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(54) **TURNING UNIT FOR TURNING OF A FIVE-WALL TRAY, APPARATUS AND METHOD FOR EMPTYING OF A FIVE-WALL TRAY**

(57) A turning unit (10) adapted to turn a five-wall tray (13) for rod like articles (R) of the tobacco industry, provided with a swinging wall (13T'), provided with a rotating shaft (12), a holding mechanism (10A) attached to the rotating shaft (12), whereas the holding mechanism (10A) comprises a body (14) and gripping members (15L, 15R, 16L, 16R, 18) adapted to grip the tray (13), whereas the gripping members (15L, 15R, 16L, 16R, 18) are adapted so that they make it possible to hold the tray (13) during turning over the tray (13). The unit according to the invention is characterised in that the holding mechanism (10A) is adapted to move together with the held tray (13) transversely to the axis (12A) of the rotating shaft (12), and the turning unit (10) is provided with suction cups (31, 32) which are adapted to fix the tray (13) relative to the body (14) of the holding mechanism (10A).

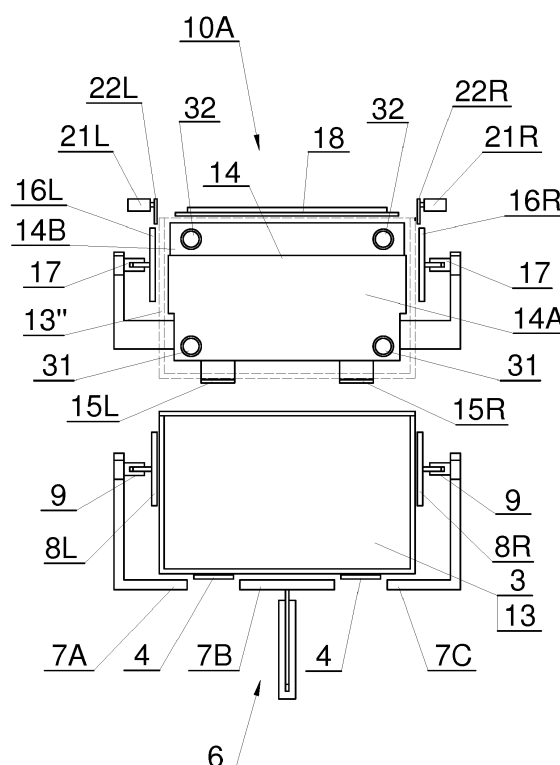


Fig. 8

Description

[0001] The object of the invention is a turning unit for turning of a five-wall tray, an apparatus and a method for emptying of the five-wall tray filled with rod like articles of the tobacco industry.

[0002] Tobacco industry's factories manufacture various articles for smoking. Both finished and semi-finished products made at successive production stages may be jointly referred to as rod like articles which may be transported on conveyors or in trays. Plastic trays which are used for all types of rod like articles, among others for cigarettes, cigarillos, cigars and filter material rods, are commonly used in the tobacco industry. Plastic trays have the shape of a cuboid without two adjacent walls, i.e. these are trays having four walls. Plastic trays are rigid and are used for temporary storage and transport of rod like articles on the premises of tobacco factories. Generally, cardboard trays designed as five-wall trays are commonly used for the transport of filter rods outside the factory premises. Cardboard trays have thinner walls, are less rigid and easily deformable, with one swinging wall. The filling of a five-wall tray takes place after opening of a tray i.e. after swinging the swinging wall. After the filling, the tray must be closed i.e. the swinging wall must be turned to its original position. The same swinging wall is swung in order to empty the tray. In the transport time, the filled tray is covered with a lid in order to protect the rods collected inside. The structure of the apparatus for unloading of five-wall trays must take into account the fact that the trays are non-rigid, and the gripping members must be adapted to possible deformations of the tray. The handling of the tray in order to empty it requires the back wall of the tray to be flat, without deformations. The manufacturers of tobacco products use filter rods of various filter materials. Currently frequently used filter rods are heavier than previously used rods made of acetate. In the case of long and heavy rods it happens that a cardboard tray visibly deforms under the influence of the weight of the rods and makes the tray handling difficult. In addition, an uncontrollable displacement of the rods in the tray may occur. There is a risk that during the unloading process the rod like articles collected in the tray will not be accurately fed to the article receiving unit due to a large deformation of the tray, which may cause damage to the rods or machine stoppage. Occasionally the rod manufacturers load heavy rods into more rigid trays, however, then the problem appears that it is not possible to hold the tray with a swung wall strongly enough because of the tray material high rigidity and springing of the swung wall.

[0003] An apparatus for emptying of five-wall cardboard trays is known from the patent EP1118543B1. The filled trays are placed on the filled trays station, and then the upper wall is swung so that the lugs of that wall are pulled out of lateral walls of the tray into which they are inserted for the duration of the transport. Elements whose task would be to eliminate the risk of tray deformation

are not used in the disclosed solution. A solution wherein a five-wall cardboard tray designed for emptying is placed in a four-wall plastic tray, with one wall of the five-wall tray being manually swung after placing it in the plastic tray, is known from the document GB2148853A. The trays which have been put together and secured against separation by means of a special holder which holds the swung wall are placed on the tray unloader. The cardboard tray does not deform during the transport and unloading because it is held and stiffened from four sides by the walls of the plastic tray, and from the fifth side by means of the holder.

[0004] The object of the invention is a turning unit designed to turn over a five-wall tray for rod like articles of the tobacco industry provided with a swinging wall, provided with a rotating shaft, a holding mechanism attached to the rotating shaft. The holding mechanism comprises a body and gripping members for gripping the tray. The gripping members are adapted so that they make it possible to hold the tray during turning over the tray. The unit according to the invention is characterised in that the holding mechanism is adapted to move together with the held tray transversely to the axis of the rotating shaft, and the turning unit is provided with suction cups which are adapted to fix the tray relative to the body of the holding mechanism.

[0005] The movement of the suction cups perpendicular to the back wall of the tray which is fixed by a lifting unit ensures the most effective fixation of the tray because the adhering edge of the suction cups is not deformed or displaced in the perpendicular direction to the axis of action of the suction cup.

[0006] The unit according to the invention is further characterised by being provided with at least two suction cups adapted to fix the back wall of the tray.

[0007] The unit according to the invention is further characterised by being provided with at least two suction cups disposed in such a way that they fix the swinging wall of the tray.

[0008] Gripping the back wall of the tray at the bottom corners of the tray and the swinging wall of the tray ensures the strongest grip of the tray and the absence of deformations of the back wall of the tray with the use of only four suction cups despite the fact that there is not direct access to the upper corners of the back wall of the tray.

[0009] The unit according to the invention is further characterised in that the suction cups are situated within the body.

[0010] The unit according to the invention is further characterised in that the surface supporting the body is graduated and comprises a supporting surface adapted to support the back wall of the tray and a supporting surface adapted to support the swinging wall of the tray.

[0011] The unit according to the invention is further characterised in that the adhering surfaces of the suction cups are spaced above the supporting surface of the body so that they come into contact with the back wall of

the tray and/or with the swinging wall of the tray before the tray is supported against the body.

[0012] The object of the invention is also an apparatus for emptying of a five-wall tray for rod like articles of the tobacco industry, provided with a swinging wall, provided with a filled tray station, a turning unit adapted to turn over the filled tray, provided with a holding mechanism, whereas the holding mechanism comprises a body and gripping members adapted to grip the tray, and the apparatus also comprises a lifting unit adapted to lift the turning unit, a filled tray emptying station, and an empty tray station. The apparatus according to the invention is further characterised in that the holding mechanism of the turning unit is adapted to move the tray transversely to the axis of the shaft of the turning unit and, in addition, the turning unit is provided with suction cups which are adapted to fix the tray relative to the body of the holding mechanism.

[0013] The apparatus according to the invention is further characterised in that the turning unit is provided with at least two suction cups adapted to fix the back wall of the tray.

[0014] The apparatus according to the invention is further characterised in that the turning unit is provided with at least two suction cups adapted to fix the swinging wall of the tray.

[0015] The apparatus according to the invention is further characterised by being provided with a lifting unit adapted to lift the filled trays.

[0016] Moreover, the object of the invention is a method for emptying of the five-wall tray for rod like articles of the tobacco industry, provided with a swinging wall, wherein the filled five-wall tray is placed on the filled tray station, the filled five-wall tray is conveyed along the filled tray station, the filled five-wall tray is gripped by means of the gripping members of the holding mechanism of the turning unit, the filled five-wall tray is lifted by means of the lifting unit, the filled five-wall tray is turned over by means of the turning unit, the filled five-wall tray is placed in the filled tray emptying station, the empty five-wall tray is conveyed to the empty tray station, the empty five-wall tray is received from the empty tray station. The method according to the invention is characterised in that before gripping the five-wall tray by means of the gripping members the holding mechanism of the turning unit is moved perpendicular to the back wall of the tray, and the five-wall tray is fixed relative to the body of the holding mechanism by means of two suction cups pushed against the five-wall tray during the movement of the holding mechanism.

[0017] The apparatus for emptying of the tray according to the invention enables the machine to work with the cardboard trays with different rigidity, from very rigid to very non-rigid. Even in the case of trays for which the first bend of the tray wall is difficult due to the thickness and the rigidity of the tray material, the trays are gripped so that the back inside wall of the tray is flat, which guarantees proper emptying of the trays. The apparatus

equally properly empties both new trays and reused trays whose walls have been previously bent.

[0018] The object of the invention was shown in detail in a preferred embodiment in a drawing in which:

- 5 Fig. 1 shows a filled five-wall tray in a perspective view, the front side of the tray being visible,
- Fig. 2 shows the filled five-wall tray with a slightly opened upper wall and lugs of that wall pulled out of lateral walls in a perspective view, the front side of the tray being visible,
- 10 Fig. 3a shows, in a perspective view, the filled five-wall tray with the back wall being fully swung open and its lugs being pushed close to the lateral walls, the back side of the tray being visible,
- 15 Fig. 3b shows, in a perspective view, the filled five-wall tray with the back wall being fully swung open and its lugs being pushed close to the lateral walls, the front side of the tray being visible,
- 20 Fig. 4 shows a tray emptying machine in a side view, before feeding the tray from the filled tray station,
- 25 Fig. 5 shows the tray emptying machine in a side view, after feeding and lifting the tray fed for unloading,
- Fig. 6 shows the tray emptying machine in a side view, after swinging the upper wall open and after lowering the turning unit,
- 30 Fig. 7 shows a handling module in a side view, before the tray is gripped by the turning unit,
- Fig. 8 shows the lifting unit and the turning unit in a view from the side of the filled tray station,
- 35 Fig. 9 shows the tray emptying machine in a side view, after feeding the tray to the emptying unit.

[0019] In this description, the invention will be described with reference to a five-wall tray 13 shown in Figs. 1 and 2. The tray was shown as filled in upright position, i.e. in such position in which the filled trays are placed in the filled tray station of the filled tray emptying machine, whereas in Fig. 1 the upper wall is not swung open i.e. it is in the closed position for the transport time. The filled space of the trays was marked by hatching with lines, with only several example rod like articles R lying on the bottom of the tray. In such upright position, the filled trays are placed by the operator onto the filled trays station, whereas the operator holds the tray by the sidewalls in such a way that he can see the tray contents. Such expressions as upper, bottom, lateral, front and back will refer to the position of the tray shown in Figs. 1 and 2, with the front side, left lateral side and upper side of each tray being visible therein.

[0020] The five-wall tray 13 has a bottom wall 13B on which it stands, a back wall 13A and two lateral walls, a left lateral wall 13L and a right lateral wall 13R. The five-

wall tray 13 has a hinged upper wall 13T' which is designed as self-aligning relative to the back wall 13A of the tray 13 with which it is connected along the edge 13E. The upper wall 13T' has two swinging lugs 13FL and 13FR which, during the transport, are inserted into slots in the corresponding lateral walls 13L and 13R. The operator puts the five-wall tray 13 onto the filled trays station while holding the five-wall tray 13 with the open side 13G directed towards him. After putting the filled five-wall tray 13 onto the filled tray station, the operator lifts the upper wall 13T' so that the swinging lugs 13FL and 13FR pull out of the walls 13L and 13R and loosely hang down on the side outside the lateral walls 13L and 13R (Fig. 2). Figs. 3a and 3b show the five-wall tray 13 at a later stage of the emptying cycle of the five-wall tray 13 in an open configuration which is required during the handling of the tray. The upper wall 13T' is fully swung open i.e. it abuts on the back wall 13A, whereas the lugs 13FL and 13FR abut on the lateral walls 13L and 13R. As a result, it is possible to empty the five-wall tray 13 through the upper open side 13T of the five-wall tray, and the upper wall 13T' and the lugs 13FL and 13FR do not hinder the tray handling. The filling of the five-wall tray 13 on the tray loader also takes place through the upper side 13T.

[0021] The five-wall trays 13 may be made of cardboard or other inexpensive material, are usually softer than the four-wall trays made of plastic and are usually designed for a single use.

[0022] This invention is used in an example five-wall tray unloader described below. For the sake of simplicity, the units belonging to the tray emptying machine 1 according to the invention were shown in Fig. 4 in simplified terms without the drive mechanisms; the outer contour of the machine was shown with a dashed line. The tray emptying machine 1 is provided with a filled tray station 2 onto which the filled five-wall trays 13 to be unloaded are placed by the operator. The filled tray station 2 may be designed as a conveyor 4 provided with two conveyor belts adapted to convey the trays 13; the trays 13 may also be conveyed by means of chains having links with a flat load bearing surface. From the filled tray station 2, the trays 13 are fed as first filled trays 13' in order to deliver them for unloading, whereas a plurality of filled trays 13 is collected on the filled tray station 2. The feeding of the first filled tray 13' from all filled trays 13 standing in the station 2 may take place after lifting of all filled trays 13 from the conveyor 4 except for the first tray 13' which is transported by the conveyor 4. The lifting of the trays 13 may take place by means of a lifting device 4A with the movement of which the lowering of a locking device 4B is coupled, which allows the first filled tray 13' transported by the conveyor 4 to pass through. After the feeding of the first filled tray 13', the lifting device 4A is lowered, the trays 13 lifted earlier by the lifting device 4A are put onto the conveyor 4, and the locking device 4B is lifted. The filled tray station 2 is provided with lateral guides 4C situated on two sides of the trays 13 conveyed along the filled tray station 2. The lateral guides 4C are

convergently positioned in the feeding direction i.e. from the back part 2A to the front part 2B of the filled tray station 2, whereas the convergence of the lateral guides 4C may be adjusted depending on the kind of the tray 13, for example on the rigidity of the tray 13. Moreover, the lateral guides 4C may be positioned at different heights also depending on the kind of the tray 13, especially on the rigidity of lateral walls of the tray 13 and on the shape of lateral walls of the tray 13. The filled tray station 2 may be provided with an adjustable support element 5; the adjustment of position of the support element 5 is required to allow stopping the filled tray 13 at a place from which it may be easily collected or lifted. The filled tray 13 is placed by the operator in the back part 2A of the filled tray station 2. In the front part 2B of the filled tray station 2, a lifting unit 6 designed to lift the filled tray 13 is situated. The lifting unit 6 may be embodied as a lift designed to lift filled trays from the conveyor 4 of the filled tray 13 station 2, the mechanism of the lifting unit 6 being situated below the conveyor belts of the conveyor 4.

[0023] The filled tray, after feeding it onto the conveyor 4, is positioned in the area of operation of the lifting unit 6 (Fig. 8), whereas the lifting unit may be provided with abutting elements designed to stop the tray 13. The lifting unit 6 designed to lift the filled trays 13 is provided with brackets 7A, 7B and 7C shown in Figs. 4 and 8. In order to avoid the tray deformation, at the time of lifting the filled tray 13 is supported at several points on interconnected brackets 7A, 7B and 7C which may be inclined towards the front part 1A of the tray emptying machine 1. At the time of lifting by the lifting unit 6, the tray 13 is held by movable lateral clamping members 8L and 8R which in the case of the five-wall trays 13 made of cardboard have the task of eliminating the risk of deformation of these trays and displacement (falling down) of the rod like articles R in the upper corners of the five-wall tray 13. The lateral clamping members 8L and 8R may be moved for example by pneumatic actuators 9, whereas the position of the clamping members 8L and 8R requires adjustment according to the rigidity and the overall dimensions of the trays 13 used. The lifting of the tray 13 by the lifting unit 6 may be accomplished by any linear movement mechanism with electric or pneumatic drive. The lifting unit 6 lifts the filled tray 13 (Fig. 5) to a height at which the turning unit 10 may grip the filled tray 13. The turning unit 10 is adapted to turn the filled tray 13 before unloading it at the filled tray emptying station 23, whereas the turning unit 10 may be moved in the vertical direction by the lifting unit 11. Fig. 5 shows the machine with the tray 13 in the position after it has been lifted by the lifting unit 6 where the upper wall 13T' is swung. The tray emptying machine 1 is provided with two opening units 21 L, 21 R designed to open the upper wall 13T' of the tray 13. The opening units 21 L, 21 R have for example rotational working elements 22L and 22R (Fig. 8) which swing the upper wall 13T'. As a result of the action of the opening units 21 L, 21 R the swinging wall 13T' is swung

and pressed to the wall 13A as shown in Fig. 3a, and then the lugs 13FL and 13FR are pressed to the lateral walls respectively 13L and 13R as shown in Figs. 3a and 3b. After swinging the wall 13T' of the five-wall tray 13, the five-wall tray 13 may be gripped by the turning unit 10. On the machine 1 shown in Fig. 6, the tray 13 is in an open configuration, i.e. the wall 13T' and the lugs 13FL and 13FR have been swung. The turning unit 10 has been lowered so that it can grip the tray 13.

[0024] Fig. 7 shows the turning unit 10 which is attached to a rotating shaft 12 with the axis of rotation 12A on a slide 11A of the lifting unit 11. The position of the turning unit 10 relative to the tray 13 in Fig. 7 corresponds to the position shown in Fig. 6. The turning unit 10 is provided with a main support element 14 on which, after gripping the tray, the back wall 13A of the five-wall tray 13 is supported. The support element 14 in the form of a plate has a supporting surface 14A to support the wall 13A and a supporting surface 14B to support the wall 13T'. The turning unit 10 is provided with mechanical gripping members to grip the tray 13, namely at least one bottom gripper 15L, 15R to support the bottom wall 13B of the tray 13, at least one pair of lateral grippers 16L, 16R to grip the lateral walls 13L, 13R of the tray 13, and a damper 18 to cover the rod like articles R being in the tray. For the sake of simplification, the drive elements have not been shown in the drawing. Furthermore, the turning unit 10 is provided with vacuum gripping members 31 and 32 (Fig. 7 and 8). In the embodiment shown, the suction cups 31 and 32 are situated within the support element 14, the suction cups 31, 32 may also be situated outside the support element 14. The turning unit 10 is provided with two suction cups 31 situated within the supporting surface 14A of the support element 14, for example in round openings which are adapted to vacuum-based gripping of the bottom part of the back wall 13A, namely are adapted to grip the corners of the back wall 13A. The turning unit 10 is provided with two suction cups 32 situated within the supporting surface 14B of the support element 14 which are adapted to vacuum-based gripping of the swinging wall 13T', namely are adapted to grip the opposite fragments of the wall 13T'. Since the wall 13T' is connected with the back wall 13A, the suction cups 31 and 32 act on all corners of the back wall 13A. The embodiments of the turning unit with a greater number of suction cups acting on the back wall 13A at multiple points are possible. Due to the action of the suction cups 31, 32 the back wall 13A of the tray 13 is pressed to the support element 14 and fixed, whereas the distance between the surface 14A and the surface 14B corresponds or is equal to the thickness of the wall 13T'. The inside surface of the back wall 13A remains flat, and the entire tray remains undeformed. The abovementioned mechanical and vacuum gripping members are attached to the holding mechanism 10A adapted to hold the tray 13 in the turning unit 10 during the handling of the tray 13, the support element (14) constitutes the body or a fragment of the body of the holding mechanism (10A).

[0025] The turning unit 10 and the lifting unit 11 constitute a handling unit 19. The handling of the tray 13 is to be understood as the lifting of the tray 13 by the lifting unit 11 and the turning of the tray 13 by the turning unit 10 as well as the moving of the tray 13 on the holding mechanism 10A away from the axis 12A of the shaft 12 of the turning unit 10. In addition, during the execution of the tray 13 emptying cycle it is possible to freely combine the functions of lifting, turning and moving the tray 13 away from the axis of rotation 12A.

[0026] Fig. 7 shows the turning unit 10 in the position before pushing the holding unit 10A against the tray 13 which has been lifted and is held by the lifting unit 6. While pushing the holding unit 10A on the guide 10B, the suction cups 31 and 32 will abut against the wall 13A and 13T' and their working surfaces (adhering surfaces) will be pushed to the level of the surfaces 14A and 14B. While pushing or after pushing the holding mechanism 10A against the tray 13, the vacuum is supplied to the suction cups 31 and 32. As a result, the tray 13 is fixed relative to the support element 14. Next, the clamping members 16L and 16R designed in the shape of longitudinal slats are clamped on the walls 13L and 13R, whereas lateral grippers 16L, 16R may be moved by means of pneumatic actuators 17 and may act on the tray 13 so as to eliminate the deformations of the lateral walls 13L and 13R. Self-aligning bottom grippers 15L, 15R are turned so that they support the bottom 13B of the tray 13. A greater number of grippers may be needed for less rigid trays 13 and in the case of heavy rod like articles R. A damper 18 which is slidably fastened to the guide 18A of the holding mechanism 10A in the turning unit 10 and is moved by means of any not shown drive unit with linear motion, for example a pneumatic or electric drive unit, is used to cover the rod like articles R in the tray 13.

[0027] The holding mechanism 10A is attached to the linear guide 10B which is connected with the rotating shaft 12 with the axis of rotation 12A. The holding mechanism 10A may be moved along the guide 10B by means of any drive mechanism (not shown) so as to ensure the movement of the holding mechanism 10A transversely to the axis 12A of the shaft 12. The holding mechanism 10A is adapted to change the distance of the tray 13 from the axis 12A of the rotating shaft 12. The combination of rotational movement of the tray 13 with the linear movement allows unrestricted handling of the tray 13 during the transport thereof to the unloading position at the tray 13 emptying station 23. In addition, it is possible to start the rotational movement of the turning unit 10 in any phase of lifting movement of the lifting unit 11. After gripping the tray 13 by the turning unit 10 belonging to the handling unit 19, the tray 13 is turned and carried to a filled tray emptying station 23 as shown in Fig. 9.

[0028] The tray emptying machine 1 is provided with the filled tray emptying station 23 (Fig. 4) in the front part 1A of the machine below which a conveyor 24 adapted to receive the rod like articles R unloaded from the trays 13 is situated. An empty tray station 25 is situated in the

back part 1B of the tray emptying machine 1. The empty tray station 25 may be designed as a conveyor or an empty tray store. The empty tray station 25 is provided with a receiving unit 28 comprising a self-aligning shelf 26 with a support 27. On the shelf 26, after it has been pulled out, the empty tray 13 carried by the turning unit 10 after emptying at the filled tray emptying station 23 is placed. The backward movement of the shelf 26 with the support 27 towards the back part 1 B of the machine 1 causes a displacement of all empty trays 13 collected at the station 25. The tray emptying machine 1 is provided with a controller 40 (shown in Fig. 3) connected with individual units of the machine 1.

Claims

1. Turning unit (10) for turning of a five-wall tray (13) for rod like articles (R) of the tobacco industry, provided with a swinging wall (13T'), provided with

a rotating shaft (12),
a holding mechanism (10A) attached to the rotating shaft (12),
whereas the holding mechanism (10A) comprises a body (14) and gripping members (15L, 15R, 16L, 16R, 18) for gripping the tray (13),
whereas the gripping members (15L, 15R, 16L, 16R, 18) are adapted so that they make it possible to hold the tray (13) during turning over the tray (13),

characterised in that

the holding mechanism (10A) is adapted to move, together with the held tray (13), transversely to the axis (12A) of the rotating shaft (12), and
the turning unit (10) is provided with suction cups (31, 32) which are adapted to fix the tray (13) relative to the body (14) of the holding mechanism (10A).

2. The unit as in claim 1, **characterised by** being provided with at least two suction cups (31) adapted to fix the back wall (13A) of the tray (13).
3. The unit as in claim 1, **characterised by** being provided with at least two suction cups (32) disposed in such a way that they fix the swinging wall (13T') of the tray (13).
4. The unit as in any of the claims 1 to 3, **characterised in that** the suction cups (31, 32) are situated within the body (14).
5. The unit as in claim 4, **characterised in that** the supporting surface of the body (14) is stepped and comprises a supporting surface (14A) adapted to support the back wall (13A) of the tray (13) and a supporting surface (14B) adapted to support the

swinging wall (13T') of the tray (13).

6. The unit as in claim 5, **characterised in that** the adhering surfaces of the suction cups (31, 32) are spaced above the supporting surface (14A, 14B) of the body (14) so that they come into contact with the back wall of the tray (13) and/or with the swinging wall (13T') of the tray (13) before the tray (13) is supported against the body (14).

7. An apparatus (1) for emptying of a five-wall tray (13) for rod like articles (R) of the tobacco industry, provided with a swinging wall (13T'), provided with

a filled tray station (2),
a turning unit (10), adapted to turn over the filled tray (13), provided with a holding mechanism (10A), whereas the holding mechanism (10A) comprises a body (14) and gripping members (15L, 15R, 16L, 16R, 18) adapted to grip the tray (13),
a lifting unit (11) adapted to lift the turning unit (10),
a filled tray (13) emptying station (23),
an empty tray station (25),

characterised in that

the holding mechanism (10A) of the turning unit (10) is adapted to move the tray (13) transversely to the axis (12A) of the shaft (12) of the turning unit (10), and in addition the turning unit (10) is provided with suction cups (31, 32) which are adapted to fix the tray (13) relative to the body (14) of the holding mechanism (10A).

8. The apparatus as in claim 7, **characterised in that** the turning unit (10) is provided with at least two suction cups (31) adapted to fix the back wall (13A) of the tray (13).
9. The apparatus as in claim 7, **characterised in that** the turning unit (10) is provided with at least two suction cups (32) adapted to fix the swinging wall (13T') of the tray (13).
10. The apparatus as in any of the claims 7 to 9, **characterised by** being provided with a lifting unit (6) adapted to lift the filled trays (13).
11. A method for emptying of a five-wall tray (13) for rod like articles (R) of the tobacco industry, provided with a swinging wall (13T'), wherein

the filled five-wall tray (13) is placed on a filled tray station (2),
the filled five-wall tray (13) is conveyed along a filled tray station (2),

the filled five-wall tray (13) is lifted by means of
a lifting unit (6),
the filled five-wall tray (13) is gripped by means
of gripping members (15L, 15R, 16L, 16R, 18)
of a holding mechanism (10A) of a turning unit 5
(10),
the filled five-wall tray (13) is turned over by
means of the turning unit (10) and the turning
unit (10) is lifted by means of a lifting unit,
the filled five-wall tray (13) is placed in a filled 10
tray emptying station (23),
the empty five-wall tray (13) is conveyed to an
empty tray station (25),
the empty five-wall tray (13) is received from the
empty tray station (25), 15

characterised in that

before gripping the five-wall tray (13) by means of
the gripping members (15L, 15R, 16L, 16R, 18) the
holding mechanism (10A) of the turning unit (10) is 20
moved perpendicular to the back wall of the tray (13),
and the five-wall tray (13) is fixed relative to the body
(14) of the holding mechanism (10A) by means of
two suction cups (31, 32) pushed against the five-
wall tray (13) during the movement of the holding 25
mechanism (10A).

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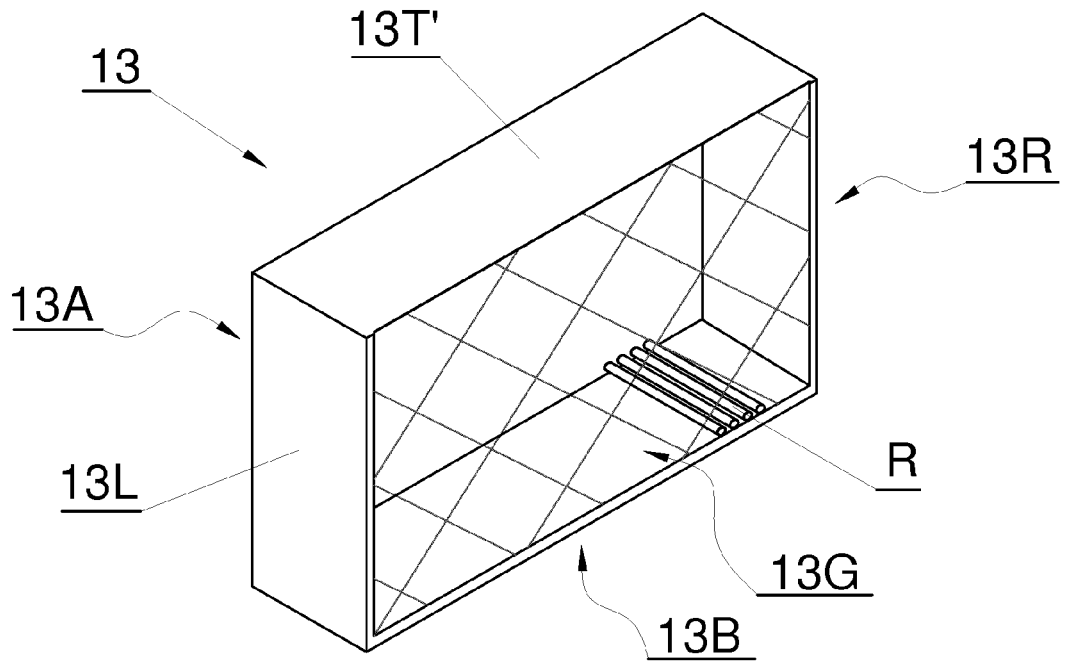


Fig. 1

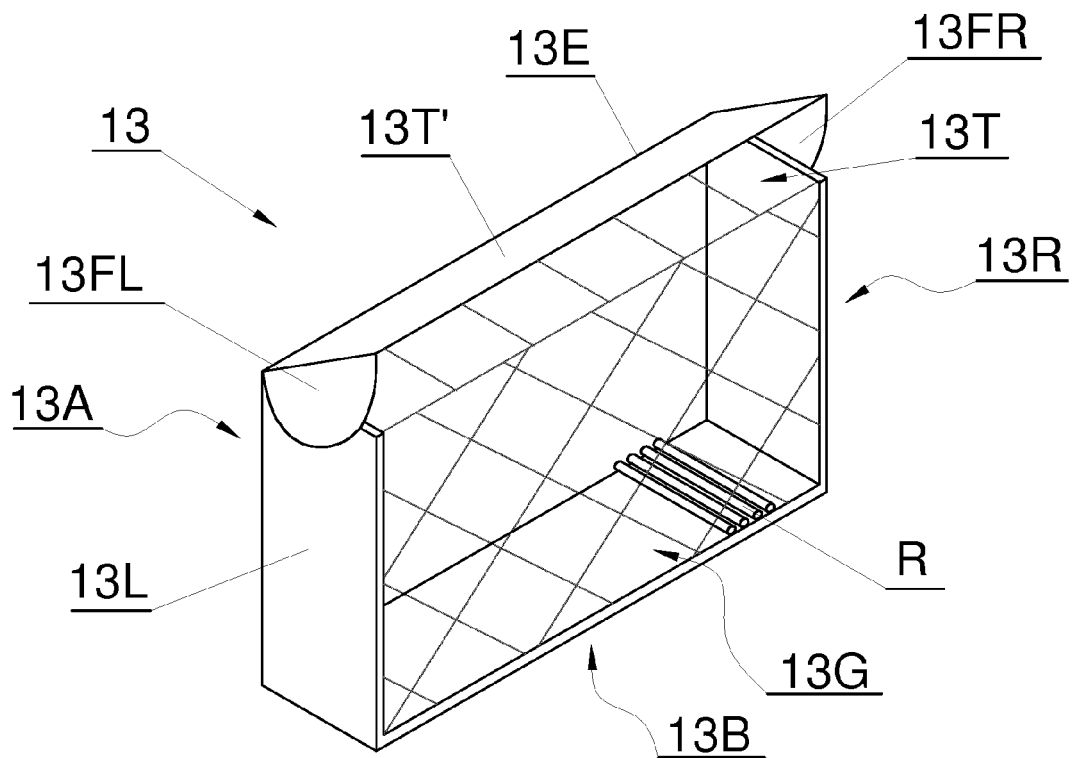


Fig. 2

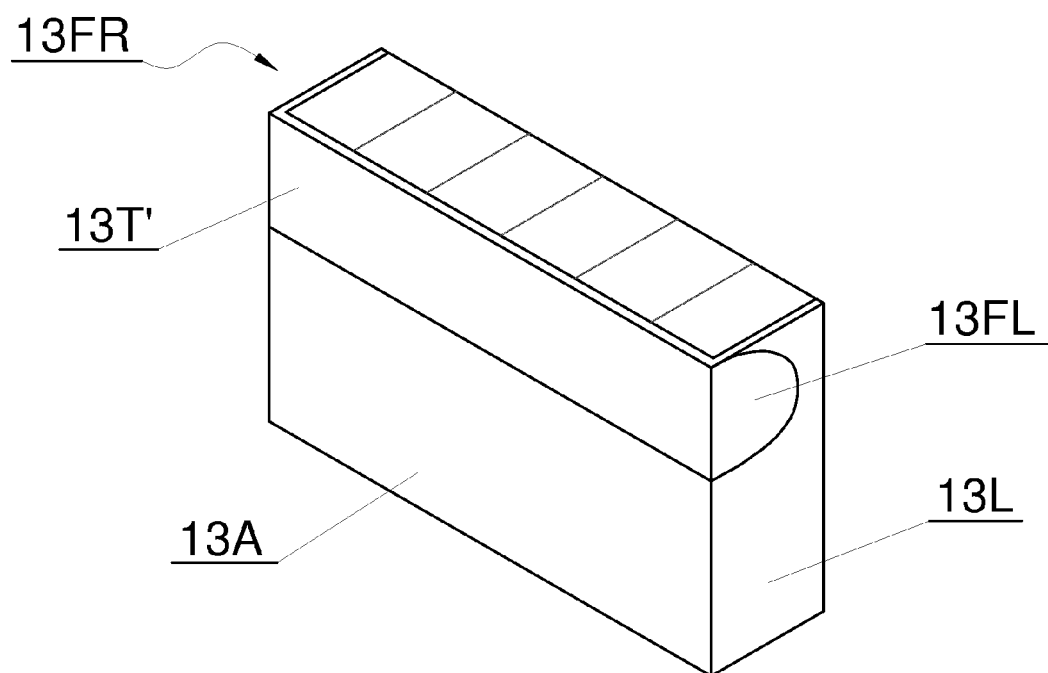


Fig. 3a

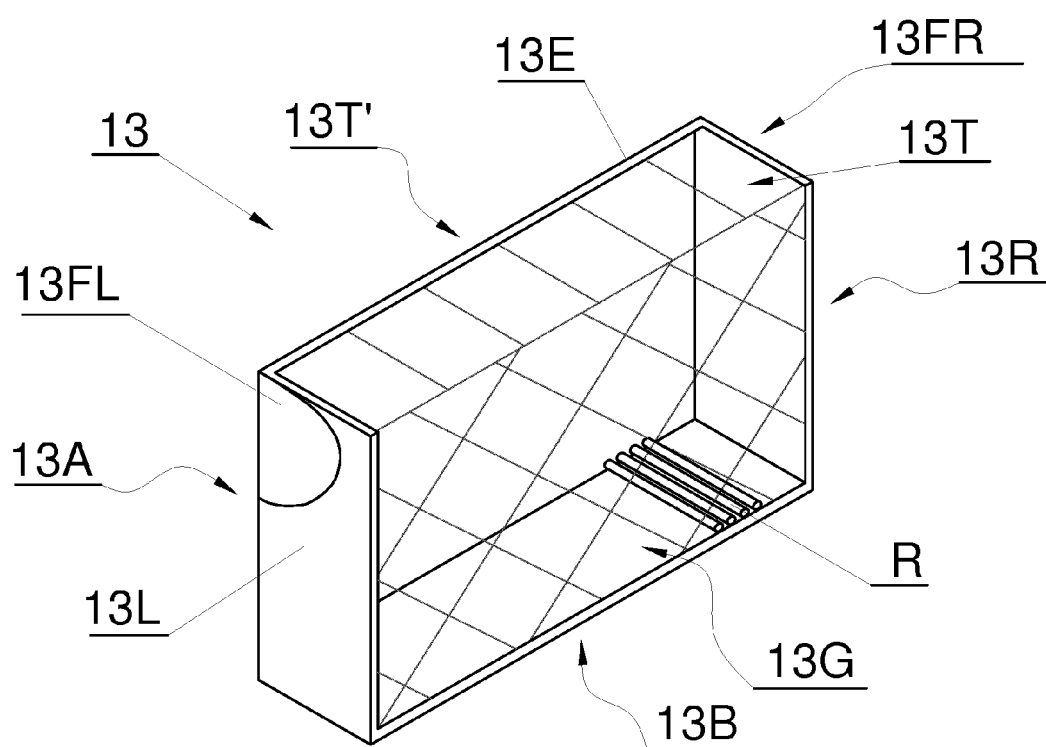


Fig. 3b

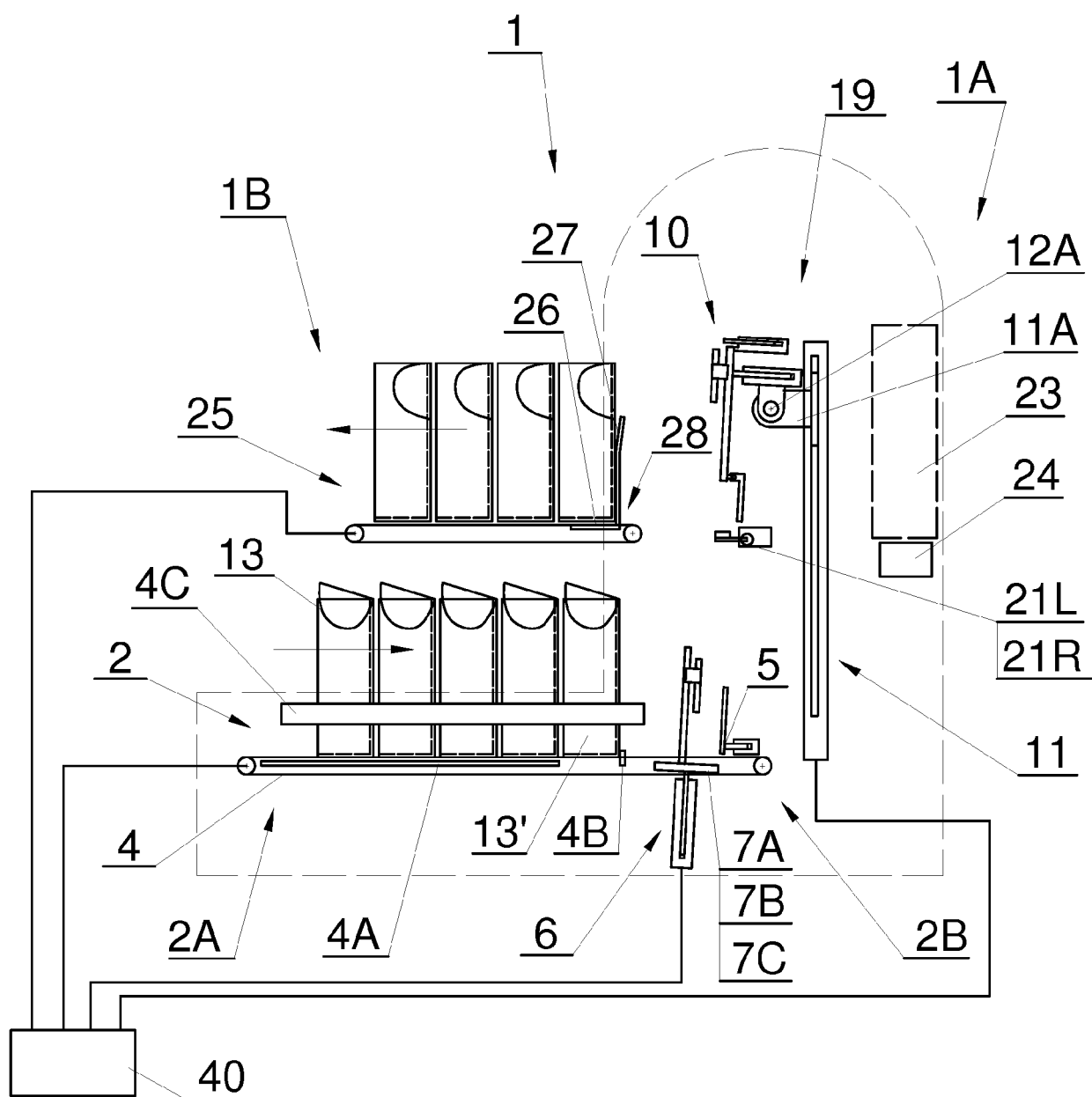


Fig. 4

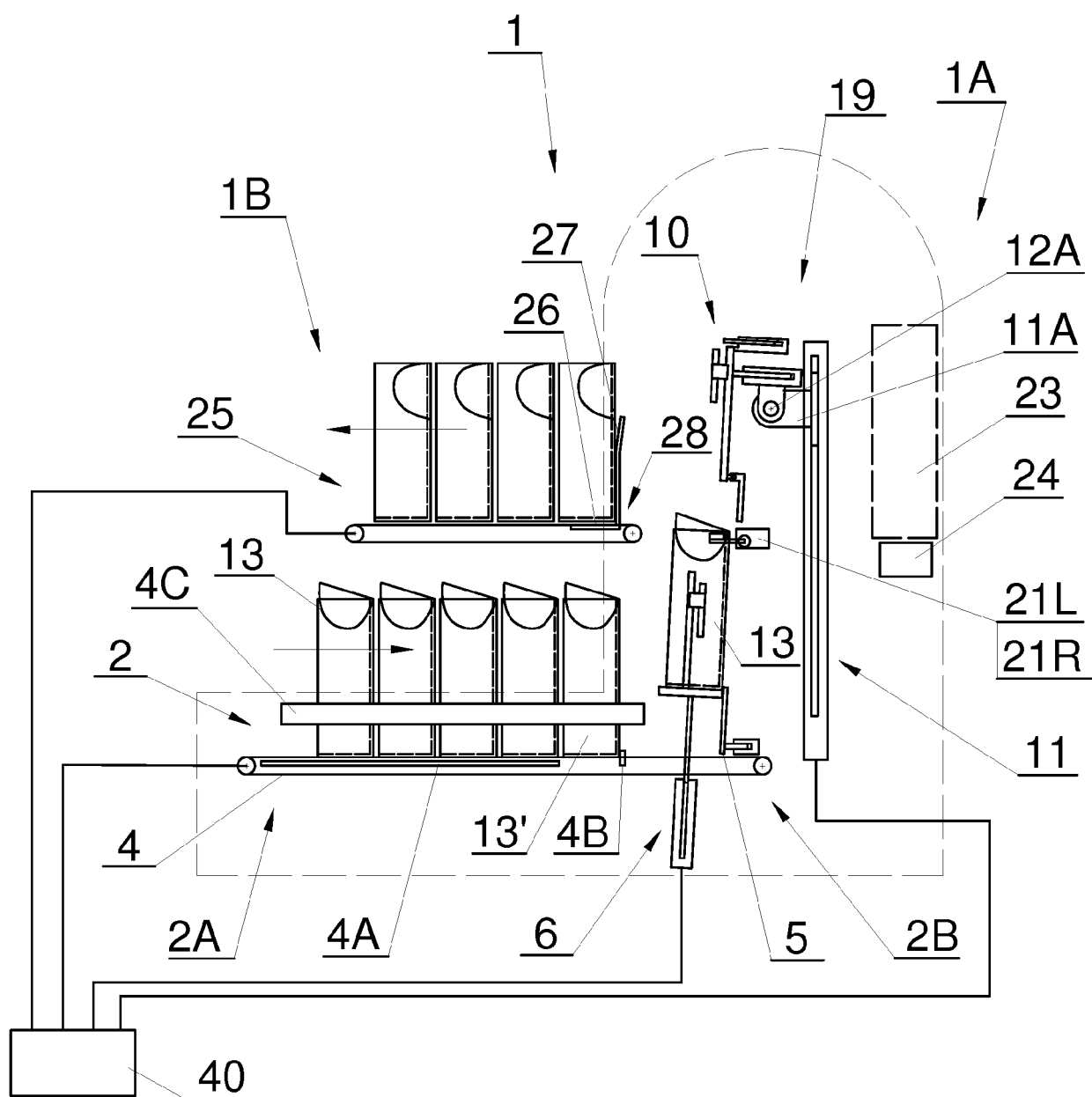


Fig. 5

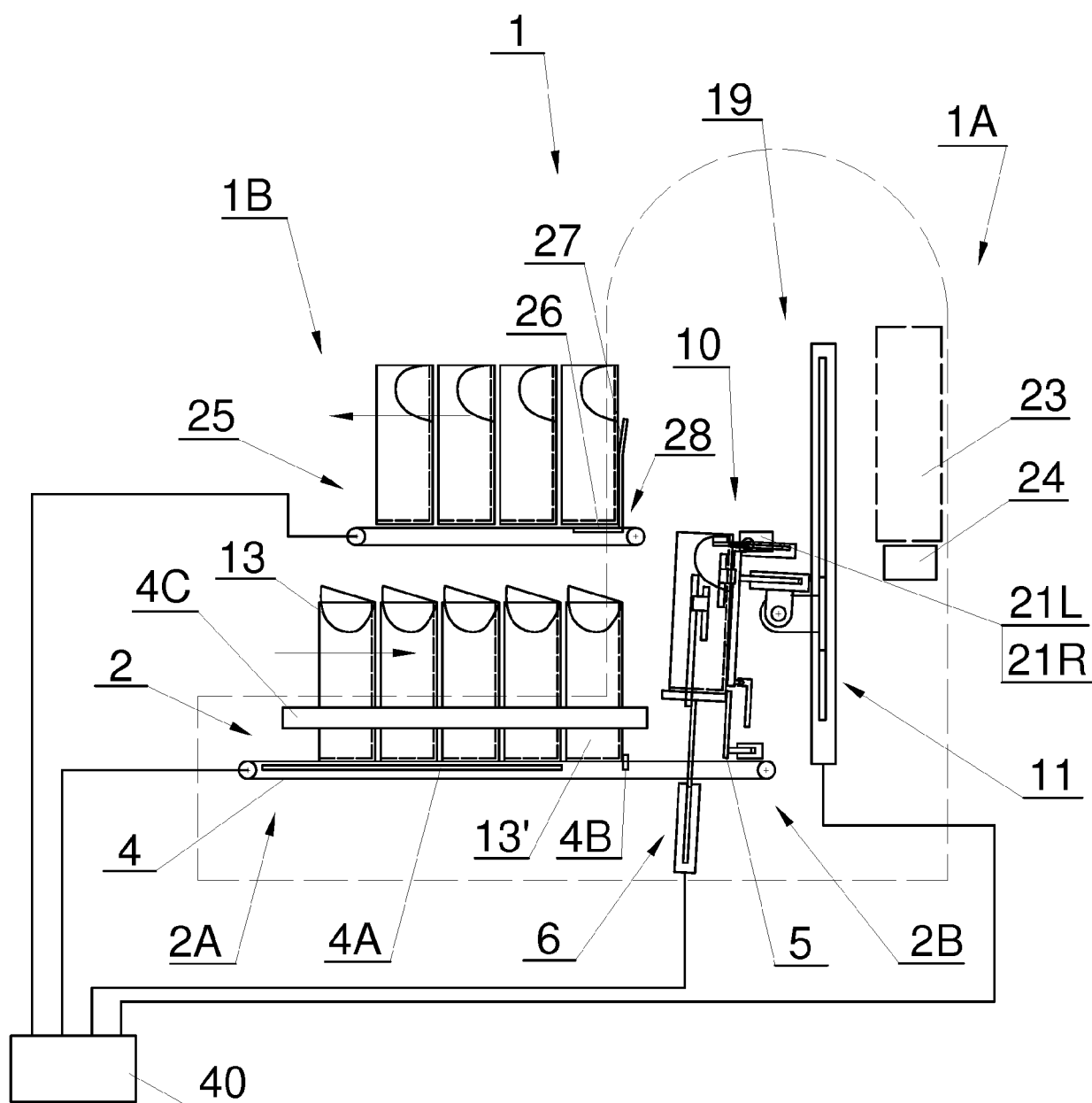


Fig. 6

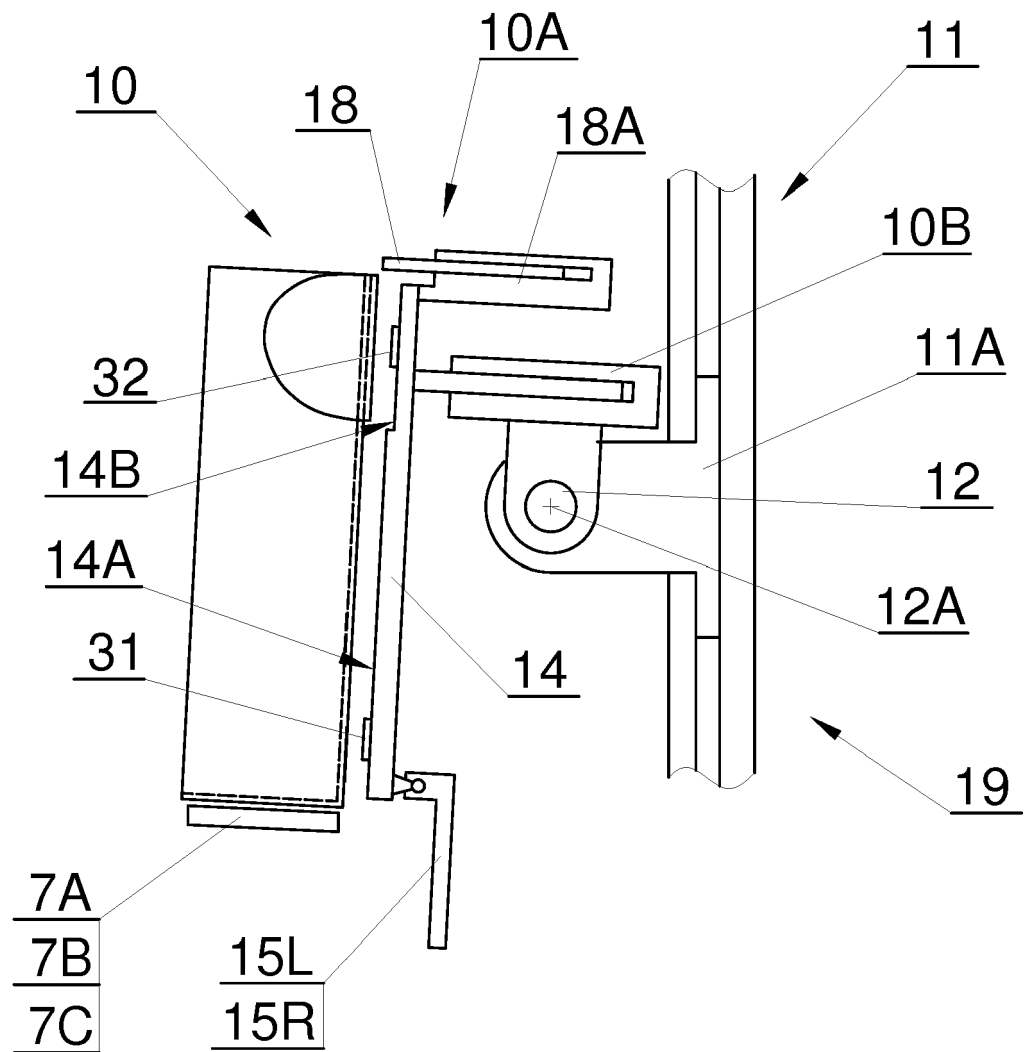


Fig. 7

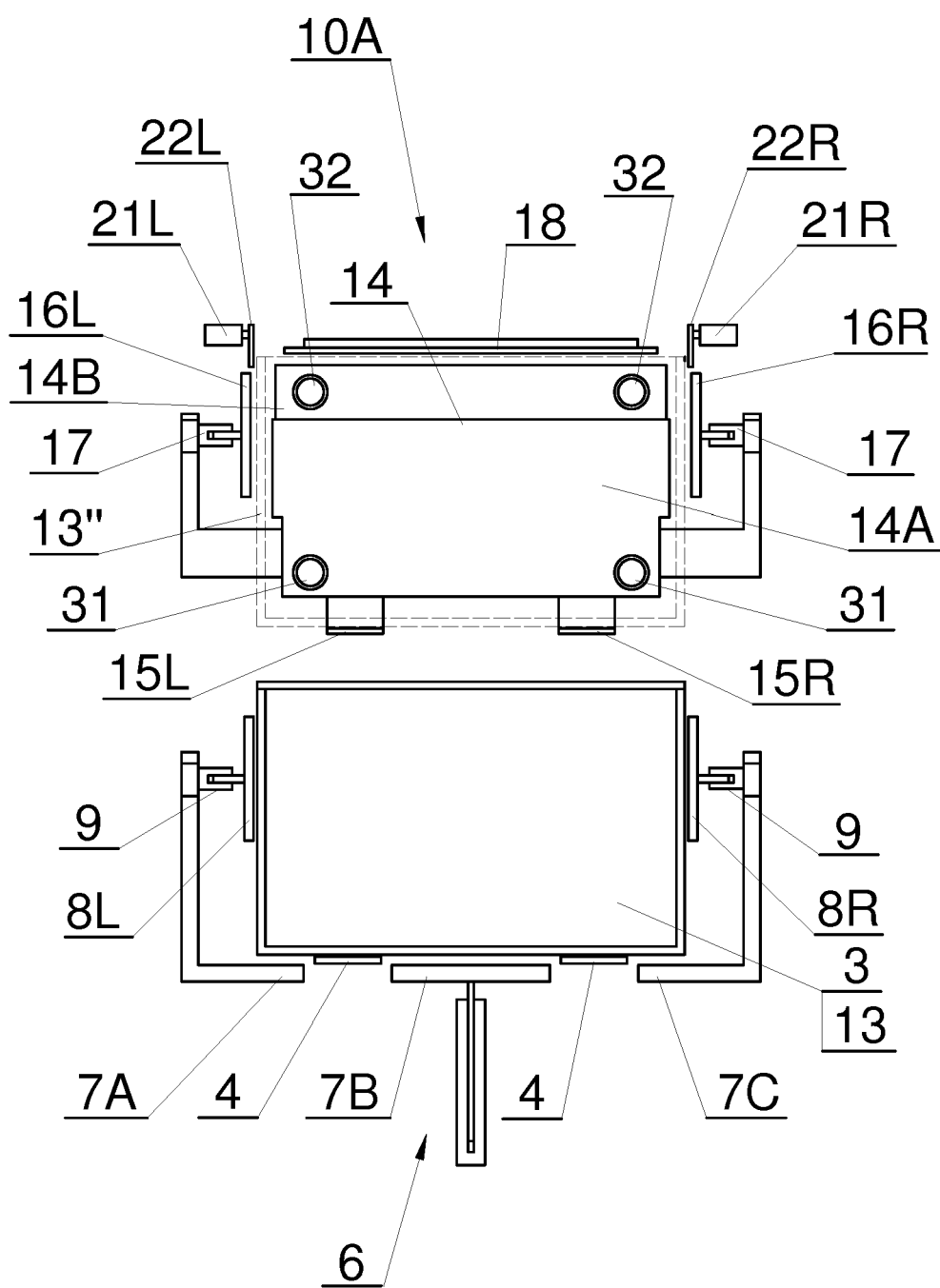


Fig. 8

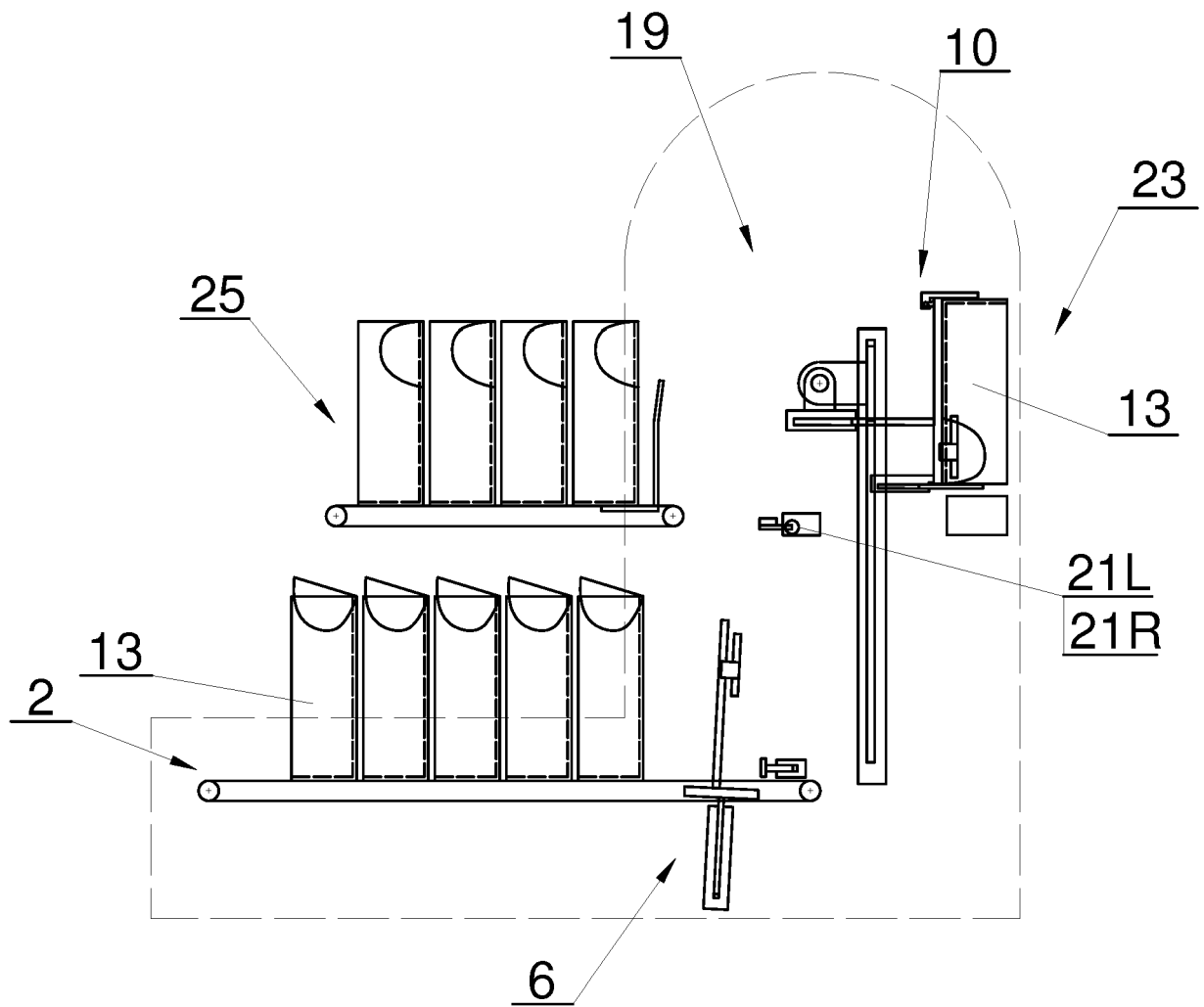


Fig. 9



EUROPEAN SEARCH REPORT

Application Number
EP 16 18 7283

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 598 135 A1 (TOKYO AUTOMATIC MACH WORKS [JP]; JAPAN TOBACCO INC [JP]) 25 May 1994 (1994-05-25)	1-4,6,8,9	INV. A24C5/356
Y	* column 3, line 57 - column 4, line 5; figures 1-4, 6 * * column 6, line 52 - column 7, line 32 * * column 7, line 45 - column 8, line 19 * * body 5c with suction cups 5h; distribution of suction cups: see figures 2, 4 and 6 *	5,7,10,11	ADD. A24C5/358
Y	----- W0 2015/033264 A1 (GD SPA [IT]) 12 March 2015 (2015-03-12) * figures 1-3, 7 *	7,10,11	
Y	----- EP 3 025 597 A1 (INT TOBACCO MACHINERY POLAND [PL]) 1 June 2016 (2016-06-01) * paragraphs [0002], [0033]; figure 10 * -----	5	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 January 2017	Examiner Schwarzer, Bernd
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

EP 16 18 7283

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The members are as contained in the European Patent Office EDP file on
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11-01-2017

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0598135 A1	25-05-1994	DE 69307469 D1	27-02-1997
		DE 69307469 T2	22-05-1997
		EP 0598135 A1	25-05-1994
		US 5435688 A	25-07-1995
		WO 9322199 A1	11-11-1993

WO 2015033264 A1	12-03-2015	NONE	

EP 3025597 A1	01-06-2016	CN 105614946 A	01-06-2016
		EP 3025597 A1	01-06-2016
		JP 2016101984 A	02-06-2016
		US 2016304271 A1	20-10-2016

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1118543 B1 [0003]
- GB 2148853 A [0003]