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(54) **Vacuum chamber for vacuum packing machines with one-piece pack holder**

(57) A vacuum chamber (17) for vacuum packing machines, comprising a holder (24, 24') suitable for holding the packs (P) to be vacuum sealed and means (35, 35', 27, 27') able to create a vacuum and completely weld (seal) each pack (P) in said holder (24, 24'); this holder (24, 24') is substantially one-piece and sealably connectable to an upper head (25) carrying said means (35, 35', 27, 27') able to create a vacuum and completely weld each pack (P); at least one element (44) of opportune height can be positioned between said holder (24, 24') and said head (25) to vary the volume of the holder (24, 24') and therefore of the chamber (17) and equipped with sealing means (45) for bearing on the upper edge of the holder (24, 24').

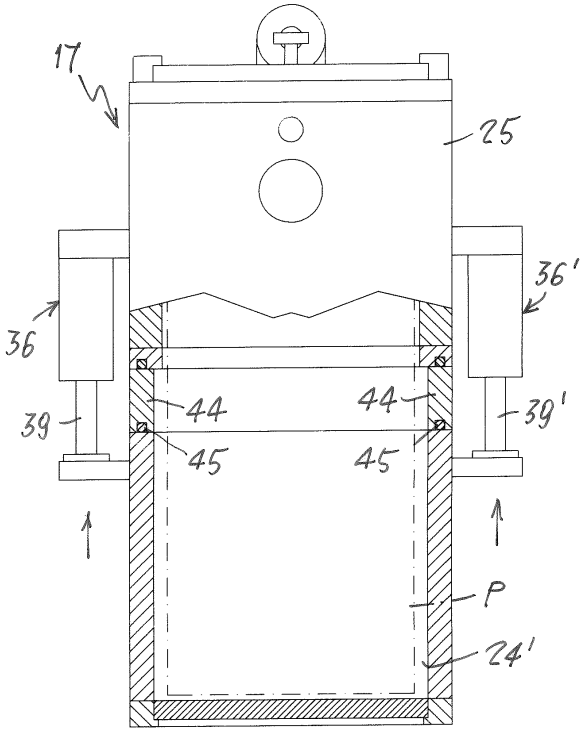

Fig. 3d

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Description

[0001] The present invention relates to vacuum chambers for vacuum packing machines.

[0002] As is known, vacuum packing machines can be horizontal or vertical, manual or automatic, and are used to produce finished packets or packs of loose products. In these vacuum packing machines, a certain quantity of loose product is introduced inside a hollow tubular element that provides the shape of the packet it is wished to obtain. A film made of a plastic material is wrapped around this tubular former element and then pulled downwards and longitudinally welded via welding means. When this longitudinal welding is finished, the film that will form the product pack must be welded transversally so as to at least partially close the top and completely close the bottom of the packs.

[0003] Each one of the packs leaving the tubular former element is inserted in at least one sealed chamber equipped with suitable means for completing the welding of the pack. In general, these vacuum chambers are formed by a holder having a movable bottom end. The top part of this holder has suction pipes, externally connected to opportune means for creating vacuum in the chamber, and welders for the purpose of closing the top of the pack after a vacuum has been created inside it.

[0004] In patent application No. GE2012A000016, filed by the same applicant of the present application, a vacuum chamber for vacuum packing machines is described that comprises a holder suitable for holding the packs to be vacuum sealed and means able to create a vacuum and completely weld (seal) each pack in said holder; this holder is formed by at least two parts that can be sealably connected when the vacuum is created in the chamber and be separated from each other so that at least one element of opportune height can be positioned between them to alter the volume of the holder.

[0005] Packs of various sizes can be made in a simple and inexpensive manner by means of this chamber, as the holder is rendered substantially modular and the head, where the more sophisticated equipment is located, such as the welding means and the means for creating the vacuum in the chamber, is totally uninvolved in the variation in size of the holder.

[0006] The object of the present invention is a vacuum chamber in which the pack holder is substantially made in one piece and therefore replaceable, if necessary, without affecting the head where the welding means and the means for creating the vacuum in the chamber are housed, and is also provided with lateral actuators for moving the holder with respect to the head that are compact, inexpensive, highly efficient and rapid in use.

[0007] This object is achieved by the present invention by means of a vacuum chamber for vacuum packing machines according to claim 1.

[0008] Other important characteristics of the present invention are the subject of the dependent claims.

[0009] Further characteristics and advantages of the present invention will be better understood in the following description, considered by way of non-limitative example and with reference to the attached drawings, where:

- Fig. 1 shows a side elevation view of a vacuum packing machine that uses one or more vacuum chambers according to the present invention;
- Fig. 2 shows a side elevation view, on an enlarged scale, of the present vacuum chamber in Fig. 1 comprising a movable holder for holding each pack to be vacuum sealed and a head located above this holder;
- Fig.3a shows a first cross-sectional view of the present vacuum chamber considered along line III-III of Fig. 2, with the movable holder in an upper end-of-travel position;
- Fig.3b shows a second view of the vacuum chamber with the holder moved downwards;
- Fig.3c shows a third view of the vacuum chamber in which a frame of adequate depth has been inserted between the holder and the upper head; and
- Fig. 3d shows a fourth view of the vacuum chamber with the holder raised by a certain distance so as to close and seal the present vacuum chamber.

[0010] With reference to Fig. 1 of the attached drawings, reference numeral 1 indicates former element 2, carrying a truncated-cone-shaped loading mouth 3 at the top, is provided downstream of this hopper 1. The tubular former element 2 is held by a support frame 4 and has a collar 5, in itself known and of opportune shape, able to wrap a film 6, of a plastic material for making the packs, around itself. This film 6, coming from a feed reel (not shown) is drawn to the collar 5 and the tubular former element 2 by means of opportune rollers 7. Thanks to the collar 5, this film 6 essentially passes from a flat configuration to a tubular configuration so as to wrap around the tubular former element 2. The collar 5, like the drive rollers 7, is supported by the machine's support structure 8. The film 6, wrapped around the tubular former element 2, is drawn downwards by opportune feed means, for example, a pair of rollers 9, of which at least one is power-driven, on which a belt 10 runs in contact with the film 6 to be fed. These feed means 9 and 10 of the film 6 are arranged on at least one side of the tubular former element 2. A device 11 for longitudinally welding the film is provided on the other side of this tubular former element 2. This device 11 comprises a longitudinal welding bar 12 that, by means of an actuator 13 and opportune horizontal guides, can slide away from or towards the tubular former element 2, and consequently moves in a transverse direction. There are two units 18 and 18' downstream of the tubular former element 2 for the transversal welding of the top and bottom of each pack and the separation of two successive packs in the packing process. Each of these units 18 and 18' comprises a respective actuator 19 and 19' for the transverse movement, in one

direction or the other, of a head 20 and 20' carrying welding and cutting means. Each of these heads 20 and 20' is dual-headed and performs a complete weld on the bottom of each pack and a partial weld on the top of each pack. A beater device 21 is positioned downstream of these transversal welding units 18 and 18' and is equipped with an actuator 22 able to move transversely, in one direction and the other, a head 23 able to intermittently beat at least one side of each pack being formed at different heights, for the purpose of compacting and tamping down the product to be packed in an optimal manner. Thanks to the actuator 22, this head 23 of the beater device 21 situated on one side of the pack moves with a reciprocating linear transverse motion. At least one collector or distributor 14, into which each pack arrives by gravity, is provided downstream of the beater device 21. This tubular collector 14 is open at the top and comprises a bottom consisting of a movable base 15. This base 15 can be moved in one direction or the other, to open or close the bottom of the collector 14, by means of an associated actuator 16. A vacuum chamber 17 according to the present invention is positioned downstream of this collector or distributor 14. The chamber 17 comprises a movable one-piece holder 24, in which each pack to be vacuum sealed is placed, and an upper head 25, on which the final welders for the top of pack are positioned, of which the associated movement actuators 26 and 26' and the pipes 27 and 27', connected upstream to suitable suction means able to create the vacuum in the chamber 17, are visible in the figure. These pipes 27 and 27' and these actuators 26 and 26' are located in diametrically opposed positions with respect to the head 25. This head 25 is closed at the top by a removable cover 31, which is operated by means of an associated actuator 32. The bottom of the holder 24, visible in the subsequent figures, comprises a guide plate 28, having a frame-like shape under the holder. This bottom can be moved in one direction or the other to open or close the holder 24 by means of an associated actuator 29. Downstream of the chamber 17, the vacuum packing machine comprises means 30 for discharging the finished vacuum packs coming out of this chamber 17.

[0011] The present vacuum chamber 17 is show on a larger scale in Fig. 2. The top cover 31 of the head 25 is guided in its translational opening and closing motion by a fixed frame 33, while the actuator 32 comprises a moveable rod 34 connected to said cover 31. The two welders 35 and 35' shown inside head 25 are in diametrically opposed positions and have the function of completely closing the top of the of each pack, which is partially welded by units 18 and 18' (shown in Fig. 1). Instead, the bottom of each pack is completely welded, always by said groups 18 and 18'. Two actuators, located in diametrically opposed positions, are provided on the sides of the lower holder 24; one of these actuators, namely actuator 36, is visible in the figure. This actuator 36 comprises a fixed cylinder 37, supported by a support 38 fastened to the side of the holder 24, and a moveable rod 39 fitted with an end support 40 connecting to the movable holder 24. The movable bottom 41 of the holder 24, suitable for being moved by the actuator 29, is also visible in the figure.

[0012] Both actuators 36 and 36', situated laterally to the holder 24 and able to move the latter upwards or downwards by a certain distance, can be seen in Fig. 3a. The upper head 25 comprises, at the bottom, a frame 42 that rests on the upper edge of the movable holder 24 by means of at least one annular sealing gasket 43.

[0013] Assuming it is wished to create a vacuum in a pack P (see Fig. 3d) having a height greater than the total height of the head 25 and the holder 24 in Fig. 3a, the chamber 17 is adapted to the new size before starting the vacuum creation process. The actuators 36 and 36' located at the sides of the holder 24 (see Fig. 3b) are operated to move the one-piece movable holder 24 downwards. This movement will be of adequate displacement to enable the insertion of a new frame 44 (see Fig. 3c) provided at the bottom with sealing gaskets 45. This frame 45, with transverse dimensions corresponding to the transverse dimensions of the holder 24, will rest on the upper edge of latter. At this point, the actuators 36 and 36' will raise the one-piece holder 24 again, so that the vacuum chamber 17, formed by the movable holder 24' of greater height with respect to the holder 24 in Fig. 3a, by the frame 44 and by the head 25 is again closed and sealed. In this way, a vacuum chamber 17 (see Fig. 4d) of greater size is obtained with respect to the vacuum chamber in Fig. 3a, in a simple manner and, advantageously, without the need to completely replace it, and in particular without the need to replace the upper zone or head 25 in which the welders and means for creating the vacuum in the chamber are housed. The frame 44 can have any height and shape, the walls could be made so that their thickness is greater, less, or equal to that of the walls of the holder 24. Alternatively, or in combination with that described, it would also be possible to arrange a number of frames stacked one on top of the other so as to create a holder 24 or 24' of opportune dimensions.

[0014] In the vacuum packing process implemented by any machine that uses the present vacuum chamber 17, the cover 31 of the head 25 is opened by the actuator 32 so that the pack P falls into the holder 24 or 24'. As previously mentioned, the pack P will have the bottom completely welded and the top partially welded. The pipes 27 and 27', connected upstream to opportune vacuum-creation means, create a vacuum inside the head 25 of the holder 24 or 24', and the welders 35 and 35' then complete the welding of the top of the pack P. At this point, the movable bottom 41 is moved by actuator 29 and the finished vacuum pack, passing through the guide plate 28 and the frame 40, can leave the chamber 17 and pass to the final discharge means 30 of the machine.

[0015] The present vacuum chamber 17 is particularly advantageous for the fact that it is also possible to make vacuum packs of different sizes and shapes with it, and

the actuators 36 and 26' are of small size and therefore more economical, rapid and better adjustable. Furthermore, in the present vacuum chamber, the holder 24, by being one-piece, could easily be replaced by providing removable supports 40 and 40' for connecting the moving part of the actuators 36 and 36' to the walls of the holder 24.

Claims

1. A vacuum chamber (17) for vacuum packing machines, comprising a holder (24, 24') suitable for holding the packs (P) to be vacuum sealed and means (35, 35', 27, 27') able to create a vacuum and completely weld (seal) each pack (P) in said holder (24, 24'), **characterized in that** said holder (24, 24') is substantially one-piece and sealably connectable to an upper head (25) carrying said means (35, 35', 27, 27') able to create a vacuum and completely weld each pack (P), there being at least one element (44) of opportune height that can be positioned between said holder (24, 24') and said head (25) to vary the volume of the holder (24, 24') and therefore of the chamber (17), and equipped with sealing means (45) for bearing on the upper edge of the holder (24, 24').

2. A chamber (17) according to claim 1, **characterized in that** said head (25) comprises, at the bottom, a frame (42) provided at the bottom with sealing means (43) for bearing on the upper edge of said element (44) for varying the volume of the holder (24).

3. The chamber (17) according to claim 1, **characterized in that** said element for varying the volume of the holder comprises one or more further frames (44) of adequate height.

4. The chamber (17) according to claim 1, **characterized in that** it comprises actuators (36, 36') for moving the holder (24, 24') away from or towards said head (25).

5. The chamber (17) according to claim 4, **characterized in that** each of said actuators (36, 36') comprises a movable rod (39, 39') connected to a wall of the holder (24, 24') and a fixed cylinder (37, 37') connected to a wall of the head (25).

6. The chamber (17) according to claim 4, **characterized in that** said actuators (36, 36') are connected to the lateral walls of the holder (24, 24') by means of a removable support (40, 40').

7. The chamber (17) according to claim 4, **characterized in that** said actuators (36, 36') for moving the holder are positioned on at least two diametrically opposed sides of said holder (24, 24').

8. The chamber (17) according to claim 1, **characterized in that** said holder (24, 24') comprises a movable bottom (41) operable by means of at least one associated actuator (29).

9. The chamber (17) according to claim 6, **characterized in that** said head (25) comprises, at the top, a movable cover (31) operated by an associated actuator (32) and guided by an opportune frame (33).

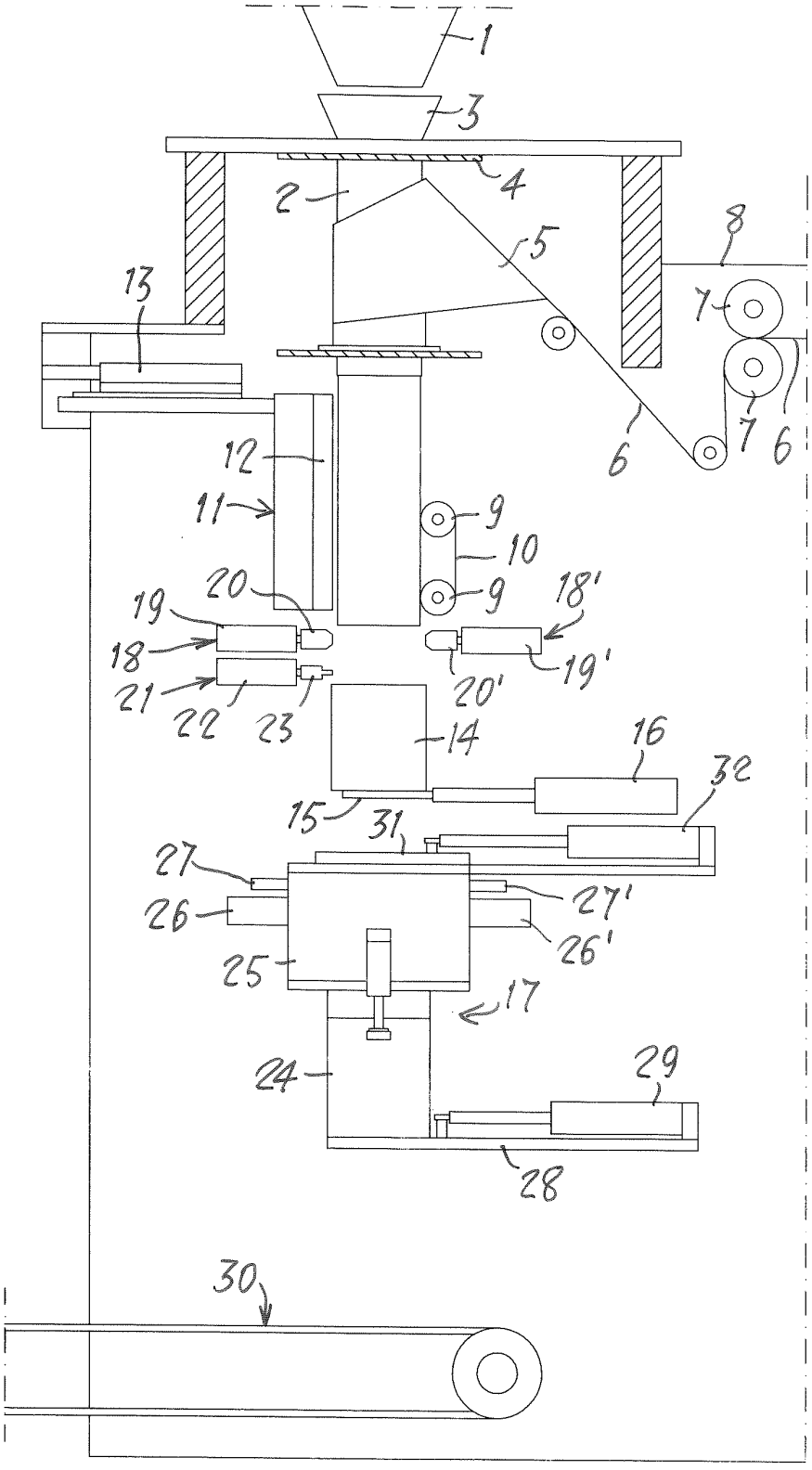
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Fig. 1

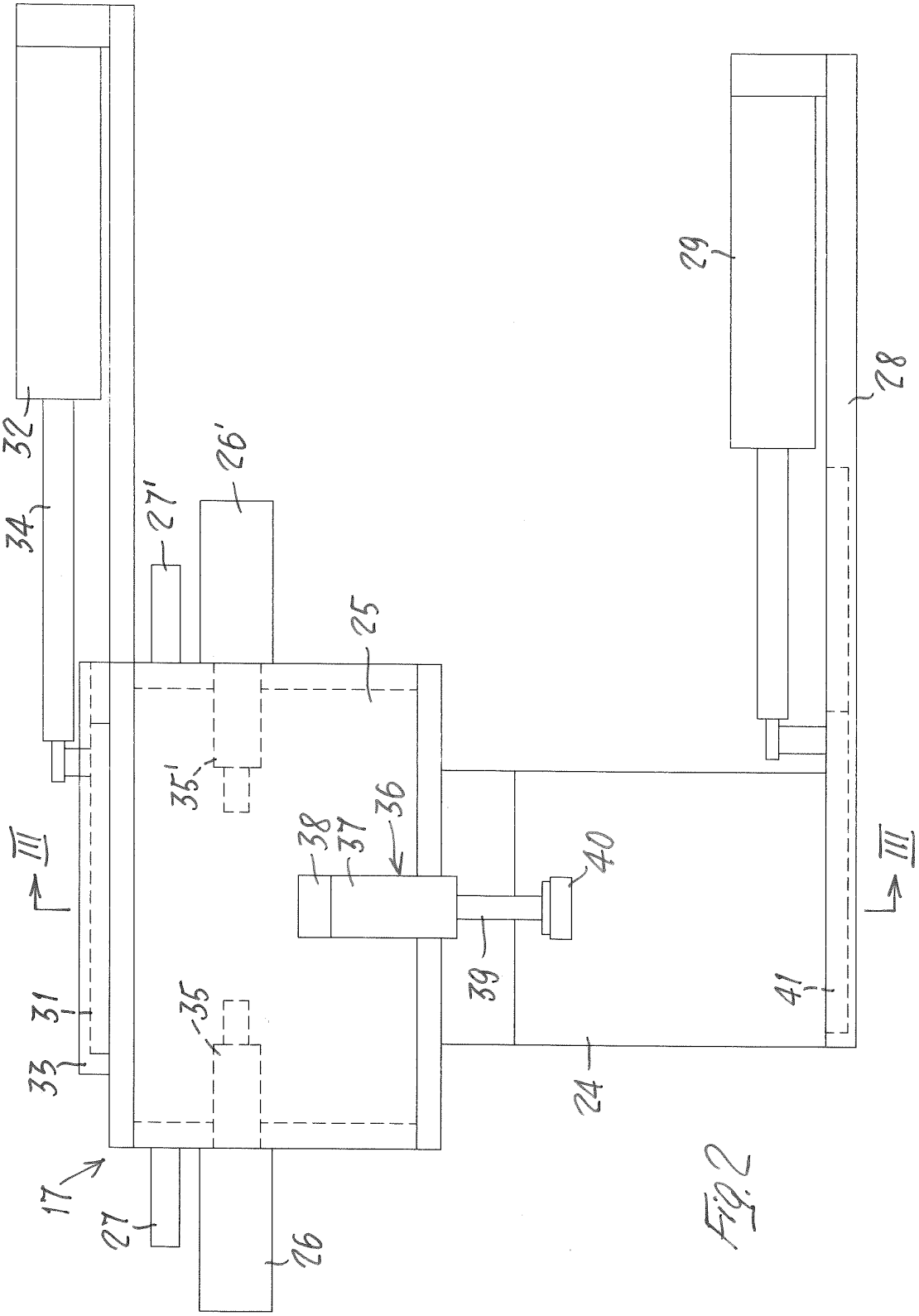

Fig. 2

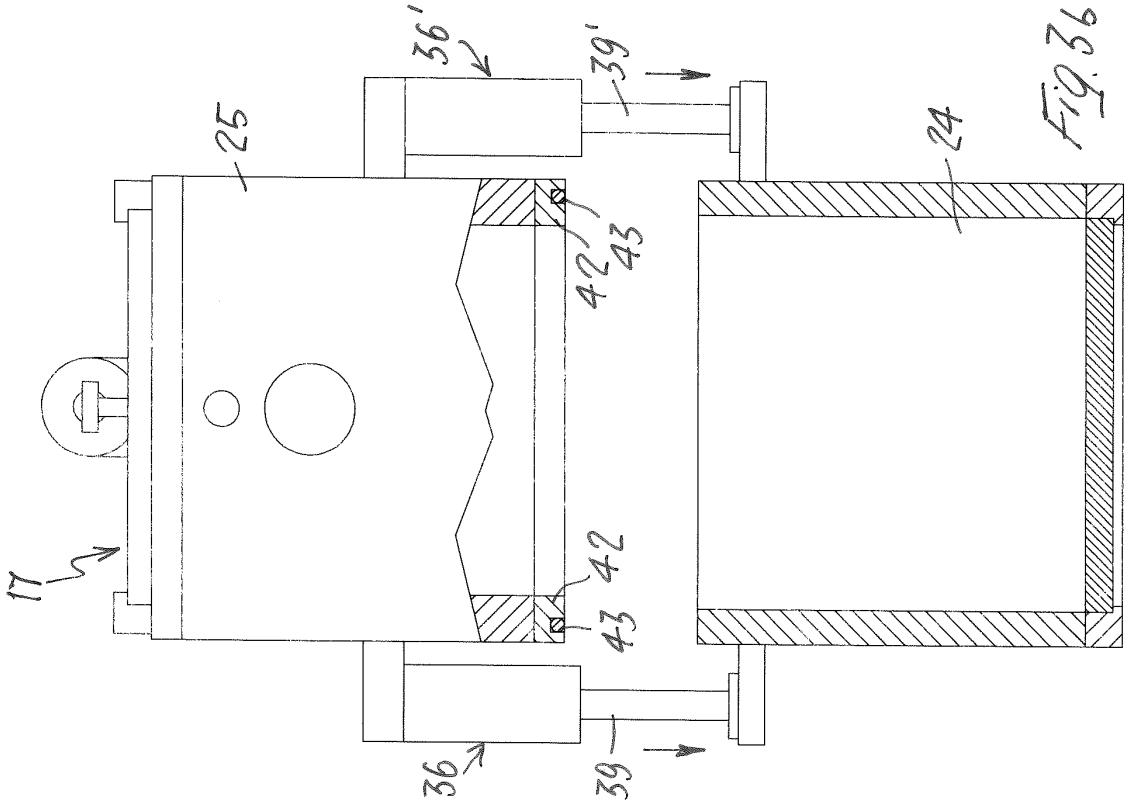
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Fig. 3b

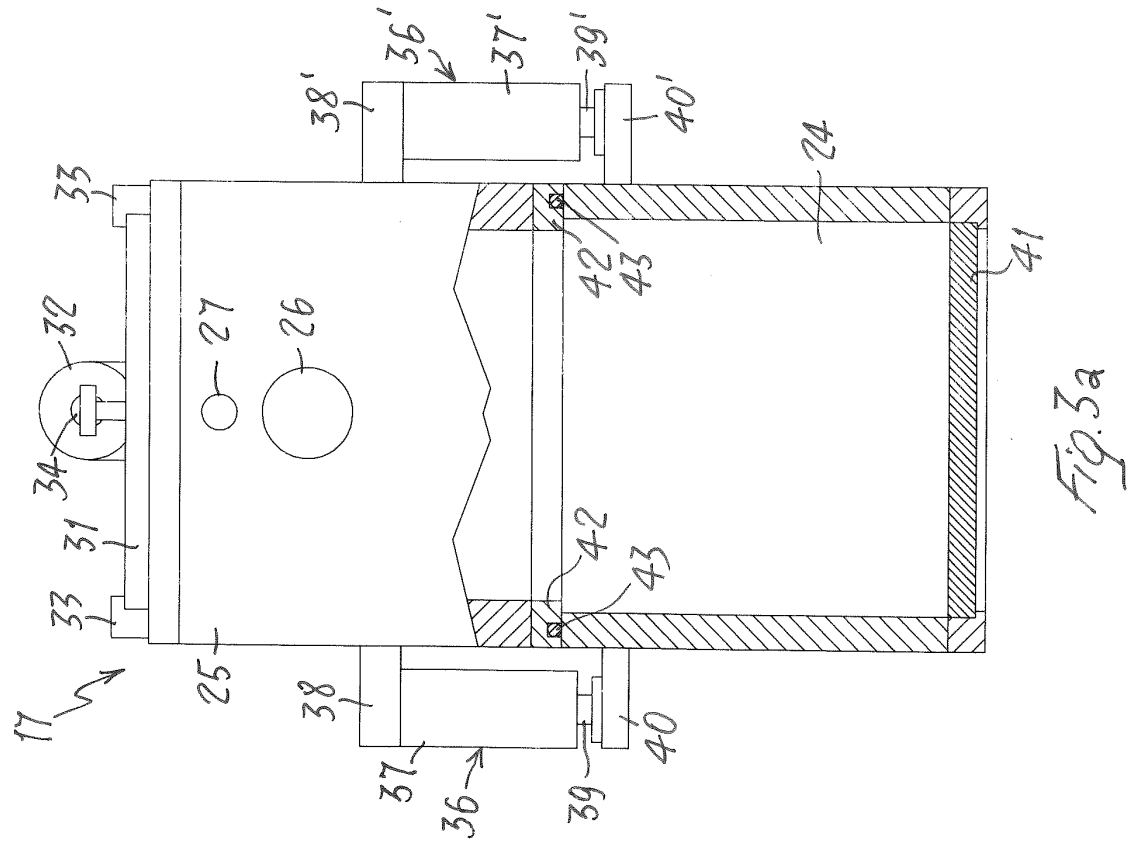
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Fig. 3a

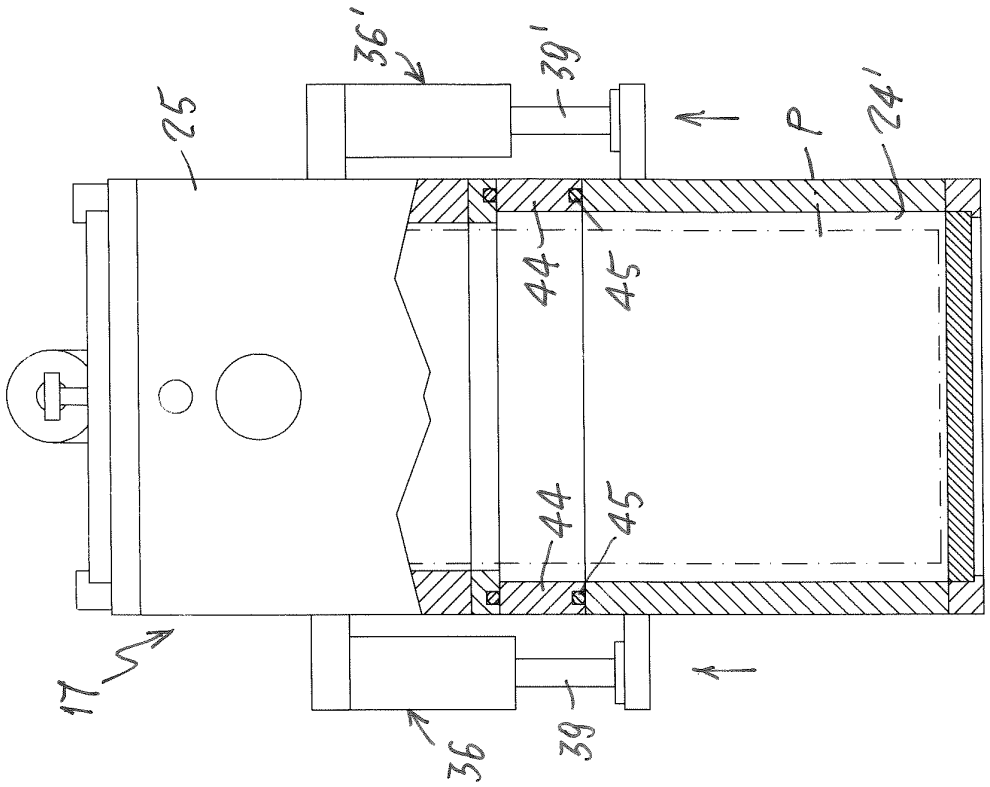

Fig. 3d

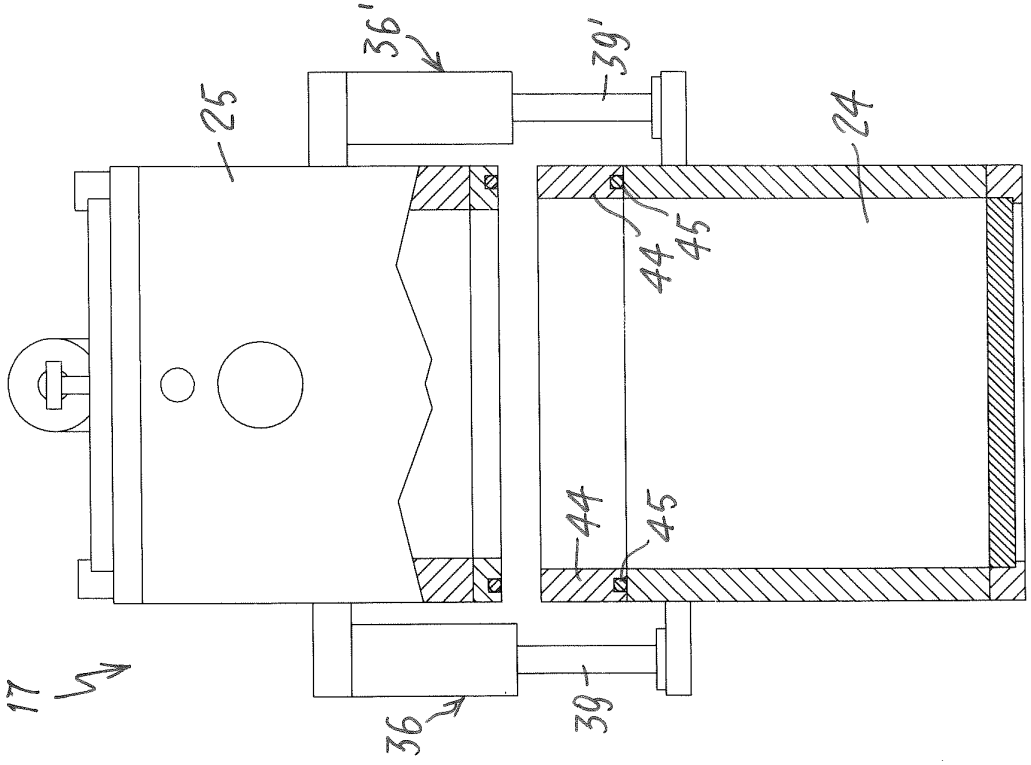

Fig. 3c

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EUROPEAN SEARCH REPORT

Application Number
EP 13 16 4573

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 3 006 120 A (ALFRED GRAFINGHOLT) 31 October 1961 (1961-10-31)	1,2,4,5	INV. B65B31/02
A	* column 2, lines 19-44 * * column 3, line 63 - column 4, line 54; figures 1,9 *	3,6-9	

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A	* column 2, lines 6-32 * * column 4, lines 13-71; figures 1,2 *	3-9	

X	EP 0 714 831 A1 (SARA LEE DE NV [NL]) 5 June 1996 (1996-06-05)	1	
A	* column 5, line 10 - column 7, line 28; figures 4,5 *	2-9	

A	US 4 164 111 A (DI BERNARDO PIETRO [IT]) 14 August 1979 (1979-08-14) * column 3, line 8 - column 4, line 4; figures 1-3 *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 July 2013	Kulhanek, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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