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(54) GARMENT IRONING AND/OR DRYING APPARATUS OF TUNNEL TYPE

(57) Garment treatment, or ironing and/or drying, apparatus (1), comprising: a treatment chamber (2) traversed by a feed path (x) for garments to be treated; steaming and/or ventilation means provided with steam and/or air outlets (3) opening on two opposite walls (6) and facing from the side said feed path (x) and both movable towards and away from each other, so as to determine a width (L) of the treatment chamber (2) traversed by the feed path (x), said walls (6) closing, on the side adjacent the feed path (x), respective distribution modules (7) that are connected, via a flexible hose, to an upstream portion of said steaming and/or ventilation means, said distribution modules (7) comprising at least one inlet mouth (7a) coupled to the flexible hose and a distribution path (7b) that connects said inlet mouth (7a) to said steam and/or air outlets (3).

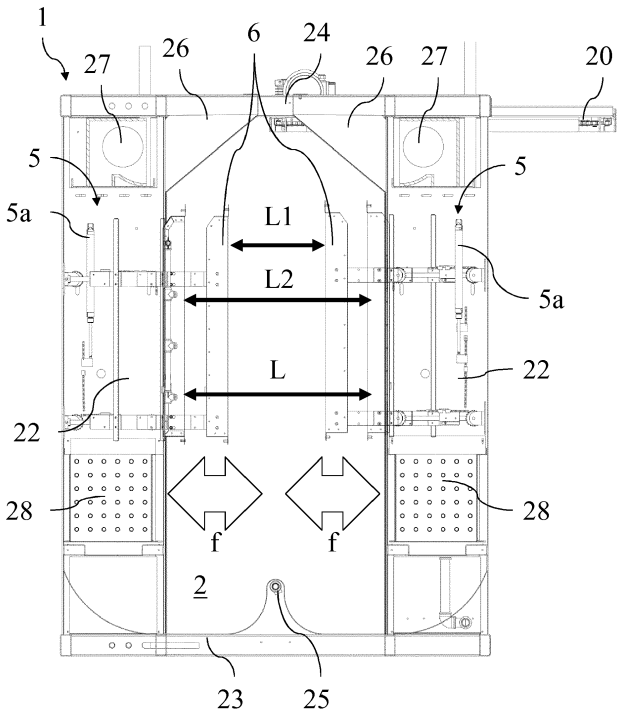

Fig. 5

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Description

Application field

[0001] The present invention refers to a garment treatment apparatus, particularly to a so-called tunnel apparatus suitable to iron, recondition and/or finish garments having various appearance and being of different types.

[0002] The invention has useful application in the logistic and industrial laundry sectors.

Known art

[0003] As it is well known, in the above-mentioned industrial sectors there is the need of treating the garments after they lie in their packages for a more or less long time - for example following the transportation from the manufacturing area - in order to be able to display them in the retail outlet in unexceptionable conditions.

[0004] In order to carry out the so-called reconditioning of those garments, they are put into industrial apparatuses that expose them to steam action and/or to hot/cold air jets blowing.

[0005] Those apparatuses, better known in the sector as tunnels, have a continuous loop garment feed chain that traverses one or more treatment chambers. At the sides of the chamber, there are facing walls equipped for steaming and/or ventilating the garments moving along the path. It is also usual to provide for steaming and blowing nozzles that hit the garments from the bottom and in case from the top too.

[0006] The distance dividing the equipped lateral walls, i.e. the chamber width, has a critical importance during the above described treatment operations.

[0007] The outerwear, or generally the heavy items that need an inflating effect after a long packaging period, or moreover the wet laundry garments to be dried, are inserted inside the tunnel in the width direction (this case is known as front/back progression). In this case, the width of the chamber walls must be quite high - roughly about one meter - in order to allow inserting the items.

[0008] For the lighter garments, such as for example blouses, trousers, or other similar items, instead a narrower dimension of the treatment chamber is preferred. In fact, in this case, the consecutive items are inserted inside the tunnel slantwise (shoulder-shoulder progression), so that the front and back portions are directly hit by the steam and/or air. The steaming and blowing nozzles proximity guarantees a greater ironing efficiency for the above-mentioned items.

[0009] In light of the above, the known art offers wide chamber or narrow chamber drying/ironing tunnels, specifically intended for one or the other of the above-identified garment types.

[0010] Therefore, there is no possibility to carry out the treatment of different garment types with a single apparatus, unless accepting a non-optimal result when ironing the light items or when inflating the heavy ones.

[0011] Therefore, the technical problem underlying the present invention is to provide an improved single garment treatment apparatus being equally effective in reconditioning the items of both the above-identified categories.

Summary of the invention

[0012] The above-mentioned technical problem is solved by a garment treatment apparatus, comprising: a treatment chamber traversed by a feed path for garments to be treated; steaming and/or ventilation means provided with steam and/or air outlets opening on two opposite walls facing from the sides said feed path wherein at least one of those walls is movable so as to allow a variation in the relative distance between said walls.

[0013] Basically, the idea underlying the present invention is to transfer, at least in part, the lateral steaming and/or ventilation means on a movable member, in order to allow a machine reconfiguration according to the specific treatment needs: heavy garments or light garments.

[0014] Therefore, it is possible to obtain an innovative and advantageous operating flexibility of the treatment apparatus according to the present invention.

[0015] Preferably, both walls are movable towards and away from each other, in order to determine a width of the treatment chamber traversed by the feed path.

[0016] Actually, the treatment quality is highly improved when it is possible to guarantee a symmetric action of the lateral steaming and/or ventilation means; that effect is obtained by mounting both walls on parts being symmetrically movable with respect to the garment feed path.

[0017] Particularly, the two walls are preferably arranged to close, on the side adjacent the feed path, respective distribution modules that are connected, via a flexible hose, to an upstream portion of said steaming and/or ventilation means.

[0018] That operating structure is particularly advantageous because of its building ease. Alternatively, it is possible to provide for fluid-tight telescopic guides for said walls, in this case configuring themselves as real lateral walls of the treatment chamber. Alternatively, it is possible to provide for fluid-tight bellows for said walls configuring themselves as real lateral walls of the treatment chamber too.

[0019] Said distribution modules can advantageously comprise at least one inlet mouth being coupled to the flexible hose and a distribution path connecting said inlet mouth to said steam and/or air outlets.

[0020] The apparatus can also advantageously provide for actuator means for displacing one or both said walls.

[0021] Particularly, the actuator means can comprise at least one linear actuator being arranged in parallel to the wall connected herewith, and connected to said wall by means of an angular transmission system, for example a chain and pulley angular transmission.

[0022] Thanks to that device, it is possible to house the whole actuator/transmission mechanism inside the lateral technical compartments of a tunnel apparatus having standard dimensions.

[0023] Preferably the apparatus further comprises a control unit for the actuator means, which is able to drive said actuator means in order to selectively obtain at least two preset widths of the treatment chamber: one being dedicated to light garments, the other to heavy garments. The control unit can also control other operating parameters, for example the temperature, according to the garment types being treated.

[0024] The control unit can also drive said actuator means so that the walls oscillate at a preset frequency and a preset amplitude around a reference position.

[0025] In fact, such an operating mode seems to cause excellent ironing results, by exploiting a so-called "wave effect", on some garment types being treated.

[0026] The apparatus can also comprise a feed chain for the garments to be treated which is selectively configurable in order to arrange the garments to be fed shoulder-shoulder (selected for light garments) or front-back (selected for outerwear or heavy garments).

[0027] Further characteristics and advantages will better appear from the detailed description carried out herein of one preferred, but not exclusive, embodiment of the present invention, with reference to the attached drawings given by way of non-limiting example.

Brief description of the drawings

[0028]

Figure 1 shows a side view of a garment treatment apparatus according to the present invention;

Figure 2 shows a sectional view of the treatment apparatus along the plane C-C of figure 1;

Figure 2a shows an enlarged detail of the view of figure 2;

Figure 3 shows a sectional view of the treatment apparatus along the plane B-B of figure 1;

Figure 3a shows an enlarged detail of the view of figure 3;

Figure 4 shows a perspective view of the treatment apparatus in figure 1, having the walls removed to allow the visualization of the internal structure;

Figure 5 shows a front sectional view of the treatment apparatus in figure 1;

Figure 6a shows a perspective view of the distribution module of the treatment apparatus of figure 1;

Figure 6b shows an opposite perspective view of the distribution module of figure 6a;

Figure 7a shows a schematic front view of the distribution module of figure 6a in a first operating configuration;

Figure 7b shows a schematic front view of the distribution module of figure 6a in a second operating configuration;

Figure 7c shows a schematic top view of the distribution module of figure 6a;

Figure 8 shows a perspective view of the distribution module of figure 6a having the closing wall removed to allow the visualization of the internal structure.

Detailed description

[0029] Referring to the attached drawings, with 1 it is globally indicated a garment treatment apparatus according to the present invention.

[0030] The apparatus 1 comprises a supporting frame defining at least one treatment chamber 2 or tunnel, provided with input and output passages opposite to each other and closable by means of suitable doors 21, preferably fluid-tight. Between the input and output passages, a feed path x extends for the garments to be treated, longitudinally traversing the treatment chamber 2.

[0031] The garments to be treated can be hanged individually, by means of hangers, to coupling hooks of a continuous loop feed chain 20, a segment of which traverses the upper part of said treatment chamber 2 following the above-mentioned feed path.

[0032] Preferably, the feed chain 20 is provided to allow the coupling of the garments to be treated in two alternative configurations: one the so-called front-back, in which consecutive hanged garments are arranged transversally with respect to the feed chain 20; the other the so-called shoulder-shoulder, in which consecutive hanged garments are arranged in line with the feed chain 20. In order to allow selecting the coupling mode, the coupling hooks angular position can be modified by means of suitable permutation commands.

[0033] The treatment chamber 2 is laterally flanked by two technical compartments 22 defining flow paths therein for the steam and/or air to be dispensed in the chamber; it is also delimited by a bottom wall 23 and by a top wall 24 as well as by the above-identified doors 21.

[0034] It must be noted that the garment feed path x develops along a median plane of the treatment chamber 2, which presents a substantially symmetrical structure with respect to said plane.

[0035] From the bottom wall 23, a dispensing appendix 25 elevates, being provided with a substantially cusp-shaped cross section and with a straight top edge extended below and at the garment feed path x. On that

edge, a plurality of steam and/or air outlet nozzles open, being connected to the flow paths of the technical compartments 22 via passages under the bottom wall 23.

[0036] Particularly, the dispensing appendix 25 allows steaming the garments to be reconditioned from below, particularly guaranteeing the inflating of outerwear or other heavy garments inserted in front-back configuration.

[0037] It must be also noted that the nozzles linear extension of the dispensing appendix 25 allows locally steaming the lighter garments inserted in shoulder-shoulder configuration.

[0038] At the top wall 24, two steam and/or air recirculation mouths 26 are arranged in communication with the lateral technical compartments 22; two longitudinal fans 27 help circulating the flows coming from the recirculation mouths 26 towards the bottom of the technical compartments.

[0039] In both the technical compartments 22 is also provided an overheating battery suitable to continuously produce steam to be dispensed inside the treatment chamber 2.

[0040] Inside the two technical compartments 22, two distribution modules 7 are also slidingly movable, provided with a vertical wall 6 facing a top portion of the treatment chamber 2. The two walls 6 of the respective distribution modules 7 are opposite to each other, and symmetrically arranged with respect to the garment feed path traversing them.

[0041] The two distribution modules 7, having an identical and specular structure, are shaped as a closed box, on the side adjacent the garment feed path x, from the respective wall 6 provided with a plurality of through slots.

[0042] The distribution module 7 is also connected, by means of a flexible hose not shown in the attached drawings, with the steam flow being generated inside the respective technical compartment. In particular, the flexible hose couples to two lateral inlet mouths 7a being opened on the internal side - that is the one opposite to the wall 6 - of the distribution module 7. A distribution path 7b, made by a branched hose, brings the steam coming from the inlet mouths 7a to a plurality of nozzles 7c being distributed under the wall 6.

[0043] Therefore, the steam exits from the nozzles 7c and then from the slots of the wall 6, which thus are defining steam outlets 3 of the distribution module directed towards the garment feed path x.

[0044] Advantageously according to the present invention, the distribution modules 7 allow the steam and/or air to be properly dispensed to the garments to be treated inside the treatment chamber 2. In particular, since the distribution modules 7 are shaped as closed boxes due to the presence of the walls 6, the variation in the relative distance between such distribution modules 7 does not affect the amount of steam and/or air volume to be dispensed in the treatment chamber 2 and, more important, in the technical compartments 22 during the garment treatment.

[0045] The steam and/or air flow, being constant in the technical compartments 22, is thus kept constant in the treatment operation of different garment types. This leads to undeniable economic advantages, since a waste of steam and/or air is prevented inside the technical compartments 22 and the treatment chamber 2, whose volume is kept unchanged during the movement of the distribution modules 7, as clearly shown in figure 5.

[0046] It should also be noted that the distribution path 7b of the distribution modules 7 ensures a spatial homogeneity and a constant pressure in the steam and /or air dispensing, thus ensuring a homogeneous ironing of the garments.

[0047] As outlined above, the two distribution modules 7 are slidingly movable, according to the direction shown by arrows f of figure 5, with respect to the frame 10 of the apparatus 1.

[0048] Concretely, each distribution module 7 is provided with four brackets 11a arranged at vertices of a rectangular coupling profile. The free end of each bracket 11a is slidingly fixed to a respective guiding rod 11b, being integral with the frame and orthogonal with respect to the wall 6.

[0049] In order to command the sliding of the two distribution modules 7 along the guiding rods 11b, an actuator and transmission mechanism, briefly described in the following, is provided. It must be noted that the actuator and transmission mechanisms of the respective distribution modules 7 are fully housed inside the corresponding technical compartments 22.

[0050] For each distribution module two linear actuators 5a are provided, preferably pneumatic jacks, being fixed inside the technical compartment 22 having a vertical orientation, i.e. being arranged substantially in parallel to the steaming wall 6.

[0051] Each linear actuator 5a is provided with a transmission connecting it with two of the brackets 11a in order to help their sliding along the respective guiding rods 11b; in the following only one of those transmissions is described, the other being identical and specular to the first one.

[0052] The free end of the linear actuator 5a is bound to a first transmission chain 5b, stretched in a loop between two first toothed pulleys 5c. The first pulleys 5c are twinned with second pulleys 5d on which second transmission chains 5e are wound, being kept in tension by return pulleys 5f. The second transmission chains 5e substantially extend along the guiding rods 11b, and are bound to the sliding end of the brackets 11 a.

[0053] Therefore, a displacement of the linear actuator 5a causes a sliding of the first transmission chain 5b and, via the return determined by the twinned pulleys 5c, 5d, of the second transmission chains 5e, which drag the two brackets 11a with them along the guiding rods 11b.

[0054] Clearly, the movements of the two linear actuators 5a related to a single distribution module 7 are synchronized so that the different brackets 11a moves all together along the respective guiding rods 11b, causing a movement of the wall 6 toward or away from the oppo-

site distribution module 7.

[0055] Preferably, the linear actuators 5a related to the two distribution modules 7 are also synchronized in order to define specular movements of the opposite elements, so as to always to keep the building symmetry with respect to the garment feed path x.

[0056] The above-described operating configuration allows modifying the opening or width L between the steaming walls, particularly adapting it to the garment type to be treated. In fact, according to what said in the known art description, it is preferable to select a wider opening L1 (roughly 730-1000 mm) to treat outerwear or other heavy garments, while a narrower opening L2 (roughly 350-400 mm) is more recommended to treat the light garments.

[0057] Advantageously, the apparatus according to the present invention comprises a control unit being able to control the various operating parameters of the device, and particularly to command the movement toward or away from each other of the walls 6. Thanks to that control unit, the user can select by means of an external interface 30 for example between two different programs, one recommended for heavy garments, the other for light garments. For each program, according to what stated above, the control unit adjusts the opening of the walls 6, together with other process variables such as the temperature, being preferably lower in the light garments treatment.

[0058] It should be also noted that, thanks to the control unit, it is possible to carry out the garments treatment by letting the opening of the walls 6 vary constantly: particularly, the opening can be let oscillate at a preset amplitude and frequency around a reference mean value. Such a treatment mode determines a better ironing result with certain garments.

[0059] It should be also noted that, although the description of the preferred embodiment is focused on the steaming means integrated in the distribution modules 7, they can also provide for hot and/or cold air blowing means, according to specific functional needs being easily recognizable by one skilled in the art.

[0060] Clearly, to the above-described invention, one skilled in the art, with the purpose of fulfill contingent and specific needs, will be able to make several changes and variations, all included under the protection scope of the invention as defined by the following claims.

Claims

1. Garment treatment apparatus (1), comprising: a treatment chamber (2) traversed by a feed path (x) for garments to be treated; steaming and/or ventilation means provided with steam and/or air outlets (3) opening on two opposite walls (6) facing from the side said feed path (x) and both movable towards and away from each other, so as to determine a width (L) of the treatment chamber (2) traversed by the feed path (x), **characterized in that** said walls (6) close, on the side adjacent the feed path (x), respective distribution modules (7) that are connected, via a flexible hose, to an upstream portion of said steaming and/or ventilation means, said distribution modules (7) comprising at least one inlet mouth (7a) coupled to the flexible hose and a distribution path (7b) that connects said inlet mouth (7a) to said steam and/or air outlets (3).

2. Treatment apparatus (1) according to claim 1, further comprising actuator means (5) to displace one or both of said walls (6).

3. Treatment apparatus (1) according to claim 2, wherein said actuator means (5) comprises at least one linear actuator (5a) arranged in parallel to the wall (6) connected herewith, and connected to said wall (6) by means of an angular transmission system.

4. Treatment apparatus (1) according to claim 3, wherein said angular transmission system is a chain and pulley angular transmission (5b, 5c, 5d, 5e, 5f).

5. Treatment apparatus (1) according to one of claims 2-4, comprising a control unit for the actuator means (5), which is able to drive said actuator means in order to selectively obtain at least two preset widths (L1, L2) of the treatment chamber (2).

6. Treatment apparatus (1) according to claim 5, wherein said control unit is able to drive said actuator means so that the walls (6) oscillate at a preset frequency and a preset amplitude around a reference position.

7. Treatment apparatus (1) according to one of the preceding claims, comprising a feed chain (20) for the garments to be treated along the feed path (x) which is selectively configurable for arranging the garments to be fed in a shoulder-shoulder configuration or in a front-back configuration.

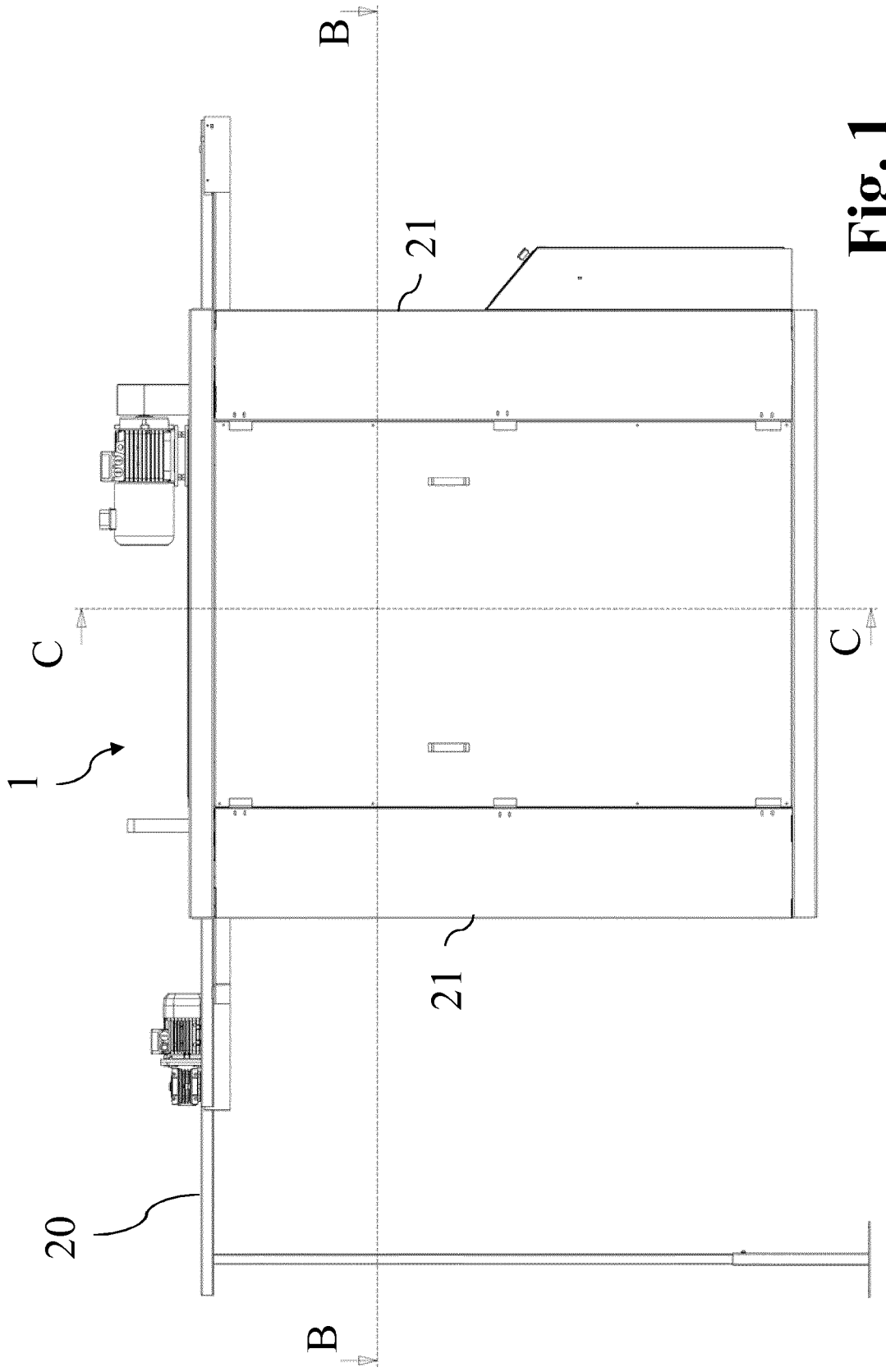


Fig. 1

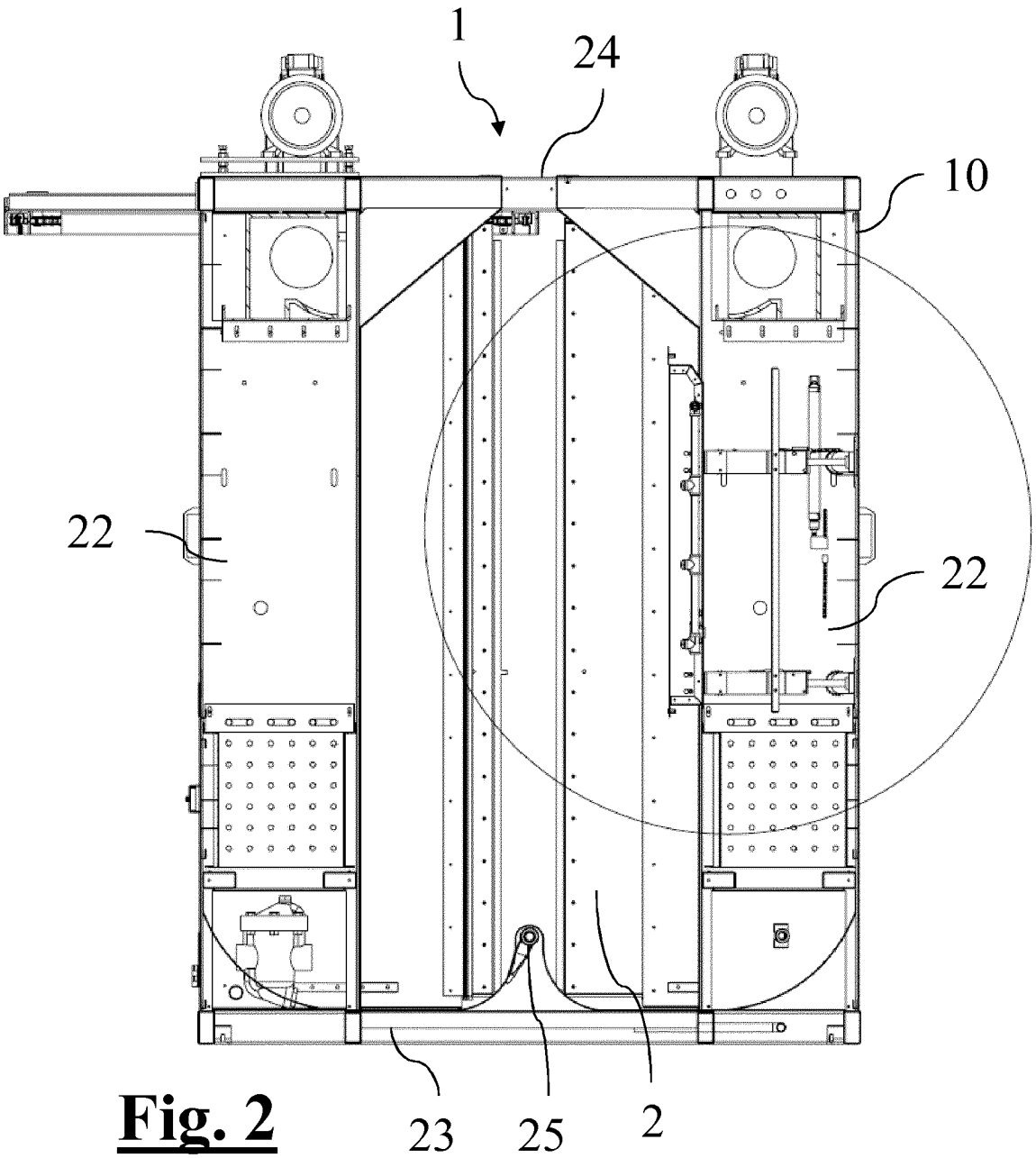


Fig. 2

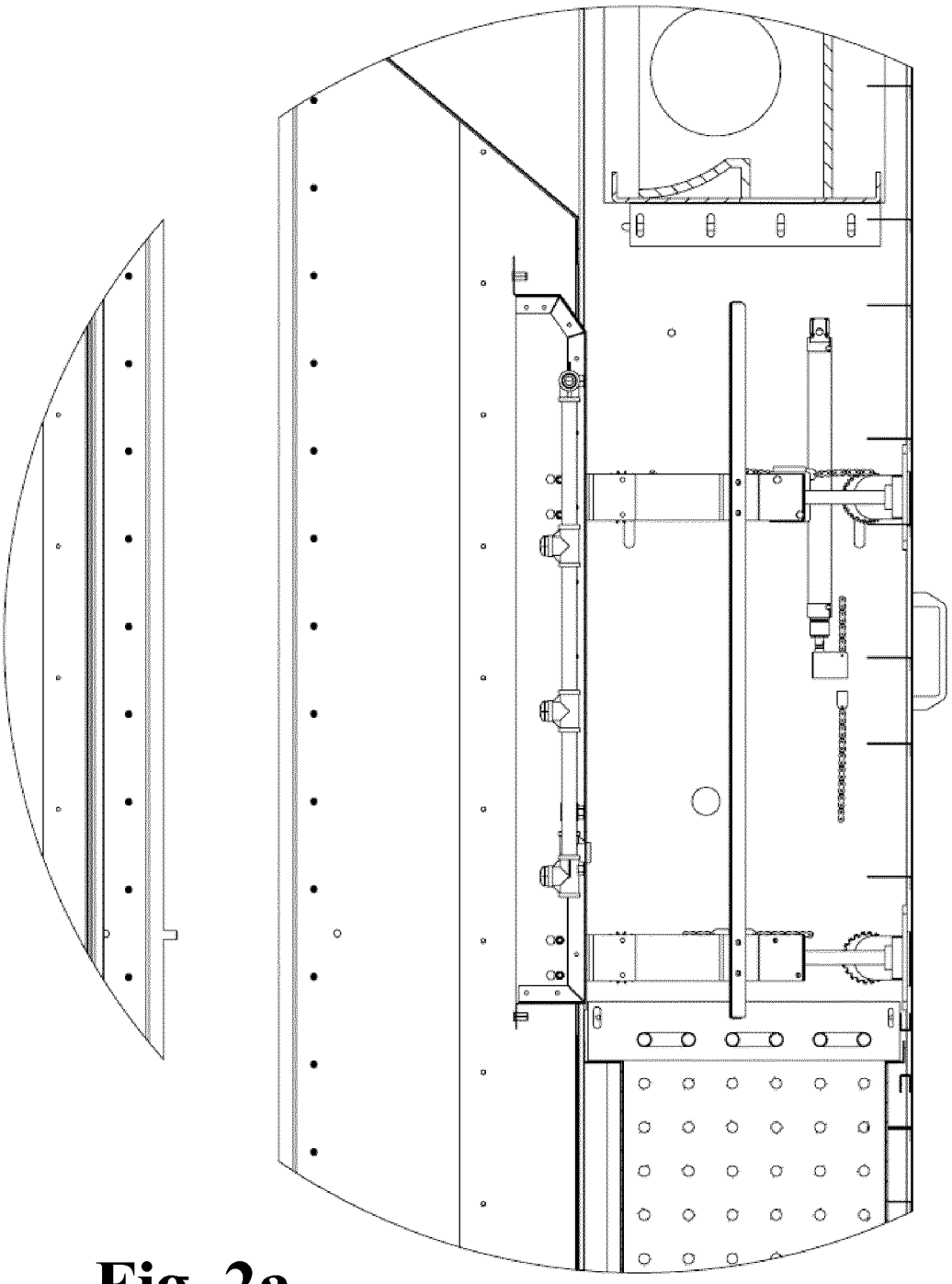
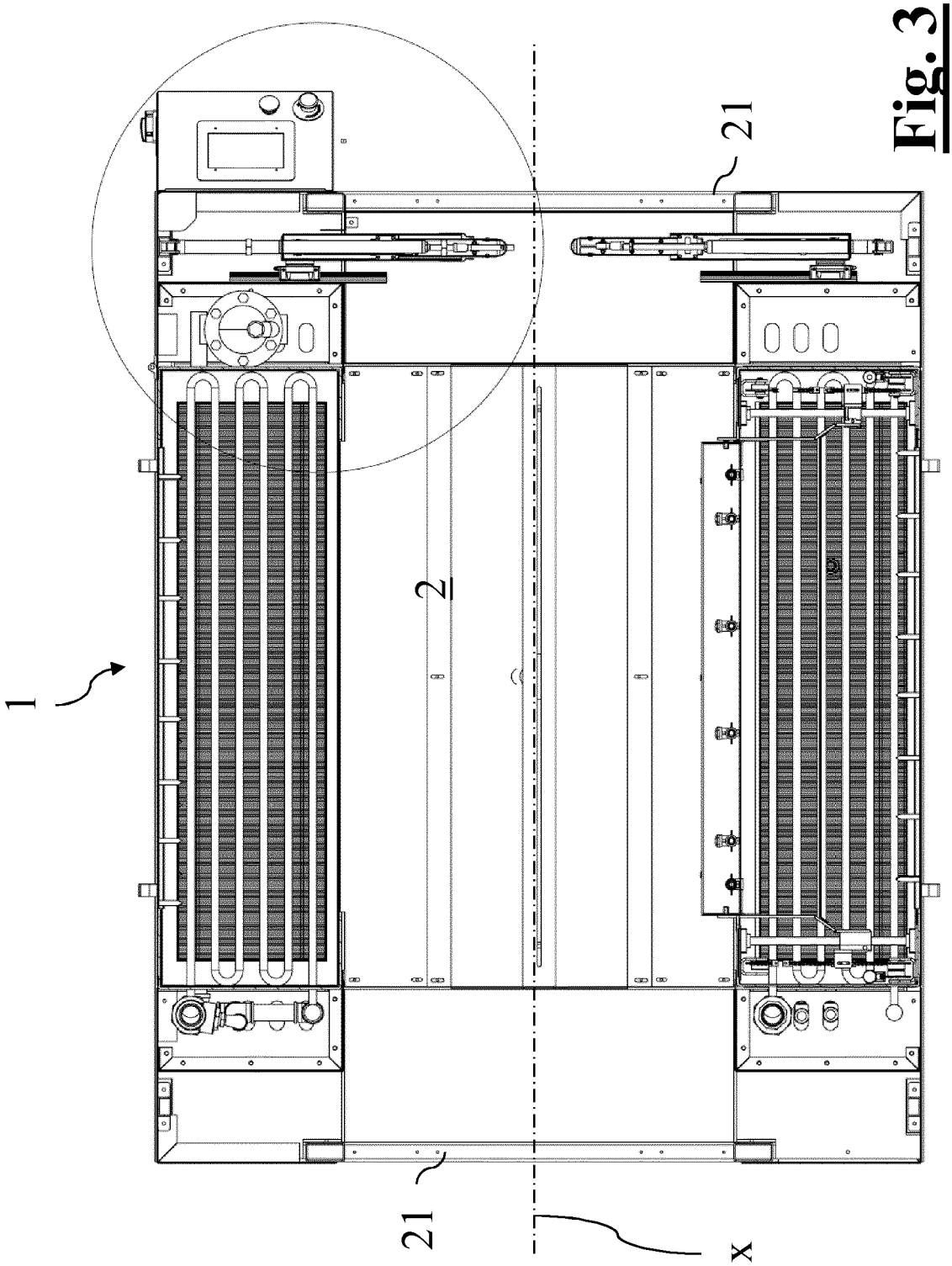


Fig. 2a

Fig. 3



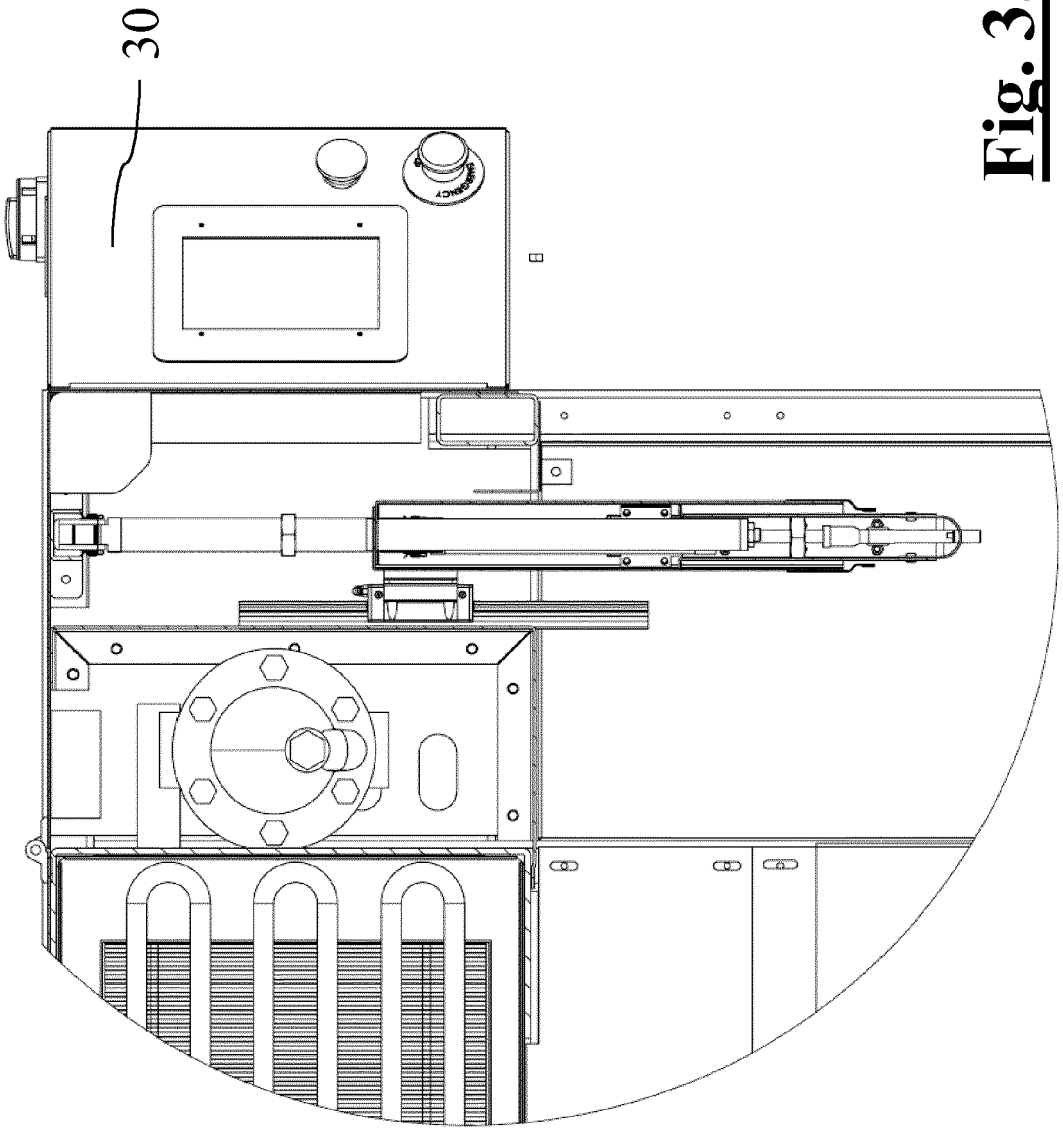


Fig. 3a

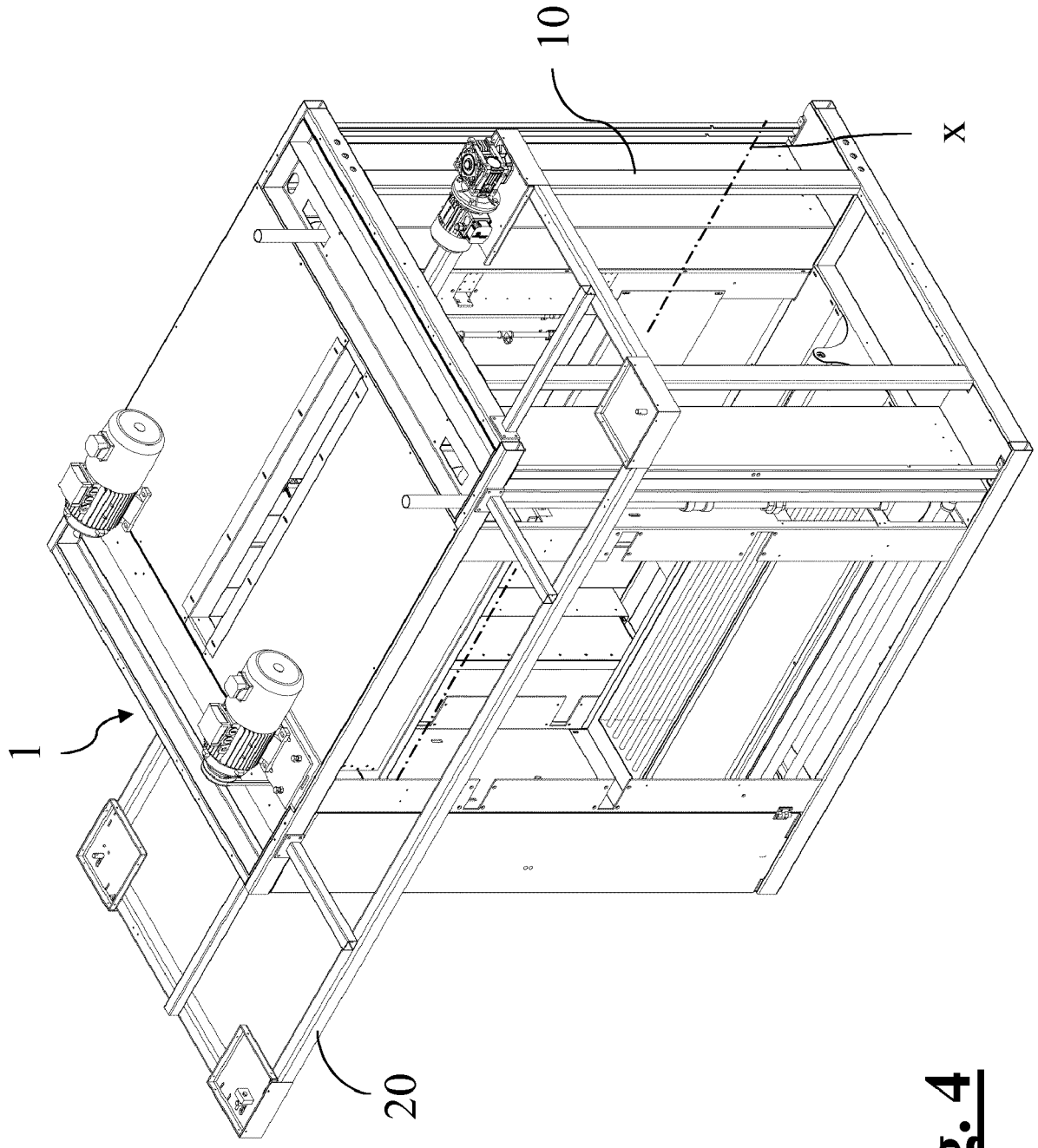


Fig. 4

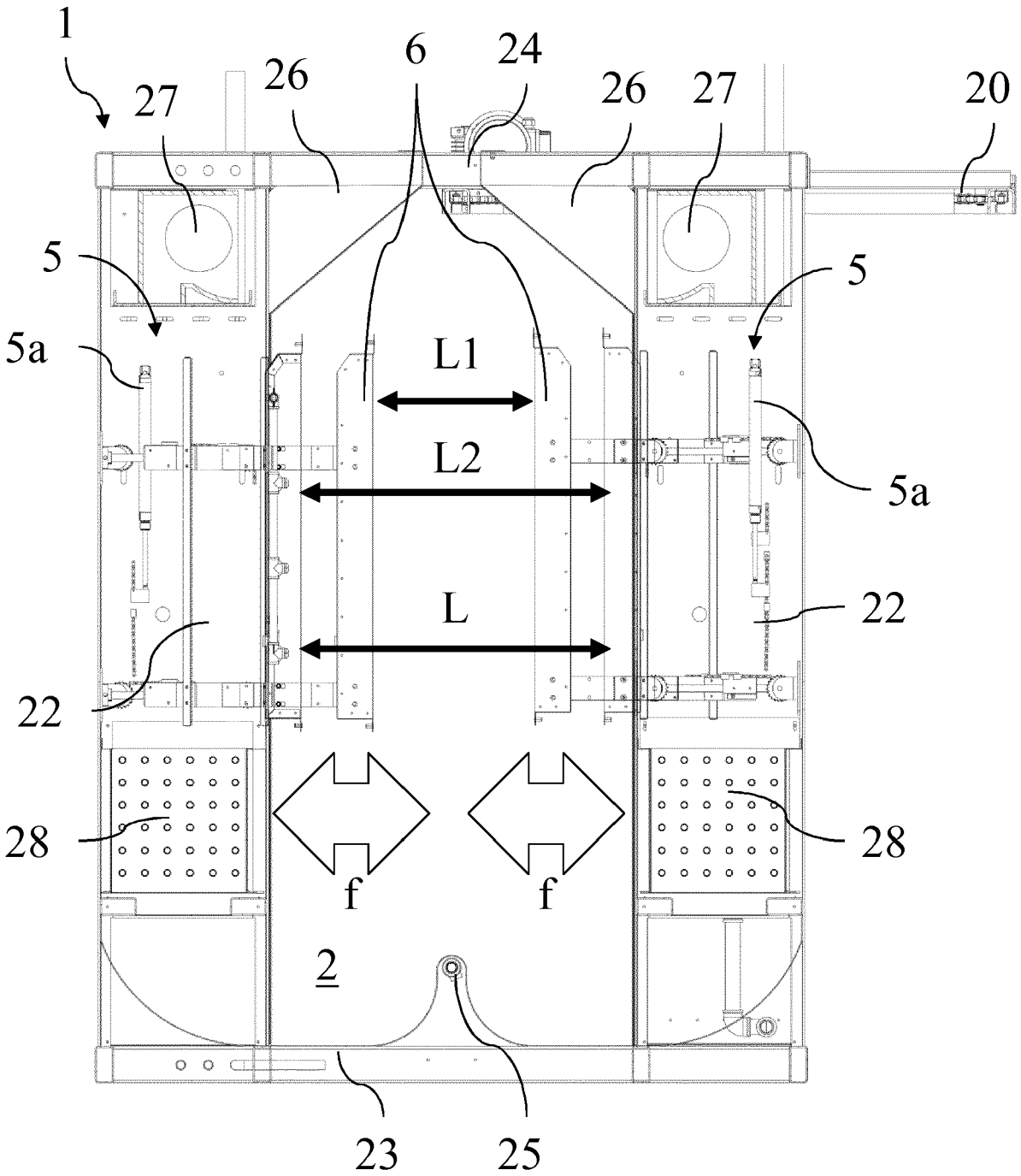


Fig. 5

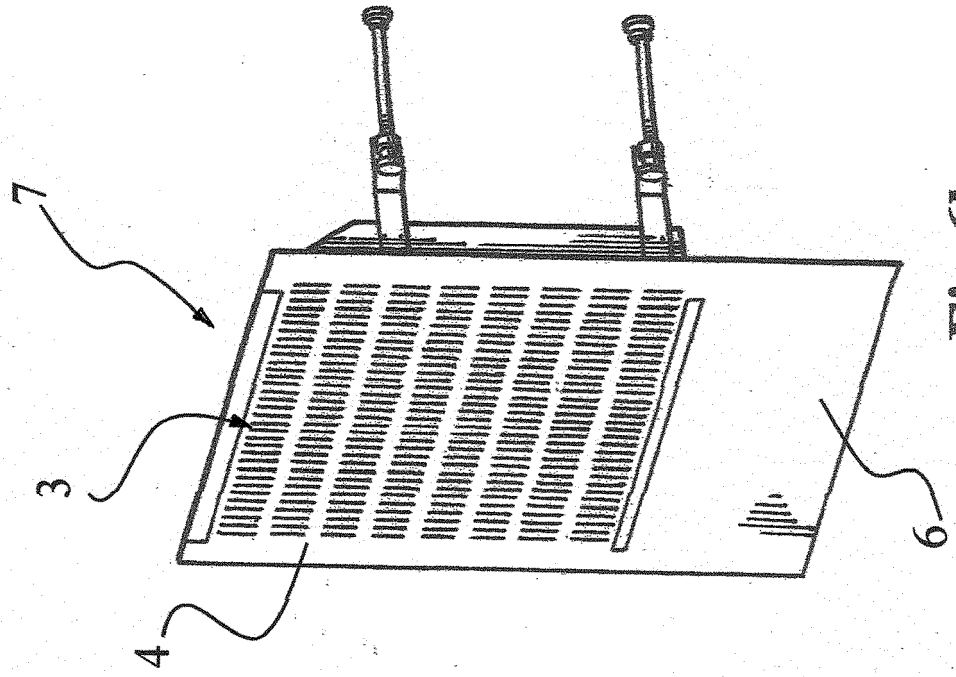


Fig.6b

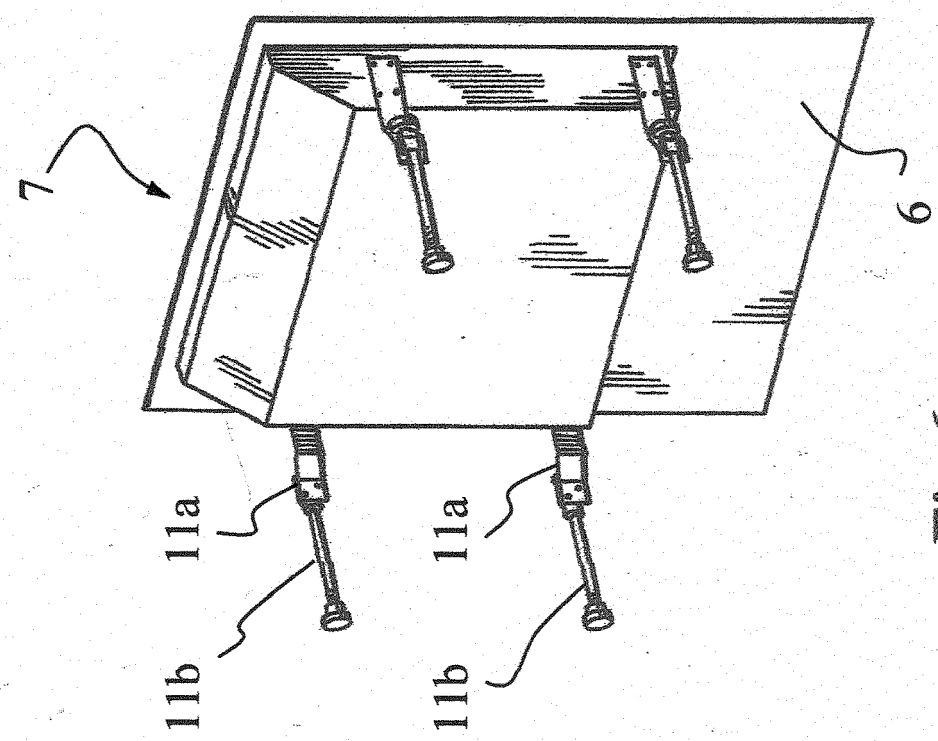


Fig.6a

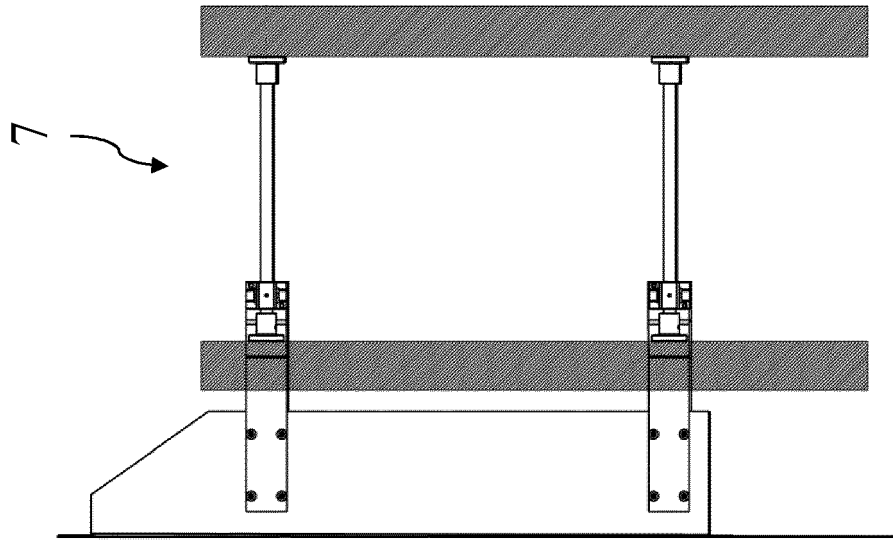


Fig. 7b

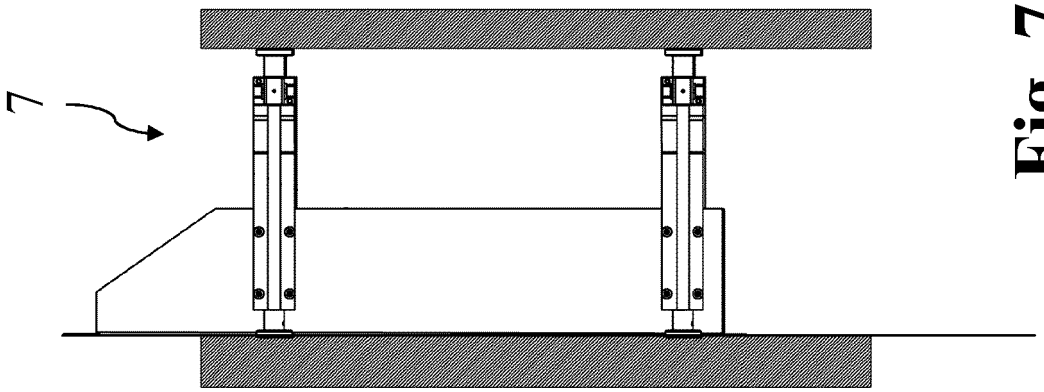


Fig. 7a

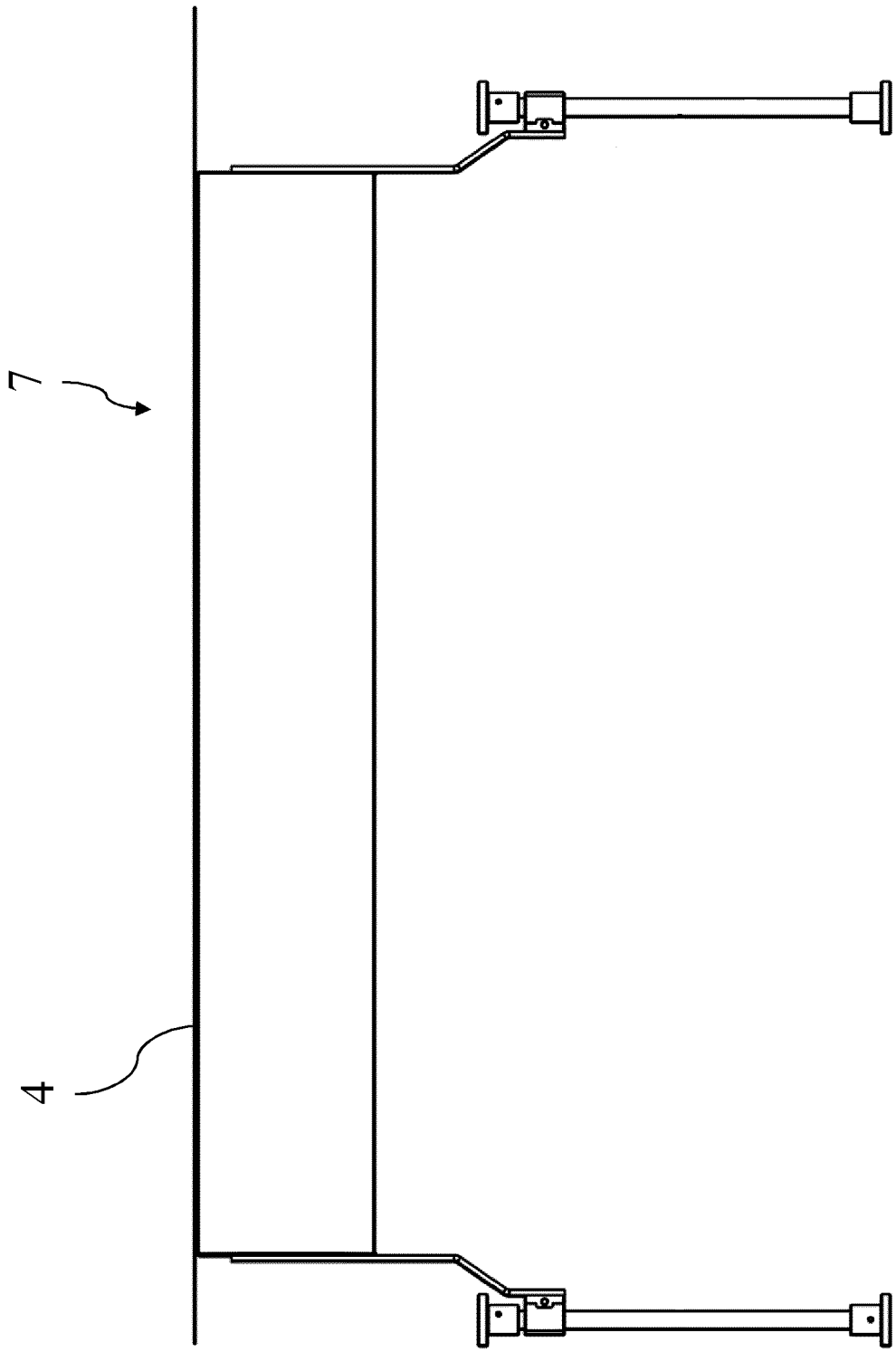


Fig. 7c

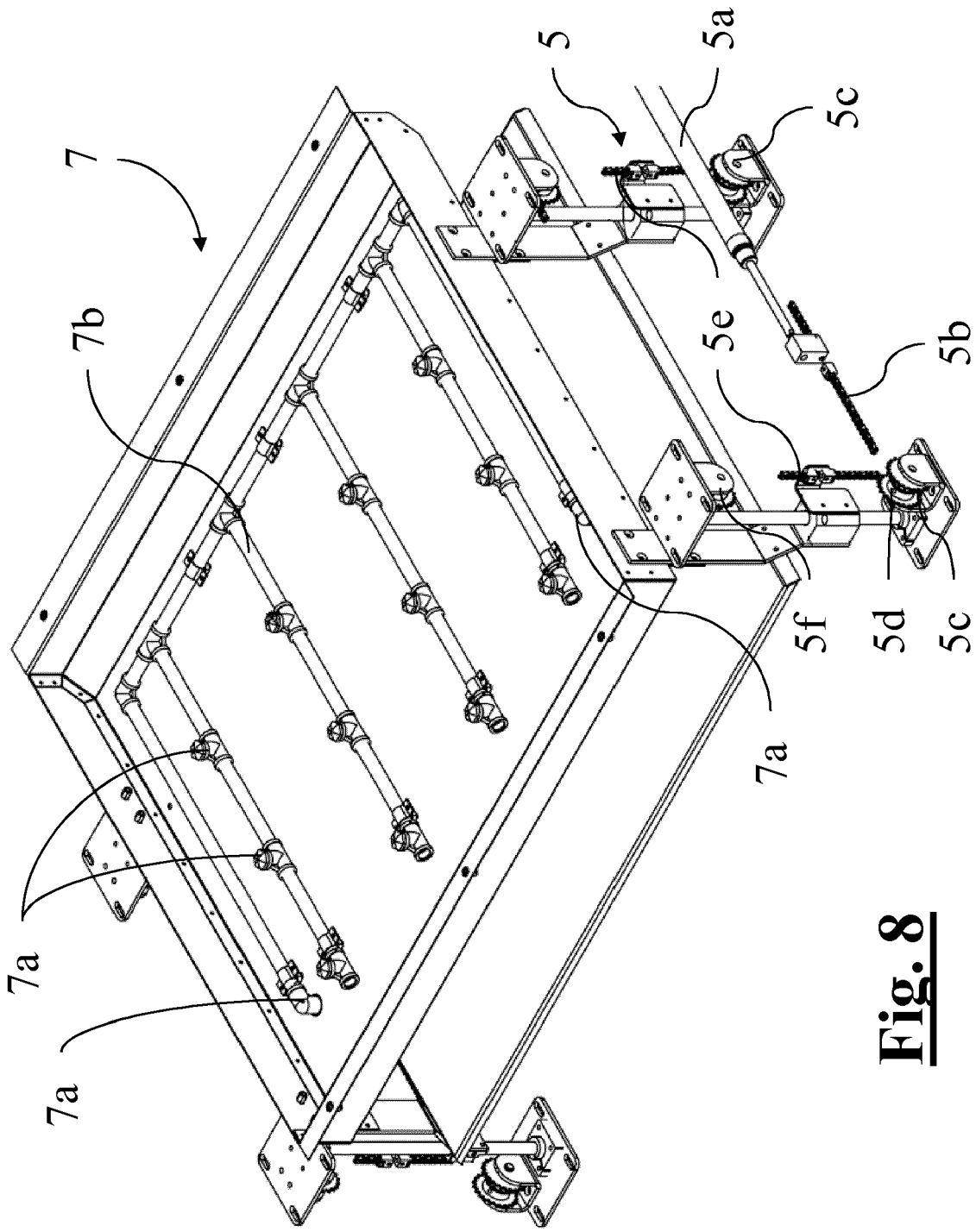


Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 8073

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 10 2008 020355 B3 (VEIT GMBH [DE]) 4 June 2009 (2009-06-04) * paragraphs [0010] - [0026] * * paragraphs [0039] - [0055] * * claims 1-20; figures 1-10 *	1-7	INV. D06F73/02
A	DE 197 38 355 A1 (VEIT GMBH & CO [DE]) 4 March 1999 (1999-03-04) * column 1, line 5 - column 1, line 19 * * column 2, line 4 - column 2, line 22 * * column 3, line 67 - column 4, line 23 * * claims 1,6,9; figures 1-6 *	1,2	
A	EP 1 995 372 A1 (ROTONDI GROUP S R L [IT]) 26 November 2008 (2008-11-26) * paragraphs [0034] - [0040] * * paragraphs [0053] - [0055] * * paragraphs [0059] - [0067] * * figures 1-4B *	1,6	
			TECHNICAL FIELDS SEARCHED (IPC) D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 January 2016	Weinberg, Ekkehard

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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28-01-2016

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