(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 241 803 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
06.05.2020 Bulletin 2020/19

(21) Application number: **17168827.8**

(22) Date of filing: **28.04.2017**

(51) Int Cl.:
B67C 7/00 *(2006.01)* ***B67C 3/22*** *(2006.01)*
B08B 3/02 *(2006.01)* ***B65B 7/28*** *(2006.01)*
B65B 3/04 *(2006.01)*

(54) A LINEAR SINGLE-BLOCK MACHINE FOR RINSING, FILLING AND SEALING BEVERAGE CANS

LINEARE BLOCK-ANLAGE FÜR SPÜLEN, FÜLLEN UND VERSCHLIESSEN VON GETRÄNKEDOSEN

UNITÉ LINEAIR BLOQUÉ POUR RINSAGE, REMPLISSAGE ET BOUCHAGE DES CANETTES DE BOISSON

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **02.05.2016 IT UA20163655**

(43) Date of publication of application:
08.11.2017 Bulletin 2017/45

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Description

[0001] The present invention relates to a single-block linear machine for breweries and/or producers of carbonated beverages in general, for rinsing and de-aerating empty cans, filling, de-aerating a head space, placing and sealing (seaming) the lid of the can in which the filling is done using an isobaric process, i.e. under constant pressure with the purpose of preventing oxidation of the product and wherein the affixing of the closing lid takes place immediately after the removal of a majority of the residual air in the head space by means of a jet of carbon dioxide. Such a machine according to the preamble of claim 1 is known from DE 197 02 770 A1.

[0002] The aim that the present invention intends to attain is providing craft breweries and producers of carbonated beverages in general with a compact and complete machine, performing all the processing steps comprised between the entering of the empty can and the exiting of the filled and sealed can, carried out with the procedures which up to today were possible only with large plants: isobaric filling, de-aeration with carbon dioxide prior to and following filling.

[0003] The alternative to pressurised filling is filling with a cannula immersed with an open top of the can, which has the drawback of a continuous contact of the beer with the air during the filling step (with a consequent oxidation of the product) before reaching a certain level internally of the can; open-top filling makes control of the formation of foam during the filling more difficult; in cases of excessive foaming there is a consequent loss of product.

[0004] The second de-aeration becomes necessary if there is not a foam cover over the beer, i.e. this head space contains only air; in some machines present on the market this operation is carried out with the cans in movement and this makes the action of the carbon dioxide poorly effective in consideration of the short time of exposure to the jet.

[0005] In these machines the placing of the lid is done "on the fly", i.e. it falls by force of gravity along a slide and goes to rest on the mouth of the can: if there is an abundant foam covering, the lid might not be correctly positioned, while if the foam is not present said lid is correctly placed but, as mentioned, the insufficiency of de-aeration carried out with the can in movement is more accentuated.

A further defect that this on-the-fly placing system of the lid exhibits is linked to the possible contaminants which the internal face of the lid (which will contact the beer and the foam) might collect by sliding on the slide. This is undesirable for the most exacting master brewers who decidedly prefer the solution of placing the lid of the present invention, defined as "pick and place", performed on the single can when halted by a mechanical arm, where the internal face of the lid does not come into contact with any surface and travels in the air through the brief journey from the lid distributor to the can.

This placing system of the lid with the can stationary is suitable for various de-aeration solutions after filling, with both the possibility of intervening with the full mouth on the station preceding the lid placing and that of injecting gas on the lid placing station by intervening for a fraction of a section during the descent of the lid.

The number of cans that start to be processed in group is chosen on the basis of a compact machine layout and the reduction of dead times and/or logjams in the flow of cans.

The machine of the present invention is defined in claim 1 and illustrated with diagrams, drawings and constructional specifications (where appropriate) in tables from 1 to 13 comprising figures from 1 to 22, in an embodiment which includes cans to be processed in groups of six units.

Figure 1 of table 1 is a schematic plan view which clearly defines the layout and on which the transversal sections represented in the subsequent tables are indicated.

Figure 2 of table 2 illustrates the transversal section at the rinsing station and indicates with different types of lines the positions of the empty can starting from the conveyor belt (first line) up to the overturned position on the washing jets.

Figures 3 and 4 of table 3 are detailed views of the gripping blocks of the cans on the first line and the relative spacing system.

Figures 5 and 6 of table 4 illustrate the retractable movement of the auxiliary border by the side of the first line.

Figure 7 of table 5 is a transversal section highlighting the activating/filling group and the support plates of the cans.

Figure 8 of table 6 is a plan view of the zones underlying the work plane at the plates rotating mechanism.

Figure 9 of table 7 illustrates the blowing mouth of the carbon dioxide and the loader with the lids waiting to be collected.

Figures 10 and 11 of table 8 are a view and a section of the lid placing arm group.

Diagrams from figure 12 to figure 22 illustrate, in progressive sequence, the processing cycle/pathway of a group of cans both during the steps in which the processing is done contemporaneously and when the cycle includes an operation on a single can; the diagrams denote, in varying tones of grey, the position of the can, its different status and/or the presence of contents therein.

The following description relates to the machine in which the cans start to be processed in groups of six; the pathway of the group is followed with the aid of the tables relating to construction (tables 1 - 8) and the diagrams (table 9 - 13). In the context of the figures the cans are always present, sometimes also illustrated in the positions that they assume during the change-position oper-

ations.

The empty cans are loaded onto the conveyor belt of the line (1) in the part that extends on the left side of the machine; the movement of the belt pushes them, in a queue, against the screw conveyor (2) which, with a rotation of six revolutions, expels six cans (just rinsed) and loads another six.

[0006] The cross-member (3), pushed by the arm (25), first performs a small approaching travel towards the screw conveyor (on the right in figure 2), the slats (28) go to rest on the can, the suction cup (27) enters aspirating mode and stably retains the cans; the arm (25) translates towards the left (as indicated by the arrow in figures 2 of table 2) guided in the support and carrying the cross-member (3) and the cans with it.

A cam, as well as the horizontal guide track, is fashioned on the support opposite the cam of figure 2, which cam, according to a known method, rotates the cross-member by 180° so as to take the cans, in the overturned position, above the series of in-line jets (13) supplied by the jet-bearing bar (24); a jet of water strikes the inside of the can and carries out the rinsing.

With an inverse movement the cans return to the screw conveyor which obviously is stationary and waiting; as soon as the cans are on the line (1) and coupled to the screw conveyor, the suction cups deactivate, the cross-member (3) moves slightly away, the screw conveyor rotates so that the six rinsed cans are released and another six are collected from the waiting queue.

The above-described sequence is summarised in figures 12, 13 and 14 of table 9.

The released cans, transported by the belt on the line (1), accumulate against the pad (7) guided along the trajectory by the border (4) which is in a raised position; the arm (8) performs a small translation to approach the gripping blocks (5) to the cans, pushing them to rest on the above-mentioned border (4) after which the suction cups (27) enter into action and stably retain the cans against the prismatic seatings of the blocks.

The border (4) has many functions: when it is raised, it guides the just-rinsed cans along the pathway, and then functions as a rest during the gripping step and lastly in the lowered position (retracted) it is an element of continuity with the sliding plane (37) with which it aligns.

The profile of the bent metal sheet which constitutes the border is designed so that each of the three elements thereof responds to a specific function: the short portion, in a raised position, assumes a vertical position so that is parallel to the flank of the cans; the end of the long portion opposite the first, resting on the plane (37), acts as a reaction against the pushing that the can receives during the gripping step; in the lowered position, the intermediate portion lies on the same plane as the plane (37). The long portion functions as a cam during the extension and/or the retraction movement; it is in fact kept pressed in contact against the edge of the plane (37) from the elastic torsion system (39) inserted on the fulcrum pin connecting the base support (38) with the sliding guide group (40); in figure 5 of table 4 the arrow indicates the direction in which the spring acts on the guide (40).

The translation movement or more precisely the extension of the retractable border (see the vertical arrow in figure 6 table 4) takes place by means of a pneumatic cylinder, which is not illustrated in the tables, but the installation thereof flanked to the guide (40) is simple to understand. The transfer arm (8), at the service of the first line, is responsible for the gripping functions of the cans (as already indicated), for the spacing thereof in the predetermined interaxis and the transfer thereof to the filling station; it supports the sliding guides (71), the linear actuator (35) and the bar (32), connects to the sliding guide (9) and is moved in translation by the linear actuator (10).

The six blocks (5) are supported by the two guide bars (71) on which they can slide, are connected to one another by a flexible belt (6), solidly constrained to each block by the cylindrical pegs (29); the first block (on the left in the layout of table 1) engages in the drawing pin of the bracket (33) so that it is drawn from the linear movement of the actuator (35) to which the bracket is solidly constrained.

When the actuator (35) closes, the first block presses on the spacer (34) and so on until all the group of blocks and spacers are packed: the interaxis between the prisms of the blocks must coincide with that of the approached cans, i.e. equal to the diameter thereof.

This is the configuration illustrated schematically in figure 15 of table 10 and which makes possible the approach of the blocks to the cans and the gripping thereof; in this condition, the belt (6) portion comprised between two contiguous blocks is slowed down and forms a wave; the supply to the suction cups (27) is done via an internal channelling of the block and by means of the flexible tubes (31) connected by the fittings (30) to the perforated supply bar (32).

When the actuator (35) opens, and draws the first block, it tenses the belt and spaces all the blocks with a relative can at the predetermined interaxis: this interaxis must be equal to that of the plates (17) and of the overlying filling heads.

The configuration is schematically illustrated in figure 16 of table 10.

At this point the transfer arm (8) transfers the cans onto the plates (17), centred and resting on the pins (36); obviously, the retractable border (4) was previously retracted for enabling the above-mentioned transfer.

The diagram of figure 17, table 11, represents this situation; there follows the deactivation of the suction cups and the return of the now-empty arm (8), as in figure 18, table 11.

Following the return of the transfer arm (8), each of the six plates is lifted, pushed by the rod (47) of the relative pneumatic cylinder, and brings the can to press with the edge of the mouth on the gasket (43) of the filling head (42) (figure 7 of table 5 and diagram of figure 19, table 12).

The first de-aeration operation can then take place, fol-

lowed by the pressurised filling of the beverage (beer, carbonated beverages in general, etc.) contained in the tank (41); the filling is done contemporaneously on all six heads and the seal is guaranteed by the fact that each can has its own pushing cylinder.

We will not explain further the isobaric filling method as it is a method known to people skilled in the art and is borrowed by other types of machines for beverage filling (for example of the rotating type), in particular for very high production levels.

When filling is complete, all the plates with the filled cans lower and are rotated by 180° for the subsequent transfer to the second line (18).

The mechanism which performs the rotation, in perfect phase and simultaneously on all the plates, is illustrated in figure 7 of table 5 and figure 8 of table 6.

First, the plate (17), with the relative pins (36), is solidly constrained to the underlying pinion (50) and the whole group is coupled to the hub (49) in turn screwed to the rod (47) of the lifting cylinder with the interposition of the pair of roller bearings (48).

The pinion (50) has a straight-toothed external cogging so as to be able to freely axially slide (to be raised) while remaining coupled to the rack (46); this rack is guided by the rollers (44), idle on the pins (45), and can slide on the action of the pneumatic cylinder (51). The connection between the cylinder and rack is guaranteed by the link bar (52), screws (53) and spacers (54).

The translational movement of the rack (activated by the cylinder) transforms into rotary motion of the six enmeshed pinions (sprockets) and the overlying can-bearing plates; a precise regulation of the stroke of the piston guarantees a precise 180° rotation.

For the transfer of the full cans to the second line, the arm (16), slidable on the guide (15), is activated by the linear actuator (14); it approaches the cans which now have the resting pins (36) opposite, activates the suction cups and releases the cans on its return (see figure 20 of table 12) only when the cans are on the second line (18).

The second line conveys the cans to the lid-placing station (22) in which the operations take place with the can stationary (diagram of figure 21, table 13); the operations that take place in this station are two and, for functional reasons, they must be done in close succession.

The first operation is the de-aeration, with a flow of carbon dioxide above the free surface of the beer (head zone of the can) and immediately after the lid is placed, so as to prevent return of previously-expelled air.

A first blocking device (20) is destined to halt the can beneath the mouth (19) distributing carbon dioxide (figure 9 of table 7), the adjacent can (already de-aerated) is also halted, by a blocking device not illustrated in the figure, directly below the lid loader and the time that passes for the transfer between the first and the second position is extremely short.

The distribution of lids passes through a first rotating store (21) having a plurality of stations which supply the underlying loader (56); in the loader, the pack of lids is retained by a toroidal ring (57), an inner lip of which is elastic and allows release of one lid at a time.

Owing to a sophisticated reason connected to hygiene, the lids are stacked with the external face thereof facing downwards, so that in order to go to rest on the mouth of the can the lid has to be translated, accompanied by a 180° rotation.

The device for movement and placing of the lid, in a pneumatically-activated preferred embodiment based on mechanical mechanisms (levers and cams), is illustrated in figures 10 and 11 of table 8.

The member collecting the lid (overturned) from the loader (56) is the suction cup (59) housed in the beaker (65); two pins are applied to said beaker, by 90° with respect to the axis of the suction cup: the hollow pin (68) which crosses the central hole and the fitting (30) supplies the aspiration of the suction cup and the pin (69), solidly constrained to the con rod (66), which receives therefrom the command for rotating the beaker.

The vertical translation is guided by the sliding guide group (60) fixed to the cam support (63), all being solidly constrained to the tube of the loader (56); the support (63) has a straight profile on which a U-shaped cut is made at about halfway along the travel thereof. Then, this wall extends with a lug obtained by bending on which the rod of the double-acting pneumatic cylinder (61) is anchored; the end of the cylinder body is solidly constrained to the sliding arm (62) fixed in turn on the cursor of the linear guide group (60).

By supplying the upper chamber of the cylinder, the rod extends, the body of the cylinder and arm (62) are all positioned high, and the beaker with the suction cup collects the lid as illustrated in bold in figure 10.

When the supply is inverted (injection of compressed air into the lower chamber) the rod returns and the arm (62) begins to descend, the roller (67) constituted by a roller bearing moves first on the straight portion of the cam so that the beaker performs a simple translation, when the U-shaped recess is reached, the roller (67), recalled by the spring (64), penetrates therein and the beaker performs a first 90° rotation.

Following the descent of the arm (62), the beaker performs a further 90° rotation, i.e. completely overturns, and in the final straight portion of travel the lid is placed on the can.

The rotation movement of the beaker (65) takes place precisely and with minimum effort due to the roller bearings (70) which constitute the fulcrum of said beaker on the arm (62).

In the context of the layout of the machine, the de-aeration and lid placing operations are schematically illustrated in figure 21 of table 13.

If it were necessary to improve the de-aeration with a further jet of antioxidant gas, it is possible to intervene immediately before the placing of the lid.

The following step is sealing the lid: for this operation, the cans momentarily leave the second line (figure 22,

table 13) and are collected by the star conveyor (11) which carries them, in stepped motion, to the rolling station and lastly, after the completion of the sealing, newly places them on the second line and the cycle is complete.
The functioning of the roller of the lid/can edge is not described, as it is prior art; it is only stressed that this station is inserted in the machine, as described, so as to constitute a true single-block.
The definition of "linear machine" can be applied to this layout as no operation takes place on a rotary-type machine; the transfer of the cans from a first line to a second line, parallel thereto, enables to keep the machine compact and to contemporaneously carry out a plurality of operational steps.
The fixing of the lid with the pick and place system, to be carried out with the can stationary, not only has the advantage of non-contamination, as mentioned in the foregoing, and precise placing even in the presence of a foam covering, but also enables managing the second de-aeration operation to best effect whether it takes place in the position that precedes the lid placing by means of the mouth (19), or it is desired to carry it out immediately prior to the placing of the lid.
In the latter case, a few seconds before the lid is placed a final spray of antioxidant gas can be directed into the high zone of the can.
This versatility of the machine enables optimum filling of the beers produced with the widest range of recipes and other types of carbonated beverages too, independently of the degree of foaminess they have.

Claims

1. A single-block machine for breweries and producers of carbonated beverages, in general, for rinsing, performing a first de-aeration, filling, possibly performing a second de-aeration, and sealing cans, comprising:

- a first line (1), for example a conveyor belt, onto which empty cans are loaded;
- a collector screw conveyor (2);
- a cross member (3) bearing multiple elements for gripping the cans;
- a plant for first de-aeration and filling, according to isobaric filling technology, provided with a tank (41), relative supply conduits and filling heads (42);
- a washing/rinsing tank (12), which is incorporated in the single-block, wherein jets (13) are arranged in line and work simultaneously on a number of cans equal to the number of filling heads;
- a first transfer arm (8) with a series of gripping blocks (5);
- an auxiliary border (4), of a retractable type, on-board the first line;
- a series of plates (17) with rest and centring pins (36) with a mechanism for lifting and rotating said plates wherein each single plate (17) is provided with both a vertical lifting movement able to maintain the can pushed against a gasket (43) of one of the heads during the first de-aeration and the filling, and a rotary motion of 180° which it imparts once it has re-descended;
- a lid placing station, in which the lids are placed on the cans;
- a second line (18) for conveying the cans to the lid placing and lid sealing stations;
- a second transfer arm (16) by a side of the second line;

characterised in that:

- a gripping of the empty cans in the various movements occurs by means of aspirating suction cups (27) which is a gripping system and is able to produce no crushings and/or permanent deformations on the very slim walls of the can during both approaching and gripping, wherein the cross member (3) is bearing multiple suction cups for gripping the cans and the series of gripping blocks (5) of the first arm (8) having relative suction cups (27);
- the first arm (8), located by a side of the first line, is provided with a barrier pad (7), and a device for realising two different spacing interaxes for the cans and a translation movement able to transfer the cans onto the plates (17), wherein the suction cups (27) at said gripping blocks (5) are joined by a belt (6), slidable on guide bars (71);
- the second line (18) is parallel to the first line (1), it receives the full cans removed from the second transfer arm (16) on the plates (17) and transfers them to the following stations;
- a star conveyor (11) with an attached roller group (23) is foreseen for sealing the lid.

2. The machine according to claim 1, **characterised in that** it comprises:

- a gas dispenser mouth (19) for a second de-aeration;
- a store (21) for storing packs of lids, of a rotating drum type;

the can adjacent to the can undergoing the lid-placing step momentarily pausing beneath the mouth (19) which dispenses a flow of carbon dioxide onto the mouth of the can for a second de-aeration;
the lid-placing station being surmounted by a rotating store (21) which supplies lids to a loader of the lids; each single lid being gripped by a suction cup (59) on an external face thereof, collected from the loader

(56) rotated by 180° during the transfer, centred and rested on the upper edge of the can.

3. The machine according to claim 2, **characterised in that** a rinsing station comprises the arm (3) bearing the series of aspirating suction cups (27) able to collect the cans resting on the screw conveyor (2), said arm (3) bearing the series of aspirating suction cups (27) performing a roto-translational motion until it brings the cans, overturned in a vertical position, above the water jets (13).

4. The machine according to claim 2, **characterised in that** on-board of the first line (1), towards an inside of the machine, said mobile retractable auxiliary border (4) is applied, which in a raised position first functions as a guide for the cans immediately after rinsing while they are transferred against the barrier pad (7) and subsequently functions as a reaction force for the cans when the first arm (8) performs the gripping approach by pressing with the suction cups; after performing these functions said border, recalled by a pneumatic cylinder, slides on a guide (40) and lowers down to the level of the sliding plane (37) to enable a following passage of the cans.

5. The machine according to claim 2, **characterised in that** the blocks (5) have two V-shaped prisms for alignment and centring of the can, one of said aspirating suction cup (27) for gripping the can and **in that** said blocks are slidable on two of said guide bars (71).

6. The machine according to claims 4 and 5, **characterised in that** the blocks (5) are connected to one another, positioned at an equal interaxis by a cogged belt (6) that is flexible but not extensible; the last block is fixed on the guide bars, the first is connected to the external cursor of an actuator (35), the end-travel positions of which respectively define the configuration of approached blocks and the configuration of open blocks: the first interaxis is defined by the thickness of a spacer (34) and corresponds to the diameter of the can, the second interaxis is defined by the multiple of the pitches of the belt (6) in which fixing with pegs (29) takes place and is equal to the interaxis of the plates (17) and the overlying filling heads.

7. The machine according to claim 2, **characterised in that** the plates (17), in the part which normally emerges from the sliding plane, are provided with two of said pins (36) on which the can rests and is centred, in the part underlying the work plane, the plate is prolonged with a long gearing (50) which is constrained by pairs of roller bearings (48) to a hub (49) fixed to a rod (47) of a lifting cylinder (51); when the cans are in position on the plate, the cylinder pushes the cans upwards to seal against the gasket (43) of one of the isobaric filling head (42).

8. The machine according to claim 7, **characterised by** a rack (46), slidable on the rollers (44), the straight cogging of which engages with the gearings (50) of the plates, maintains said plates in mutual phase and rotates them by 180° by effect of a predetermined travel of the rack imparted on the rod of the cylinder (51).

Patentansprüche

1. Block-Anlage für Brauereien und Hersteller von kohlensäurehaltigen Getränken im Allgemeinen zum Spülen, Durchführen einer ersten Entlüftung, Füllung, möglicherweise Durchführen einer zweiten Entlüftung und zum Verschließen von Dosen, umfassend:

   - eine erste Linie (1), beispielsweise ein Förderband, auf die leere Dosen geladen werden;
   - einen Sammelschneckenförderer (2);
   - einen Querträger (3), der mehrere Elemente zum Greifen der Dosen trägt;
   - eine Anlage zur ersten Entlüftung und Füllung gemäß der isobaren Fülltechnologie, die mit einem Tank (41), relativen Versorgungsleitungen und Füllköpfen (42) versehen ist;
   - einen Wasch-/Spültank (12), der im Block eingebaut ist, wobei die Düsen (13) in Reihe angeordnet sind und gleichzeitig an einer Anzahl von Dosen arbeiten, die gleich der Anzahl der Füllköpfe ist;
   - einen ersten Transferarm (8) mit einer Reihe von Greifblöcken (5);
   - eine Hilfskante (4) vom einziehbaren Typ an Bord der ersten Linie;
   - eine Reihe von Platten (17) mit Aufstell- und Zentrierstiften (36) mit einem Mechanismus zum Anheben und Drehen der Platten, wobei eine jede einzelne Platte (17) sowohl mit einer vertikalen Hubbewegung, die in der Lage ist, die Dose während der ersten Entlüftung und der Füllung gegen eine Dichtung (43) eines der Köpfe gepresst zu behalten als auch einer Drehbewegung von 180°, die sie nach dem erneuten Abstieg ausübt, versehen ist;
   - eine Deckelplatzierungsstation, in der die Deckel auf die Dosen platziert werden;
   - eine zweite Linie (18) zum Befördern der Dosen zu den Deckelplatzierungs- und Deckelverschlussstationen;
   - einen zweiten Transferarm (16) an einer Seite der zweiten Linie;

   dadurch gekennzeichnet, dass

- ein Greifen der leeren Dosen in den verschiedenen Bewegungen mittels Ansaugsaugnäpfen (27) erfolgt, das ein Greifsystem darstellt und keine Quetschungen und/oder dauerhaften Verformungen an den sehr schlanken Wänden der Dose sowohl beim Annähern als auch beim Greifen erzeugen kann, wobei der Querträger (3) mehrere Saugnäpfe zum Greifen der Dosen und die Reihe von Greifblöcken (5) des ersten Arms (8) mit relativen Saugnäpfen (27) trägt;
- der erste Arm (8), der sich an einer Seite der ersten Linie befindet, mit einem Sperrkissen (7) und einer Vorrichtung zum Realisieren von zwei unterschiedlichen Abstandszwischenachsen für die Dosen und einer Translationsbewegung, die in der Lage ist, die Dosen auf die Platten (17) zu transferieren, versehen ist, wobei die Saugnäpfe (27) an den Greifblöcken (5) durch einen Riemen (6) zusammengefügt sind, der auf Führungsstangen (71) verschiebbar ist;
- die zweite Linie (18) parallel zur ersten Linie (1) verläuft, sie empfängt die vollen Dosen, die vom zweiten Transferarm (16) auf den Platten (17) entfernt wurden, und sie an die folgenden Stationen transferiert;
- ein Sternförderer (11) mit angebrachter Rollengruppe (23) zum Verschließen des Deckels vorgesehen ist.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** sie umfasst:

- einen Gasspendermund (19) für eine zweite Entlüftung;
- einen Speicher (21) zum Aufbewahren von Deckelpackungen eines rotierenden Trommeltyps;

wobei die Dose, die sich neben der Dose befindet, die den Schritt zum Platzieren des Deckels durchläuft, vorübergehend unter dem Mund (19) anhält, der einen Kohlendioxidstrom auf den Mund der Dose für eine zweite Entlüftung abgibt;
wobei die Deckelplatzierungsstation von einem rotierenden Speicher (21) überragt ist, der einem Lader der Deckel Deckel zuführt;
wobei jeder einzelne Deckel von einem Saugnapf (59) an seiner Außenseite erfasst, vom Lader (56) gesammelt und während des Transfers um 180° gedreht, zentriert und auf dem oberen Rand der Dose gelegt wird.

3. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** eine Spülstation den Arm (3) umfasst, der die Reihe von Ansaugsaugnäpfen (27) trägt, die in der Lage sind, die auf dem Schneckenförderer (2) ruhenden Dosen zu sammeln,
wobei der Arm (3), der die Reihe von Ansaugsaugnäpfen (27) trägt, eine Rotations-Translationsbewegung ausführt, bis er die in vertikaler Position umgekippten Dosen über die Wasserstrahlen (13) bringt.

4. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** an Bord der ersten Linie (1) in Richtung eines Inneren der Maschine die bewegliche einziehbare Hilfskante (4) angebracht ist, die in angehobener Position zunächst als Führung für die Dosen unmittelbar nach dem Spülen wirkt, während sie gegen das Sperrkissen (7) transferiert werden, und anschließend als Reaktionskraft für die Dosen wirkt, wenn der erste Arm (8) die Greifannäherung durch Drücken mit den Saugnäpfen ausführt; nach dem Ausführen dieser Funktionen gleitet die von einem Pneumatikzylinder zurückgerufene Kante auf eine Führung (40) und senkt sich auf das Niveau der Gleitebene (37) ab, um einen nachfolgenden Durchgang der Dosen zu ermöglichen.

5. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** die Blöcke (5) zwei V-förmige Prismen zum Ausrichten und Zentrieren der Dose, einen der Ansaugsaugnäpfe (27) zum Greifen der Dose aufweisen und dadurch, dass die Blöcke auf zwei der Führungsstangen (71) verschiebbar sind.

6. Maschine nach den Ansprüchen 4 und 5, **dadurch gekennzeichnet, dass** die Blöcke (5) miteinander verbunden sind und an einer gleichen Zwischenachse durch einen Zahnriemen (6) positioniert sind, der flexibel, aber nicht dehnbar ist; der letzte Block ist an den Führungsstangen fixiert, der erste ist mit dem externen Läufer eines Aktuators (35) verbunden, dessen Endhubpositionen jeweils die Konfiguration der angenäherten Blöcke und die Konfiguration der offenen Blöcke definieren: die erste Zwischenachse ist durch die Dicke eines Abstandshalters (34) definiert und entspricht dem Durchmesser der Dose, die zweite Zwischenachse ist durch das Vielfache der Teilungen des Riemens (6) definiert, in denen die Fixierung mit Zapfen (29) stattfindet und gleich der Zwischenachse der Platten (17) und der darüber liegenden Füllköpfe ist.

7. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** die Platten (17) in dem Teil, der normalerweise aus der Gleitebene austritt, mit zwei der Stifte (36) versehen sind, auf denen die Dose in dem unter der Arbeitsebene liegenden Teil ruht und zentriert ist, die Platte mit einem langen Getriebe (50) verlängert ist, das durch ein Paar Rollenlager (48) an einer Nabe (49) fest befestigt ist, die an einer Stange (47) eines Hubzylinders (51) fixiert ist; wenn sich die Dosen in Position auf der Platte befinden, drückt der Zylinder die Dosen nach oben zum Verschließen gegen die Dichtung (43) eines der isobaren Füllköpfe (42).

8. Maschine nach Anspruch 7, **gekennzeichnet durch** eine Zahnstange (46), die auf den Rollen (44) verschiebbar ist, deren gerade Verzahnung in die Getriebe (50) der Platten eingreift, die Platten in gegenseitiger Phase hält und sie um 180° durch die Wirkung eines vorbestimmten Hubs der Zahnstange, die auf die Stange des Zylinders (51) ausgeübt wird, dreht.

Revendications

1. Unité monobloc destinée aux brasseries et aux fabricants de boissons gazeuses en général, pour le rinçage, la réalisation d'une première désaération, le remplissage, éventuellement la réalisation d'une deuxième désaération, et le bouchage de canettes, comprenant :

    - une première ligne (1), par exemple un tapis transporteur, sur laquelle sont chargées les canettes vides ;
    - un convoyeur à vis de réception (2) ;
    - une traverse (3) supportant des éléments multiples pour la préhension des canettes ;
    - une installation destinée à la première désaération et au remplissage, selon la technologie de remplissage isobarique, pourvue d'un réservoir (41), de conduits d'alimentation correspondants et de têtes de remplissage (42) ;
    - un réservoir de lavage/rinçage (12), étant incorporé dans le monobloc, dans lequel des jets (13) sont disposés en ligne et fonctionnent simultanément sur un nombre de canettes égal au nombre de têtes de remplissage ;
    - un premier bras de transfert (8) doté d'une série de blocs de préhension (5) ;
    - une bordure auxiliaire (4), de type rétractable, à bord de la première ligne ;
    - une série de plaques (17) dotées de chevilles d'appui et de centrage (36) dotées d'un mécanisme servant à soulever et faire tourner lesdites plaques, dans laquelle chaque plaque (17) est pourvue à la fois d'un mouvement de levage vertical pouvant maintenir la canette poussée contre une garniture (43) d'une des têtes pendant la première désaération et le remplissage, et d'un mouvement de rotation sur 180° qu'elle confère une fois qu'elle est redescendue ;
    - un poste de pose de couvercles, dans lequel les couvercles sont posés sur les canettes ;
    - une seconde ligne (18) destinée à l'acheminement des canettes vers les postes de pose et de bouchage des couvercles ;
    - un second bras de transfert (16) situé à côté de la seconde ligne ;

    caractérisée en ce que :

    - une préhension des canettes vides dans les différents mouvements a lieu au moyen de ventouses d'aspiration (27) étant un système de préhension et pouvant ne pas produire d'écrasement et/ou de déformations permanentes sur les parois très minces de la canette pendant l'approche et la préhension, dans laquelle la traverse (3) supporte plusieurs ventouses pour saisir les canettes et la série de blocs de préhension (5) du premier bras (8) comportant des ventouses (27) correspondantes ;
    - le premier bras (8), situé sur un côté de la première ligne, est pourvu d'un tampon isolant (7), et d'un dispositif pour réaliser deux entraxes d'espacement différents pour les canettes et un mouvement de translation pouvant transférer les canettes sur les plaques (17), dans laquelle les ventouses (27) en correspondance desdits blocs de préhension (5) sont reliées par une courroie (6) pouvant coulisser sur des barres de guidage (71) ;
    - la seconde ligne (18) est parallèle à la première ligne (1), elle reçoit les canettes pleines retirées du second bras de transfert (16) sur les plaques (17) et les transfère aux postes suivants ;
    - un convoyeur en étoile (11) doté d'un groupe de rouleaux (23) attaché est prévu pour le bouchage du couvercle.

2. Unité selon la revendication 1, **caractérisée en ce qu'**elle comprend :

    - une bouche de distribution de gaz (19) pour une deuxième désaération ;
    - un magasin (21), destiné au stockage des paquets de couvercles, du type à tambour rotatif ;

    la canette adjacente à la canette soumise à l'étape de mise en place du couvercle s'arrêtant momentanément sous la bouche (19) qui distribue un flux de dioxyde de carbone sur la bouche de la canette pour une seconde désaération ;
    le poste de pose du couvercle étant surmonté d'un magasin en rotation (21) fournissant des couvercles à un chargeur des couvercles ;
    chaque couvercle étant saisi par une ventouse (59) sur une face externe de celui-ci, recueilli sur le chargeur (56) pivoté sur 180° pendant le transfert, centré et en appui sur le bord supérieur de la canette.

3. Unité selon la revendication 2, **caractérisée en ce qu'**un poste de rinçage comprend le bras (3) supportant la série de ventouses d'aspiration (27) pouvant recueillir les canettes reposant sur le convoyeur à vis (2),
    ledit bras (3) supportant la série de ventouses d'aspiration (27) effectuant un mouvement de rotation et de translation jusqu'à ce qu'il amène les canettes,

renversées en position verticale, au-dessus des jets d'eau (13).

4. Unité selon la revendication 2, **caractérisée en ce qu'**à bord de la première ligne (1), vers un intérieur de l'unité, est appliquée ladite bordure auxiliaire (4) mobile rétractable qui, en position surélevée, sert tout d' abord de guide pour les canettes immédiatement après le rinçage pendant qu'elles sont transférées contre le tampon isolant (7) et fonctionne ensuite comme une force de réaction pour les canettes lorsque le premier bras (8) effectue l'approche de préhension en appuyant avec les ventouses ; après avoir effectué ces fonctions, ladite bordure, rappelée par un cylindre pneumatique, glisse sur un guide (40) et s'abaisse jusqu'au niveau du plan de glissement (37) pour permettre un passage suivant des canettes.

5. Unité selon la revendication 2, **caractérisée en ce que** les blocs (5) comportent deux prismes en forme de « V » pour l'alignement et le centrage de la canette, une desdites ventouses d'aspiration (27) pour saisir la canette et **en ce que** lesdits blocs sont coulissants sur deux desdites barres de guidage (71).

6. Unité selon les revendications 4 et 5, **caractérisée en ce que** les blocs (5) sont reliés l'un à l'autre, sont positionnés en correspondance d'un entraxe égal par une courroie crantée (6) étant flexible mais non extensible ; le dernier bloc est fixé sur les barres de guidage, le premier est relié au curseur externe d'un actionneur (35) dont les positions de fin de course définissent respectivement la configuration des blocs approchés et la configuration des blocs ouverts : le premier entraxe est défini par l'épaisseur d'une entretoise (34) et correspond au diamètre de la canette, le second entraxe est défini par le multiple des pas de la courroie (6) dans lesquels se déroule la fixation avec des taquets (29) et est égal à l'entraxe des plaques (17) et des têtes de remplissage superposées.

7. Unité selon la revendication 2, **caractérisée en ce que** les plaques (17), dans la partie qui émerge normalement du plan de coulissement, sont pourvues de deux desdites chevilles (36) sur lesquelles repose et est centrée la canette, dans la partie sous-jacente au plan de travail, la plaque est prolongée par un engrenage long (50) qui est contraint par des paires de roulements à rouleaux (48) à un moyeu (49) fixé à une tige (47) d'un cylindre de levage (51) ; lorsque les canettes sont en position sur la plaque, le cylindre pousse les canettes vers le haut pour boucher contre la garniture (43) de l'une des têtes de remplissage isobarique (42).

8. Unité selon la revendication 7, **caractérisée par** une crémaillère (46), pouvant coulisser sur les rouleaux (44), dont la denture rectiligne s'engage avec les engrenages (50) des plaques, maintient lesdites plaques en phase mutuelle et les fait tourner sur 180° sous l'effet d'une course prédéterminée de la crémaillère conférée à la tige du cylindre (51).

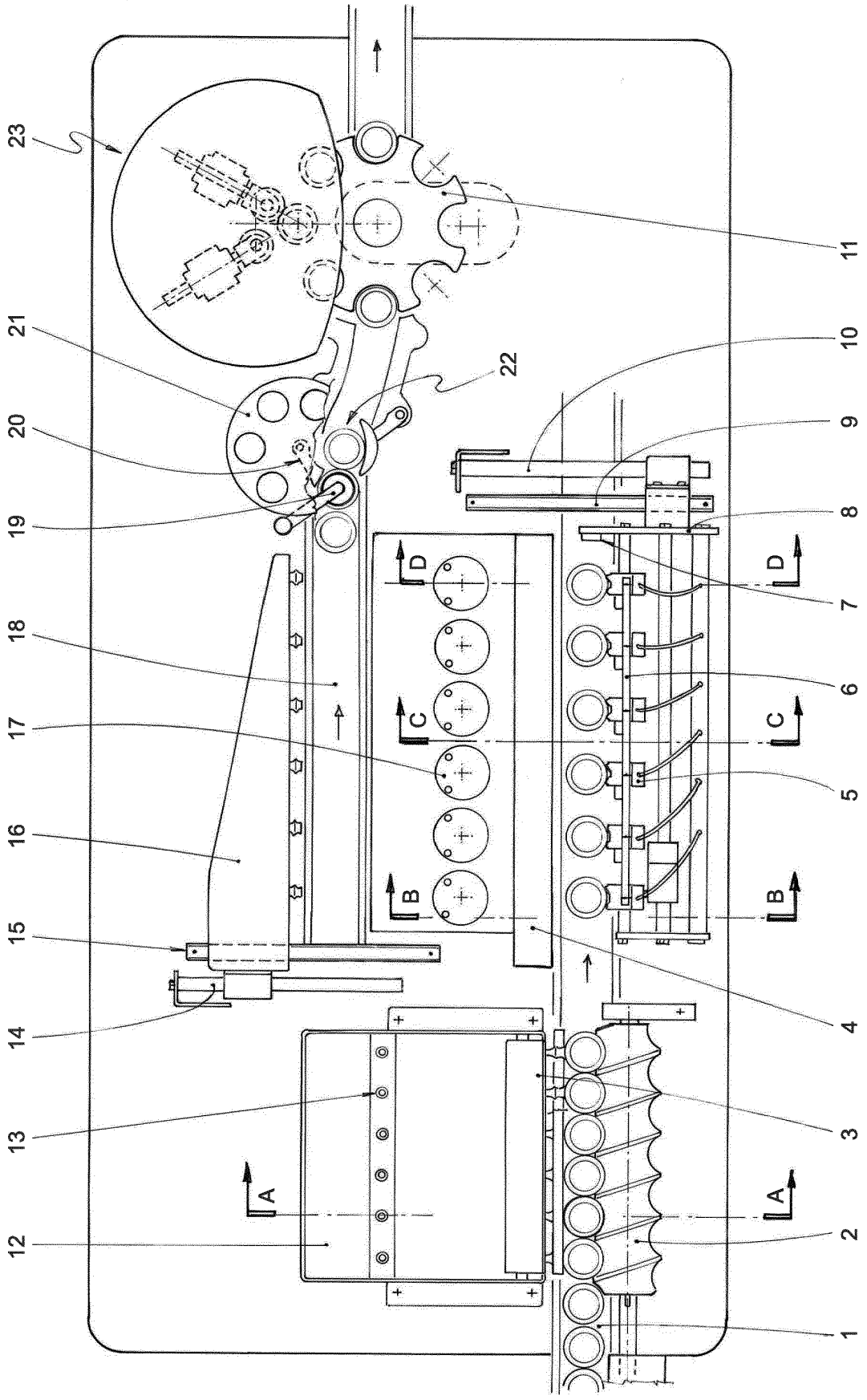

fig. 1

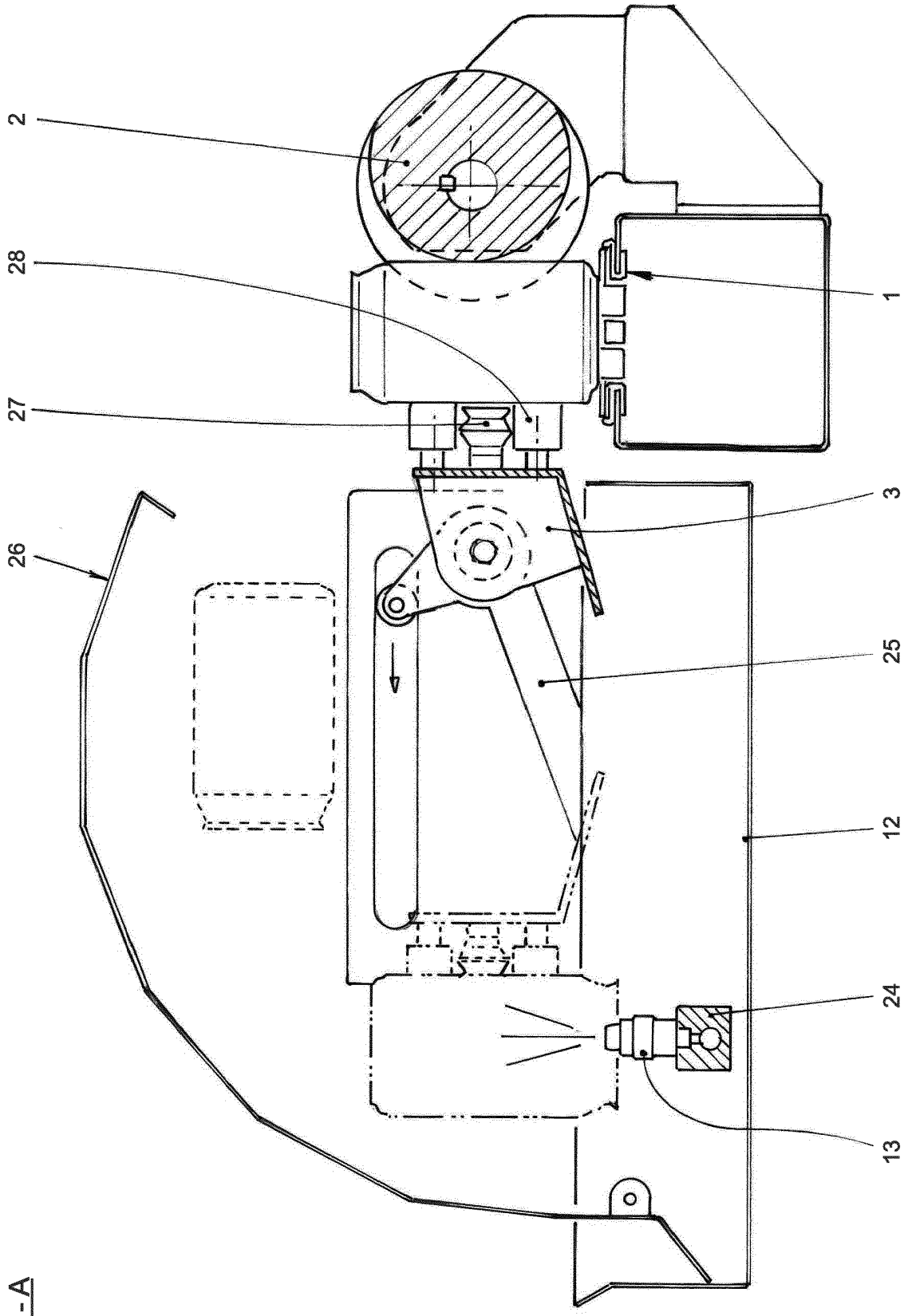

fig. 2

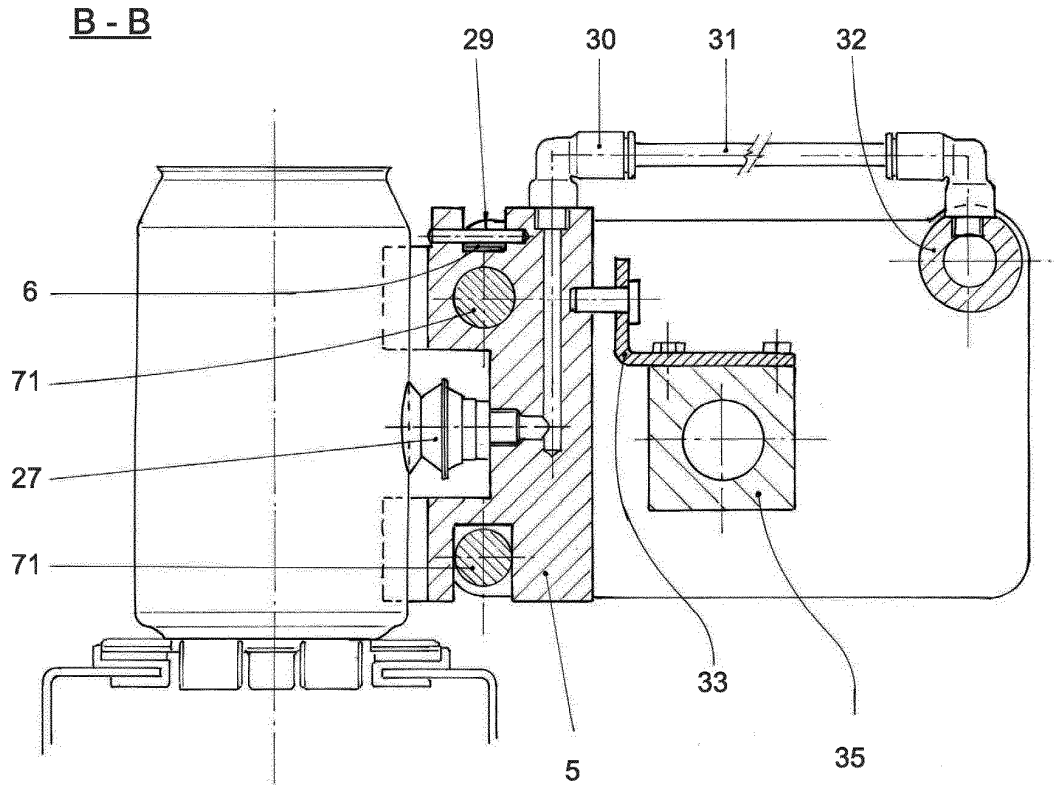

fig. 4

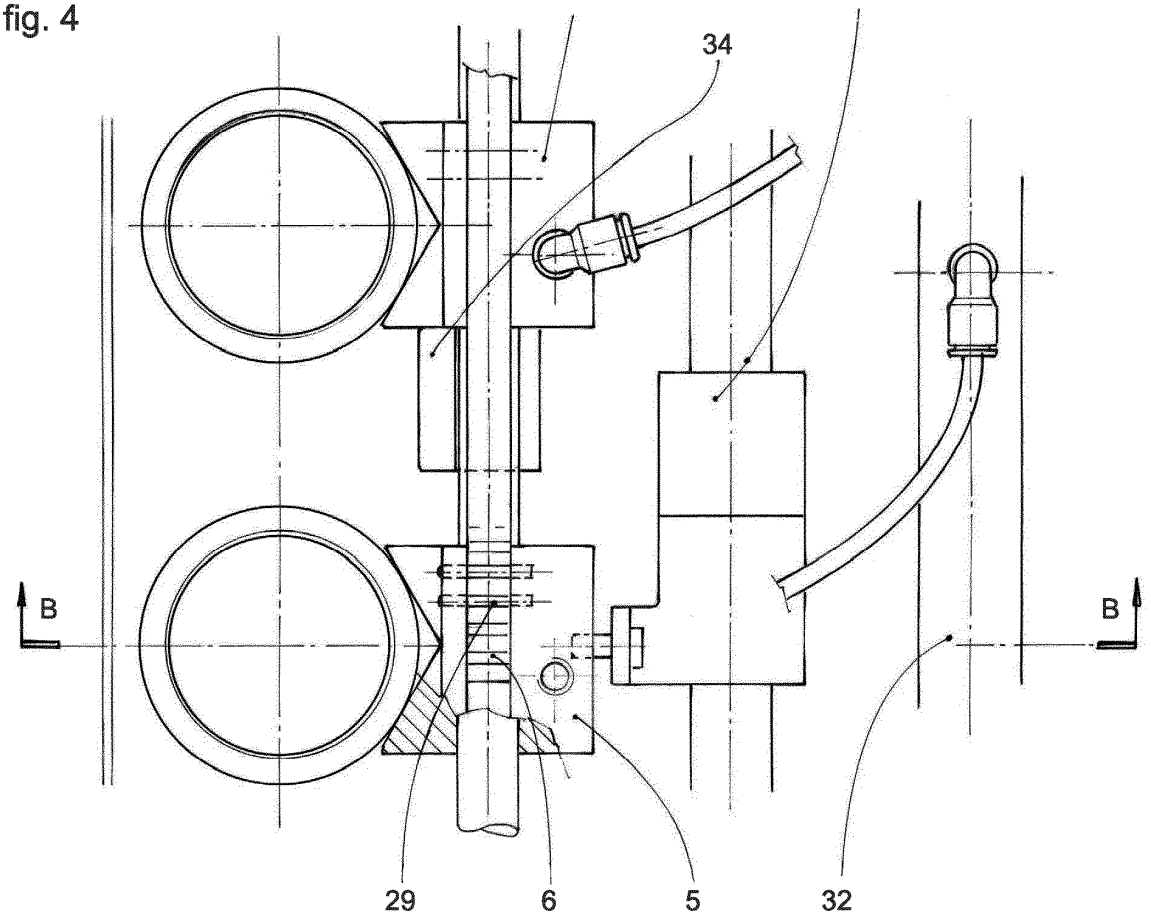

fig. 3

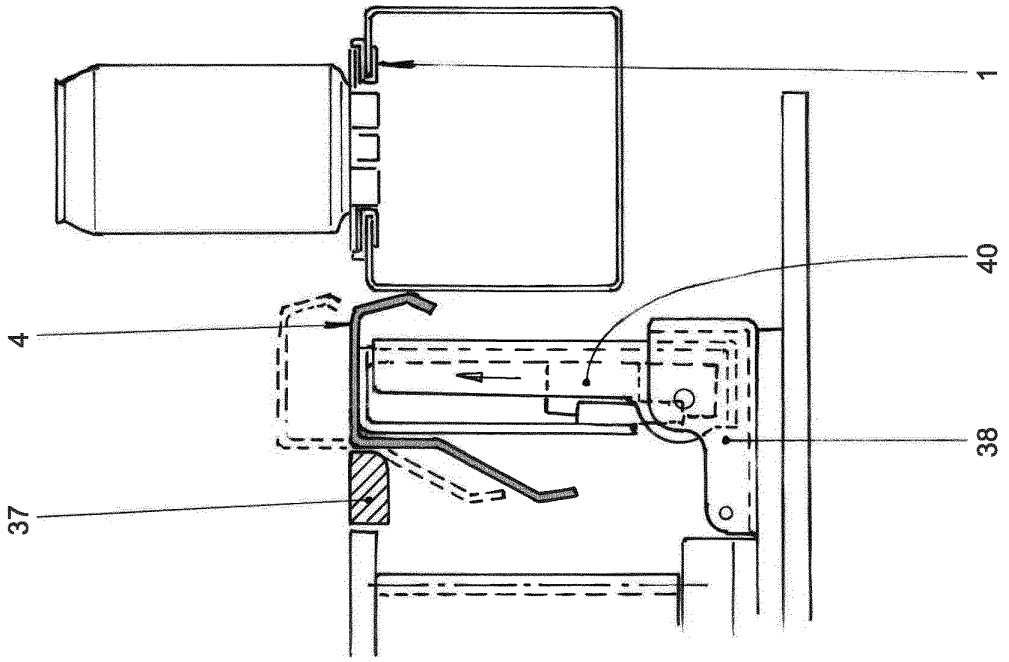

fig. 6

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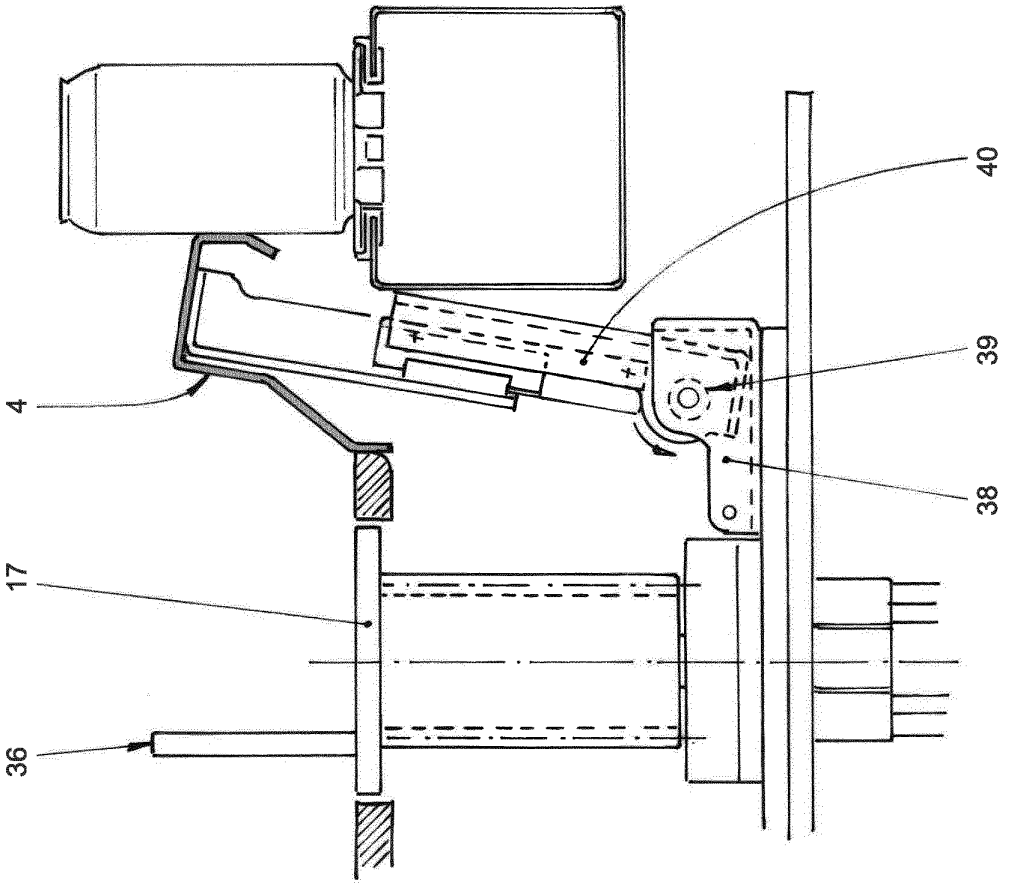

fig. 5

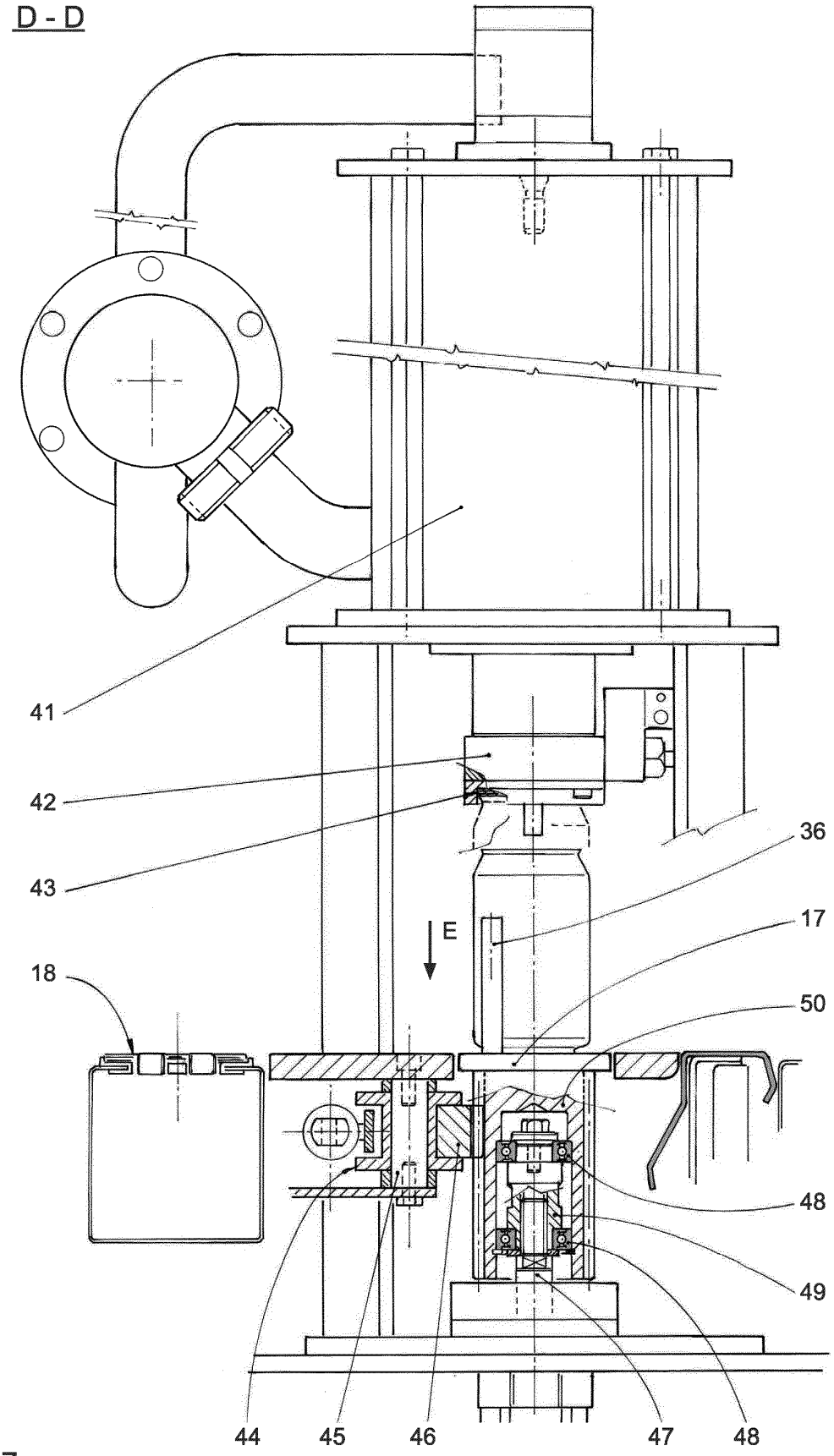

fig. 7

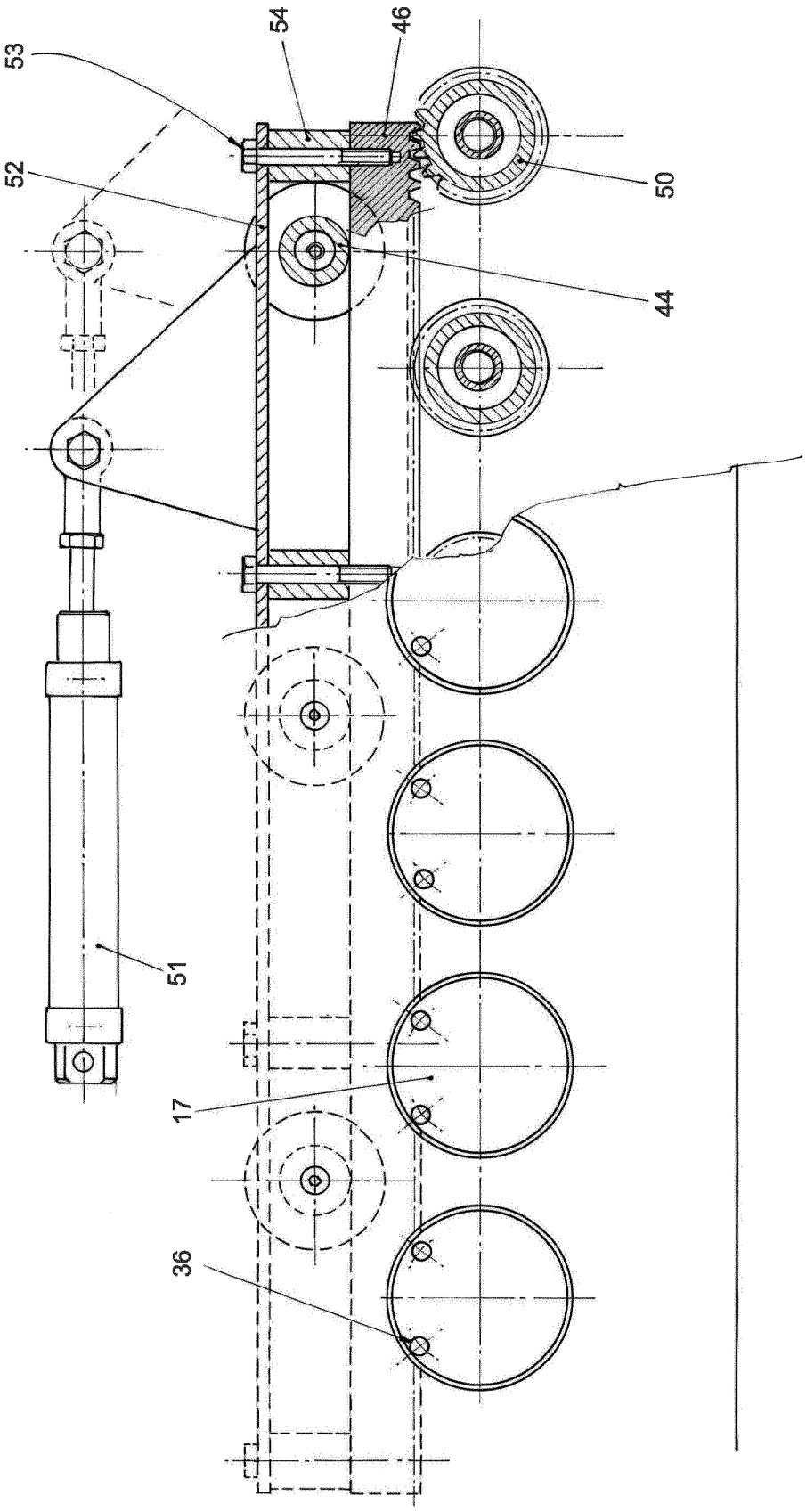

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fig. 8

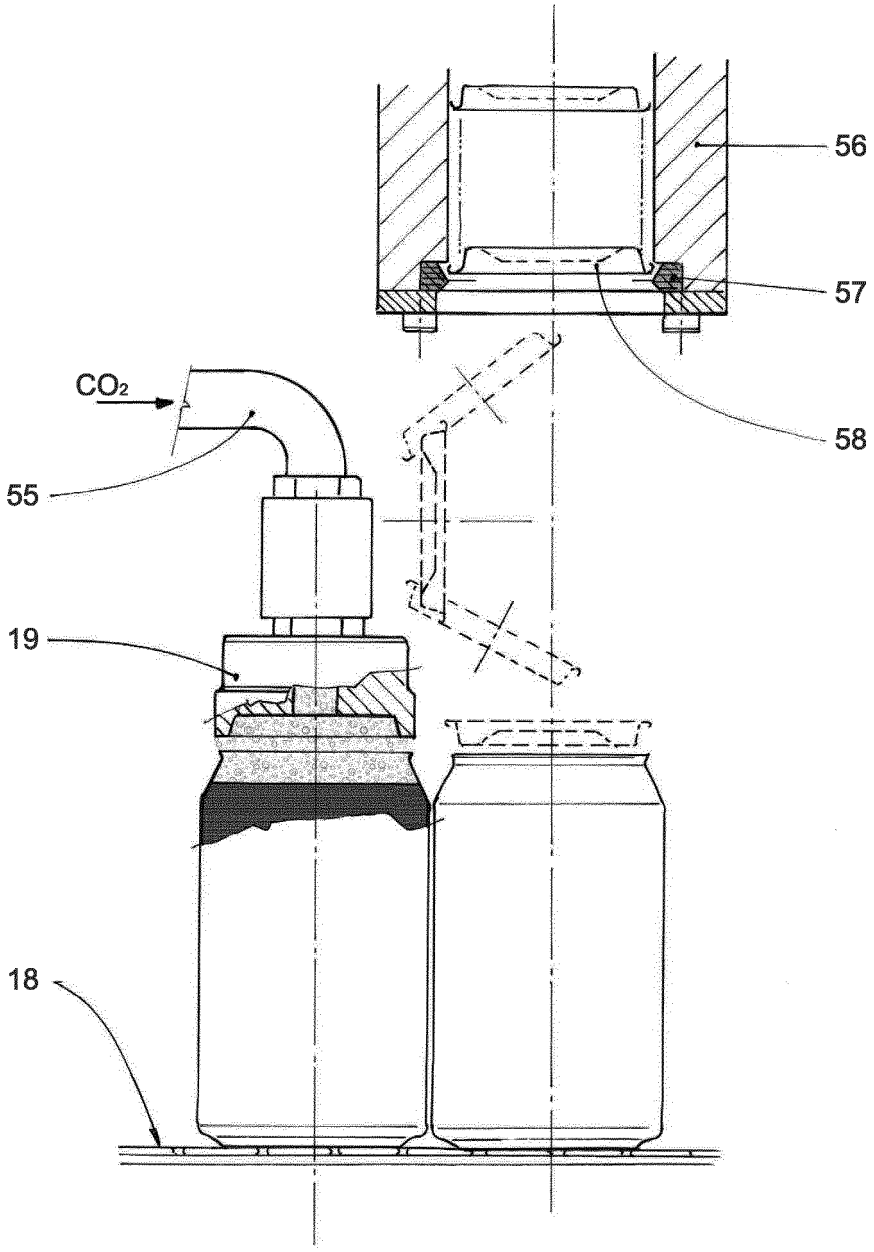

fig. 9

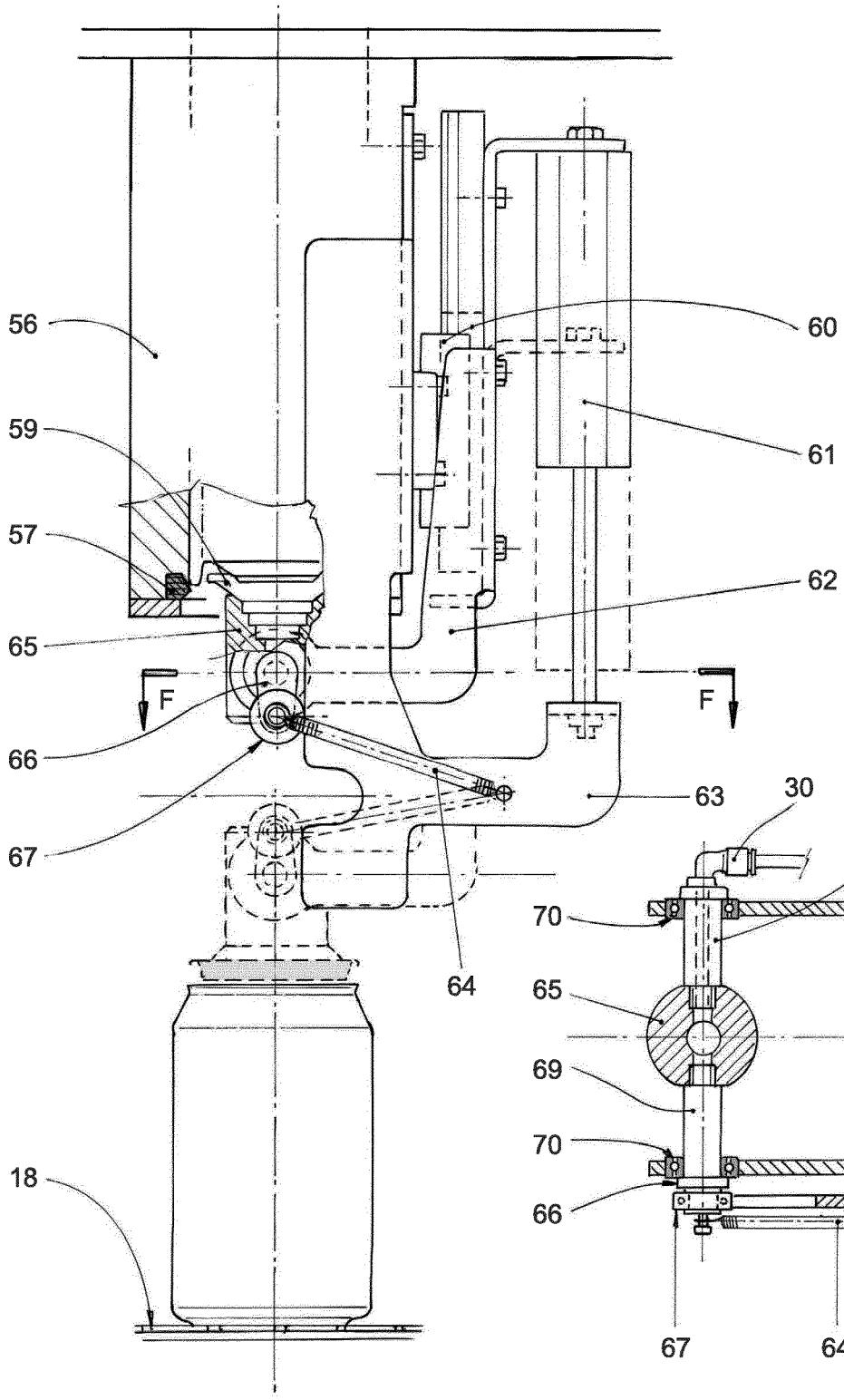
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fig. 10

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fig. 11

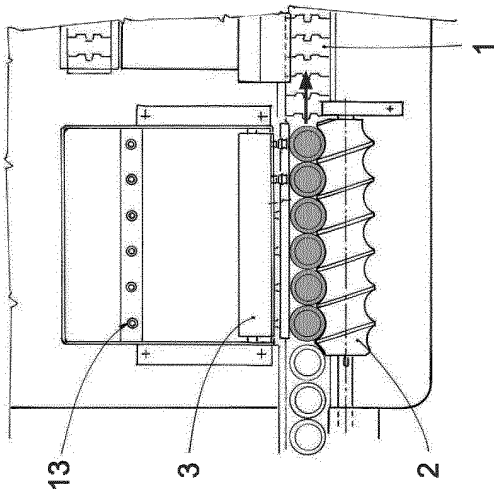

fig. 14

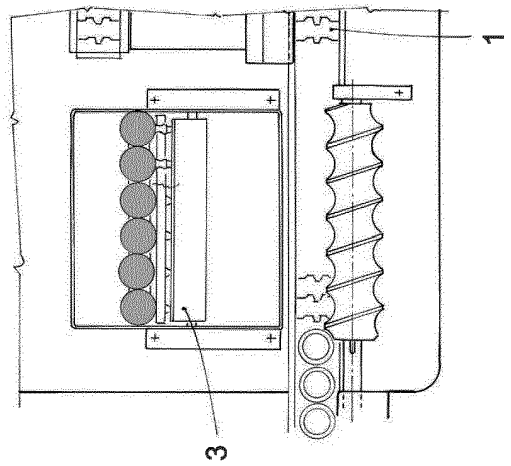

fig. 13

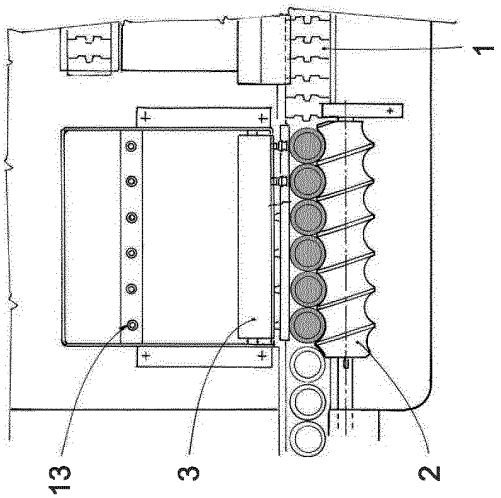

fig. 12

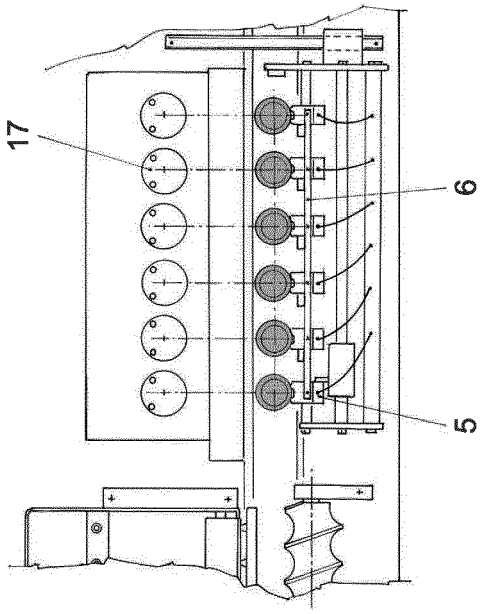

fig. 16

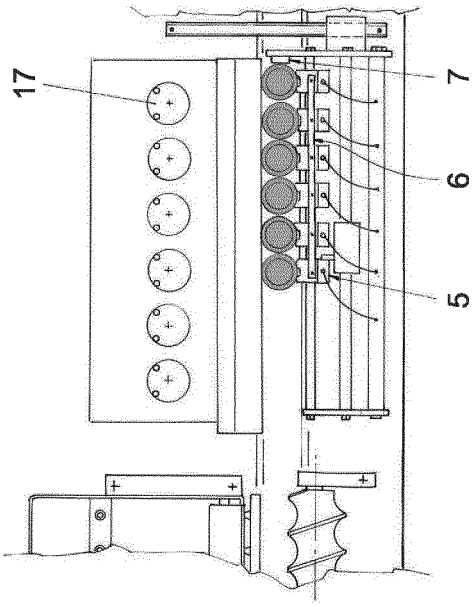

fig. 15

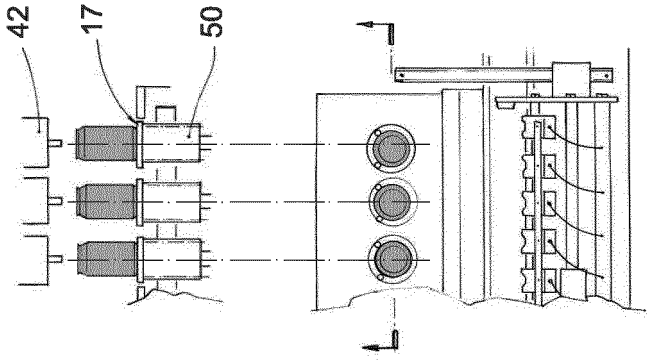

fig. 18

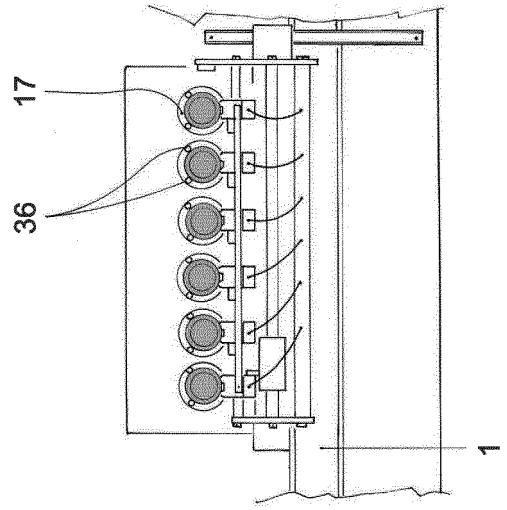

fig. 17

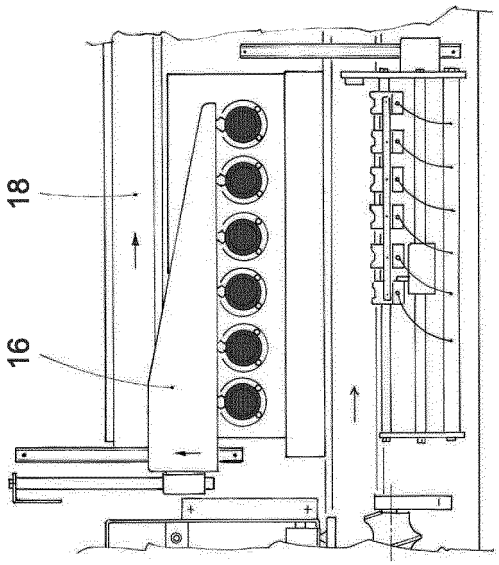

fig. 20

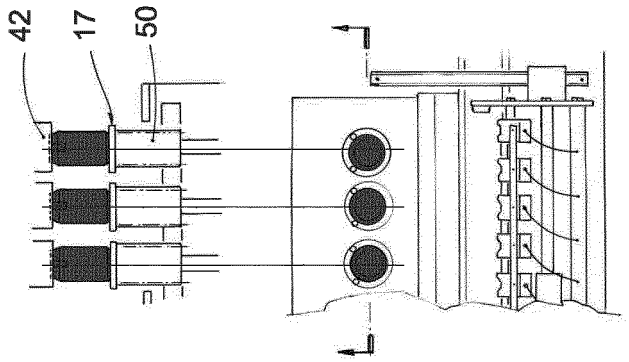

fig. 19

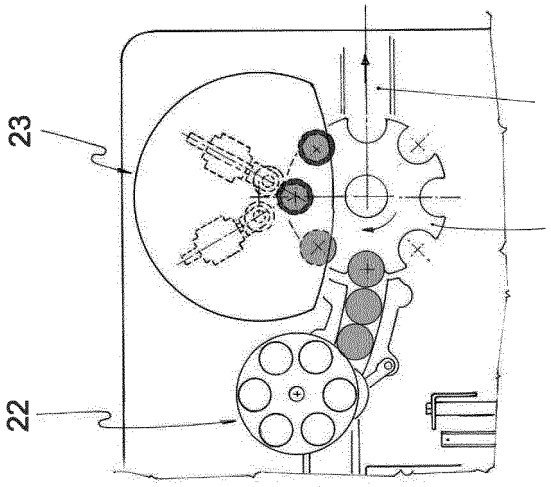

fig. 22

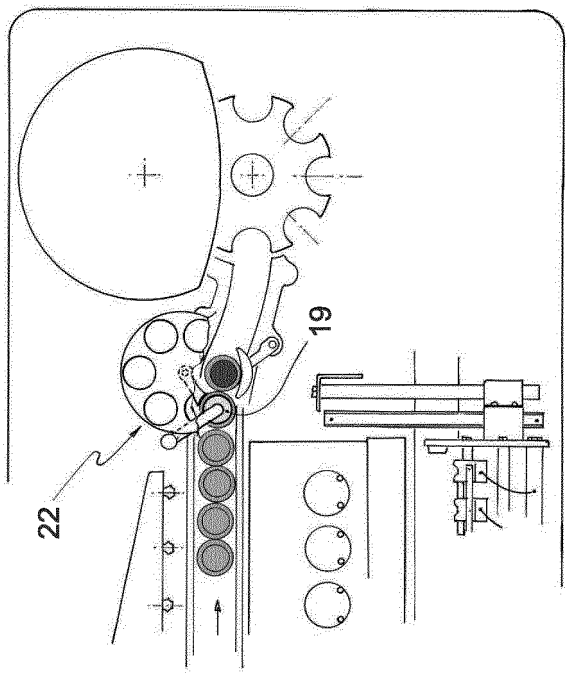

fig. 21

REFERENCES CITED IN THE DESCRIPTION

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