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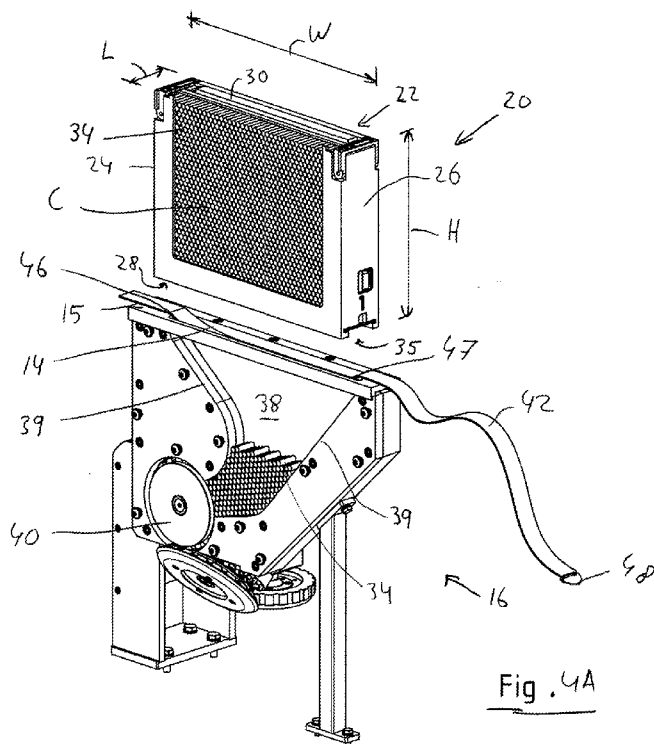
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(54) Title: A TRAY FOR HOLDING CIGARETTE PARTS FOR ELECTRONIC CIGARETTES AND AN UNLOADING DEVICE FOR UNLOADING THE CIGARETTE PARTS FROM THE TRAY



(57) Abstract: The present invention relates to a tray (20) for holding cigarette parts (34) for electronic cigarettes, an unloading device (16) for unloading the cigarette parts (34) from the tray (20) and the combination of a tray (20) and an unloading device (16). The tray (20) comprises a front wall, which is movable from a closed position to an open position in order to create an access opening for filling the tray (20) with cigarette parts (34), and wherein the bottom wall (28) is movable from a closed position to an open position in order to create a discharge opening (35) for unloading the cigarette parts (34) from the tray (20) under the influence of gravity. The unloading device comprises a tray holder (15), a receiving opening (14), a reservoir (38) and a discharge unit (40) for discharging the cigarette parts (34) from the reservoir (38).

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A TRAY FOR HOLDING CIGARETTE PARTS FOR ELECTRONIC CIGARETTES AND AN UNLOADING
DEVICE FOR UNLOADING THE CIGARETTE PARTS FROM THE TRAY

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Field of the art

The present invention relates to a combination of a tray for holding cigarette parts, such as cartridges, for electronic cigarettes and an unloading device for unloading the cigarette parts from the tray. The present invention also relates to the tray and to the
10 unloading device separately, and to a method of unloading cigarette parts from a tray with the unloading device.

Background of the invention

Specific operation lines for cigarette parts, such as filling lines for cartridges, of
15 electronic cigarettes are often located in countries with high labour costs, such as European countries. The manufacture of these cigarette parts typically takes place in a different location, more in particular in countries with lower labour costs, such as China and other countries outside Europe. This is due to the fact that these cigarette parts are at least partially manufactured with manual labour.

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The manufactured cigarette parts are transported from the country with lower labour costs to the country with high labour costs. The cigarette parts are often transported in large numbers. Generally, the cigarette parts are transported in a tray. A single tray may hold several hundred to several thousand cigarette parts.

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When the cigarette parts arrive at the location in Europe an addition operation is often performed on the cigarette parts. An operation line is used for said additional operation. In the situation that the cigarette parts are cartridges, the cartridges are typically manufactured in a country with low labour costs, and subsequently filled with a liquid in a
30 country with high labour costs. A filling line is used for the filling of the cartridges. When the cigarette parts arrive at the location of the operation line, they are generally unloaded from the tray prior to the operation in the operation line. The cigarette parts are generally unloaded as bulk. However, the operation line requires that the cigarette parts have a certain orientation. Therefore, the start of the operation generally comprises reorienting the
35 cigarette parts to the required orientation and supplying the cigarette parts to the operation line. It was found that this is a rather cumbersome process.

Object of the invention

It is an object of the invention to provide a less cumbersome device and method of providing cigarette parts to an operation line of cigarette parts for e-cigarettes.

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It is a further object of the invention to simplify the process of processing cigarette parts of e-cigarettes. In particular, it is a further object of the invention to simplify the process of making and filling of cartridges of e-cigarettes.

10 The invention

In order to achieve at least one object, the invention provides a combination of a tray for holding cigarette parts, such as cartridges, for electronic cigarettes and an unloading device for unloading the cigarette parts from the tray,

the tray comprising: a front wall, a rear wall, a left wall, a right wall, a bottom wall
15 and a top wall which define a compartment (C), wherein the front wall is movable from a closed position to an open position in order to create an access opening for filling the tray with cigarette parts, and wherein the bottom wall is movable from a closed position to an open position in order to create a discharge opening for unloading the cigarette parts from the tray under the influence of gravity,

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and

the unloading device comprising:

- a tray holder constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,
- 25 – a receiving opening configured to engage the discharge opening of the tray and having dimensions which correspond to the dimensions of the bottom opening,
- a reservoir configured for holding a plurality of cigarette parts in an essentially horizontal orientation, and
- a discharge unit for discharging the cigarette parts from the reservoir.

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With the present invention, each cigarette part stays in a controlled orientation and position from the moment it has been made and stored to the moment the additional operation is performed. The step of reorienting the cigarette parts which are stored as bulk is removed from the process, resulting in a simpler and more efficient overall process.

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A tray which may be filled manually by a worker in for instance China or any other location, is directly coupled to the unloading device according to the invention and subsequently emptied. During the transport and the unloading process the cigarette parts stay in the required orientation. There is no need for any reorienting.

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In an embodiment, the discharge unit comprises a reorienting device constructed to reorient the cigarette parts from an essentially horizontal orientation to an essentially vertical orientation. The tray was found to be unloaded best in a situation in which the cigarette parts are oriented horizontally. However, certain operation lines, such as the filling line of
10 cartridges, generally work best when the cigarette parts are oriented vertically. The reorienting device makes this possible.

In an embodiment, the unloading device is configured to discharge the cigarette parts one by one. The unloading device receives the cigarette parts from the tray in a flow of
15 multiple cigarette parts in parallel and transforms this flow into a one by one flow, which is convenient for the operation line.

In an embodiment, the discharge opening of the tray or the receiving opening of the unloading device is provided with a flexible band which is fastened in a sliding manner to the
20 tray or to the unloading device, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering
25 the flexible band is removed from the reservoir by pulling the flexible band out of the reservoir. It was found that the flexible band provides an effective control device for unloading the cigarette parts from the tray while maintaining the required orientation.

In an embodiment, the flexible band is attached to the tray and has:

- 30
- a first part which spans a length (L1) of the receiving opening between a first connection point at one end of the opening and a second connection point at a second, opposite end of the opening, and
 - a second part which forms an extension of the first part, the second part being located on the opposite side of the first or second connection point as the first part,
- 35
- wherein the length of the first part is increased by sliding the second part of the flexible band past the first or second connection point. This is an effective way of controllably lowering the cigarette parts into the reservoir.

In an embodiment, the flexible band is detachable from at least one connection point and comprises a pulling member at one end for pulling the flexible band from the reservoir once the cigarette parts have been controllably lowered into the reservoir. This is an effective way of removing the flexible band from between the cigarette parts.

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In an embodiment, the bottom wall of the tray is arranged in a sliding manner in rails which extend along the bottom of the tray, the bottom wall being configured to slide in order to open the discharge opening. The sliding bottom wall enables a simple unloading process of the tray, after the tray has engaged with the unloading device.

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In an embodiment, when seen in top view a sliding direction of the flexible band is parallel to a sliding direction of the bottom wall. This makes the overall process simple to carry out for an operator.

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In an embodiment, the flexible band is arranged in the receiving opening of the unloading device. After engagement of the tray with the unloading device and after removal of the bottom wall, the cigarette parts are effectively supported with the flexible band.

In an embodiment, a distance (Y) between the front wall and the rear wall of the tray can be varied in order to allow the tray to hold cigarette parts of different lengths. This has the advantage is that the tray can be used for different sizes of cigarette parts. The receiving opening may have a width which can be varied in correspondence with the distance between the front wall and rear wall of the tray.

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In an embodiment, the tray comprises a plurality of mounting positions for the rear wall, each mounting position corresponding to a different distance (Y) between the rear wall and the front wall. This is an effective way of varying the distance between the front wall and rear wall.

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The tray may be flat.

In an embodiment, the discharge unit comprises:

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- an inclined rotary member which is mounted for rotation about an inclined axis, the inclined axis extending at an angle of 40-50 degrees to the horizontal, wherein the inclined rotary member comprises part holders which are constructed to hold the cigarette parts at an angle of 40-50 degrees to the inclined axis, wherein during rotation of the inclined

rotatory member a part axis of a cigarette part which is held by a part holder tilts from a substantially horizontal orientation to a substantially vertical orientation, and

- a rotary infeed member constructed to rotate about an essentially horizontal axis and constructed to receive the cigarette parts having a horizontal orientation from the reservoir and to transfer the cigarette parts to the respective part holders of the inclined rotary member,
- a rotary outfeed member constructed to rotate about an essentially vertical outfeed axis and configured to receive the cigarette parts from the inclined rotary member and to transport the cigarette parts further downstream.

This was found to be a very practical way of reorienting the cigarette parts.

In an embodiment, the reorienting device comprises a gear box, wherein an inclined gear, an infeed gear and an outfeed gear are coupled to respectively the inclined rotary member, the rotary infeed member and the rotary outfeed member and engage one another in the gear box, wherein the inclined gear is positioned between the infeed gear and the outfeed gear. The gearbox advantageously synchronizes the different rotary elements of the reorienting device.

In an embodiment, the inclined rotary member is configured to move the cigarette parts downward from the infeed location where the cigarette parts are received from the rotary infeed member to the outfeed location where the cigarette parts are transferred to the rotary outfeed member. The downward movement makes it possible to perform all processing operations at a convenient height for an operator.

In an embodiment, the part holders are recesses in a conical part of the inclined rotary member.

In an embodiment, the reservoir comprises a tapering end section which becomes narrower towards the rotary infeed member. In this way the flow is advantageously converted from a plural cigarette part flow to a singular cigarette part flow, i.e. one by one.

The present invention further relates to a tray for holding multiple cigarette parts for electronic cigarettes, the tray comprising: a front wall, a rear wall, a left wall, a right wall, a bottom wall and a top wall which define a compartment, wherein at least the front wall is removable to provide access to the interior for filling the tray with cigarette parts, and

wherein the bottom wall is removable in order to create a discharge opening for unloading the cigarette parts from the tray.

The tray may comprise any of the features as disclosed in the combination of the tray
5 and unloading device.

The present invention further relates to an unloading device for unloading the tray according to the invention, the unloading device comprising:

- 10 – a tray holder constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,
- a receiving opening configured to engage the discharge opening of the tray and having dimensions which correspond to the dimensions of the bottom opening,
- a reservoir configured for holding a plurality of cigarette parts in an essentially
15 horizontal orientation, and
- a discharge unit for discharging the cigarette parts from the reservoir.

The unloading device may comprise any of the features as disclosed in the combination of the tray and unloading device.
20

The present invention further relates to a method of unloading cigarette parts for electronic cigarettes from a tray, the method comprising:

- providing the combination of a tray and an unloading device according to the invention, the tray being loaded with a plurality of cigarette parts, and
- 25 – engaging the loaded tray with the tray holder of the unloading device, wherein the discharge opening engages the receiving opening, and
- discharging the cigarette parts from the tray into the reservoir in a controlled manner, and
- discharging the cigarette parts from the unloading device by the discharge unit.

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In an embodiment of the method, the discharge unit discharges the cigarette parts one by one.

In an embodiment of the method, the tray or the unloading device comprises a
35 flexible band, and wherein the cigarette parts are lowered into the reservoir as a group while being supported by the flexible band, wherein the lowering takes place by gradually

increasing the length of the flexible band, and wherein after the cigarette parts have been lowered into the reservoir the flexible band is pulled out of the reservoir.

In an embodiment of the method, the cigarette parts are held in the reservoir in an essentially horizontal orientation and are reoriented to an essentially vertical orientation by the discharge unit.

In an embodiment of the method, the cigarette parts have a substantially tubular shape and have a main axis, wherein the main axis of the cigarette parts is oriented orthogonally to the front wall and to the rear wall.

In an embodiment of the method, the cigarette parts leave the tray in a downward direction (D) which is essentially orthogonal to the main axis of the cigarette parts.

These and other aspects of the invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description and considered in connection with the accompanying drawings in which like reference symbols designate like parts.

Brief description of the figures

Figure 1 shows a view in perspective of the unloading device according to the invention on its support frame.

Figure 2 shows a view in perspective of the unloading device according to the invention on its support frame and from a different angle.

Figure 3 shows a view in perspective of the unloading device according to the invention.

Figures 4A – 4G show views in perspective of a combination of a loaded tray and an unloading device according to the invention in different stages of the unloading process.

Figure 5 shows a close-up of figure 2 with some parts removed.

Figures 6A and 6B show views in perspective of a reorienting device of the unloading device according to the invention.

Figure 7 shows a view in perspective of the tray according to the invention.

Figure 8 shows a top view of the tray according to the invention.

Figure 9 shows a view in perspective of a detail of the tray according to the invention.

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Detailed description of the figures

Turning to figures 1, 2 and 3, an unloading device 10 for unloading cigarette parts from a tray is shown. In the examples shown, the cigarette parts are cartridges and the operation line is a filling line, but the same principles can be applied in a similar manner on other types of cigarette parts and operation lines. The unloading device may form the start
5 of a filling line, in which empty cartridges are filled with a liquid. The unloading device may also be placed somewhere halfway the filling line to feed partly processed cartridges to the filling line. The filling line may comprise multiple stations for checking, filling, testing, labelling and packaging. The rest of the filling line is not part of the present invention.

10 The unloading device 10 is positioned on a support frame 12. The unloading device comprises a tray holder 16 which is configured for receiving a full tray, i.e. a tray loaded with empty or partly processed cartridges. The tray may be loaded with cartridges in an entirely different location than the location of the filling line.

15 The unloading device has a receiving opening 14 which is upwardly directed and configured to engage a discharge opening of the tray.

Turning in particular to figures 2 and 3, the unloading device comprises a reorienting device 50, as will be explained further below.

20

Turning to figures 4A, 7, 8 and 9, a tray 20 is shown. The tray is flat, i.e. a height H and a width W are relatively large in comparison with a length L of the tray. The tray comprises a front wall 21 (which is of a see through material), a movable rear wall 22A, a fixed rear wall 22B, a left wall 24, a right wall 26, a bottom wall 28 and a top wall 30. The
25 walls define a compartment C. The compartment C is delimited by the movable rear wall 22A. The fixed rear wall 22B provides structural rigidity.

The tray has handles 101 which are connected to the rest of the tray via hinges 102.

30 The front wall is movable from a closed position to an open position in order to create an access opening for filling the tray with empty cartridges 34. The tray 20 comprises rails 100 on the front side to allow the front wall to slide in and out. The front wall comprises ridges 106 which slide through the rails. The cartridges 34 have a substantially tubular shape and have a main axis 110, wherein the main axis of the cartridges is oriented
35 orthogonally to the front wall 21 and to the rear wall 22A. The front wall may be completely removable in order to make the tray easily accessible for a person who makes cartridges

manually and places the cartridges in the tray as a last step in the manufacturing process. The tray 20 may hold several hundreds of cartridges.

The tray has a slot 112 at the bottom. Rails 29 are provided in the sides of the slot
5 112. The bottom wall 28 slides in said slot 112 along the rails 29. The bottom wall 28 is movable from a closed position to an open position in order to create an unloading opening 35 for unloading the cartridges from the tray under the influence of gravity.

Turning to figure 8, the distance Y between the front wall and the movable rear wall
10 22A of the tray 20 can be varied in order to allow the tray to hold cartridges of different lengths. To this end the tray comprises a plurality of mounting positions 105 for the movable rear wall 22A. Each mounting position corresponds to a different distance Y between the rear wall and the front wall which in turn corresponds to a length of the cartridges. The movable rear wall 22A comprises ridges 107 which fit in the mounting positions 105. Figure
15 8 indicates three distances Y1, Y2 and Y3, but there are in fact more options, as there are five mounting positions 105.

Turning in particular to figure 4A, the unloading device 16 comprises the tray holder
15 constructed for receiving a full tray and for holding the full tray in an essentially upright 20 orientation in which the cartridges 34 have an essentially horizontal orientation.

The tray holder has a receiving opening 14 which has dimensions (length, width) which correspond to the dimensions of the unloading opening 35 at the bottom of the tray.

25 The unloading device comprises a reservoir 38 configured for holding a plurality of cartridges in an essentially horizontal orientation. The reservoir has sloping side walls 39 which form a tapering section which becomes narrower towards the rotary infeed member and leads to a discharge unit 40 for discharging the cartridges from the reservoir 38. The discharge unit is located at the bottom end of the reservoir, so that the cartridges move
30 downward under the influence of gravity.

Turning to figure 4B, the unloading process starts when a full tray 20 is placed on the tray holder 15. In this situation, it is not yet possible for the cartridges to leave the tray under the influence of gravity.

Turning to figure 4C, the bottom wall 28 is subsequently removed by sliding it in the direction E. The bottom wall 28 is arranged in a sliding manner in rails 29 which extend along the bottom of the tray.

5 If there would be no extra provision, the cartridges would tumble down under the influence of gravity as indicated in figure 4C. It was found that this results in cartridges falling down in the wrong orientation, and these cartridges subsequently form an obstruction of the unloading device.

10 Therefore, as shown in figure 4D, an extra flexible band 42 is provided which is constructed to prevent the cartridges from dropping in an uncontrolled manner into the reservoir. The flexible band may be provided to the unloading opening 35 of the tray or to the receiving opening 14 of the unloading device. The flexible band 42 which is fastened in a sliding manner to the tray or to the unloading device.

15

In this embodiment, the flexible band is arranged in the unloading device at the very upper end of the receiving opening 14. However, the flexible band may also be arranged on the tray directly underneath the bottom wall 28 or on the inside of the bottom wall 28 of the tray, i.e. directly above the bottom wall 28. If the flexible band is arranged on the unloading
20 device, only one flexible band is necessary which is an advantage over an embodiment with a flexible band on each tray.

The flexible band 42 has a first part 45A which spans a length (L1) of the receiving opening between a first connection point 46 at one end of the opening and a second
25 connection point 47 at a second, opposite end of the opening. The flexible band 42 has a second part 45B which forms an extension of the first part, the second part being located on the opposite side of the second connection point 47 as the first part.

When the tray is engaged with the unloading device and the bottom wall 28 has been
30 removed, the flexible band initially is taut and blocks the receiving opening. Thereafter, the flexible band 42 is gradually loosened in order to let the cartridges move downward through the receiving opening into the reservoir in a controlled manner.

The length of the first part 45A is increased by sliding the second part 45B of the
35 flexible band past the second connection point 47 in a sliding direction S. The weight of the cartridges rests on the flexible band and pushes the flexible band down. This weight assists

in the sliding movement of the flexible band. The cartridges leave the tray in a downward direction (D) which is essentially orthogonal to the main axis of the cartridges.

Turning to figure 4E at some point, the flexible band 42 will contact the cartridges
5 which were already in the reservoir. This point in time also marks the end of any risk that the cartridges may tumble in the wrong direction and form an obstruction. The flexible band is now disconnected at connection point 46 and removed from the reservoir in pulling direction P by pulling the pulling member 48. When seen in top view the pulling direction (P) of the flexible band is parallel to the sliding direction (E) of the bottom wall.
10

Turning to figure 4F, when the flexible band 42 has been removed, the cartridges are free to move in the direction of the discharging unit 40 which discharges the cartridges from the reservoir in a controlled manner and one by one.

15 Turning to figure 4G, the end situation in which the entire tray 20 has been unloaded is shown.

Turning to figures 5, 6A and 6B, the discharge unit 40 comprises a reorienting device
20 50 constructed to reorient the cartridges 34 from an essentially horizontal orientation to an essentially vertical orientation.

The discharge unit comprises an inclined rotary member 52 which is mounted for rotation about an inclined axis 62, the inclined axis extending at an angle of 40-50 degrees to the horizontal. The inclined rotary member 52 comprises part holders 56 which are
25 constructed to hold the cartridges at an angle of 40-50 degrees to the inclined axis 62. The part holders 56 are recesses in a conical part 58 of the inclined rotary member 52.

Part holders which are configured to hold the cartridges are also referred to as
30 cartridge holders.

A stationary guide 152 is provided around the inclined rotary member 52 to keep the cartridges 34 in the part holders. The stationary guide is indicated in dashed lines. A similar stationary guide is provided around the infeed and rotary outfeed members 51 and 53 to keep the cartridges in the recesses.
35

The rotary infeed member 51 and the rotary outfeed member 53 have part holders 57 which extend parallel to the respective axes 61, 63.

The reorienting device 50 further comprises a rotary infeed member 51 constructed to rotate about an essentially horizontal axis 61 and constructed to receive the cartridges having a horizontal orientation from the tray holder 16 and to transfer the cartridges to the respective part holders 56 of the inclined rotary member.

5

During rotation of the inclined rotatory member, a part axis of a cartridge which is held by a part holder tilts from a substantially horizontal orientation to a substantially vertical orientation.

10 In the case the cigarette part is a cartridge, the part axis is also referred to as cartridge axis.

The reorienting device further comprises a rotary outfeed member 53 constructed to rotate about an essentially vertical outfeed axis 63 and configured to receive the vertically oriented cartridges from the inclined rotary member 52 and to transport the cartridges further downstream.

The reorienting device comprises a gear box 64. An inclined gear 72, an infeed gear 71 and an outfeed gear 73 are coupled to respectively the inclined rotary member 52, the rotary infeed member 51 and the rotary outfeed member 53 and engage one another in the gear box. The inclined gear 72 is positioned between the infeed gear 71 and the outfeed gear 73.

The inclined rotary member 52 is configured to move the cartridges downward in direction T from the infeed location 75 where the cartridges are received from the rotary infeed member to the outfeed location where the cartridges are transferred to the rotary outfeed member.

With the words "essentially horizontal orientation", an orientation is intended in which the main axis of the cigarette parts extends at an angle of less than 10 degrees to the horizontal.

It will be recognized that an embodiment may not achieve all of the stated objects.

35 As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which can be embodied in various forms. Therefore, specific structural and

functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure. Further, the terms and phrases used herein are not intended to be limiting, but rather, to provide an
5 understandable description of the invention.

The terms "a" or "an", as used herein, are defined as one or more than one. The term plurality, as used herein, is defined as two or more than two. The term another, as used herein, is defined as at least a second or more. The terms including and/or having, as used
10 herein, are defined as comprising (i.e., open language, not excluding other elements or steps). Any reference signs in the claims should not be construed as limiting the scope of the claims or the invention.

The mere fact that certain measures are recited in mutually different dependent
15 claims does not indicate that a combination of these measures cannot be used to advantage.

CLAIMS

1. Combination of a tray (20) for holding cigarette parts (34), such as cartridges, for electronic cigarettes and an unloading device (10) for unloading the cigarette parts from the tray,

5 the tray comprising: a front wall (21), a rear wall (22A), a left wall (26), a right wall (24), a bottom wall (28) and a top wall (30) which define a compartment (C), wherein the front wall is movable from a closed position to an open position in order to create an access opening for filling the tray with cigarette parts, and wherein the bottom wall is movable from a closed position to an open position in order to create an unloading opening (35) for unloading the cigarette parts from the tray under the influence of gravity,

10 and

the unloading device comprising:

- 15 – a tray holder (16) constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,
- a receiving opening (14) configured to engage the unloading opening (35) of the tray and having dimensions which correspond to the dimensions of the bottom opening,
- 20 – a reservoir (38) configured for holding a plurality of cigarette parts in an essentially horizontal orientation, and
- a discharge unit (40) for discharging the cigarette parts from the reservoir, wherein the discharge unit (40) comprises a reorienting device (50) constructed to reorient the cigarette parts from an essentially horizontal orientation to an essentially vertical orientation.

- 25 2. Combination according to claim 1, wherein the discharge unit comprises:

- 30 – an inclined rotary member (52) which is mounted for rotation about an inclined axis (62), the inclined axis extending at an angle of 40-50 degrees to the horizontal, wherein the inclined rotary member comprises part holders (56) which are constructed to hold the cigarette parts at an angle of 40-50 degrees to the inclined axis, wherein during rotation of the inclined rotatory member a part axis of a cigarette part which is held by a part holder tilts from a substantially horizontal orientation to a substantially vertical orientation, and

- a rotary infeed member (51) constructed to rotate about an essentially horizontal axis (61) and constructed to receive the cigarette parts having a horizontal orientation from the reservoir and to transfer the cigarette parts to the respective part holders of the inclined rotary member,
- 5
- a rotary outfeed member (53) constructed to rotate about an essentially vertical outfeed axis (63) and configured to receive the cigarette parts from the inclined rotary member and to transport the cigarette parts further downstream.
- 10
3. Combination according to claim 2, comprising a gear box (64), and wherein an inclined gear (72), an infeed gear (71) and an outfeed gear (73) are coupled to respectively the inclined rotary member, the rotary infeed member and the rotary outfeed member and engage one another in the gear box, wherein the inclined gear is positioned between the infeed gear and the outfeed gear.
- 15
4. Combination according to any of the preceding claims, wherein the discharge opening (35) of the tray or the receiving opening (14) of the unloading device is provided with a flexible band (42) which is fastened in a sliding manner to the tray or to the unloading device, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering the flexible band is removed from the reservoir by pulling the flexible band out of the reservoir.
- 20
- 25
5. Combination according to claim 4, wherein the flexible band (42) is attached to the tray and has:
- a first part (45A) which spans a length (L1) of the receiving opening between a first connection point (46) at one end of the opening and a second connection point (47) at a second, opposite end of the opening, and
 - a second part which (45B) forms an extension of the first part, the second part being located on the opposite side of the first or second connection point as the first part,
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- 35
- wherein the length of the first part is increased by sliding the second part of the flexible band past the first or second connection point.

- 5
6. Combination according to claim 4 or 5, wherein the flexible band is detachable from at least one connection point and comprises a pulling member (48) at one end for pulling the flexible band from the reservoir once the cigarette parts have been controllably lowered into the reservoir.
- 10
7. Combination according to any of the preceding claims, wherein the bottom wall of the tray is arranged in a sliding manner in rails (29) which extend along the bottom of the tray, the bottom wall being configured to slide in order to open the unloading opening (35) of the tray.
- 15
8. Combination according to any of the preceding claims 4-7, wherein when seen in top view a sliding direction (S) of the flexible band is parallel to a sliding direction (E) of the bottom wall.
- 20
9. Combination according to any of the preceding claims 4-8, wherein the flexible band is arranged in the receiving opening of the unloading device.
- 25
10. Combination according to any of the preceding claims, wherein a distance (Y) between the front wall (21) and the rear wall (22) of the tray can be varied in order to allow the tray to hold cigarette parts of different lengths.
- 30
11. Combination according to the preceding claims, wherein the tray comprises a plurality of mounting positions (105) for the rear wall (22), each mounting position corresponding to a different distance (Y) between the rear wall and the front wall.
- 35
12. Combination according to the preceding claims, wherein the tray is flat.
13. Combination according any of claims 2-12, wherein the inclined rotary member is configured to move the cigarette parts downward from the infeed location where the cigarette parts are received from the rotary infeed member to the outfeed location where the cigarette parts are transferred to the rotary outfeed member
14. Combination according to any of claims 2-13, wherein the part holders (56) are recesses in a conical part (58) of the inclined rotary member.
15. Combination according to any of the preceding claims, wherein the unloading device is configured to discharge the cigarette parts one by one.

16. Combination according to any of the preceding claims, wherein the reservoir comprises a tapering end section which becomes narrower towards the rotary infeed member.
- 5 17. Tray (20) for holding multiple cigarette parts (34) for electronic cigarettes, the tray comprising: a front wall (21), a rear wall (22), a left wall (24), a right wall (26), a bottom wall (28) and a top wall (30) which define a compartment (C), wherein at least the front wall is removable to provide access to the interior for filling the tray with cigarette parts, and wherein the bottom wall (28) is removable in order to
10 create a unloading opening (35) for unloading the cigarette parts from the tray.
18. Tray according to claim 17, wherein the discharge opening (35) of the tray is provided with a flexible band (42) which is fastened in a sliding manner to the tray, wherein when the tray is engaged with the unloading device and the bottom wall is
15 in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering the flexible band is removed from the reservoir by pulling the
20 flexible band out of the reservoir.
19. Tray according to claim 17 or 18, wherein the flexible band (42) is attached to the tray and has:
- a first part (45A) which spans a length (L1) of the receiving opening between
25 a first connection point (46) at one end of the opening and a second connection point (47) at a second, opposite end of the opening, and
 - a second part which (45B) forms an extension of the first part, the second part being located on the opposite side of the first or second connection point as the first part,
- 30 wherein the length of the first part is increased by sliding the second part of the flexible band past the first or second connection point.
20. Tray according to any of the preceding claims 17-19, wherein the flexible band is detachable from at least one connection point and comprises a pulling member (48)
35 at one end for pulling the flexible band from the reservoir once the cigarette parts have been controllably lowered into the reservoir.

21. Tray according to any of the preceding claims 17-20, wherein the bottom wall of the tray is arranged in a sliding manner in rails (29) which extend along the bottom of the tray, the bottom wall being configured to slide in order to open the unloading opening (35) of the tray.
- 5
22. Tray according to any of the preceding claims 17-21, wherein when seen in top view a sliding direction (S) of the flexible band is parallel to a sliding direction (E) of the bottom wall.
- 10
23. Tray according to any of the preceding claims 17-22, wherein a distance (Y) between the front wall (21) and the rear wall (22) of the tray can be varied in order to allow the tray to hold cigarette parts of different lengths.
- 15
24. Tray according to the preceding claim, wherein the tray comprises a plurality of mounting positions (105) for the rear wall (22), each mounting position corresponding to a different distance (Y) between the rear wall and the front wall.
25. Tray according to any of the preceding claims 17-24, wherein the tray is flat.
- 20
26. Unloading device (16) for unloading the tray (20) according to any of the preceding claims, the unloading device comprising
- a tray holder (15) constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,
 - 25 – a receiving opening (14) configured to engage the discharge opening (15) of the tray and having dimensions which correspond to the dimensions of the bottom opening,
 - a reservoir (38) configured for holding a plurality of cigarette parts in an essentially horizontal orientation, and
 - 30 – a discharge unit (40) for discharging the cigarette parts from the reservoir wherein the discharge unit (40) comprises a reorienting device (50) constructed to reorient the cigarette parts from an essentially horizontal orientation to an essentially vertical orientation.
- 35
27. Unloading device according to claim 26, wherein the discharge unit comprises:

- 5 – an inclined rotary member (52) which is mounted for rotation about an inclined axis (62), the inclined axis extending at an angle of 40-50 degrees to the horizontal, wherein the inclined rotary member comprises part holders (56) which are constructed to hold the cigarette parts at an angle of 40-50 degrees to the inclined axis, wherein during rotation of the inclined rotary member a part axis of a cigarette part which is held by a part holder tilts from a substantially horizontal orientation to a substantially vertical orientation, and
- 10 – a rotary infeed member (51) constructed to rotate about an essentially horizontal axis (61) and constructed to receive the cigarette parts having a horizontal orientation from the tray holder and to transfer the cigarette parts to the respective part holders of the inclined rotary member,
- 15 – a rotary outfeed member (53) constructed to rotate about an essentially vertical outfeed axis (63) and configured to receive the cigarette parts from the inclined rotary member and to transport the cigarette parts further downstream.

20 28. Unloading device according to the preceding claim 27, comprising a gear box (64), and wherein an inclined gear (72), an infeed gear (71) and an outfeed gear (73) are coupled to respectively the inclined rotary member, the rotary infeed member and the rotary outfeed member and engage one another in the gear box, wherein the inclined gear is positioned between the infeed gear and the outfeed gear.

25 29. Unloading device according to claim 26 or 27, wherein the inclined rotary member is configured to move the cigarette parts downward from the infeed location where the cigarette parts are received from the rotary infeed member to the outfeed location where the cigarette parts are transferred to the rotary outfeed member

30 30. Unloading device according to any of claims 27-29, wherein the receiving opening (14) of the unloading device is provided with a flexible band (42) which is fastened in a sliding manner to the tray or to the unloading device, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering the

35

flexible band is removed from the reservoir by pulling the flexible band out of the reservoir.

- 5 31. Unloading device according to any of the preceding claims 27 - 33, wherein the part holders (56) are recesses in a conical part (58) of the inclined rotary member.
32. Unloading device of any of claims 26-31, wherein the unloading device is configured to discharge the cigarette parts one by one.
- 10 33. Unloading device according to any of the preceding claims 26-32, wherein the reservoir comprises a tapering end section which becomes narrower towards the rotary infeed member.
- 15 34. Method of unloading cigarette parts (34) for electronic cigarettes from a tray (20), the method comprising:
- providing the combination of a tray and an unloading device according to any of claims 1 - 17, the tray being loaded with a plurality of cigarette parts (34), and
 - engaging the loaded tray with the tray holder of the unloading device, wherein 20 the unloading opening (35) engages the receiving opening (14), and
 - discharging the cigarette parts from the tray into the reservoir in a controlled manner, and
 - discharging the cigarette parts from the unloading device by the discharge 25 unit, wherein the cigarette parts are held in the reservoir in an essentially horizontal orientation and are reoriented to an essentially vertical orientation by the discharge unit.
- 30 35. Method according to any of the preceding method claims, wherein the tray or the unloading device comprises a flexible band (42), and wherein the cigarette parts are lowered into the reservoir as a group while being supported by the flexible band, wherein the lowering takes place by gradually increasing the length of the flexible band, and wherein after the cigarette parts have been lowered into the reservoir the flexible band is pulled out of the reservoir.

36. Method according to any of the preceding method claims, wherein the cigarette parts leave the tray in a downward direction (D) which is essentially orthogonal to the main axis of the cigarette parts.

5 37. Method according to the preceding method claim, wherein the discharge unit discharges the cigarette parts one by one.

38. Combination of a tray (20) for holding cigarette parts (34), such as cartridges, for electronic cigarettes and an unloading device (10) for unloading the cigarette parts from the tray,

10 the tray comprising: a front wall (21), a rear wall (22A), a left wall (26), a right wall (24), a bottom wall (28) and a top wall (30) which define a compartment (C), wherein the front wall is movable from a closed position to an open position in order to create an access opening for filling the tray with cigarette parts, and wherein the bottom wall is movable from a closed position to an open position in order to create
15 an unloading opening (35) for unloading the cigarette parts from the tray under the influence of gravity,

and

the unloading device comprising:

- 20 – a tray holder (16) constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,
- a receiving opening (14) configured to engage the unloading opening (35) of the tray and having dimensions which correspond to the dimensions of the bottom opening,
- 25 – a reservoir (38) configured for holding a plurality of cigarette parts in an essentially horizontal orientation, and
- a discharge unit (40) for discharging the cigarette parts from the reservoir.

39. Combination of claim 38, wherein the discharge opening (35) of the tray or the
30 receiving opening (14) of the unloading device is provided with a flexible band (42) which is fastened in a sliding manner to the tray or to the unloading device, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is
35 gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the

controlled lowering the flexible band is removed from the reservoir by pulling the flexible band out of the reservoir.

- 5 40. Combination of claim 38 or 39, wherein the unloading device is configured to discharge the cigarette parts one by one.
41. Combination according to any of the preceding claims 39-40, wherein the flexible band (42) is attached to the tray and has:
- 10 – a first part (45A) which spans a length (L1) of the receiving opening between a first connection point (46) at one end of the opening and a second connection point (47) at a second, opposite end of the opening, and
 - a second part which (45B) forms an extension of the first part, the second part being located on the opposite side of the first or second connection point as the first part,
- 15 wherein the length of the first part is increased by sliding the second part of the flexible band past the first or second connection point.
42. Combination according to any of the preceding claims 39-41, wherein the flexible band is detachable from at least one connection point and comprises a pulling member (48) at one end for pulling the flexible band from the reservoir once the
- 20 cigarette parts have been controllably lowered into the reservoir.
43. Combination according to any of the preceding claims 38-42, wherein the bottom wall of the tray is arranged in a sliding manner in rails (29) which extend along the
- 25 bottom of the tray, the bottom wall being configured to slide in order to open the unloading opening (35) of the tray.
44. Combination according to any of the preceding claims 38-43, wherein when seen in top view a sliding direction (S) of the flexible band is parallel to a sliding direction
- 30 (E) of the bottom wall.
45. Combination according to any of the preceding claims 39-44, wherein the flexible band is arranged in the receiving opening of the unloading device.
- 35 46. Combination according to any of the preceding claims 38-45, wherein a distance (Y) between the front wall (21) and the rear wall (22) of the tray can be varied in order to allow the tray to hold cigarette parts of different lengths.

47. Combination according to the preceding claims 38-46, wherein the tray comprises a plurality of mounting positions (105) for the rear wall (22), each mounting position corresponding to a different distance (Y) between the rear wall and the front wall.
- 5 48. Combination according to the preceding claims 38-47, wherein the tray is flat.
49. Combination according to any of the preceding claims 38-48, wherein the discharge unit (40) comprises a reorienting device (50) constructed to reorient the cigarette parts from an essentially horizontal orientation to an essentially vertical orientation.
- 10 50. Combination according to any of the preceding claims 38-49, wherein the discharge unit comprises:
- an inclined rotary member (52) which is mounted for rotation about an inclined axis (62), the inclined axis extending at an angle of 40-50
 - 15 degrees to the horizontal, wherein the inclined rotary member comprises part holders (56) which are constructed to hold the cigarette parts at an angle of 40-50 degrees to the inclined axis, wherein during rotation of the inclined rotatory member a part axis of a cigarette part which is held by a part holder tilts from a substantially horizontal orientation to a
 - 20 substantially vertical orientation, and
 - a rotary infeed member (51) constructed to rotate about an essentially horizontal axis (61) and constructed to receive the cigarette parts having a horizontal orientation from the reservoir and to transfer the cigarette parts to the respective part holders of the inclined rotary member,
 - 25 – a rotary outfeed member (53) constructed to rotate about an essentially vertical outfeed axis (63) and configured to receive the cigarette parts from the inclined rotary member and to transport the cigarette parts further downstream.
- 30 51. Combination according to any of the preceding claims 38-50, comprising a gear box (64), and wherein an inclined gear (72), an infeed gear (71) and an outfeed gear (73) are coupled to respectively the inclined rotary member, the rotary infeed member and the rotary outfeed member and engage one another in the gear box, wherein the inclined gear is positioned between the infeed gear and the outfeed
- 35 gear.

52. Combination according any of the preceding claims 38-51, wherein the inclined rotary member is configured to move the cigarette parts downward from the infeed location where the cigarette parts are received from the rotary infeed member to the outfeed location where the cigarette parts are transferred to the rotary outfeed member
53. Combination according to any of the preceding claims 38-52, wherein the part holders (56) are recesses in a conical part (58) of the inclined rotary member.
54. Combination according to any of the preceding claims 38-53, wherein the reservoir comprises a tapering end section which becomes narrower towards the rotary infeed member.
55. Tray (20) for holding multiple cigarette parts (34) for electronic cigarettes, the tray comprising: a front wall (21), a rear wall (22), a left wall (24), a right wall (26), a bottom wall (28) and a top wall (30) which define a compartment (C), wherein at least the front wall is removable to provide access to the interior for filling the tray with cigarette parts, and wherein the bottom wall (28) is removable in order to create a unloading opening (35) for unloading the cigarette parts from the tray.
56. Tray according to claim 55, wherein the discharge opening (35) of the tray is provided with a flexible band (42) which is fastened in a sliding manner to the tray, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering the flexible band is removed from the reservoir by pulling the flexible band out of the reservoir.
57. Tray according to claim 55 or 56, wherein the flexible band (42) is attached to the tray and has:
- a first part (45A) which spans a length (L1) of the receiving opening between a first connection point (46) at one end of the opening and a second connection point (47) at a second, opposite end of the opening, and

- a second part which (45B) forms an extension of the first part, the second part being located on the opposite side of the first or second connection point as the first part,

wherein the length of the first part is increased by sliding the second part of the flexible band past the first or second connection point.

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58. Tray according to any of the preceding claims 55-57, wherein the flexible band is detachable from at least one connection point and comprises a pulling member (48) at one end for pulling the flexible band from the reservoir once the cigarette parts have been controllably lowered into the reservoir.

10

59. Tray according to any of the preceding claims 55-58, wherein the bottom wall of the tray is arranged in a sliding manner in rails (29) which extend along the bottom of the tray, the bottom wall being configured to slide in order to open the unloading opening (35) of the tray.

15

60. Tray according to any of the preceding claims 55-59, wherein when seen in top view a sliding direction (S) of the flexible band is parallel to a sliding direction (E) of the bottom wall.

20

61. Tray according to any of the preceding claims 55-60, wherein a distance (Y) between the front wall (21) and the rear wall (22) of the tray can be varied in order to allow the tray to hold cigarette parts of different lengths.

25

62. Tray according to the preceding claim, wherein the tray comprises a plurality of mounting positions (105) for the rear wall (22), each mounting position corresponding to a different distance (Y) between the rear wall and the front wall.

63. Tray according to any of the preceding claims 55-62, wherein the tray is flat.

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64. Unloading device (16) for unloading the tray (20) according to any of the preceding claims, the unloading device comprising

- a tray holder (15) constructed for receiving a full tray and for holding the full tray in an essentially upright orientation in which the cigarette parts have an essentially horizontal orientation,

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- a receiving opening (14) configured to engage the discharge opening (15) of the tray and having dimensions which correspond to the dimensions of the bottom opening,
- a reservoir (38) configured for holding a plurality of cigarette parts in an essentially horizontal orientation, and
- a discharge unit (40) for discharging the cigarette parts from the reservoir.

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65. Unloading device of claim 64, wherein the unloading device is configured to discharge the cigarette parts one by one.

10

66. Unloading device according to claim 64 or 65, wherein the receiving opening (14) of the unloading device is provided with a flexible band (42) which is fastened in a sliding manner to the tray or to the unloading device, wherein when the tray is engaged with the unloading device and the bottom wall is in an open position, the flexible band is taut and blocks the receiving opening and wherein after engagement of the tray with the unloading device the band is gradually loosened in order to let the cigarette parts move downward through the receiving opening into the reservoir in a controlled manner, and wherein after the controlled lowering the flexible band is removed from the reservoir by pulling the flexible band out of the reservoir.

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67. Unloading device to any of claims 64 - 66, wherein the discharge unit (40) comprises a reorienting device (50) constructed to reorient the cigarette parts from an essentially horizontal orientation to an essentially vertical orientation.

25

68. Unloading device according to any of the preceding claims 64-67, wherein the discharge unit comprises:

- an inclined rotary member (52) which is mounted for rotation about an inclined axis (62), the inclined axis extending at an angle of 40-50 degrees to the horizontal, wherein the inclined rotary member comprises part holders (56) which are constructed to hold the cigarette parts at an angle of 40-50 degrees to the inclined axis, wherein during rotation of the inclined rotatory member a part axis of a cigarette part which is held by a part holder tilts from a substantially horizontal orientation to a substantially vertical orientation, and

30

35

- a rotary infeed member (51) constructed to rotate about an essentially horizontal axis (61) and constructed to receive the cigarette parts having a horizontal orientation from the tray holder and to transfer the cigarette parts to the respective part holders of the inclined rotary member,
- 5
- a rotary outfeed member (53) constructed to rotate about an essentially vertical outfeed axis (63) and configured to receive the cigarette parts from the inclined rotary member and to transport the cigarette parts further downstream.
- 10
69. Unloading device according to the preceding claim, comprising a gear box (64), and wherein an inclined gear (72), an infeed gear (71) and an outfeed gear (73) are coupled to respectively the inclined rotary member, the rotary infeed member and the rotary outfeed member and engage one another in the gear box, wherein the inclined gear is positioned between the infeed gear and the outfeed gear.
- 15
70. Unloading device according to claim 68 or 69, wherein the inclined rotary member is configured to move the cigarette parts downward from the infeed location where the cigarette parts are received from the rotary infeed member to the outfeed location where the cigarette parts are transferred to the rotary outfeed member
- 20
71. Unloading device according to any of the preceding claims 64 - 70, wherein the part holders (56) are recesses in a conical part (58) of the inclined rotary member.
72. Unloading device according to any of the preceding claims 64-71, wherein the reservoir comprises a tapering end section which becomes narrower towards the rotary infeed member.
- 25
73. Method of unloading cigarette parts (34) for electronic cigarettes from a tray (20), the method comprising:
- 30
- providing the combination of a tray and an unloading device according to any of claims 38 - 54, the tray being loaded with a plurality of cigarette parts (34), and
 - engaging the loaded tray with the tray holder of the unloading device, wherein the unloading opening (35) engages the receiving opening (14), and
- 35
- discharging the cigarette parts from the tray into the reservoir in a controlled manner, and

- discharging the cigarette parts from the unloading device by the discharge unit.

- 5 74. Method according to the preceding method claim, wherein the discharge unit discharges the cigarette parts one by one.
- 10 75. Method according to any of the preceding method claims 73-74, wherein the tray or the unloading device comprises a flexible band (42), and wherein the cigarette parts are lowered into the reservoir as a group while being supported by the flexible band, wherein the lowering takes place by gradually increasing the length of the flexible band, and wherein after the cigarette parts have been lowered into the reservoir the flexible band is pulled out of the reservoir.
- 15 76. Method according to any of the preceding method claims 73-75, wherein the cigarette parts are held in the reservoir in an essentially horizontal orientation and are reoriented to an essentially vertical orientation by the discharge unit.
- 20 77. Method according to any of the preceding method claims 73-76, wherein the cigarette parts leave the tray in a downward direction (D) which is essentially orthogonal to the main axis of the cigarette parts.

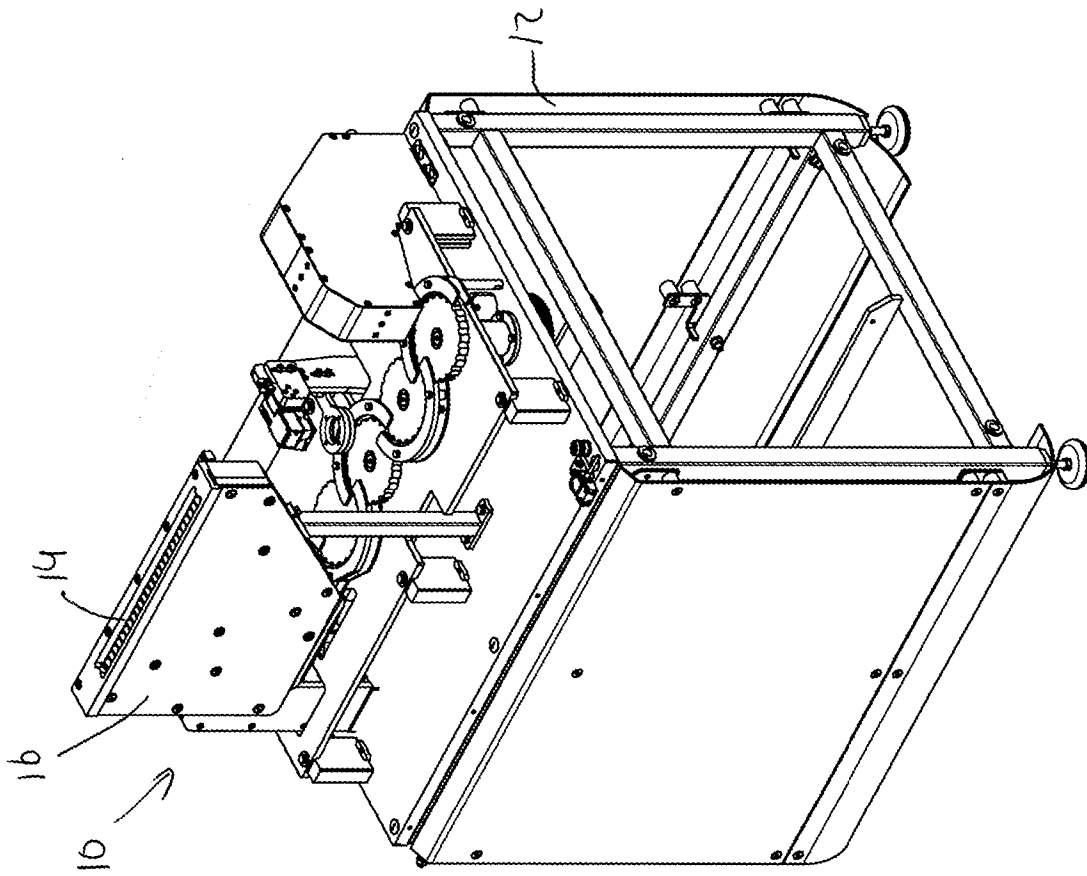


Fig. 1

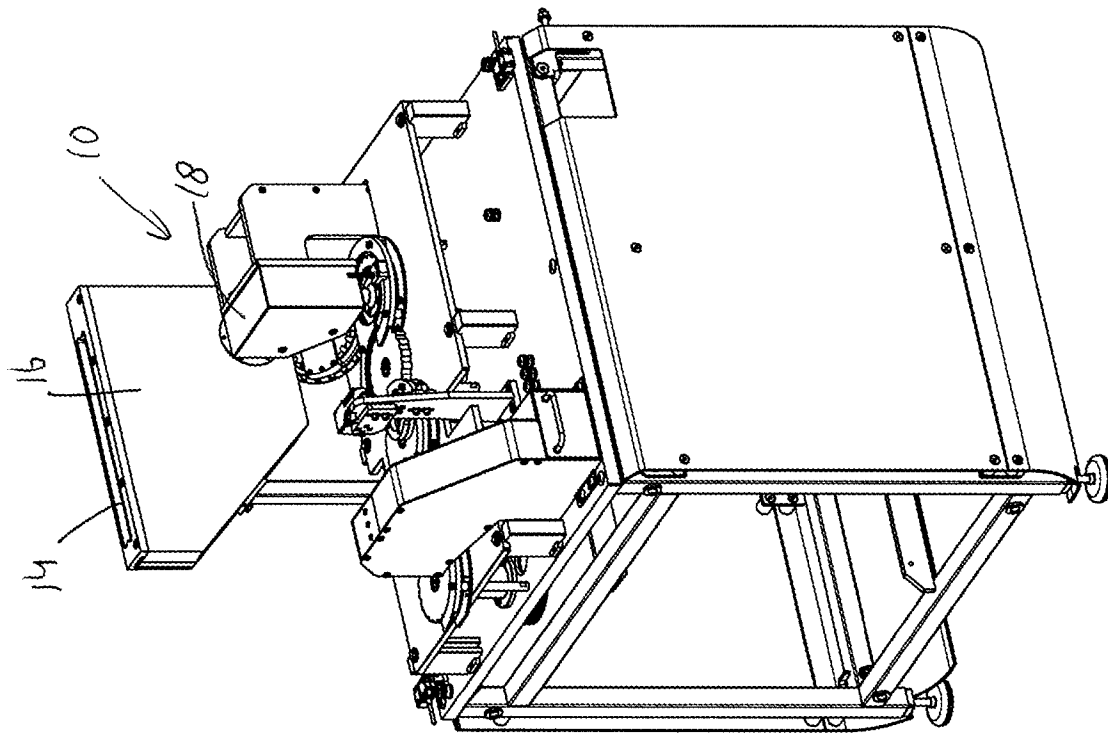


Fig. 2

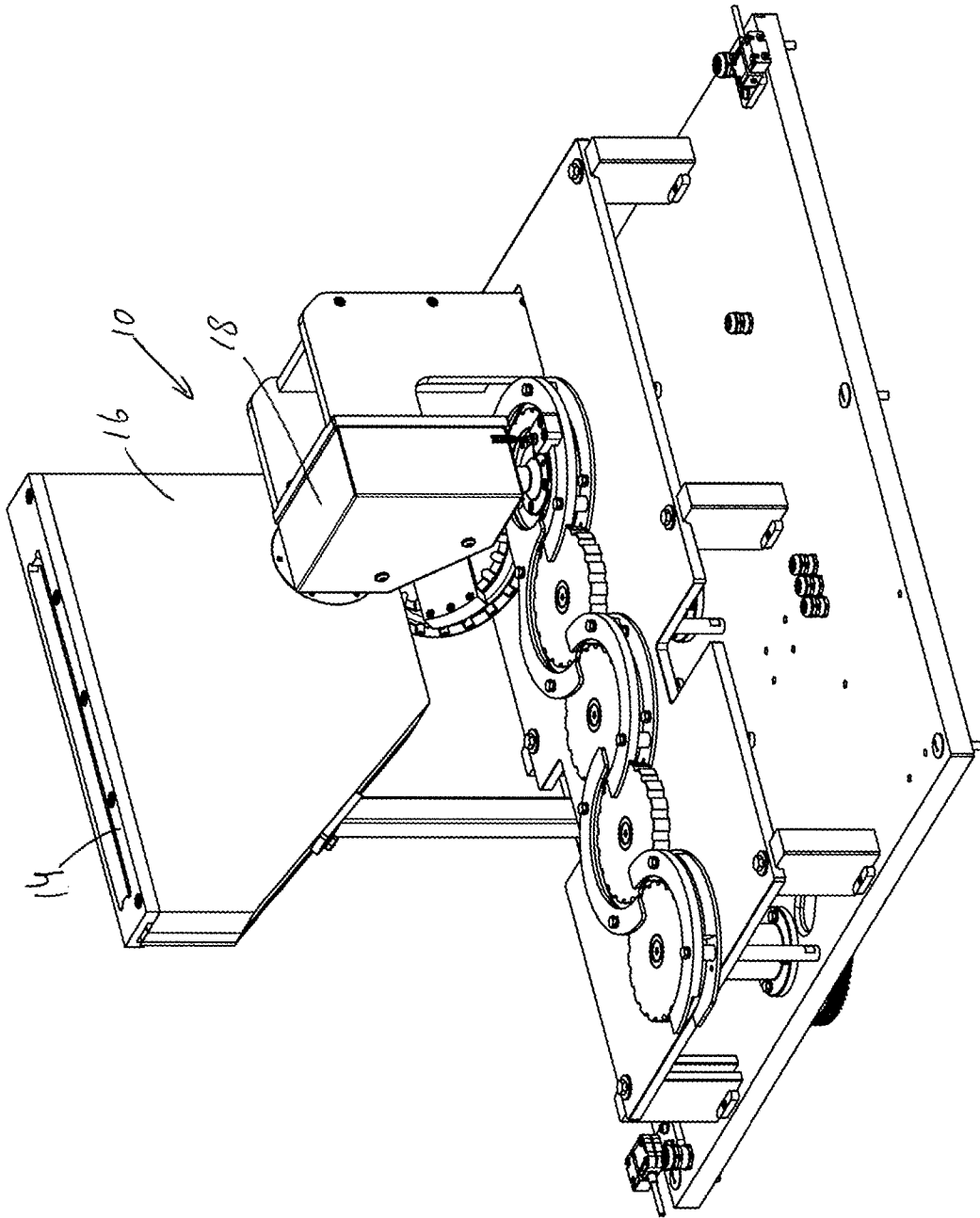


Fig. 3

Fig. 4B

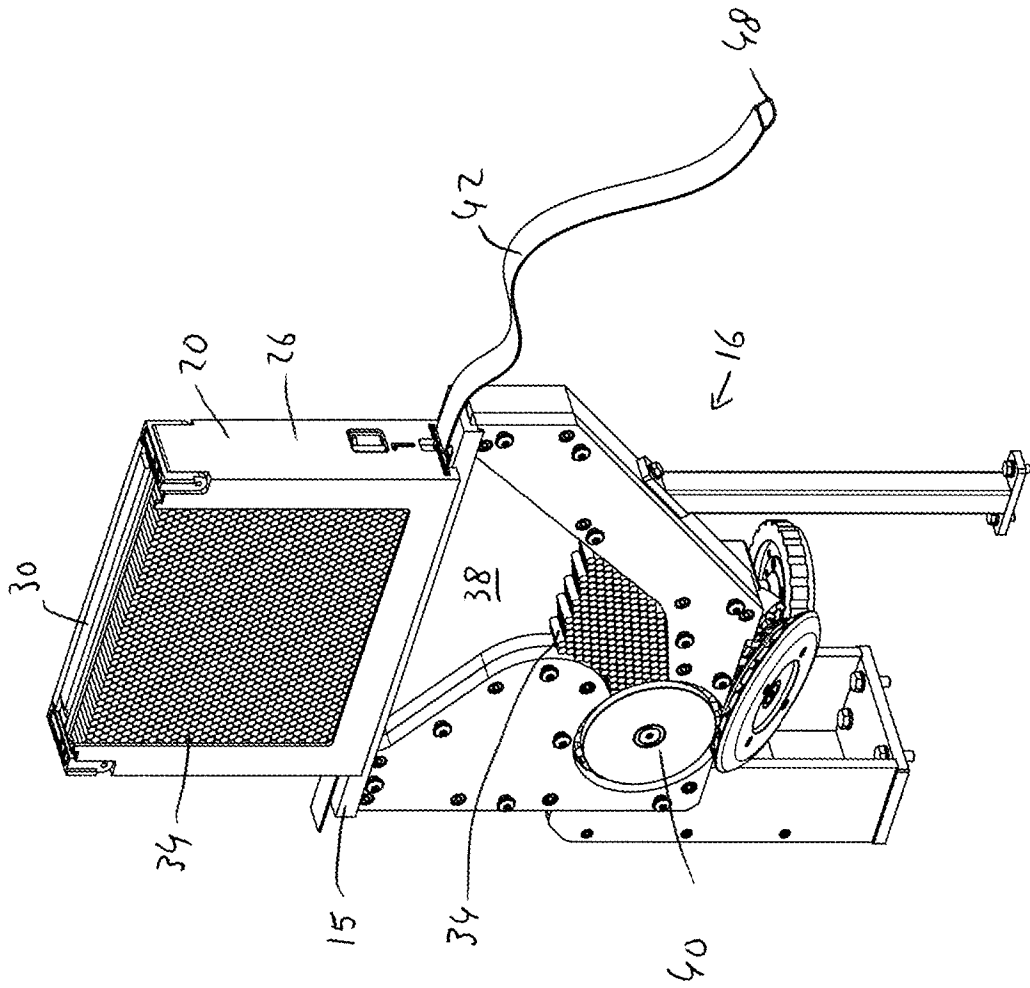


Fig. 4c

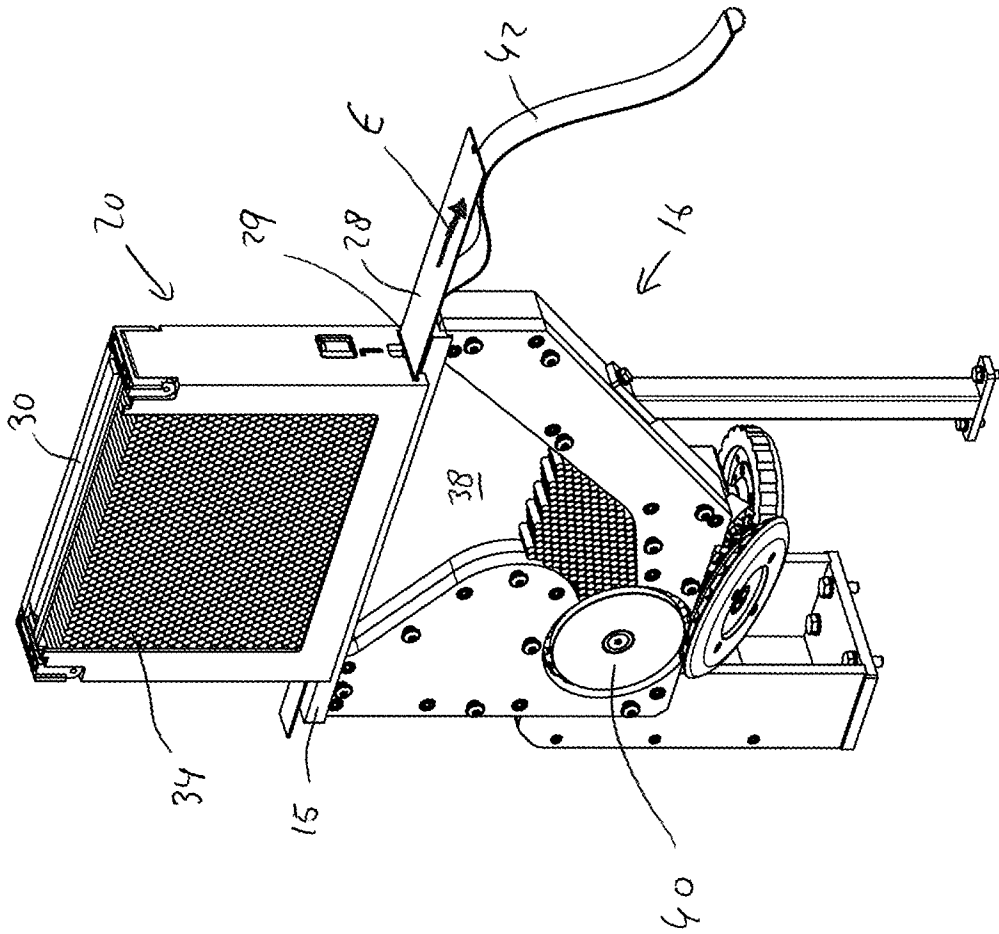


Fig. 40

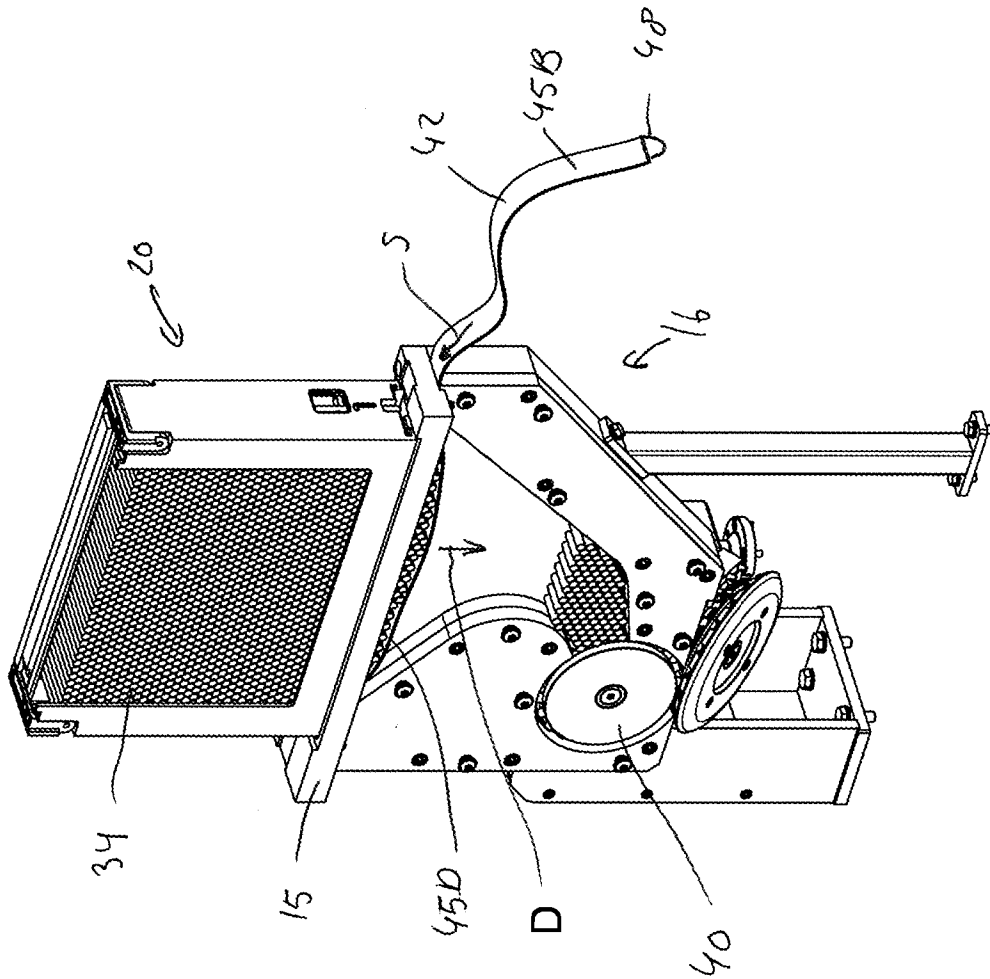


Fig. 4c

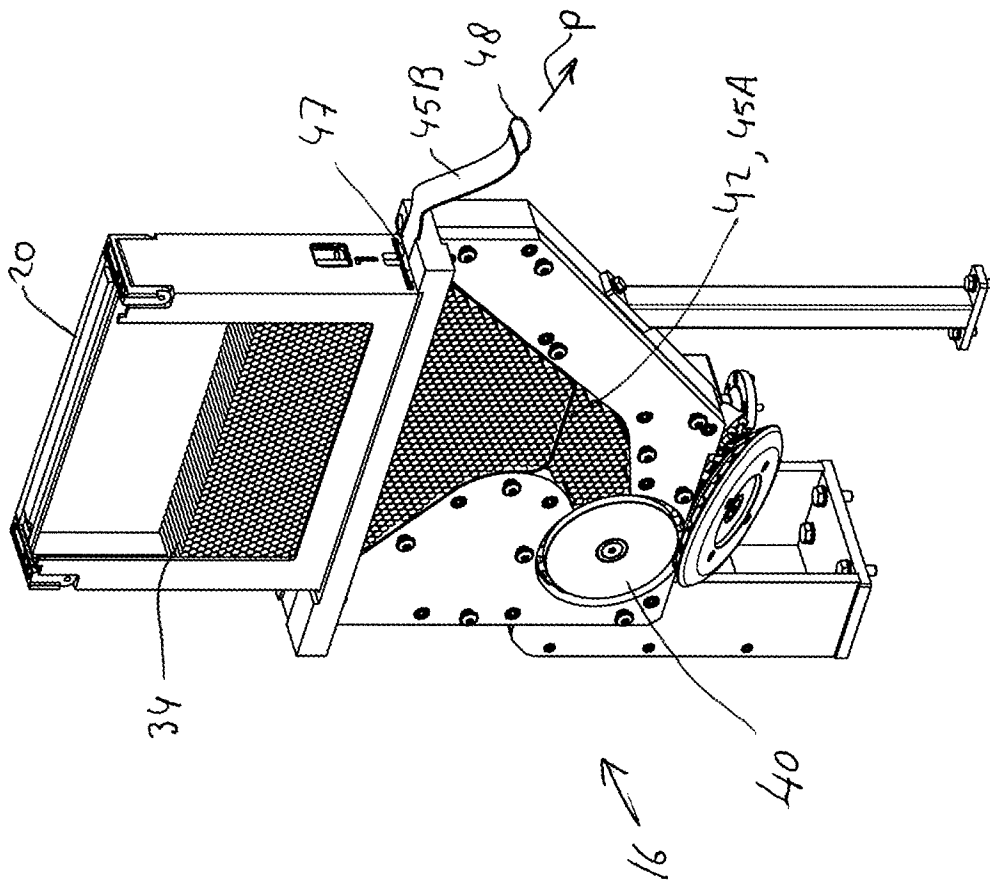


Fig. 4f

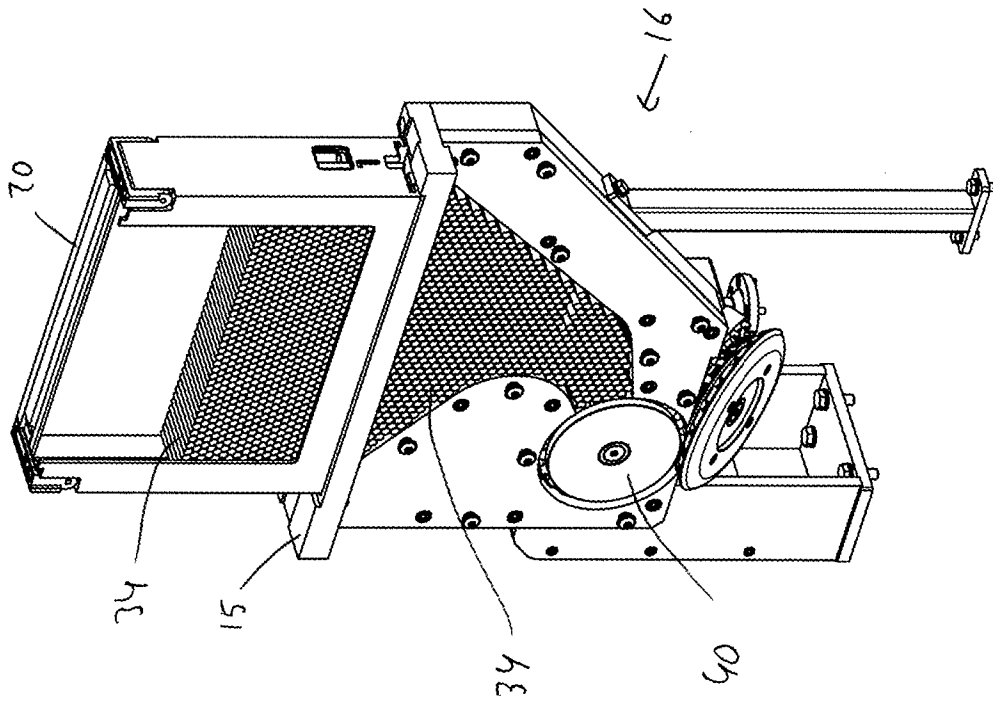
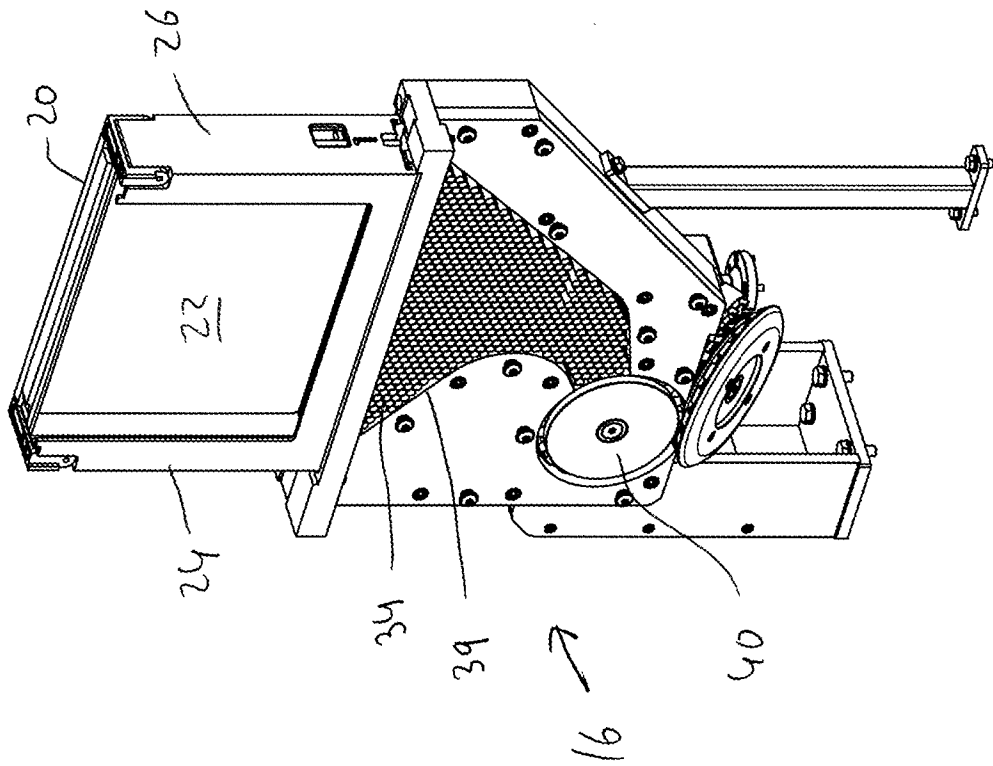


Fig. 49-



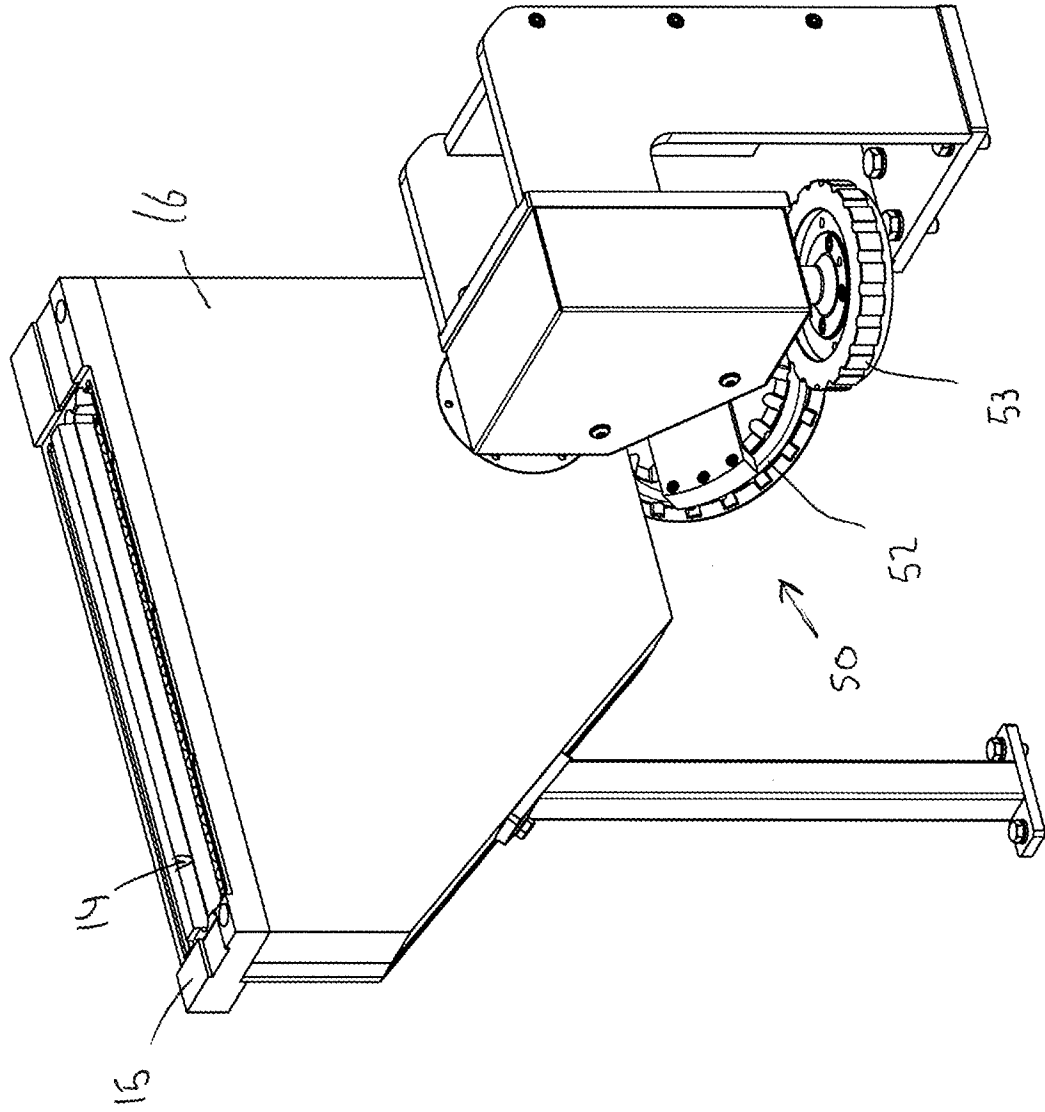
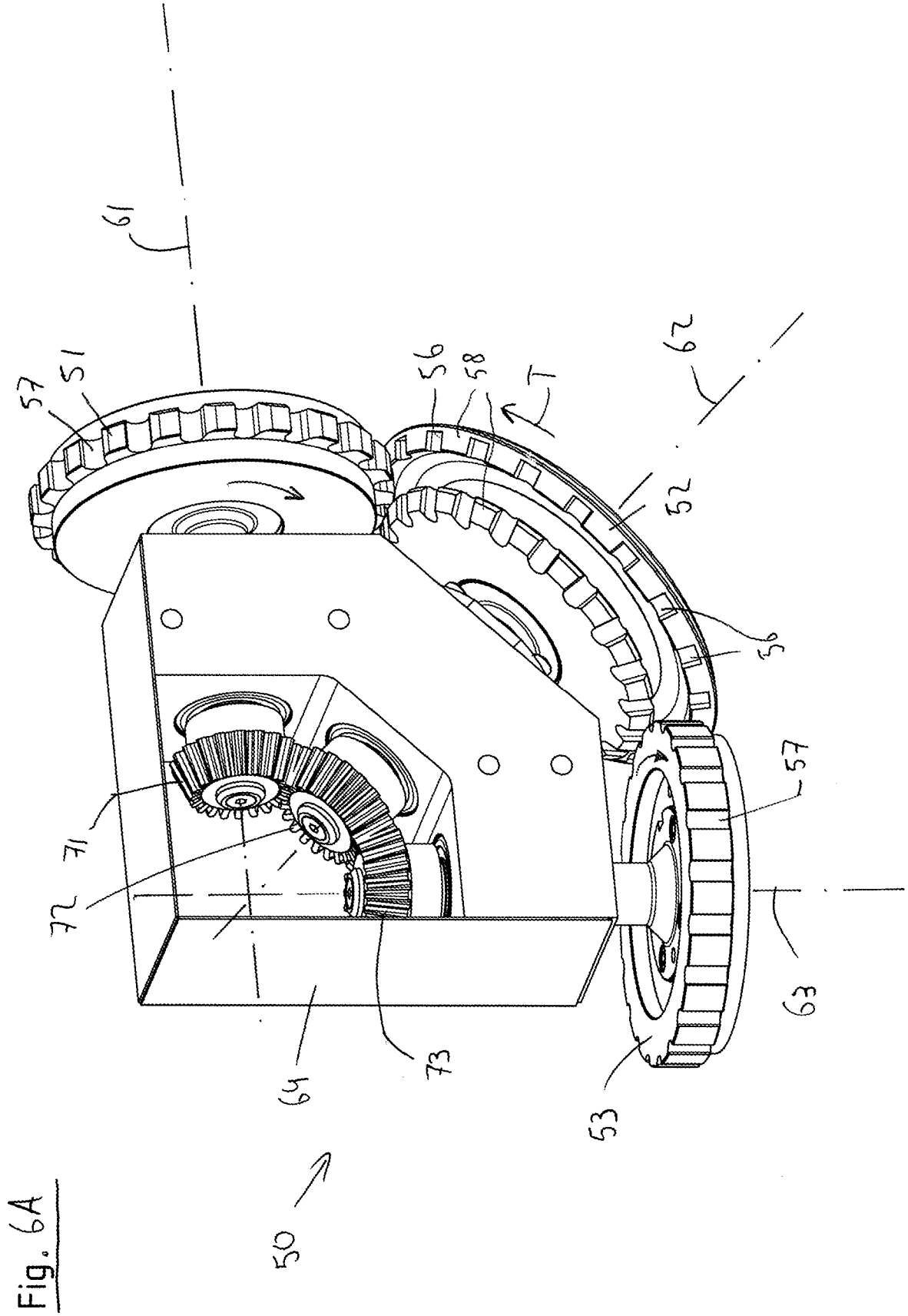


Fig. 5



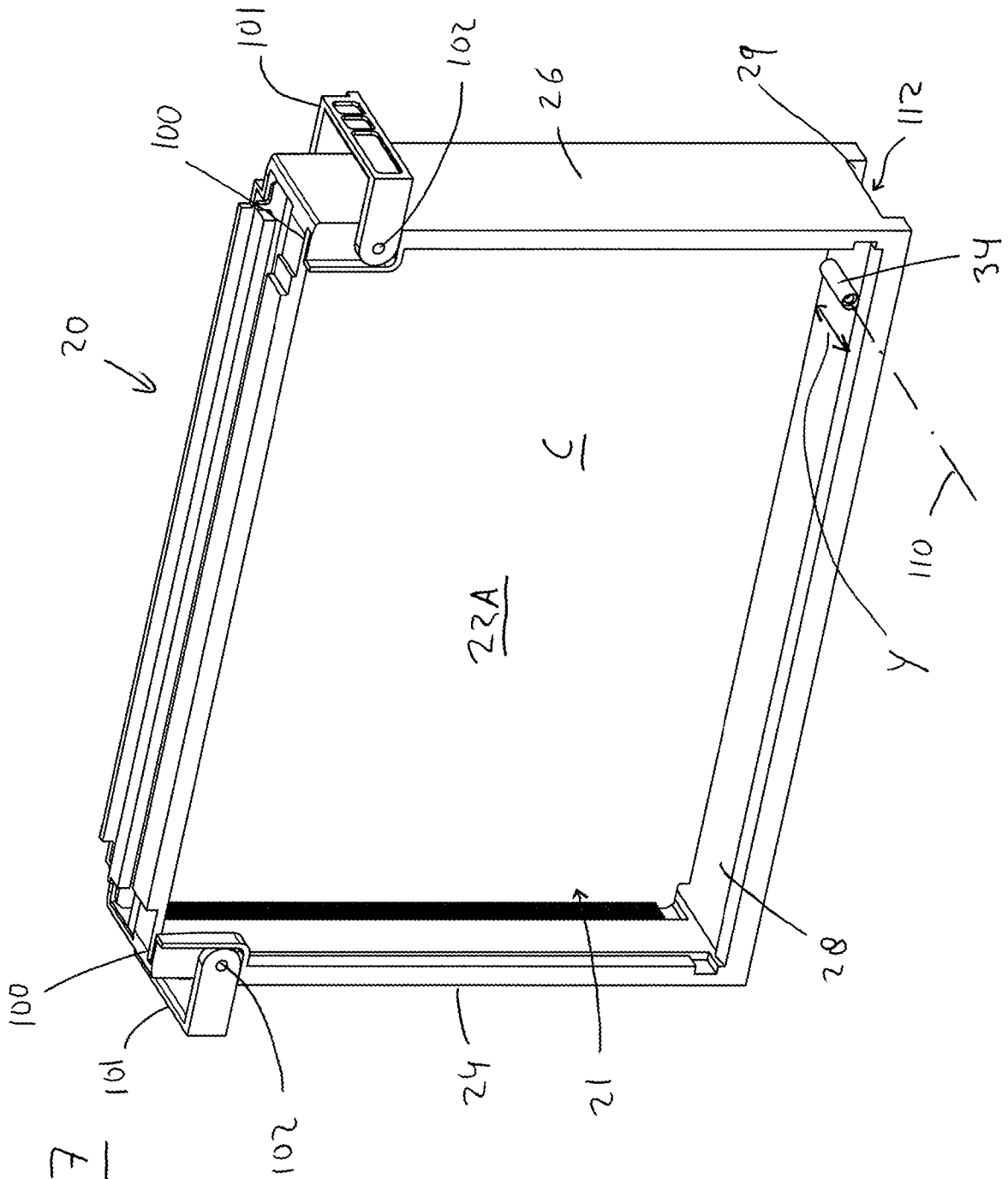
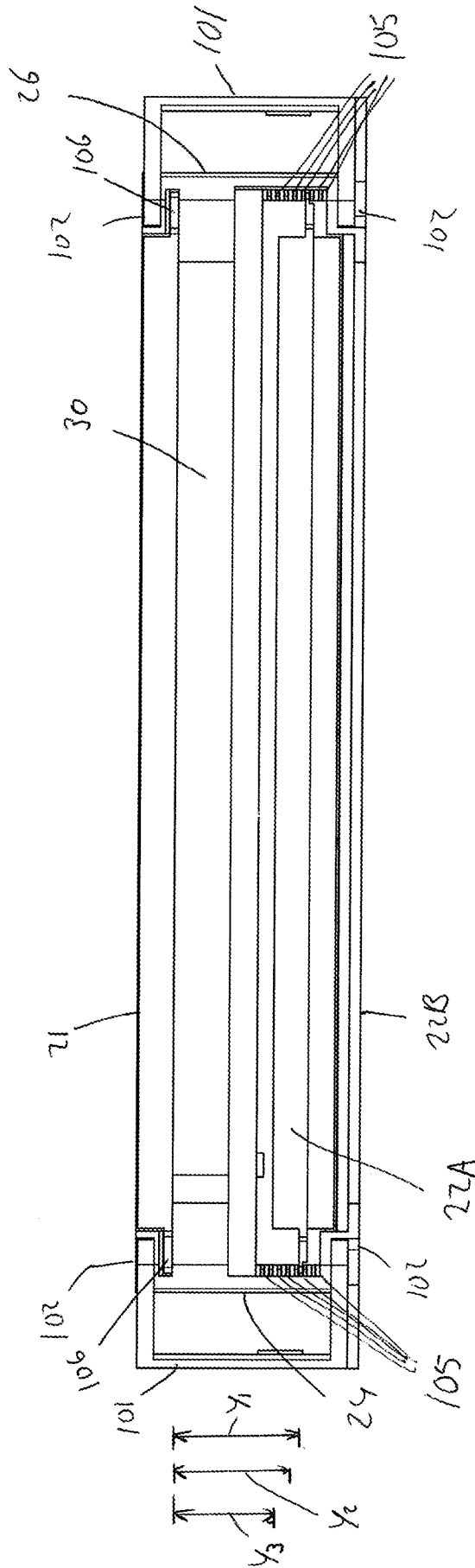


Fig. 7

Fig. 8



INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2016/050407

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24C5/356 A24C5/358 A24F47/00
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A24C A24F
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 10 2011 053602 A1 (HAUNI MASCHINENBAU AG [DE]) 14 March 2013 (2013-03-14)	1-17,21,25-38,43,48-55,59,63,64,67-77
Y	paragraph [0049]; figure 7 paragraph [0045]; figure 4	40,74
X	US 2008/202540 A1 (CARTER BRENT WALKER [US] ET AL) 28 August 2008 (2008-08-28)	64,65
Y	paragraph [0034]; figure 3A	40,74
X	US 3 283 930 A (JACK CASCIO ET AL) 8 November 1966 (1966-11-08)	64
Y	figures 8-12	38,43,48
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 13 September 2016	Date of mailing of the international search report 24/11/2016
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Schneider, Marc
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/NL2016/050407

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-17, 21, 25-38, 40, 43, 48-55, 59, 63-65
67-72(completely); 73-77(partially)

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2016/050407

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	paragraph [0048]; figure 13 -----	38,43,48
X	EP 2 570 038 A1 (HAUNI MASCHINENBAU AG [DE]) 20 March 2013 (2013-03-20) abstract -----	38,55, 64,73
A	WO 2013/076750 A1 (MONTRADE S R L [IT]; GIANNINI ANTONELLA [IT]; MONZONI ALBERTO [IT]) 30 May 2013 (2013-05-30) page 13, line 14 - page 14, line 5; figures 3,9 -----	34,73
A	US 5 474 092 A (MOSER THEO [DE] ET AL) 12 December 1995 (1995-12-12) abstract column 1, line 7 - line 11 -----	34,73

INTERNATIONAL SEARCH REPORT

Information on patent family members

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-17, 21, 25-38, 40, 43, 48-55, 59, 63-65, 67-72(completely); 73-77(partially)

Combination, tray, unloading device, method, wherein the discharge unit comprises a reorienting device

- 1.1. claims: 40, 65

Combination, tray, unloading device, method, wherein the unloading device is configured to discharge the cigarette part one by one

2. claims: 18-20, 22, 39, 41, 42, 44, 45, 56-58, 60, 66(completely); 73-77(partially)

Combination, tray, unloading device, method, wherein the discharge opening of the tray or the receiving opening of the unloading device is provided with a flexible band

3. claims: 23, 24, 46, 47, 61, 62(completely); 73-77(partially)

Combination, tray, unloading device, method, wherein the depth of the tray can be adjusted
