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(54) VACUUM PACKAGING MACHINE

(57) A vacuum packaging machine which comprises a base (2), in which there is a vacuum chamber (3) provided with an access opening (4) which can be closed by a lid (5) that is articulated to the base (2) by means of at least one hinge device (6), means being provided for the movement of the lid (5), with respect to the base (2), along a movement direction (7) that is substantially perpendicular to the plane of arrangement of the access opening (4).

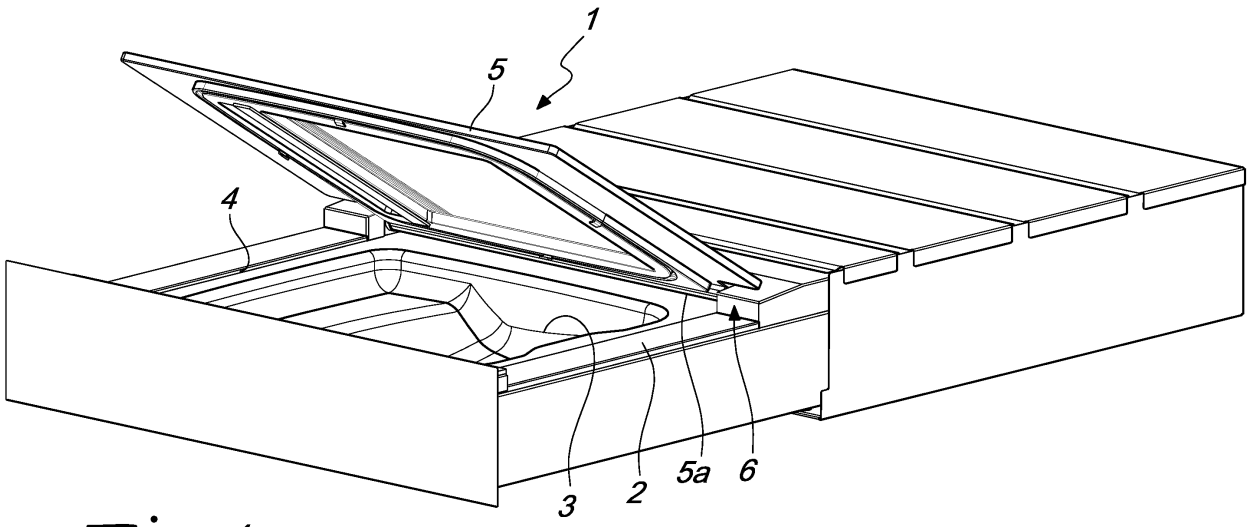

Fig. 1

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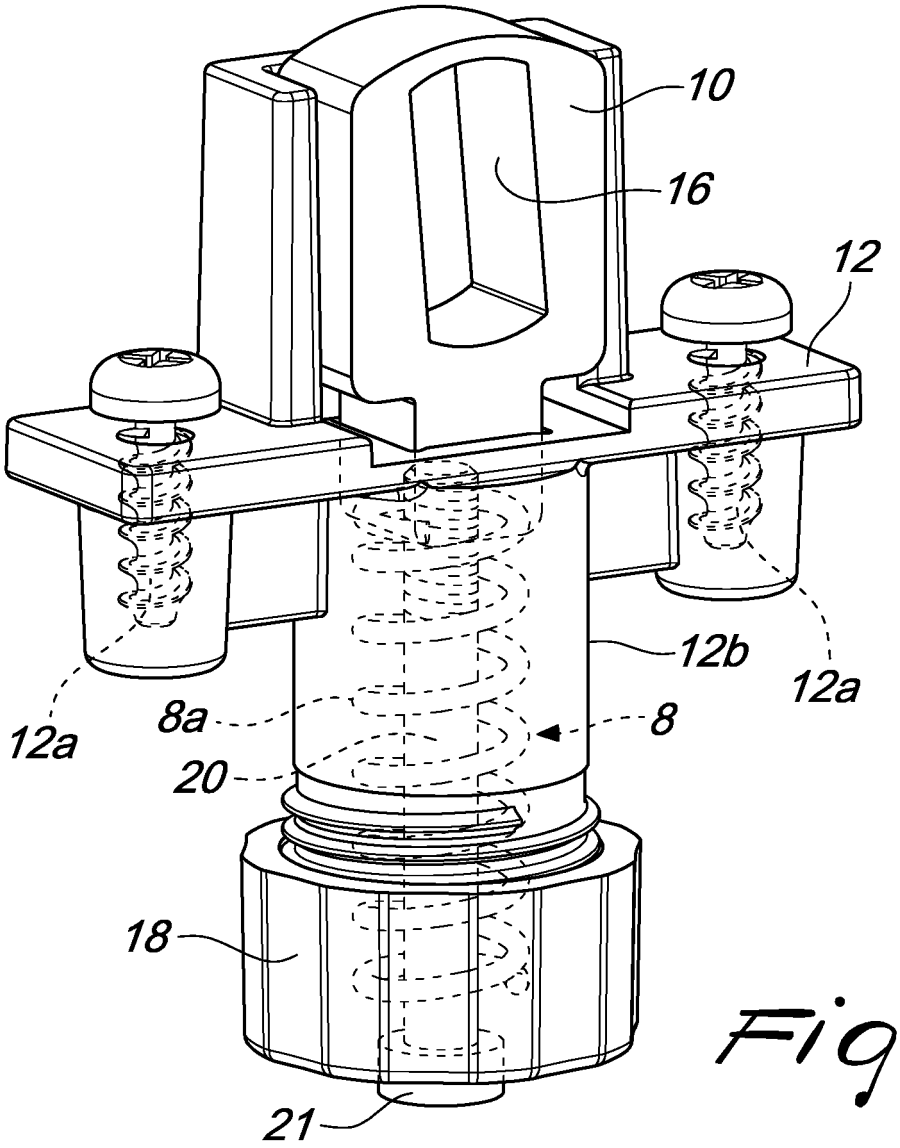

Fig. 3

Description

[0001] The present invention relates to a vacuum packaging machine.

[0002] Vacuum packaging machines are known which allow to package food products in sealable vacuum bags and which generally have a base, which defines a vacuum chamber, that can be connected to a vacuum pump and is provided with an access opening, which can be closed hermetically by means of an openable lid, for inserting and extracting the food product packed in the vacuum bag from the vacuum chamber.

[0003] Vacuum packaging machines in particular are known which are configured like a drawer, so as to be used in kitchen furniture, and worktop models and wheeled models, both for household and professional use, are also known.

[0004] Machines of this type usually have the lid articulated to the base by means of self-balancing rotatable hinges or more complex mechanical elements provided with gas cylinder actuators, so that the opening and closing of the lid is conditioned by the stiffness of the gas cylinder actuators or of the self-balancing rotatable hinges.

[0005] The solutions used so far for the articulation of the lid to the base provide a hinging axis of the fixed lid, whereby when the lid is closed onto the base the gasket that seals the lid and the vacuum chamber first makes contact with the rear side of the base, i.e., the side that is parallel and proximate to the hinging axis of the lid, and also with the opposite side only after complete closure.

[0006] Although these solutions allow the sealing of the vacuum chamber as soon as extraction of the air inside it is started, they entail that when the lid is in the inactive position, i.e., when the lid is brought to the closed position following its rotation about the hinging axis but vacuum is not provided inside the machine, the lid remains spaced on the opposite side with respect to the hinging axis by a few millimeters. Accordingly, in the inactive position the lid assumes an arrangement that is slightly inclined with respect to the base and raised on the opposite side with respect to the hinging axis and is unacceptable from an aesthetic point of view.

[0007] Moreover, in the drawer-like models, this raised arrangement of the lid in the inactive position entails a risk of interference of the lid with the flush-mounting container in which the machine is inserted, to the point of being able to prevent the exit of the drawer from the container.

[0008] The aim of the present invention is to provide a vacuum packaging machine that is capable of improving the background art in one or more of the above mentioned aspects.

[0009] Within this aim, an object of the invention is to provide a vacuum packaging machine that allows perfect closure of the lid.

[0010] Another object of the present invention is to provide a vacuum packaging machine that is extremely reliable and safe during use.

[0011] Moreover, an object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0012] Another object of the invention is to provide a vacuum packaging machine that can be manufactured with relatively modest costs and is appreciable also from an aesthetic point of view.

[0013] This aim and these and other objects that will become better apparent hereinafter are achieved by a vacuum packaging machine according to claim 1, optionally provided with one or more of the characteristics of the dependent claims.

[0014] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment, of the vacuum packaging machine according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a vacuum packaging machine according to the invention applied to a drawer;

Figure 2 is a perspective view of a detail of the machine according to the invention, with parts omitted for the sake of simplicity;

Figure 3 is a perspective view, partially in phantom lines, of a portion of a hinge device of the lid of the machine according to the invention;

Figure 4 is a sectional view of the portion of the hinge device of Figure 3;

Figure 5 is a perspective and exploded view of the portion of the hinge device of Figure 3;

Figure 6 is a sectional view of the machine, taken at the hinging axis of its lid.

[0015] With reference to the figures, the vacuum packaging machine, according to the invention, generally designated by the reference numeral 1, comprises a base 2 which forms a vacuum chamber 3 provided, preferably at a substantially horizontal flat surface arranged on the upper side of the base 2, with an access opening 4, that can be closed by a lid 5, which is, in turn, articulated to the base 2 by means of at least one hinge device 6.

[0016] As shown, the machine is, for example, structured to be used in a drawer, but can be optionally configured also as a worktop machine or wheeled machine.

[0017] As is known per se, it is possible to arrange in the vacuum chamber 3 a food product packaging bag and the vacuum chamber 3 can be connected to a vacuum pump, accommodated in the base 2, so that following the actuation of the vacuum pump, after closing the access opening 4 of the vacuum chamber, by means of the lid 5, it is possible to create vacuum in the bag, which is subsequently sealed by means of a heat-sealing bar accommodated in the vacuum chamber itself.

[0018] The particularity of the invention resides in that

it comprises means for moving the lid 5, with respect to the base 2, along a movement direction 7 that is substantially perpendicular to the plane of arrangement of the access opening 4 of the vacuum chamber 3.

[0019] More particularly, these movement means are provided by making the hinge device 6 movable, with respect to the base 2, along the above mentioned movement direction 7.

[0020] In this manner, the hinge device 6 allows the vertical lowering of the lid 5, i.e., its movement toward the access opening 4, during vacuum generation, and also allows the lid 5 to assume, with the machine inactive, a practically horizontal position, i.e., a position that is substantially parallel to the plane of arrangement of the access opening 4, thus ensuring an optimum contact, along all the extension, of the gasket of the lid 5 with the corresponding abutment region defined on the base 2 around the access opening 4.

[0021] Advantageously, the movement of the hinge device 6, with respect to the base 2, along the movement direction 7, occurs in contrast with or by virtue of the action of elastic means 8.

[0022] With this structure, the hinge device 6 allows to compensate for the vertical movement, i.e., at right angles to the access opening 4, to which the lid 5 is subjected when vacuum is generated in the vacuum chamber 3.

[0023] More preferably, two hinge devices 6 are provided which are arranged, on mutually opposite sides, at one side 5a of the lid 5 and define a rotation axis 6a for the lid itself which is substantially parallel to its side 5a.

[0024] Advantageously, each one of the hinge devices 6 comprises at least one respective supporting element 10, which is mounted so that it can slide with respect to the base 2, along the movement direction 7, and at least one fulcrum element 11, which is connected to the lid 5 and is coupled to the supporting element 10.

[0025] More particularly, the hinge devices 6 each comprise an anchoring body 12, which is integrally fixed to the base 2, for example by means of screws 12a or by interlocking coupling.

[0026] The anchoring body 12 supports slidingly, along the movement direction 7, the supporting element 10 and, as shown, the elastic means 8 are conveniently provided by means of a spring 8a which is interposed between the supporting element 10 and the anchoring body 12.

[0027] Advantageously, means for the adjustment of the stroke of the supporting element 10 with respect to the anchoring body 12 along the movement direction 7 are provided by virtue of which it is possible to adjust also the distance of the lid 5 and of its gasket from the base 2, with the lid 5 in the closed position and the machine in the inactive condition.

[0028] Delving further into the details of the illustrated embodiment, the fulcrum element 11 comprises a hinge head 15, which is self-balanced and coupled to an engagement seat 16 formed in the supporting element 10. In particular, the hinge head 15 has a longitudinal raised portion interlocked in the engagement seat 16, which is shaped correspondingly thereto.

[0029] Conveniently, the anchoring body 12 has a tubular portion 12b, which is extended substantially parallel to the movement direction 7 of the supporting element 10.

[0030] The tubular portion 12b is closed at one end, by a ring 18 which is coupled, by means of a thread, to the tubular portion 12b.

[0031] The spring 8a is accommodated axially in the tubular portion 12b, so as to act, with one of its ends, against the ring 18 and, with its opposite end, against a shoulder that is formed on the supporting element 10. In this manner, by unscrewing or screwing the ring 18 with respect to the tubular portion 12b it is possible to vary the elastic response of the spring 8a with respect to the movement of the supporting element 10, with respect to the anchoring body 12, along the movement direction 7.

[0032] The cited means for adjusting the stroke of the supporting element 10 are advantageously provided by means of a rod 20, which is extended axially inside the tubular portion 12b.

[0033] In particular, the rod 20 is coupled, at one end, to the supporting element 10 by means of a thread and slidingly crosses an axial opening 18a formed in the ring 18.

[0034] At its opposite end with respect to the end connected to the supporting element 10, the rod 20 has a maneuvering head 21 that rests against the edge of the axial opening 18a, so that by screwing or unscrewing the rod 20 with respect to the supporting element 10, by means of the maneuvering head 21, it is possible to vary the stroke performed by the supporting element 10 with respect to the anchoring body 12 along the movement direction 7.

[0035] Still with reference to the illustrated embodiment, the fulcrum element 11 of each hinge device 6 comprises a rotation pivot 25 which is accommodated so that it can rotate, with one of its ends, in a rotation seat 26 that is formed substantially parallel to the side 5a of the lid 5.

[0036] Conveniently, the rotation seat 26 is formed inside a tubular profile 26a fixed to the side 5a of the lid 5.

[0037] In particular, the rotation pivot 25 supports rotatably a sleeve 27 which is fixed to the rotation seat 26.

[0038] The hinge head 15 is fixed to the end of the rotation pivot 25 that is opposite with respect to the one inserted in the rotation seat 26 and an elastic element 28 is interposed between the sleeve 27 and the hinge head 15 and contrasts elastically the relative rotation between the hinge head 15 and the sleeve 27.

[0039] Operation of the machine according to the invention follows clearly from what described above.

[0040] In particular, by lowering the lid 5, the access opening 4 of the vacuum chamber 3 is closed and, since the hinge devices 6 are movable along the movement direction 7, the gasket 5 of the lid touches evenly all the perimeter of the access opening 4 of the vacuum cham-

ber 3.

[0041] When vacuum is started, the lid 5 lowers evenly for a few millimeters, overriding the elastic force of the springs 8a that act on the supporting elements 10 of the hinge devices 6.

[0042] In this manner, the lid 5 can remain, when lowered, in a completely horizontal position, facilitating, if the machine is used on a drawer, the return of the drawer itself into the corresponding container, while during vacuum start, since there is more space between the gasket of the lid 5 and the vacuum chamber, it is not necessary to exert any additional effort in order to allow the gasket to make contact with the entire perimeter of the access opening 4 of the vacuum chamber 3.

[0043] In practice it has been found that the invention is capable of fully achieving the intended aim and objects and in particular it is stressed that the machine according to the invention can be validly used on drawers, since the hinge devices of the lid associated therewith allow the lid to arrange itself horizontally when it is lowered onto the base, thus avoiding interference with the container that accommodates the drawer, both when the drawer is closed and in particular during its opening.

[0044] Another advantage of the invention is to be able to adjust the position of the supporting elements with respect to the plane of arrangement of the access opening of the vacuum chamber and more particularly of the flat horizontal surface of the base on which the lid 5 abuts. This allows, during the assembly of the machine, the arrangement of the lid according to the tolerances imposed by the materials used for the vacuum chamber and for the lid.

[0045] All the characteristics of the invention indicated above as advantageous, convenient or the like may also be omitted or replaced with equivalents.

[0046] The individual characteristics described with reference to general teachings or to particular embodiments may all be present in other embodiments or may replace characteristics in these embodiments.

[0047] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0048] In practice, the materials used, so long as they are compatible with the specific use, as well as the shapes and dimensions, may be any according to the requirements.

[0049] All the details may further be replaced with other technically equivalent elements.

[0050] The disclosures in Italian Patent Application No. 102017000098236 from which this application claims priority are incorporated herein by reference.

[0051] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A vacuum packaging machine, comprising a base (2) which forms a vacuum chamber (3) provided with an access opening (4) which can be closed by a lid (5) that is articulated to said base (2) by means of at least one hinge device (6), **characterized in that** it comprises means for the movement of said lid (5) with respect to said base (2) along a movement direction (7) that is substantially perpendicular to the plane of arrangement of said access opening (4).

2. The machine according to claim 1, **characterized in that** said at least one hinge device (6) can move, with respect to said base (2), along said movement direction (7).

3. The machine according to claim 1, **characterized in that** said at least one hinge device (6) can move with respect to said base (2), along said movement direction (7), in contrast with or by virtue of the action of elastic means (8).

4. The machine according to one or more of the preceding claims, **characterized in that** it comprises a pair of hinge devices (6) which are arranged, on mutually opposite sides, at one side (5a) of said lid (5) and define a rotation axis (6) for said lid (5) which is substantially parallel to said side (5a).

5. The machine according to one or more of the preceding claims, **characterized in that** each one of said hinge devices (6) comprises at least one respective supporting element (10) which is mounted so that it can slide with respect to said base (2), along said movement direction (7), and at least one fulcrum element (11) which is connected to said lid (5) and is coupled to said supporting element (10).

6. The machine according to one or more of the preceding claims, **characterized in that** said hinge devices (6) each comprise an anchoring body (12) which is integrally fixed to said base (2) and supports slidingly, along said movement direction (7), said supporting element (10), said elastic means (8) comprising a spring (8a) which is interposed between said supporting element (10) and said anchoring body (12).

7. The machine according to one or more of the preceding claims, **characterized in that** it comprises means for the adjustment of the stroke of said supporting element (10) with respect to said anchoring body (12) along said movement direction (7).

8. The machine according to one or more of the preceding claims, **characterized in that** said fulcrum element (11) comprises a hinge head (15) which is

self-balanced and coupled to an engagement seat (16) formed in said supporting element (10).

9. The vacuum packaging machine according to one or more of the preceding claims, **characterized in that** said anchoring body (12) is provided with a tubular portion (12b) which is closed, at one end, by a ring (18) which is coupled by means of a thread to said tubular portion (12b), said spring (8a) being accommodated axially with respect to said tubular portion (12b) and acting, with one of its ends, against said ring (18) and, with its opposite end, against a shoulder that is formed on said supporting element (10).

10. The machine according to one or more of the preceding claims, **characterized in that** said stroke adjustment means comprise a rod (20) which is coupled, at one end, to said supporting element (10) by means of a thread and slidingly crosses an axial opening (18a) formed in said ring (18), said rod (20) having, at its opposite end, a maneuvering head (21) which abuts against the edge of said axial opening (18a).

11. The machine according to one or more of the preceding claims, **characterized in that** said fulcrum element (11) comprises a rotation pivot (25) which is accommodated so that it can rotate, with one of its ends, in a rotation seat (26) that is formed substantially parallel to said side of said lid, and supports rotatably a sleeve (27) which is fixed to said rotation seat (26), said hinge head (15) being fixed to the opposite end of said rotation pivot (25), an elastic element (28) for contrasting the relative rotation between said hinge head (15) and said sleeve (27) being interposed between said sleeve (27) and said hinge head (15).

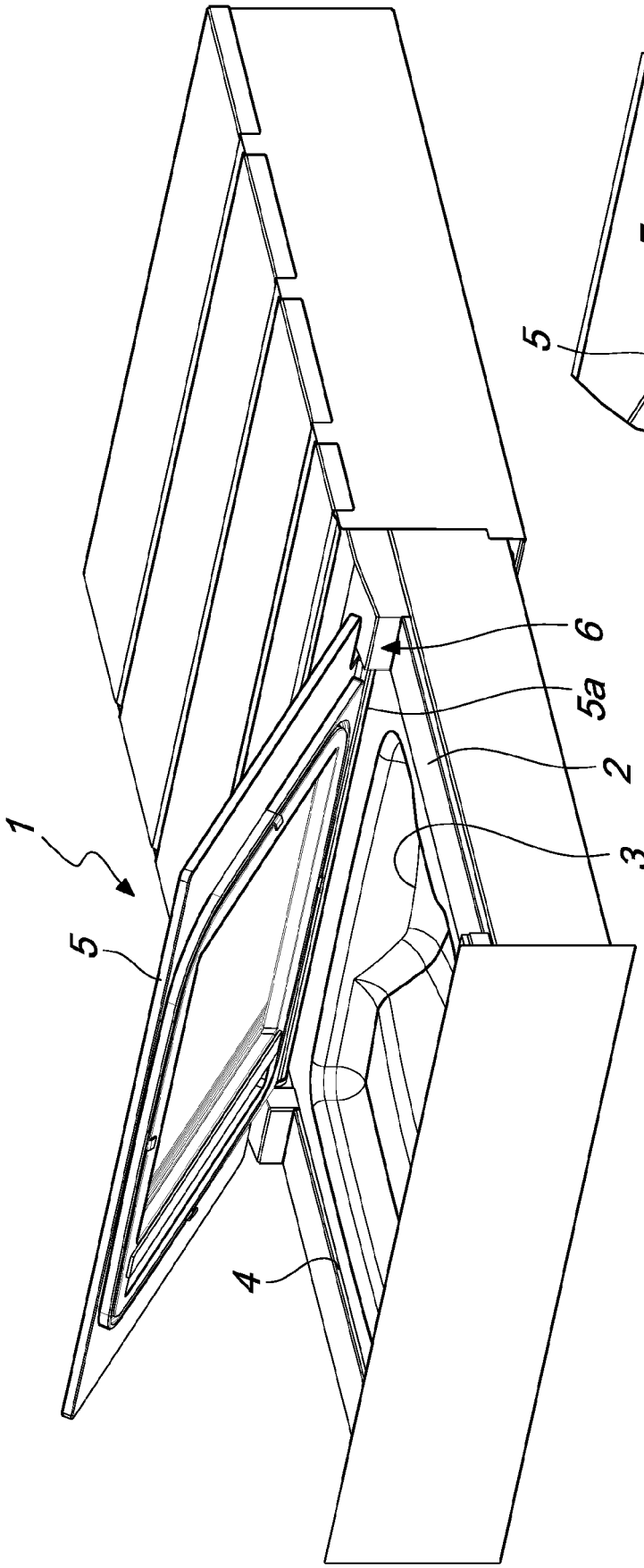

Fig. 1

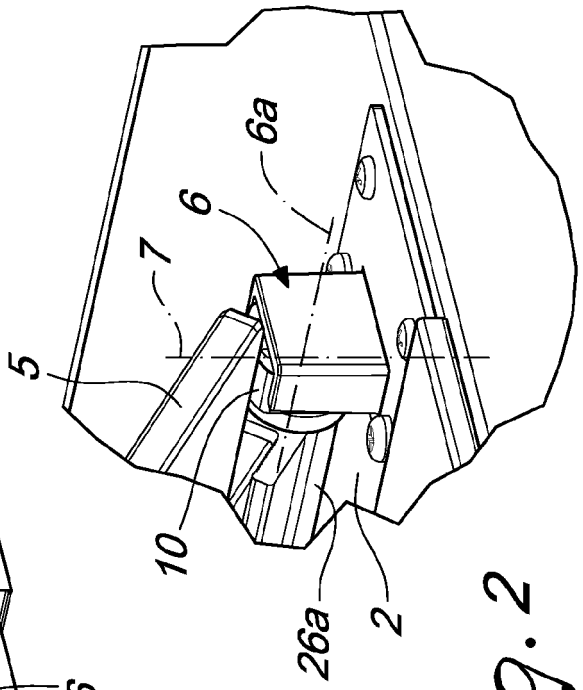

Fig. 2

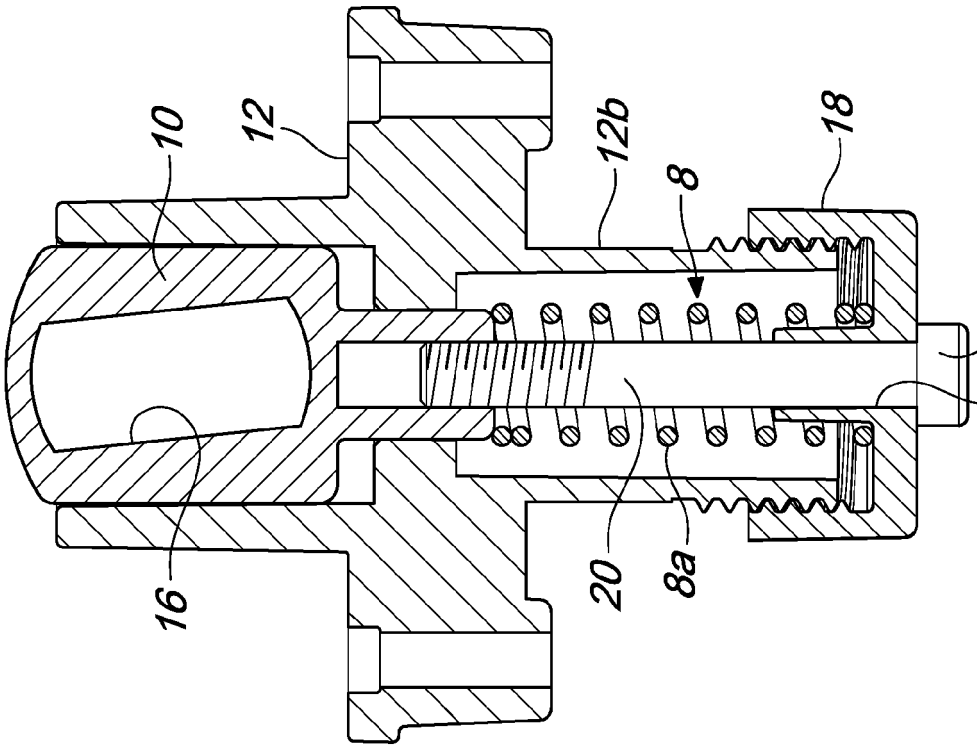

Fig. 4

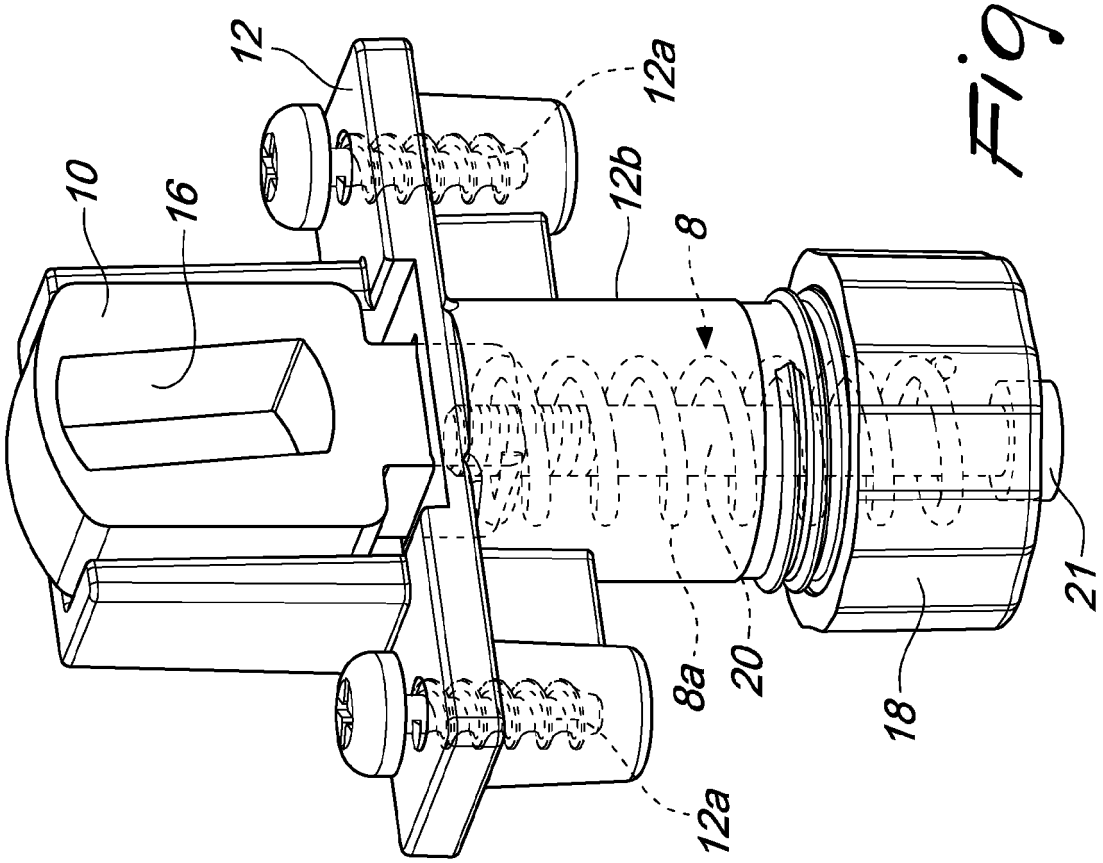

Fig. 3

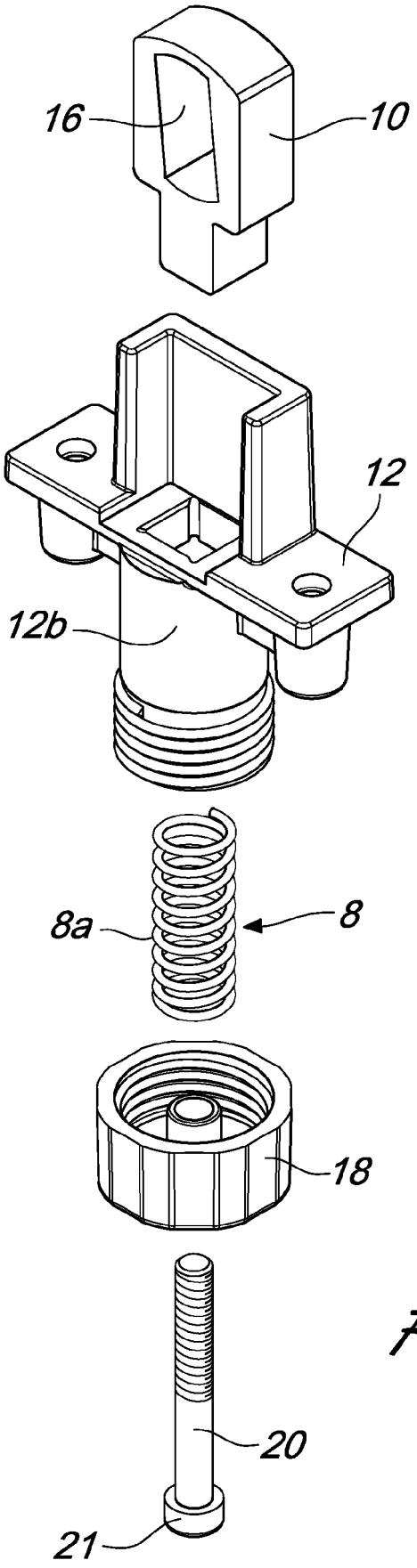

Fig. 5

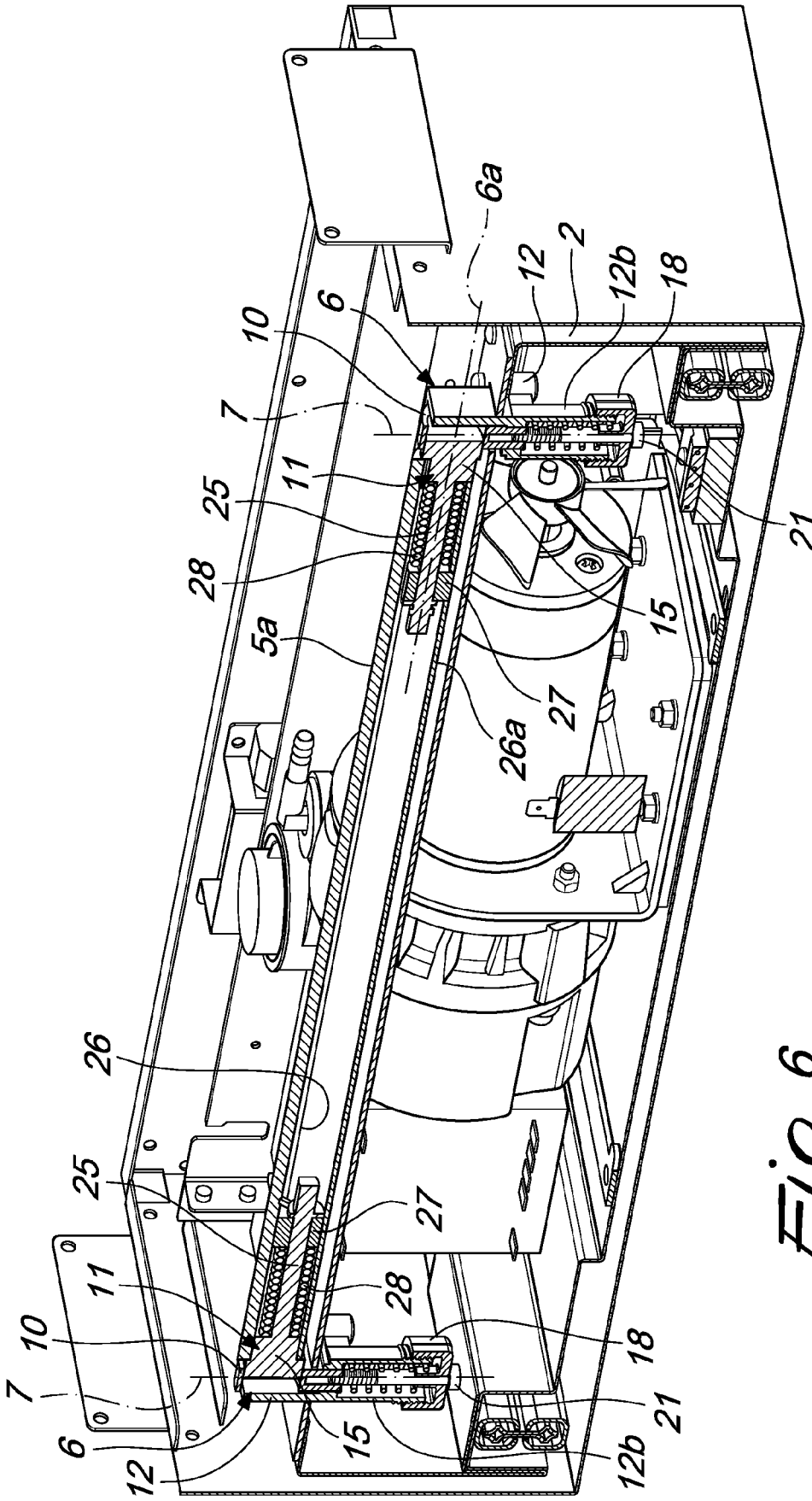
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Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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