of the invention is to obviate the above-mentioned drawbacks in the prior art, by providing a simple, rational and relatively economical solution.

[0021] The aims are attained by the invention as it is delineated in the appended claims.

[0022] In a general sense, the invention makes available a system for automatic dispensing of cutlery, typically spoons, in which the cutlery is piled internally of a special vertically-developing container body, and is dispensed one item at a time by an extractor group associated to the container body.

[0023] In this way, the system is kept small and constructionally very simple and economical. Further, it can effectively be mounted internally of the automatic food product dispensers, such as to release the cutlery directly internally of the recipients destined to contain the products.

[0024] Further characteristics and advantages of the invention will better emerge from a reading of the following description, which is provided by way of nonlimiting example, with the aid of the accompanying figures of the drawings, in which:

- figures 1 a and 1 b are respectively a longitudinal view and a plan view of a spoon;
- figure 1 c is section IC-IC indicated in figure 1 a;
- figure 2 is a front view of the cutlery dispensing system of the invention;
- figure 3 is an enlarged detail of figure 2;
- figure 4 is the section along line IV-IV of figure 3, in enlarged scale;
- figure 5 is a plan view of the detail of figure 3;
- figures 6a to 6c are sections along line VI-VI of figure 3, shown schematically during respective stages of extraction of the item of cutlery, and in which the spoons overlying the first in the stack are represented in a broken line;
- figure 7 illustrates an alternative embodiment of the invention in a schematic view which is the same as in figures 6a-6c.

[0025] The system 1 for automatic dispensing of spoons 10, illustrated in the figures, is typically destined

to be installed internally of automatic liquid and semi-solid commestible product dispensers.

[0026] By "liquid and semi-solid commestible products", reference is made to drinks, viscous products, and fluid foods which contain solid parts internally thereof, such as, for example, broths and soups.

[0027] The automatic dispensers are generally predisposed to pour the relative product internally of special cups; this is done at the moment at which the user buys the product.

[0028] The system 1 releases the spoons 10 directly internally of the cups, preferably before dispensing the product itself.

[0029] Each spoon 10 comprises an elongate gripping handle 11 which at an end thereof bears a bowl-shaped appendix.

[0030] The bowl 12 projects with respect to the gripping handle 11 surface and is typically used to scoop the liquid or semi-solid food products in order that they can be brought to the mouth.

[0031] In particular, the bowl 12 exhibits transversal dimensions which are greater than those of the handle 11, both in thickness and width.

[0032] In the present invention, the spoons 10 must be reciprocally superimposable, in order to form vertical stacks, in which the bowls 12 are arranged one inside another, and the handles are parallel and aligned.

[0033] Further, the handles 11 must be conformed such that, when they are superposed in one of the stacks, they can freely slide on one another in a transversal direction.

[0034] In the illustrated embodiment of figures 1 a, 1 b and 1 c, the spoons 10 exhibit a symmetrical plan shape with respect to a median plane P thereof.

[0035] With respect to the median plane P, the handles 11 have a straight longitudinal profile (see figure 1 a). Alternatively, the longitudinal profile thereof might also be slightly curved.

[0036] The handles 11 further exhibit a generally flat shape which is defined by two reciprocally parallel flat surfaces, of which one is a lower surface 13 facing the same side as the concavity of the bowl 12, and an upper surface 14 facing the opposite way.

[0037] The spoons 10 are destined to be reciprocally stacked such that the lower surface 13 of each handle 11 is resting on the upper surface 14 of the underlying handle 11 (see figure 3).

[0038] The system 1 for automatic dispensing of the spoons 10 comprises a container body 2 defining a vertical corridor 20.

[0039] One of the said stacks of spoons 10 is contained internally of the vertical corridor 20, which stack is free to slide downwards, guided by the container body 2.

[0040] As illustrated in figure 5, the transversal section of the vertical corridor 20 is constant, and is of such a shape and dimension as to correspond to the plan shape of the spoon 10.

[0041] In more detail, it exhibits a narrowed part 20a which substantially snugly receives the handles 11, and a broadened part 20b which houses the bowls 12.

[0042] The narrow part 20a exhibits a window 21 which opens on a side of the container body 2 over the whole vertical extension thereof.

[0043] The window 21 has a smaller width than the length of the handles 11 of the spoons 10, and is destined to provide a visual indication of the level to which the vertical corridor 20 is filled.

[0044] As illustrated in figure 4 and in figures from 6a to 6c, the lower end of the container body 2 is not perfectly horizontal.

[0045] On the contrary, the front edge 22 of the end, i.e. the edge which inferiorly delimits the flank of the container body 2 on which the window 21 opens, is at a higher level than the posterior edge 23 inferiorly delimiting the opposite flank.

[0046] In particular, the front edge 22 comprises two distinct tracts having a horizontal development, of which a first tract 22a extends over the whole width of the narrowed part 20a of the vertical corridor 20, and of which a second tract 22b extends at the broadened part 20b; the second tract 22b being higher than the first tract 22a (see figure 3).

[0047] An extractor group is located below the container body 2, denoted overall by 3, which extracts one spoon 10 at a time from the vertical corridor 20.

[0048] In the embodiment illustrated in figures from 2 to 5, the extractor group 3 comprises a rotating shaft 30 which inferiorly closes the vertical corridor 20, and the rotation axis A of which is horizontal and parallel to the longitudinal development of the spoons 10 in the overlying stack.

[0049] The rotating shaft 30 is supported at opposite ends thereof by a pair of brackets 24 fixed to the container body 2, and is rotated by an electric motor 32.

[0050] The rotating shaft 30 centrally exhibits a roller-shaped coaxial tract 31, which is destined to halt the descent of the stack of spoons 10, restingly receiving, on the lateral surface thereof, the first spoon 10 of the stack, i.e. the lowest spoon 10.

[0051] In particular the lateral surface of the roller 31 receives, resting thereon, only the handle 11 of the first spoon 10.

[0052] As illustrated in figures from 6a to 6c, the lateral surface of the roller 31 exhibits two arched tracts 33 separated by two longitudinal flat parts 34, occupying a whole length of the roller 31, which flat parts 34 are reciprocally parallel and angularly distanced by 180°.

[0053] Each of the longitudinal flat parts 34 defines a corresponding salient abutment 35, which extends parallel to the axis A of the roller 31 over the whole length thereof, in order to oppose the longitudinal flank of the handle 11 of the first spoon 10 in the stack.

[0054] The abutment 35 exhibits a height which is not greater than a thickness of the handles 11 of the spoons 10.

[0055] As illustrated in figure 6a, when the flat parts 34

of the roller 31 are horizontal, the distance separating the flat parts 34 above the first tract 22a from the front edge 22 of the container body 2 is comprised between once and twice the thickness of a handle 11 of a spoon 10.

[0056] In this way, the upper flat part 34 and the front edge of the container body 2 define the lateral horizontal opening 25 which sets the vertical corridor 20 in communication with the outside, and through which only the first spoon 10 of the stack can pass by means of a transversal movement with respect to the overlying spoon 10.

[0057] Note that in order to guarantee a greater stability of the resting of the stack of spoons 10 of the roller 31, the contact between the roller 31 and the handle 11 of the first spoon 10 must be over as great a length as possible.

[0058] For this reason, the flat part 34 and the arched tracts 33 of the roller 31 must be shaped such that, when they are directly vertically below the stack of spoons 10, the longitudinal profile thereof, with respect to the vertical plane passing through the median line of the handles 11, is the same as the longitudinal profile of the handle 11.

[0059] In the illustrated example in which the handles 11 have a straight longitudinal profile, the arched tracts 33 are cylindrical and the flat parts 34 are flat.

[0060] If the longitudinal profile of the handles 11 were slightly curved, the arched tracts 33 and the flat parts 34 would have to have a correspondingly curved profile.

[0061] The rotating shaft 30 is activated by the electric motor 32 such as to perform discrete rotations by an angle of 180°, and to halt time-by-time in a position in which it places one of the above-mentioned flat parts 34 vertically below the stack of spoons 10, oriented horizontally.

[0062] In particular, the stopping of the rotating shaft 30 is controlled by a microswitch 36, which acts contactingly at a tract of the rotating shaft 30, the lateral surface of which microswitch 36 exhibits two recesses 37, aligned along the same diameter, each of which recesses 37 is destined to switch the microswitch 36.

[0063] In use, the vertical corridor 20 defined by the container body 2 is filled with a stack of spoons 10.

[0064] The spoons 10 of the stack are in reciprocal contact, with the handles 11 parallel and aligned, and with the bowls 12 inserted one in another and having the concavities thereof facing towards the rotation axis of the rotating shaft 30.

[0065] The container body 2 guides the stack of spoons 10 in a downwards direction, such that the handle 11 of the first spoon 10 contacts the roller 31.

[0066] To facilitate the descent of the spoons 10 internally of the container body 2 and to ensure that the handle 11 of the first spoon 10 in the stack is resting on the roller 31, the narrowed zone 20a of the vertical zone 20 also houses a weight 26 which bears down only on the handles 11 of the spoons 10 in the stack.

[0067] As illustrated in figure 6a, the rotating shaft 30 is initially in a halted position, in which the flat parts 34 of the roller 31 are horizontally oriented.

[0068] The flat part 34 which is in the upper part of the roller 31 receives the handle 11 of the first spoon 10 of the stack, locating the handle 11 close to the above-mentioned lateral opening 25 of the container body 2.

[0069] In this position the handle 11 of the overlying spoon 10 is at a higher level than the first tract 22a of the front edge 22 of the container body 2, and is therefore unable to exit from the vertical corridor 20.

[0070] When a dispensing of a spoon 10 is requested, the rotating shaft performs a 180° rotation in a clockwise direction in figures from 6a to 6c.

[0071] Following the rotation, the abutment 35 which is in the upper part of the roller 31 performs a circular trajectory having a centre thereof on the rotating axis A of the rotating shaft 30, moving in a transversal direction with respect to the longitudinal development of the first spoon 10 of the pile.

[0072] In this way, it pushes the longitudinal flank of the handle 11, causing the first spoon 10 to slide with respect to the overlying spoon 10, and causing it to exit through the lateral opening 25 of the container body 2 (see figure 6b).

[0073] In particular, the contemporary movement of the abutment 35 and the flat part 34 engages the first spoon 10 of the pile and rotates it about the rotation axis A of the rotating shaft 30 and, as the spoons 10 have the bowls 12 thereof facing towards the rotation axis A, disengages the bowl 12 of the first spoon 10 from the bowl 12 of the next, overlying spoon 10.

[0074] In this way, the first spoon 10 is extracted from the vertical corridor 20 and falls downwards in order to be directly released internally of a cup.

[0075] During the above-described rotation, the overlying spoon 10 is first slightly raised from the first spoon 10 (see figure 6b) before passing into contact with the cylindrical tract 33 of the roller 31, which keeps it raised with respect to the first tract 22a of the front edge 22 of the container body 2.

[0076] In this way, the overlying spoon 10 remains at a higher level than the lateral opening 25, and is thus held internally of the vertical corridor 20 by the container body 2.

[0077] When the shaft 30 rotation is completed, the flat parts 34 have changed position, and the overlying spoon 10 descends to rest on the flat part 34 which has moved into the upper position, ready for a new cycle of extraction.

[0078] Figure 5 illustrates an alternative embodiment of the invention, which differs from the previous embodiment only as regards the extractor group 3.

[0079] In this case, the extractor group 3 comprises a generally flat body 130 located below the vertical corridor 20, which defines a flat horizontal surface 131 for retaining the stack of spoons 10.

[0080] The retaining surface 131 restingly receives only the handle 11 of the first spoon 10 in the stack.

[0081] The retaining surface 131 is at a distance from the first tract 22a of the front edge 22 of the container body 2 only by a quantity comprised between once and

twice the thickness of the handles 11 of the spoons 10.

[0082] In this way, the retaining surface 131 and the edge of the container body 2 define a lateral opening 25' which places the vertical corridor 20 in communication with the outside, and through which only the first spoon 10 in the stack can pass by means of a transversal movement with respect to the overlying spoon 10.

[0083] Above the retaining surface 131, a pusher slide 132 moves alternatingly and straight in a transversal direction with respect to the longitudinal development of the first spoon 10, placing itself alternatingly below the vertical corridor 20.

[0084] In the illustrated example, the pusher slide 132 is a flat body not thicker than the handles 11 of the spoons 10 and of a substantially equal length to the spoons 10.

[0085] The pusher slide 132 faces only the longitudinal side of the handle 11 of the first spoon 10 in the stack.

[0086] In use, the handle 11 of the first spoon 10 in the stack is received restingly on the retaining surface 131, which places it close to the lateral opening 25' of the container body 2.

[0087] The pusher slide 132 is in a retracted position with respect to the vertical corridor 20.

[0088] When a spoon 10 is to be dispensed, the pusher slide 132 performs a complete cycle of advancing and retraction.

[0089] During the advancing run, it acts against the longitudinal side of the handle 11 of the first spoon 10, causing the spoon 10 to move with respect to the overlying spoon 10 and causing the first spoon 10 to exit through the lateral opening 25' of the container body 2.

[0090] In this way, the first spoon 10 exits the vertical corridor 20 and falls from the retaining surface 131, for example into a cup.

[0091] During the advancing run, the handle 11 of the overlying spoon 10 drops down to rest on the back of the pusher slide 132, which slide 132 keeps the spoon 10 at a higher level than the first tract 22a of the front edge 22 of the container body 2.

[0092] In this way, the overlying spoon 10 is raised with respect to the lateral opening 25' and is thus held internally of the vertical corridor 20 of the container body 2.

[0093] During the return run, the pusher slide 132 is newly brought into the retracted position with respect to the vertical corridor 20, enabling the overlying spoon 10 to rest on the retaining surface 131, ready for a new extraction cycle.

[0094] Obviously an expert in the sector can make numerous modifications of a practical-applicational nature to the invention, without its forsaking the ambit of the inventive idea as it claimed herein below.

[0095] For example, the corridor 20 defined by the container body 2 might not be vertical, and might also be associated to means, such as a spring, for pushing the stack of spoons 10 housed internally thereof downwards towards the extractor group 3.

Claims

1. A system for automatic cutlery dispensing, comprising:

   a plurality of items of cutlery (10), each of which comprises an elongate gripping handle (11) which at an end thereof bears a shaped appendage (12) for holding food and/or drinks, the shaped appendage (12) projecting with respect to a surface of the gripping handle (11),
   a container body (2) affording a vertically-developing corridor (20) in which a stack of the items of cutlery (10) is housed and held, the stack of cutlery (10) being free to slide vertically internally of the corridor (20), the corridor (20) being inferiorly closed by a retaining surface (34, 131) which restingly receives a lowest item of cutlery (10) of the stack, placing said lowest item close to a lateral opening (25, 25') of the container body (2), and
   a mobile pusher element (35, 132) which acts against a longitudinal flank of the gripping handle (11) of the lowest item of cutlery (10) in order to cause the lowest item to slide contactingly against an item (10) superior thereto in the stack, and to expel the lowest item of cutlery (10) from the corridor (20) through the lateral opening (25, 25') of the container body (2).

2. The system of claim 1, **characterised in that** the shaped appendage (12) of the items of cutlery (10) is conformed as a bowl of a spoon.

3. The system of claim 1, **characterised in that** the retaining surface (34, 131) restingly receives the handle (11) of the lowest item (10) in the stack.

4. The system of claim 3, **characterised in that** the profile of the retaining surface (34, 131) with respect to a vertical plane passing through the halfway lines of the handles (11) of the items of cutlery (10) is substantially similar to the longitudinal profile of the handles (11).

5. The system of claim 1, **characterised in that** the longitudinal profile of the handles (11) of the items of cutlery is straight.

6. The system of claim 1, **characterised in that** the retaining surface (34, 131) is flat.

7. The system of claim 1, **characterised in that** the handles (11) of the items of cutlery (10) in the stack are in reciprocal contact on respective surfaces (13, 14) which enable the handles (11) to slide on one another in a transversal direction.

8. The system of claim 1, **characterised in that** the pusher element (35, 132) moves in a transversal direction to the longitudinal development of the lowest item of cutlery (10) in the stack.

9. The system of claim 8, **characterised in that** the pusher element (35, 132) acts contactingly only with the gripping handle (11) of the lowest item of cutlery (11) in the stack.

10. The system of claim 1, **characterised in that** the pusher element (132) is mobile along a straight trajectory.

11. The system of claim 1, **characterised in that** the pusher element (35) is mobile along a circular trajectory.

12. The system of claim 11, **characterised in that** the shaped appendages (12) of the items of cutlery (10) in the stack are concave, and the concavity thereof faces towards the rotation axis (A) of the pusher element (35).

13. The system of claim 11, **characterised in that** the pusher element (35) is solidly constrained to the retaining surface (34), and both are defined by a rotating body (31) which is located below the vertical corridor (20) of the container body (2), and which rotates about a horizontal axis (A) parallel to the longitudinal development of the lowest item of cutlery (10) in the stack.

14. The system of claim 13, **characterised in that** the rotating body (31) is a cylindrical body, which exhibits at least a flat part (34) functioning as a retaining plane and which defines an abutment (35) functioning as a pusher element.

15. The system of claim 14, **characterised in that** the cylindrical body (31) exhibits a plurality of the longitudinal flat parts (34), which are angularly equidistanced from the rotation axis (A).

16. The system of claim 1, **characterised in that** the corridor (20) which contains the stack of items of cutlery (10) is inclined not vertically, and is associated to means for pushing the stack of items of cutlery (10) towards the retaining surface (34, 131).

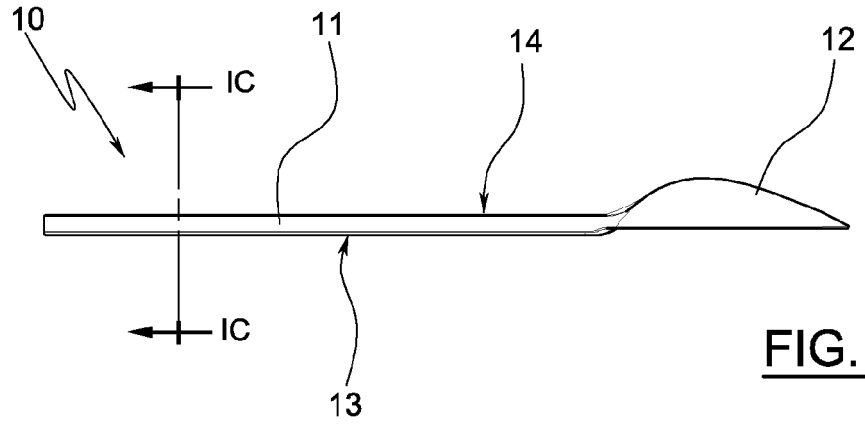


FIG.1a

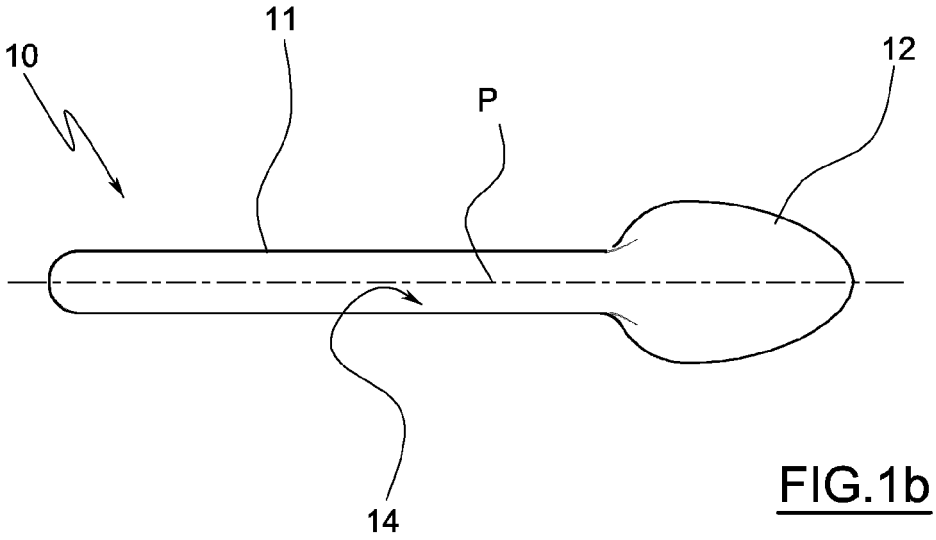


FIG.1b

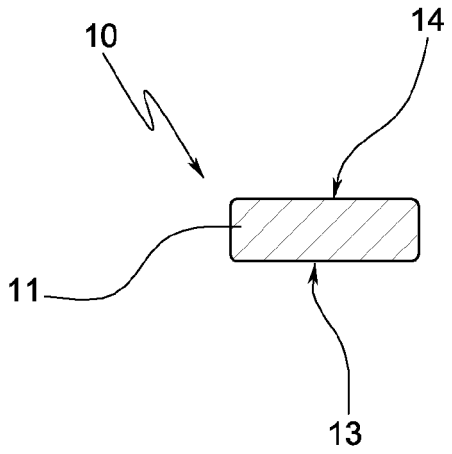


FIG.1c

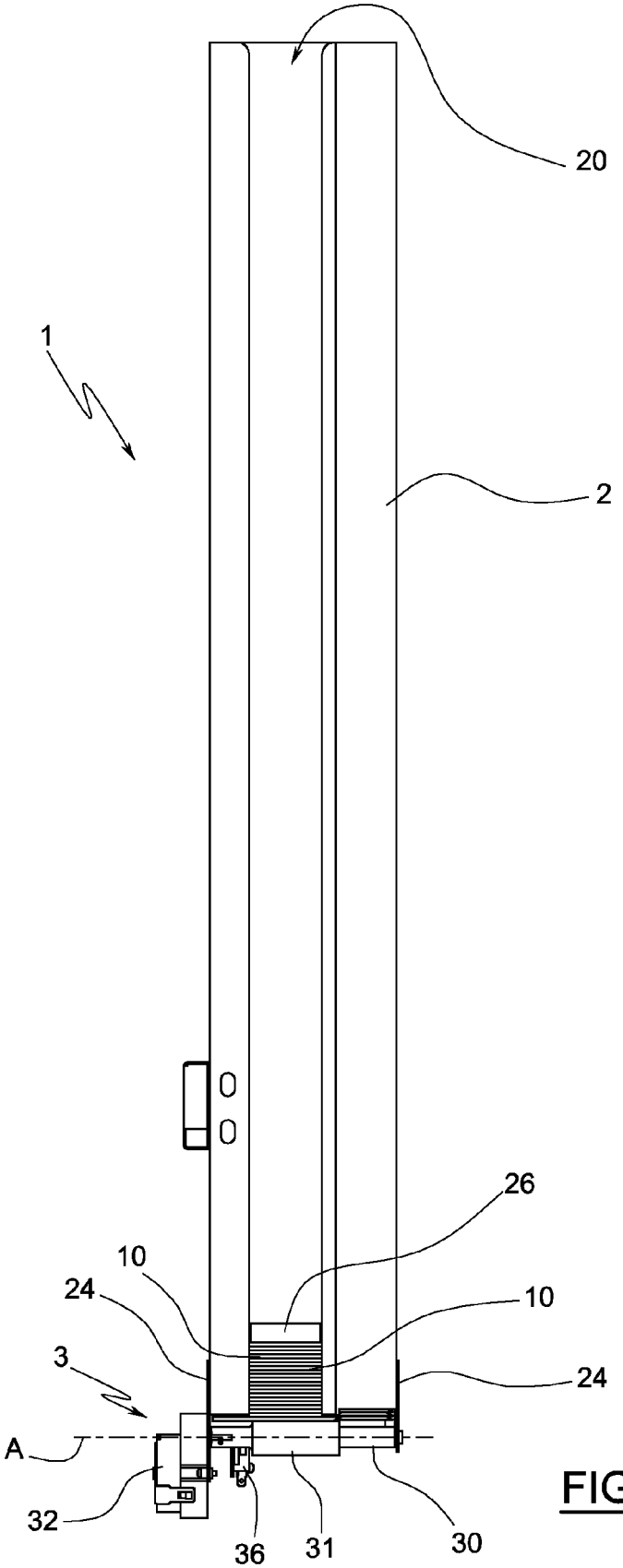
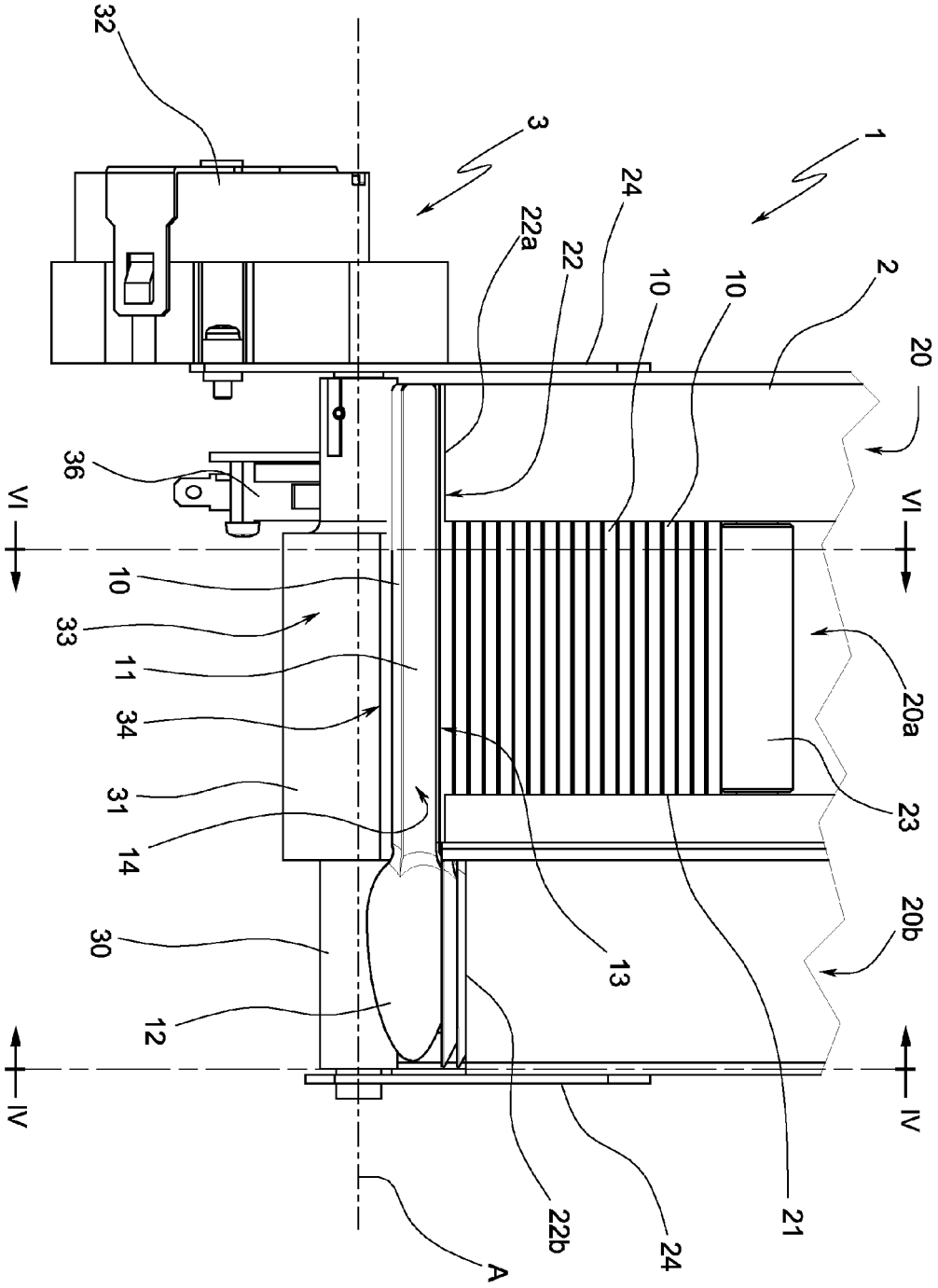


FIG.2

FIG.3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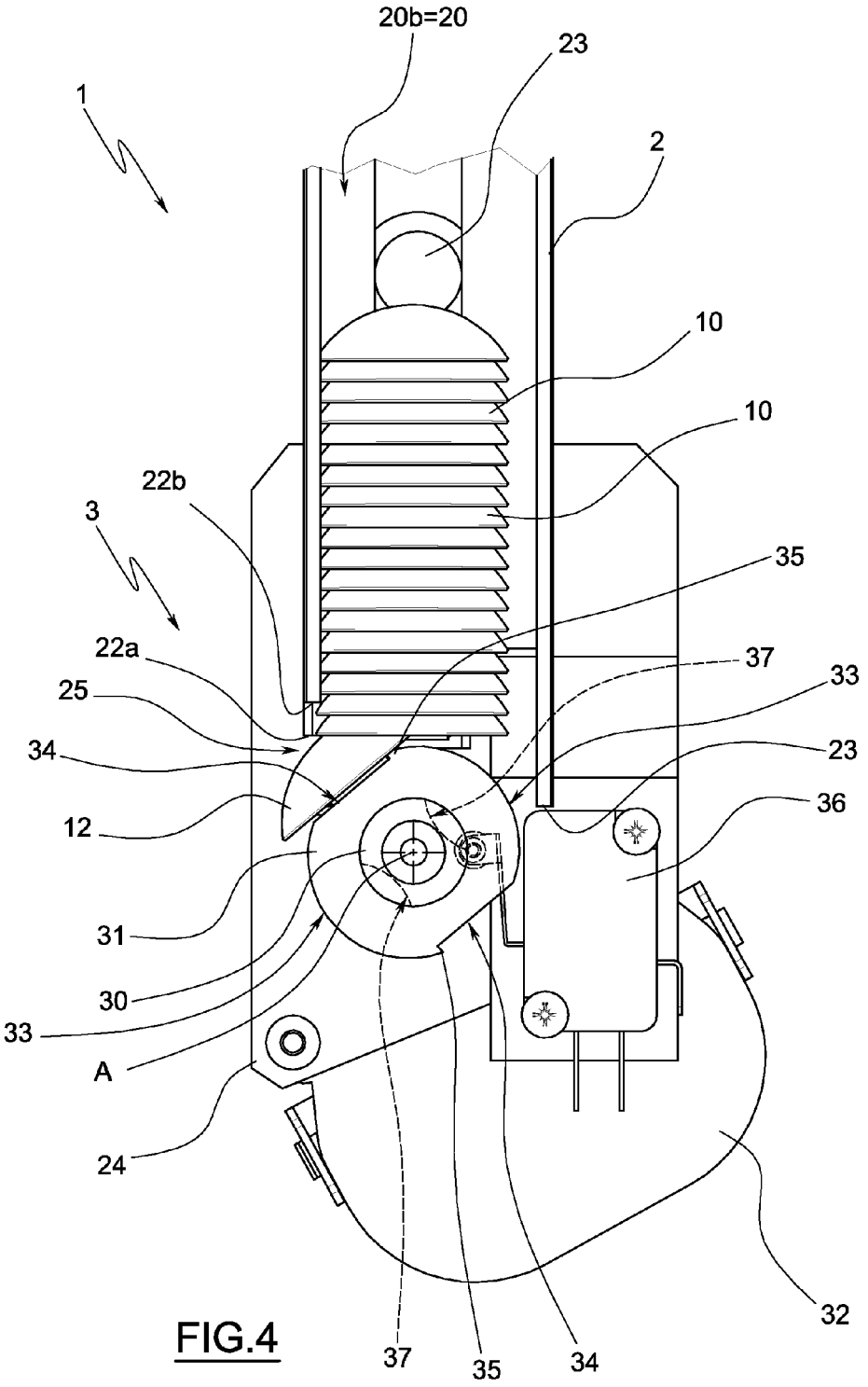
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FIG.4

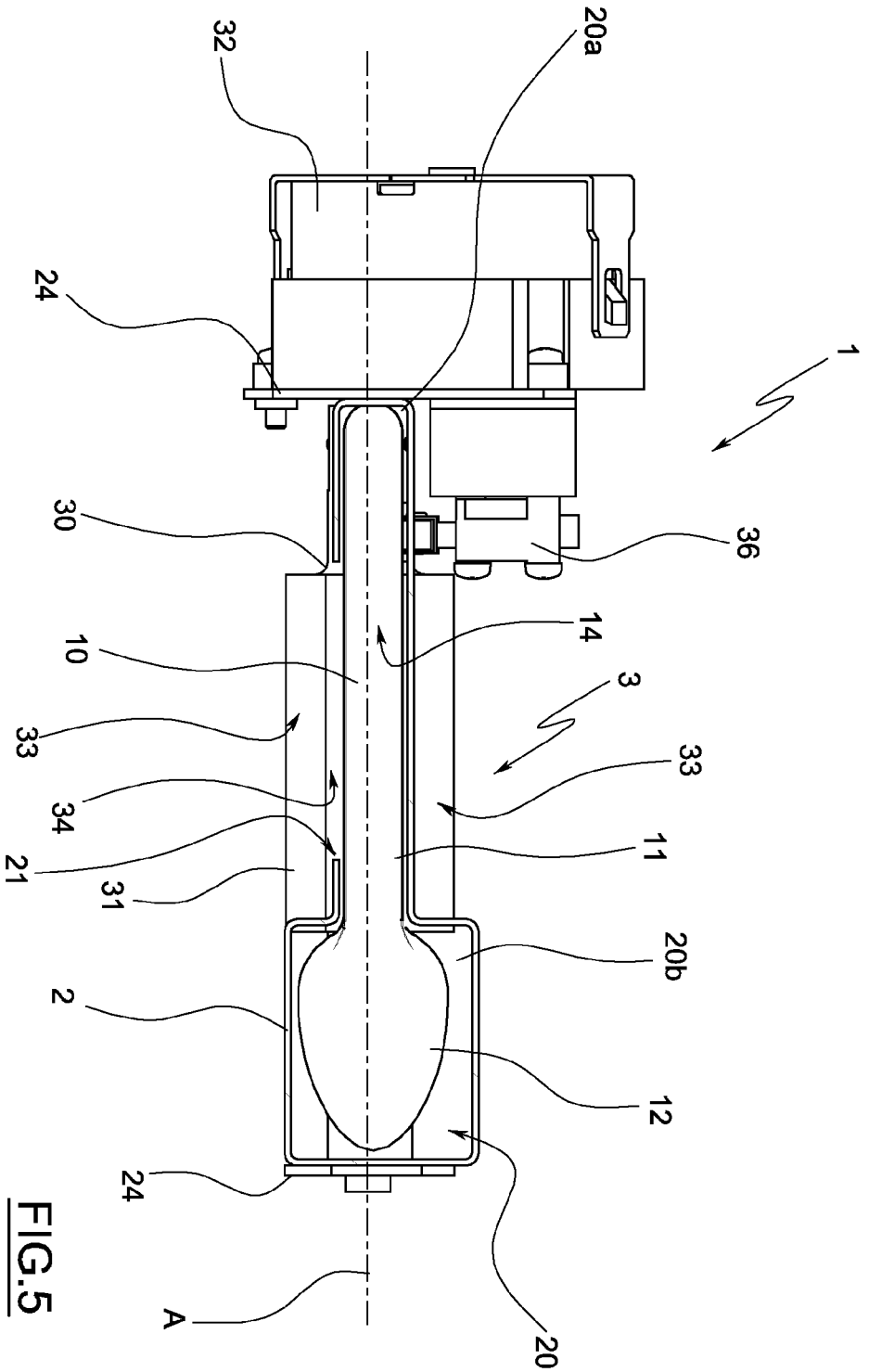

FIG.5

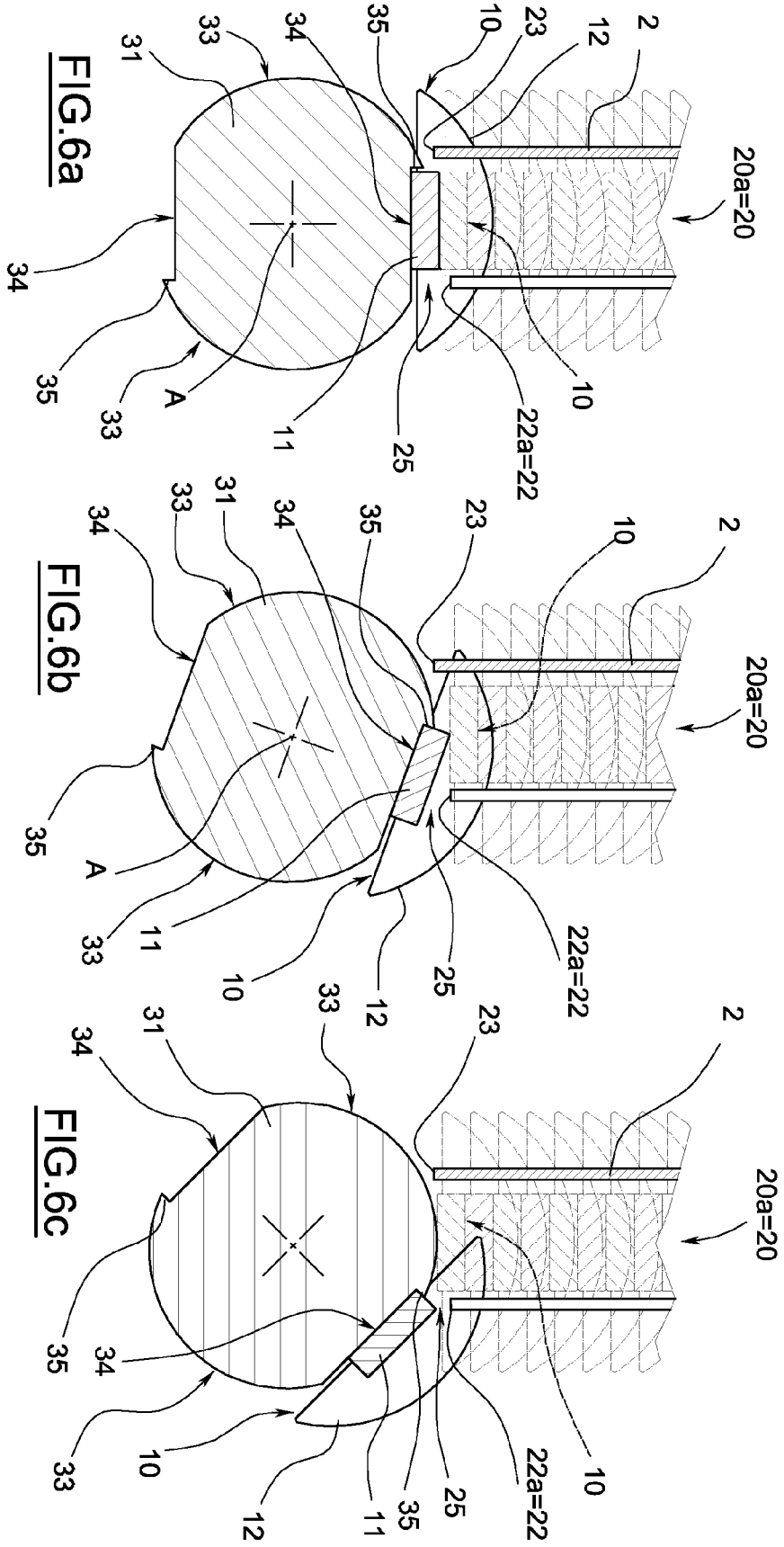
FIG.6a
FIG.6b
FIG.6c
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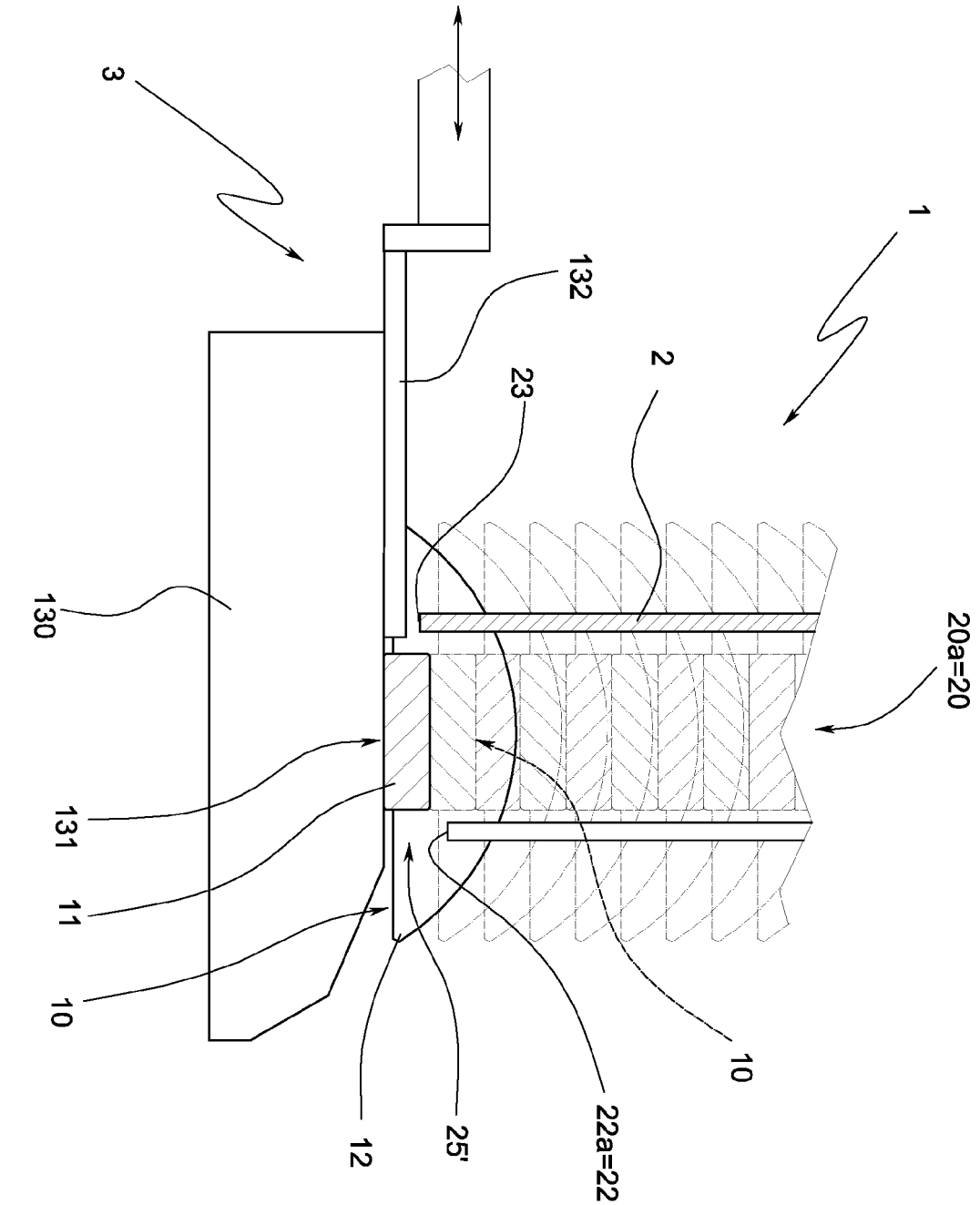

FIG.7