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Description

The invention relates to a mobile suction device, in particular to a site or workshop suction device, having a suction device housing and a suction unit located therein for generating a suction flow, according to the preamble of claim 1.

Such a suction device is mentioned in US 2003/208874 A1, for example.

A further suction device is mentioned in DE 8912526 U1, for example. By way of example, the suction unit is located in a drawer. A suction hose emerges laterally from the drawer. This being so, a top side of the suction device housing is fully available for stacking a further container, for example a cubicle, a transport box for tools or the like. On the top side of the suction device housing, there are for example upward-oriented bolt projections for engagement with corresponding receptacles at the container to be stacked above.

If not used, the suction hose is for example removed from the suction port or stowed in a stowing cavity of the suction device housing placed adjacently or below. This, however, is inconvenient.

On this basis, the present invention is based on the problem of providing an improved connection concept for a suction line in a mobile suction device of the type referred to above.

To solve this problem, a suction device according to the technical teaching of claim 1 is provided.

It is a fundamental idea of the present invention that the suction device housing can form a part of a stack while the suction inlet is nevertheless located on the top side of the suction device housing, which would in principle prevent the stacking of a further container. This makes the suction inlet easily accessible from the top.

According to the invention, the suction device housing has a base housing and a cover whereby an interior of the base housing can be closed. According to the invention, the suction inlet is provided on the cover. Is it also possible for the suction inlet to be

provided adjacent to the cover or at any rate in a stationary region of the top side of the suction device housing.

A preferred embodiment of the invention provides that it comprises a container attachment which can be located on the top side of the suction device housing in the stacking direction and has connecting means for establishing a connection to at least one vacuum cleaner connector provided at the suction device housing. The container attachment can be used in many ways in combination with the suction device according to the invention.

The dirt collecting chamber is expediently provided in a dirt collecting container which can be installed into a container receptacle of the suction device housing and where, in a suction mode position of the dirt collecting container, a suction flow outlet of the dirt collecting container is flow-connected to a suction unit inlet of the suction unit, the dirt collecting container being removable from the suction device housing for the removal of dirt connected in the dirt collecting chamber. At least one filter holder for holding at least one filter element of the filter assembly is expediently provided in the dirt collecting container. This arrangement is particularly hygienic.

In the suction device it is advantageously provided that the dirt collecting chamber is provided in a dirt collecting container which can be installed into a container receptacle of the suction device housing and where, in a suction mode position of the dirt collecting container, a suction flow outlet of the dirt collecting container is flow-connected to a suction unit inlet of the suction unit, the dirt collecting container being removable from the suction device housing for the removal of dirt connected in the dirt collecting chamber, and that at least one filter holder for holding at least one filter element of the filter assembly is provided in the dirt collecting container.

In this it is a fundamental idea that the mobile suction device no longer has to be taken to a disposal site such as a dustbin as a whole, but that there is a dirt collecting container which can be removed from the suction device housing, which makes handling significantly easier. If the suction device cannot travel on a ground on castors, in particular, it is advantageous if the user does not have to take the whole

suction device to the dustbin, for example, but only has to take the relatively lightweight and compact dirt collecting container to the disposal site.

The dirt collecting container has a cuboid form, for example. This being so, a base wall and side walls extending upwards therefrom are preferably provided.

A preferred embodiment of the invention provides that an outer circumferential contour of the dirt collecting container correlates with an inner circumferential contour of the container receptacle of the suction device housing in such a way that the dirt collecting container can be installed positively into the container receptacle. An inner circumferential contour of the container receptacle is preferably designed for a positive hold of the dirt collecting container. An outer circumferential contour of the dirt collecting container preferably is, preferably as a whole or at least in sections and preferably substantially, a positive fit with respect to an inner circumferential contour of the container receptacle.

The container receptacle expediently comprises a plug-in receptacle into which the dirt collecting container can be inserted.

The container receptacle is preferably open towards the top. It is expediently provided that the dirt collecting container is securely held in the container receptacle even without any locking means. It is, however, also possible that the suction device comprises locking means for locking the dirt collecting container in the container receptacle. The locking means comprise hooks, latches, swivel or sliding bolts or the like, for example. It is also possible that the dirt collecting container is held in the container receptacle in a clamping fit.

A filter bag is preferably installable into the dirt collecting container, i.e. the at least one filter holder comprises a holder for a filter bag, a filter bag filter holder as it were. This offers the advantage that dirt collected in the filter bag can be disposed of hygienically. It is, however, also possible for the dirt collecting chamber to be designed to receive dirt, dust and other similar particles directly, so that the dirt collects in the dirt collecting chamber of the dirt collecting container itself and is disposed of from there. The filter bag is therefore not indispensable.

One embodiment of the invention, which is also advantageous together with the above-mentioned filter bag, provides that the at least one filter holder comprises a holder for a main filter. The main filter may for example be a non-woven fabric filter, a pleated filter or the like. The main filter prevents the entry of dirt into the suction unit from the dirt collecting chamber. The main filter acts in combination with a filter bag and also without a filter bag.

It can be provided that the suction device has a cleaning device for cleaning the main filter, for example by means of reverse flow, vibration etc.

The filter holder for the main filter is expediently located at the suction flow outlet of the dirt collecting container, so that the suction flow outlet can be closed off by the main filter. The suction flow thus flows through the main filter towards the suction unit.

The main filter expediently forms substantially a side wall of the dirt collecting container. The suction flow outlet is expediently located at a side wall of the container insert and is covered by the main filter. It is particularly preferred if the main filter covers virtually the entire side wall area - facing the suction unit - of the dirt collecting container.

The suction device housing and/or the dirt collecting container can expediently be closed by a cover.

A preferred concept provides that the dirt collecting container is open on its top side and can be closed by a cover.

It is for example possible that a cover separate from the suction device housing, i.e. a dirt collecting container cover, is provided for the dirt collecting container. In this way the dirt collecting container closed by the dirt collecting container cover can be taken to the disposal site, for example a dustbin. This is particularly hygienic.

The suction inlet is expediently located at the cover.

It is preferred if a connecting element or pipe element is located at the suction inlet, for example a type of connector. The pipe element terminates into the dirt collecting chamber. In this it is preferably provided that the pipe element is provided and designed to establish a flow connection to a filter bag in the dirt collecting container, i.e. to its inflow opening, if the cover is closed. If the cover is closed, the pipe element and thus the suction inlet enters a flow connection to an inflow opening of the filter bag.

The suction device housing for example has a base housing which can be closed off by a cover, a suction device housing cover as it were. The suction device housing cover expediently covers the suction unit and/or at least a stowage receptacle for stowing an accessory of the suction device, e.g. a nozzle or the like.

One advantageous embodiment of the invention provides that the cover for closing the dirt collecting container is represented by the suction device housing cover.

Between the respective cover, i.e. the dirt collecting container cover or the cover of the suction device housing, and the dirt collecting container, a seal assembly, e.g. comprising O-rings and the like, is expediently provided. It is particularly preferred if the seal assembly is located at the cover.

If the cover is opened, it uncovers the interior of the suction device housing, so that the dirt collecting container can be removed. If the cover of the suction device housing at the same time forms the cover for the dirt collecting container, both are opened in one go, i.e. both the suction device housing and the dirt collecting container, so that a filter bag or another such filter element which may be located in the interior of the dirt collecting container, the dirt collecting chamber or the like is easily and directly accessible.

In the suction device it is expediently provided that it comprises a container attachment which can be located on the top side of the suction device housing in the stacking direction and which has connecting means for establishing a connection to at least one vacuum cleaner port provided at the suction device housing.

In this it is a fundamental idea that, as it were, an attachment communicating with the suction device housing, i.e. having connecting means for establishing a connection to at least one vacuum cleaner port provided at the suction device housing, can be hitched to or stacked onto the mobile suction device. The container attachment can fulfil various tasks, for example provide stowage space for a suction hose, be used for storing an electric connecting cable or the like. Further functions not provided in the basic suction device can also be outsourced to the container attachment in a manner of speaking. The container attachment can for example make available a further volume for the accommodation of dust, dirt or the like, or at least one control or indicator for operating the basic suction device.

The connecting means can for example comprise one or more through-openings for a line which can be or is connected to the vacuum cleaner port, for example, or they can be represented by at least one through-opening. The line is the suction line for example, e.g. a suction hose, an electric line or both. It is also possible that a combination line is used, i.e. that electric connecting means are provided at the suction hose itself, for example for operating an electric brush located at the free end of the suction line.

The vacuum cleaner port is expediently located on a top side of the suction device housing, where the container attachment can be placed. The vacuum cleaner port advantageously comprises the suction inlet. The through-opening expediently communicates with the suction inlet of the suction device housing, so that the suction line can be or is connected to the suction inlet through the through-opening. The suction line can thus extend away from the container attachment towards the workplace.

The through-opening for example allows the suction line to be pushed through. This offers the advantage that a plug connector at the suction line can for example be plugged directly into the suction inlet of the suction device housing, having a positive fit therein, for example. There are no additional interfaces, i.e. there is little risk of a leakage in the region of the suction line. It is, however, also possible that a connecting element is provided at the through-opening for connection to the suction inlet of the

suction device housing and that the suction line can be connected to the suction inlet of the suction device housing, for example using a plug connection, for establishing a flow connection. The container attachment thus effectively initially established the flow connection to the suction inlet of the suction device housing and in addition a connection to which the suction line can in turn be connected.

It is advantageously provided that the connecting means comprise an electric contact assembly for establishing an electric connection between the container attachment and a suction device contact assembly provided at the suction device housing, and that the container attachment has a control and/or indicator for operating or indicating at least one function of the suction device electrically connected to the electric contact assembly, and/or an electric connection, in particular for an electric connecting cable of a hand-operated power tool, connected to the contact assembly.

The connecting means expediently comprise at least one plug connection for establishing an electric or pneumatic connection to the suction device housing. It is thus for example possible that electric contacts at the container attachment communicate with electric contacts at the suction device housing, so that there is an electric connection between the suction device housing and the container attachment. As a result, messages can for example be output by output means, e.g. a display and/or a loudspeaker, of the container attachment, for example warnings when the dirt collecting chamber is full or the like.

It is also possible that a control or indicator at the container attachment communicates with the suction device housing, for example with a control unit thereof, via the electric connections.

It is furthermore possible that a connection between the container attachment and the suction device housing is established via the pneumatic plug connection, so that a pneumatic connection, for example for a pneumatic tool, of the container attachment is in flow-connection with a pneumatic connection of the suction device housing, of the base suction device as it were.

A simple embodiment provides that one or more through-opening(s) is/are provided. This has already been mentioned. The at least one through-opening for example comprises a through-opening for an electric or pneumatic socket, so that a plug connection element, for example an electric or pneumatic plug connection element, can be connected to the socket through the through-opening. If now a plug of a hand-operated power tool is to be plugged into the suction device, i.e. into a socket thereof, for example, the socket is accessible through the through-opening of the container attachment. The container attachment can provide protection for the socket.

The through-opening can also be a through-opening for at least one control or indicator for operating the suction device. The control as it were forms a vacuum cleaner port in the form of an operating connection. The control can for example comprise an indicator for indicating a function of the suction device, for example fill level, motor power or the like. The control preferably comprises a switching element for switching the suction device on and off. An operating parameter such as speed, power or the like can also be set at the control through the through-opening.

The container attachment preferably represents a reception cavity for a line of the suction device, for example for the suction line, an electric connecting line or both. This arrangement offers the advantage that the container attachment effectively forms a depot for said line, which can be used when required. The container attachment for example has a circumferential wall bounding the reception cavity circumferentially. If the suction line, which tends to unroll, is now held in the reception cavity, for example, it contacts the insides of the circumferential wall. The circumferential wall can be, but does not have to be, closed. It can have openings or discontinuities as well.

If the reception cavity is not required, the operator simply removes the container attachment from the suction device housing, so that the suction device is then smaller and can be transported more easily.

The reception cavity is preferably designed as a receptacle which is open towards and accessible from the top. In this way a suction hose or an electric connecting line can be placed in the receptacle of the container attachment, for example.

The container attachment preferably comprises a carrying handle assembly for carrying the stack of container attachment and suction device housing. Any further containers of the stack which may be located on the underside of the suction device housing, for example, can obviously be transported easily as well. A transport box for a tool can for example be mounted below the suction device housing.

The carrying handle assembly can for example comprise in particular pivotable carrying handles arranged laterally at the container attachment. In a particularly preferred embodiment illustrated in the drawing, the carrying handle assembly has an upward-projecting carrying handle, for example a type of handhold, web or the like. The carrying handle is preferably situated approximately in the centre of a top side of the container attachment.

The carrying handle is however expediently designed such that it does not project in front of a top-side support surface of the container attachment provided for stacking an upper container. The support surface is for example represented by a circumferential wall of the container attachment.

It is preferred if the carrying handle forms a winding aid for winding up a line, such as the suction line, in particular a suction hose, or an electric connecting line. The suction line can then for example be wound around the carrying handle, which is in particular located in the centre of the top side of the container attachment and there projects in the manner of a dome, for example. When the suction line relaxes again, it expediently pushes itself against the circumferential wall forming the reception cavity of the container attachment.

In the region of its top side, the suction device housing has first coupling means for interaction with second coupling means of the upper container for coupling the suction device housing to the upper container in a pull-off resistant manner in the stacking direction. The coupling means can for example comprise hooks, swivel bolts, lugs or the like.

The container attachment expediently has second coupling means interacting with the first coupling means of the suction device housing for coupling to the suction device

housing in a pull-off resistant manner in the stacking direction. This is for example advantageous in connection with the carrying handle assembly of the container attachment as mentioned above.

An advantageous embodiment of the invention provides that the container attachment has on its top side second coupling means corresponding to the second coupling means of the suction device housing and suitable for coupling the container which can be mounted on the suction device housing. The container attachment and the suction device housing thus have essentially the same coupling means, so that the container can optionally be placed on the top side of the suction device housing and the container attachment in a pull-off resistant manner in the stacking direction. The operator therefore can optionally place the container or the container attachment on the top of the suction device housing. In this, the system idea extends so far that a stack consisting of the suction device housing, the container attachment and the further container can be formed, for example, and that the corresponding coupling means are fully compatible with one another.

An outer circumferential contour of the suction device housing and an outer circumferential contour of the container attachment expediently correspond to each other in such a way that the outer circumferential contour of the suction device housing and the outer circumferential contour of the container attachment are in alignment with each other when the container attachment is stacked on top of the suction device housing. This offers the advantage that a virtually homogenous stack can be formed from the suction device housing and the container attachment.

The container attachment expediently comprises at least one lateral opening, for example a groove or a through-opening, for the suction line. The suction hose, an electric connecting line of the suction device or the like can thus for example be inserted into the lateral opening from the top or from the side and penetrate it. The lateral opening can be open at the top or at the side, but does not have to be. It can have a closed outer circumference, being designed as a type of bore, for example.

It is preferred if the at least one opening is open towards the top side of the container attachment, so that the suction line or the electric connecting line or both can be inserted into the opening from above.

The opening is preferably so deep and/or arranged in such a way that the suction line or the electric connecting line held in the opening does not project in front of a top-side support surface of the container attachment provided for stacking an upper container.

The opening is for example provided at a circumferential wall, the top side of which forms the support surface. The opening provided there for the suction line or the electric connecting line is expediently so deep that the suction line or the electric connecting line can be completely inserted into the opening at the circumferential wall. It is therefore expedient that the suction line or the electric connecting line does not prevent a placement of a further container on the container attachment in the stacking direction.

The suction device housing preferably has a base housing and a cover with which an interior of the base housing can be closed off. The container attachment can expediently be mounted on the cover. It is preferred if the cover of the suction device housing can be opened together with the container attachment stacked thereon. The interior of the base housing is then easily accessible even if the container attachment is mounted on the cover.

It is preferred if coupling means, e.g. the above-mentioned first coupling means, comprise a lock element for latching the container attachment to the suction device housing. In a position in which the container attachment is locked, the lock element latches the container attachment to the base housing while overlapping the cover. The lock element thus absorbs the forces required for holding the container attachment at the base housing.

The container attachment expediently has an additional volume for receiving dirt, for example a preseparator for dirt, in addition to the dirt collecting chamber in the suction device housing.

In the dirt collecting chamber a vacuum region forms in the operation of the suction unit. The dirt collecting container bounds the dirt collecting chamber and has, communicating with or representing the suction inlet, an inflow opening for the inflow of the suction flow and a suction flow outlet for air to flow to the suction unit. The suction flow outlet of the dirt collecting chamber and a suction unit inlet of the suction unit are in flow connection via a main filter of the filter assembly for holding dirt in the dirt collecting chamber. In this it is advantageously provided that an outer circumference of the main filter lies outside the vacuum region of the dirt collecting chamber, so that any secondary air which may enter the suction unit inlet in addition to the suction flow flows from outside the dirt collecting chamber.

In this context it is a fundamental idea that the main filter as it were is not located in the vacuum chamber or dirt collecting chamber, but in principle between the dirt collecting chamber and the suction unit inlet. If secondary air flows into this space between the dirt collecting chamber and the suction unit inlet, which could be described as a sealing gap, this is not dirt-laden air from the dirt collecting chamber, but air from the environment of the suction device, which is significantly cleaner than the suction flow as a rule, in any case containing less in the way of dust, particles and other dirt. This secondary air can enter the suction unit inlet on the one hand. On the other hand, if the seal between the dirt collecting container and the suction unit inlet is not perfect, secondary air, i.e. clean air, can flow into the dirt collecting chamber past the main filter. Consequently clean air added to the suction flow flows past the main filter directly or by way of the dirt collecting chamber into the suction unit inlet, which does not pose any problems at all, however, because this air is relatively clean compared to the air drawn in through the suction inlet, the suction flow or the particle-laden dirty air.

Between the suction unit inlet and the suction flow outlet, there is a sealing gap, for example, in which the outer circumference of the main filter is located.

The main filter may for example be a pleated filter, a non-woven fabric filter or a combination thereof. In any case the main filter has a filter surface which retains particles and other dirt in the dirt collecting chamber. A seal is expediently provided

at the outer circumference of the main filter. The seal is preferably joined integrally and/or by adhesive power to the filter surface of the main filter, for example bonded, welded, sprayed on or the like. As a result no air can flow between the seal and the filter surface. The seal can for example consist of a polyurethane foam, a rubber material, an elastic plastic material or a combination thereof.

It is advantageous if the suction device has a clamping device for clamping the main filter between the suction flow outlet and an inlet housing region of the suction device housing, where the suction unit inlet is located, wherein the main filter is clamped between the suction flow outlet and the inlet housing region in a clamping position of the clamping device.

The clamping device can for example have movable parts mounted at the dirt collecting container, which can come into engagement with abutment contours at the suction device housing. It is, however, also possible that movable parts or clamping elements of the clamping device are located on the suction device housing and can come into engagement with abutment contours or mating contours at the dirt collecting container.

The clamping device can for example comprise a clamping bolt. The clamping bolt can advantageously be handled easily and without the use of tools by means of a hand lever, a knob or the like.

The clamping device expediently has a clamping mechanism, which can for example comprise a lever mechanism and/or a wedge or bevel mechanism or the like.

It is expedient if the clamping device, in particular its clamping mechanism, is designed for a linear relative adjustment of the components to be clamped, so that an end face of the main filter seal with the associated seal seat at the inlet housing region or the dirt collecting container is evenly loaded with clamping force substantially across its entire surface area. The movement direction of the linear adjustment is thus approximately perpendicular to the end face or the seal seat.

The clamping device is for example provided for clamping the main filter to an inlet housing region of the suction device housing, where the suction unit inlet is located. In the clamping position of the clamping device the main filter is then clamped to the inlet housing region. The above-mentioned seal therefore bears against the inlet housing region, for example.

It is also possible that a seal interacting with the main filter, for example bearing against the filter surface of the main filter, is provided in the inlet housing region. In other words, the main filter does not have to have a seal of its own, but can also interact with another seal, which is as it were provided by the inlet housing region or the dirt collecting container or is located there.

Various techniques, some of which are presented below by way of example, are suitable for clamping.

The clamping device for example comprises a lever assembly, such as a toggle lever assembly, for moving the main filter into the clamping position.

It is furthermore advantageous if the clamping device has a roller or roll assembly whereby the main filter can be rolled into the clamping position as it were.

Also preferred is a bevel assembly with at least one clamping bevel for moving the main filter into the clamping position. It is furthermore possible that a lever assembly suitable for the actuation of the bevel assembly, for example for adjusting the at least one clamping bevel, is provided.

Combinations of lever assembly and/or roller assembly and/or bevel assembly are possible as well.

It is preferred if a latching device is provided for latching the clamping device in the clamping position. The latching device can for example act directly on the main filter. It is however also possible that the latching device latches an actuating element with which the clamping device can be actuated in the clamping position.

It is furthermore advantageous if a releasing device is provided for releasing the main filter from the inlet housing region or the dirt collecting container. It is for example possible that the above-mentioned seal is joined more firmly than desired to the inlet housing region or the dirt collecting container, for example adheres thereto. The releasing device facilitates the release of the main filter from the inlet housing region or the dirt collecting container, for example by moving it away linearly or by pivoting it away.

The releasing device for example comprises a releasing bevel or a lever assembly acting towards release or both.

It is also possible that the clamping device comprises the releasing device integrally, i.e. that the clamping device is suitable for moving the main filter into the clamping position on the one hand and for releasing the main filter from the clamping position into a release position on the other hand.

A carrying handle suitable for carrying the dirt collecting container, e.g. in the form of a bow, a handhold or the like, is preferably provided. With this, the dirt collecting container can be carried as a whole. The carrying handle can be L-shaped or U-shaped for example. If for example a bottom part of the suction device housing of the suction device integrally comprises the dirt collecting container, it can be carried at the carrying handle as a whole. A dirt collecting container which can be removed from the suction device housing can also be picked up easily in this way.

The carrying handle preferably forms an actuating element for the operation of the clamping device and/or the releasing device. The carrying handle for example acts as a lever arm or is pivotably mounted on a lever arm. It is, however, also possible that the carrying handle comprises at least one bevel of a bevel assembly, for example the above-mentioned clamping bevel and/or a releasing bevel, or interacts with such a bevel located at the container receptacle, for example. Several bevels can obviously be provided at the carrying handle, e.g. at least one clamping bevel and/or at least one releasing bevel.

It is also possible that a clamping cam is provided at the carrying handle for clamping the main filter in the clamping position. A roller or roll or the like can also be provided at the carrying handle.

The dirt collecting container has fixed walls, for example, which bound the dirt collecting chamber, i.e. a cavity. The dirt collecting container itself is approximately cuboid, for example.

The dirt collecting chamber is expediently closed during the operation of the suction device, apart from the inflow opening, which forms the suction flow inlet or communicates therewith, and the suction flow outlet, which is flow-connected to the suction unit inlet. The dirt collecting chamber thus preferably forms a type of capsule for the dirt.

One variant of the invention, which can for example be realised in a suction device according to DE 2 229 859 A1, provides that the dirt collecting container forms a fixed part of the suction device housing. In such a suction device the main filter for example extends across the entire top side of the dirt collecting chamber and/or the dirt collecting container, on which the cover with the suction unit is then placed. If air, i.e. secondary air, now flows laterally past the sealing plane between the main filter and the cover with the suction unit towards the suction unit inlet, this is relatively clean air. It is also possible that the filter does not extend right to the outer wall of the suction device housing, for it is also possible, for example, that the atmospheric pressure can get into the interior up to the sealing plane between the main filter and the suction unit via suitable inflow openings, e.g. passages and/or a slot.

It is preferred if the dirt collecting container can be removed from the suction device housing for removing the dirt collected in the dirt collecting chamber.

The above explanations relating to the clamping device and the releasing device for the main filter apply to a dirt collecting container which is removable from the container receptacle as well, i.e. the clamping device is designed for clamping the dirt collecting container in the container receptacle and the releasing device is designed for releasing the dirt collecting container from the container receptacle. This is

implemented particularly easily if the main filter forms a part of the dirt collecting container or is held there at a filter holder.

It is, however, also possible that the main filter is located at the suction unit inlet and the dirt collecting container is clamped there by the clamping device when installed into the container receptacle, so that a tight seat of the main filter in the sealing gap between the suction unit inlet and the dirt collecting container is ensured.

The main filter may, but does not have to, be located at the dirt collecting container. The main filter can for example be located at a housing section of the suction device housing which has the suction unit and can be flow-connected to the dirt collecting container. For this purpose the housing section is for example moved towards the dirt collecting container or the dirt collecting container is moved towards the housing section. The housing section is for example a cover which is placed on a bottom part similar to the description in EP 2 229 859 A1.

It is preferred if the outer circumference of the main filter extends in the manner of a frame around the suction flow outlet which forms a part of the dirt collecting container.

The suction device according to the invention is a mobile suction device. The suction device can have castors for travelling on a ground. Expediently, however, no castors are provided. The suction device could obviously also be a portable suction device with or without castors. The suction device according to the invention is expediently not designed as an autonomous suction device working in the manner of a robot. The suction device can be carried along by the operator and used on site. A suction hose can furthermore expediently be connected to the suction device.

Figure 1 is a perspective oblique view of a suction device according to the invention which in

Figure 2 is shown in operation together with a hand-operated power tool,

Figure 3 shows the suction device according to Figures 1, 2 with the cover opened,

Figure 4 shows a dirt collecting container of the suction device according to Figures 1 to 3,

Figure 5 shows the dirt collecting container according to Figure 4 with a filter bag,

Figure 6 is a perspective oblique view from above of a container attachment of the suction device according to the preceding figures,

Figure 7 shows the container attachment according to Figure 6 from below,

Figure 8 shows a first container, and

Figure 9 shows a second container for coupling to the suction device according to the preceding figures,

Figure 10 shows the suction device according to Figures 1 to 6 with the cover open like in Figure 3, wherein the container attachment according to Figures 1, 6, 7 is placed on the cover, and

Figure 11 shows a suction device not according to the invention, on which the container according to Figures 8, 9 or the suction device of the preceding figures can be placed,

Figure 12 shows a stack of the suction device according to the invention and further containers,

Figure 13 is a perspective oblique view of the suction device according to the invention with a dirt collecting container installed,

Figure 14 shows the suction device according to Figure 13, but without a dirt collecting container,

Figure 15 is a sectional view of the suction device according to Figure 13, approximately in accordance with a line A-A,

Figure 16 shows the dirt collecting container of the suction device according to Figure 13 with a carrying handle forming a part of a lever clamping device pivoted into a position of non-use,

Figure 17 shows the dirt collecting container according to Figure 16, but with the carrying handle pivoted into a carrying position,

Figure 18 is a part-sectional view approximately according to a section B in Figure 13, with the position of the carrying handle corresponding to Figure 16,

Figure 19 is a view according to Figure 18, but with the carrying handle pivoted up as in Figure 17,

Figure 20 shows a first variant of the embodiment according to Figures 13 to 19, wherein a bevel clamping device is provided,

Figure 21 shows the dirt collecting container according to Figure 20,

Figure 22 is a front view of the suction device according to Figure 20 with the bevel clamping device moved into a release position,

Figure 23 shows the clamping device from Figure 22 in the clamping position,

Figure 24 shows a second variant of the embodiment according to Figures 13 to 19, with a lever/roller clamping device,

Figure 25 shows a dirt collecting container according of the suction device according to Figure 24,

Figure 26 is a front view approximately according to Figure 22, with the clamping device in release position, and

Figure 27 shows the clamping device according to Figure 26 in clamping position.

A mobile suction device 10 comprises a base device 20 and a container attachment 70, which can be stacked on top of a suction device housing 21 of the base device 20 (Figures 1 and 10). In the suction device housing 21, which has a bottom part or base housing 22 and a cover 23, a dirt collecting chamber 25 and a filter assembly 26 are provided. The suction flow enters the suction device housing 21 through a suction inlet 27 and flows through the dirt collecting chamber 25, wherein the filter assembly 26 retains dirt, e.g. dust, wood shavings or other similar particles, in the dirt collecting chamber 25, so that the suction unit 24 draws in filtered air as it were in the known manner.

The suction device housing 21 forms a system housing which can be coupled to other system components, for example to the containers 400, 450 according to Figures 8 and 9 and to the vacuum cleaner 280 according to Figure 11, which is not according to the invention and can travel on a ground on castors.

The base housing 22 has a base 28, from which side walls 29, 30, 31, 32 extend upwards. As a whole the base housing 22 has a cuboid shape. The side wall 29 is a front side wall, the side wall 31 a rear side wall. The side walls 30 and 32 are transverse side walls for example, in particular narrow side walls. The side walls 29 to 32 bound an interior 33.

In the interior 33 a housing section 120 is provided in which the suction unit 24 is protected and encapsulated. The housing section 120 comprises a section of the base 28, the side wall 32 and sections of the side walls 29 and 31. The housing section 120 further comprises a cover 34, which covers the top side of the suction unit 24. By the above walls and a wall 121 opposite the side wall 30, the suction unit 24 is completely surrounded, apart from a suction unit inlet 61 at the wall 121, through which the suction unit 24 draws in the suction flow, and from an outflow opening not shown in the drawing, which is located at the side wall 31, for example, and through which the suction unit 24 blows out the suction flow.

At the cover 23 there are receptacles 35, 36, in which accessories 37, 39 of the suction device 10, such as suction nozzles, brushes or the like, are accommodated. The interior 33 can be closed off by the cover 23. The cover 23 has an upper cover wall 40, from which side walls 41, 42, 43, 44 extend downwards. The side walls 41 to 44 are in alignment with the side walls 29 to 32 of the base housing 22 when the cover 23 closes off the interior 33. On the cover 34 lateral bevels 39 are provided, for example, which are overlapped by the side walls 41, 43, 44 when the cover 23 is closed (see Figure 2).

The cover 23 also closes off a container receptacle 45 located in the interior 33. The container receptacle 45 could as such serve as dirt collecting chamber. In a particularly beneficial way, it is however provided that the container receptacle 45 accommodates a dirt collecting container 46, in which a filter holder 47 and a filter holder 48 are provided. The filter holder 47 is used for holding a main filter 49, i.e. a filter element.

A filter bag 50 (Figure 5) suitable for collecting particles or other dirt and forming another filter element can be attached to the filter holder 48. In the state of use of the suction device 10, the filter bag 50 is located in the dirt collecting chamber 25. The filter bag 50 for example has a connecting plate 51 with an inflow opening 52. The connecting plate 51 can be suspended in a swivel holder 53 of the filter holder 48, so that the connecting plate 51 can be pivoted out of the dirt collecting chamber 25, for example (not shown). The connecting plate 51 could form a part of the filter holder 48 as well. In this case the connecting plate 51 could advantageously be produced from a plastic material, whereas it is expediently made of cardboard if forming a part of the filter bag 50.

The dirt collecting container 46 has a base 54, from which side walls 55 to 58 extend upwards. On the top the dirt collecting container 46 has an access opening 59. The dirt collecting chamber 25 is bounded by the side walls 55 to 58 and the base 54. The dirt collecting chamber 25 is easily accessible through the access opening 59.

The filter holder 47 for the main filter 49 extends along the side wall 58. The filter holder 47 for example comprises a frame in the interior of which the main filter 49 is

held. The main filter 49 has a size corresponding to that of the side wall 58, so that almost the entire side wall 58 is represented by the main filter 49 as it were.

The filter holder 47 extends around a suction flow outlet 60 of the dirt collecting container 46. The suction flow outlet 60 is covered by the main filter 49 as it were, so that only air purified by the main filter 49 can flow into the suction unit 24.

If the dirt collecting container 46 is installed into the container receptacle 45 - see Figure 10 - the suction flow outlet 60 of the dirt collecting container 46 and a suction unit inlet 61 of the suction unit 24 communicate with each other and are in a flow connection with each other.

At the side walls 56 and 58 of the dirt collecting container 46, support regions 83 are provided for the connecting plate 51 of the filter bag 50 or for the filter holder 48. This supports the connecting plate 51 in the position of use shown in Figure 5, so that the inflow opening 52 is available for flow connection to the suction inlet 27.

The side walls 55 to 58 and the base 54 define an outer circumferential contour 52 of the dirt collecting container 46, which is placed in an inner circumferential contour 63 of the suction device housing 21 with a positive fit in the container receptacle 45. The container receptacle 45 and its inner circumferential contour 63 are defined by the side wall 30, the side walls 29 and 31 and the base 28 as well as by the inner wall containing the suction unit inlet 61, which is not shown in the drawing.

The container receptacle 45 is a plug-in receptacle into which the dirt collecting container 46 fits positively and can be inserted. This makes the exchange and replacement of the dirt collecting container 46 very simple. It only has to be lifted out of the container receptacle 45. This offers the advantage that the operator can easily take the dirt collecting container 46 to a disposal site and there remove the filter bag 50 from the dirt collecting container 46, for example. The relatively heavy suction device 10 - at least the base device 20 - does therefore not have to be transported if dirt has to be disposed of. The concept is moreover very hygienic.

The opening and closing of the dirt collecting container 46 is simplified as well, however, because the dirt collecting container 46 does not require any separate cover, but the cover 23 fulfils the function of a cover for the dirt collecting container 46 as well. It would obviously be possible to close the dirt collecting container 46 with a separate cover, so that dirt contained in the dirt collecting chamber 25 does not get into the environment in the disposal process, in particular if no filter bag 50 is used.

On the underside of the cover 23, facing the dirt collecting chamber 25, there is a cover section 64 for covering the dirt collecting container 46. At the outer circumference of the cover section 64, a seal 65 is provided, which comes to lie between the upper end faces of the side walls 41 to 44 and the cover 23 if the cover 23 is closed. The seal 65, i.e. a seal assembly, closes and covers the dirt collecting chamber 25 tightly.

The dirt collecting chamber 25 can be closed off by the cover 23 apart from a suction flow outlet 60 and a suction inlet 27 forming an inflow opening 132. The suction flow S generated by the suction unit 24 thus flows through the inflow opening 132 into the dirt collecting chamber 25 and through the suction flow outlet 60 out of the dirt collecting chamber 25.

If the cover 23 is closed, a connecting element 86 projecting in front of the underside of the cover 23 or in front of the cover section 64 comes into flow connection with the filter bag 50. The connecting element 86 for example comprises a short, projecting tube section which enters the inflow opening 52 when the cover 23 is closed. The support regions 83 ensure that the connecting plate 51 is not diverted at this as it were automatic establishment of a plug-in connection or flow connection.

From an electrostatic point of view, it is advantageous if an earthing contact 67 at the cover 23 comes into contact with a mating contact 66, for example on the top side of the cover 34, when the cover 23 is closed.

The suction device 10 can have one or more controls 11, for example a switch 12 for switching the suction device 10 on and off and preferably for setting a power of the suction unit 24 as well. The switch 12 is a step switch and for example allows the

switching to a first or a second power stage and/or of an operating mode of the suction device 10, so that the latter is for example switched off or permanently switched on or switched on and off automatically in the operation of the hand-operated power tool 300.

The controls 11 are for example located at the side wall 32. There an electric socket 13, into which a connecting cable (not shown) of a hand-operated power tool 300 can be inserted, is expediently provided as well. The hand-operated power tool 300, e.g. a grinding machine, a saw or the like, then switches the suction device 10 on and off, for example by a controller of the suction device 10 detecting a flow of current to the hand-operated power tool 300. The lateral arrangement of the controls 11 at the side wall 32 facilitates an ergonomic handling of the suction device 10 even if incorporated into a stack of further components to be described at a later point. This would not be necessary, however, as will become clear later.

Workpieces, e.g. a workpiece plate 301, can be machined with the hand-operated power tool 300. Any dust or other particles - wood shavings in the case of a saw - arising in this process are comfortably extracted by the suction device 10; for this purpose a suction line 14, for example a suction hose 18, can be connected to the suction inlet 27.

The suction hose 18 has a connecting piece 15, for example, e.g. a pipe element or the like, which can be inserted into the suction inlet 27, which has a plug-in receptacle 68.

The connecting piece 15 has an angular shape, i.e. a plug-in section 16 and a connecting section 17 provided for insertion into the plug-in receptacle 68 extend at an angle, for example a right angle, to each other. The connecting piece could also be arcuate.

The angular or arcuate shape is particularly advantageous in the measure described in detail below, i.e. the suction hose 18 including its connecting piece 15 is on the one hand easy to use in the operating mode shown in Figure 2, in which it is directly inserted into the suction inlet 27 on the top side 69 of the suction device housing 21 without any object or container or the like being placed on the top side 69, but on the

other hand also if a container attachment 70 as shown in detail in Figures 6 and 7 is placed on the top side 69.

As such, it is awkward that the suction inlet 27 is located on the top side 69, because it is not easy to place the container 400 shown in Figure 8 or the container 450 shown in Figure 9, for example, on the top side 69 of the suction device housing 21 if the suction hose 18 is in place at the suction device 10, in any case at the base device 20.

In the form of the base device 20, the suction device 10 can be used effectively (Figure 2), but also with the extremely expedient container attachment 70, which makes work easier. The container attachment 70 has a base wall 71 and side walls 72, 73, 74, 75 extending upwards therefrom. The side walls 72 to 75 together with the base wall 71 bound an interior or a reception cavity 76 of the container attachment 70.

As a whole the container attachment 70 has a cuboid shape.

A carrying handle 77 extends upwards from the base wall 71. The carrying handle 77 has the shape of a handhold, so that the operator can grab the container attachment 70 comfortably. The carrying handle 77 is expediently located approximately in the centre of the base wall 71, providing for a favourable positioning of the centre of gravity.

The carrying handle 77 in addition expediently forms a winding aid for the suction hose 18 shown only partially in Figure 6. This suction hose 18 can be wound around the carrying handle 77. This suction hose 18 tends to relax, i.e. it bears against the insides of the side walls 72 to 75 if not subjected to an external force.

At the upper, free sections of the side walls 72 to 75, there are expediently provided inward-projecting wall sections 76, which further contribute to the firm hold of the suction hose 18 in the reception cavity 76, the interior of the container attachment 70.

The suction hose 18 or the suction line 14 respectively can however at least partially be accommodated in the reception cavity 76 or the interior of the container attachment 70 not only if the suction device 10 is not used, but also in operation.

For this purpose the container attachment 70 is provided with connecting means 80, which allow a functional coupling of the container attachment 70 to the base device 20.

For the connecting means 80 for example comprise a through-opening 81 at the base wall 71. When the container attachment 70 is mounted on the suction device housing 21, the through-opening 81 is in direct alignment with the suction inlet 27. The connecting piece 15 can therefore be inserted into the suction inlet 27 through the through-opening 81 (Figure 1). If the suction hose 18 is not required, it is simply wound up and stowed in the interior of the container attachment 70, i.e. in the reception cavity 76. It does not have to be separated from the suction inlet 27 for this purpose.

But even if an object, for example a container 400 or 450, is placed on the top side of the wall sections 78, which define support surfaces 79, the suction hose 18/the suction line 14 can be routed out of the reception cavity 76 in an ideal way. The side wall 75 has a lateral opening 82 with a cross-section corresponding to a cross-section of the suction hose 18/the suction line 14, so that the suction hose 18/the suction line 14 does not project in front of the support surfaces 79 when accommodated in the opening 82.

The carrying handle 77 does not project upwards in front of the support surfaces 79.

An electric connecting line 19 for the electric power supply of the suction unit 24, e.g. a mains cable, can also be stowed advantageously in the container attachment 70. The connecting line 19 is located at the side wall 32 of the suction device housing 21 and has a plug for insertion into a socket (not shown). The connecting line 19 can be introduced through a through-opening 84 into the reception cavity 76, i.e. the interior of the container attachment 70, and there be stowed easily in the same way as the suction line 14.

It is advantageously possible to route the connecting line 19 together with the suction line 14 to the outside through the lateral opening 82.

The through-opening 84 is situated in an edge region between the side wall 75 and the base wall 21. Below the through-opening 84 there is provided a holding receptacle 85 at the side wall 32 of the suction device housing 21, into which the connecting line 19 can be inserted. A slot is provided for this purpose on the front side of the holding receptacle 85.

It is also possible that the base device 20 has on its top side 69 further components that are no longer accessible because of a stacking of the container attachment 70, for example an indicator and/or control 87 for switching and adjusting the suction device 10 and/or for indicating operating parameters, or an electric connecting socket 88 for the insertion of a mains cable. In this case through-openings 87a and 88a are expediently provided in the container attachment 70, so that the indicator and/or control 87 and the connecting socket 88 remain accessible. The through-openings 87a and 88a are expediently located at the base wall 71. The side walls 72 to 75 protect the functional components located in the through opening 87a and 88a.

The connecting line 19, the suction inlet 27 and the connecting socket 88, the control or indicator 87 each form a vacuum cleaner port 100 like the contact assembly 89.

It is furthermore possible that a direct electric connection is for example established between the suction device housing 21 and the container attachment 70. There is for example a contact assembly 89a of the connecting means 80, which can for example comprise or be located on spring-loaded contact surfaces and/or fixed contact surfaces and/or a plug-in connector 89b and which, if the container attachment 70 is stacked on top of the suction device housing 21, is electrically connected to a suction device contact assembly 89, which may be located on the top side of the suction device housing 21, for example.

It is then possible that for example a control 101 and/or an indicator 102 for operating or indicating at least one function of the suction device 10, e.g. for switching on or off, for indicating a fill level or the like, is electrically connected to the base device 20 itself. It is however also possible that an electric connecting socket, e.g. a connection 103 for the hand-operated power tool 300 or another hand-operated power tool, is

supplied with electric power by way of the electric connection established by the contact assemblies 89, 89a.

The container attachment 70 fits ideally into the container and workshop system comprising the further containers 450 and 400 and the vacuum cleaner 280. This will become clear below.

As far as the components of this system contain identical or similar parts, these are identified by identical or similar reference numbers below and in the drawing.

In the top region of the suction device housing 21, the container attachment 70 as well as the containers 400 and 450 and the vacuum cleaner 280, first coupling means 90 are provided to interact with second coupling means 110 on the respective undersides of the above components, apart from the vacuum cleaner 280, of course, the vacuum cleaner housing 281 of which can travel on a ground by means of castors 283. The suction device housing 21, the container attachment 70, the containers 400, 450 can therefore be stacked on top of one another or onto the vacuum cleaner 280 and then joined to one another using the coupling means 90, 110 in a pull-off resistant manner with respect to the stacking direction H.

The first coupling means for example comprise, in the case of the vacuum cleaner 280, holding receptacles 91 provided on its top side 284, into which holding projections 111 of the second coupling means 110 can be inserted. The holding receptacles 91 are provided in a receptacle 285 on the top side 284 of the vacuum cleaner 280, into which holding receptacles 91 the suction device housing 21 can be installed by its base region, for example. The receptacle 285 is for example bounded laterally by side walls 287, 288, the holding receptacles 91 being provided at the side wall 288. The side walls 287 on the other hand feature holding lugs 92, which can be brought into engagement with holding projections 112 of the second coupling means 110. The holding lugs 92 are for example mounted slidably or pivotably at the side walls 287.

The suction device housing 21 can thus be secured to the top side of the vacuum cleaner 280, as can be the containers 400, 450, which are not described in detail and

which are suitable for transporting the hand-operated power tool 100, tools, accessories and the like, for example.

The containers 400, 450 and the suction device housing 21 as well as the container attachment 70 are coupled to one another by slightly different components of the coupling means 90, 110.

The coupling means 90 comprise engagement-from-behind receptacles 93 and support receptacles 94, which are provided on the top side 69 of the suction device housing 21, i.e. the cover 23, and which are used for engagement-from-behind feet 113 and for accommodating support feet 114 of the other coupling means 110. At the engagement-from-behind receptacles 93 there are provided engagement-from-behind contours 95 for the positive hold of complementary engagement-from-behind contours 115 on the engagement-from-behind feet 113. The engagement-from-behind contours 95, 115 are brought into engagement, wherein the respective upper container 400, 450 or the container attachment 70 is pivoted downwards towards the top side of the respectively lower container, e.g. the suction device housing 21, so that a positive or shear-resistant hold is provided with respect to the axes transverse to the stacking direction H.

It is possible to place a further container attachment 70 above the container attachment 70 shown in the drawing and to couple it with the coupling means 90, 110. For at the wall section 78, which projects inwards in front of the rear side wall 74 towards the reception cavity 76, there are provided engagement-from-behind contours 95a suitable for interaction with the engagement-from-behind contours 115. At the wall section 78 projecting inwards in front of the front side wall, there are support receptacles 94a for the support feet 114.

The containers 400, 450 and in any case the suction device housing 21 have an underside of similar design to the container attachment 70, i.e. the support feet 114 and the engagement-from-behind feet 113 are provided there as well. The container 450 is furthermore provided with engagement-from-behind contours 95a suitable for engagement with the engagement-from-behind contours 115.

The first coupling means 90 further comprise a lock element 96. One lock element 96 each is rotatably mounted at the cover 23 and the front side wall 72 of the container attachment 70 by means of a rotary bearing 89.

The lock element 96 has an arcuate receptacle 97, which comes into engagement with holding projections 116 and 117 by rotation. The lock element 96 located at the cover 23, is in the locking position or coupling position (Figure 1) which couples the respective upper container or container attachment 70, rotated in such a way that, overlapping the cover 23, it is in simultaneous engagement with the holding projection 116 - located above the cover 23 - of the upper container or container attachment and with the holding projection 117, which is for example located on top at the base housing 22 or the container attachment 70, below the lock element 96 at the front. This relieves the rotary bearing 98. At the same time the lock element 96 couples the respective containers in a pull-off resistant manner with respect to the stacking direction H.

The coupling between the container attachment 70 and the base device 20 is designed to be so convenient that the cover 23 can be opened even if the container attachment 70 is placed on top (Figure 10).

Figure 12 shows a stack consisting of a container 450, on top of which the suction device housing 21 of the suction device 10 and then the container attachment 70 are placed. A further container 450 is stacked on top of the container attachment 70. The containers 450, the suction device housing 21 of the suction device 10 and then the container attachment 70 are firmly joined to one another by the coupling means 90 and 110. The lock elements 96 of the lower container 450 and of the suction device 10 and the container attachment 70 are moved into the respective coupling position, for example.

An advantageous sealing concept for the main filter 49 and an expedient installation concept for the dirt collecting container 46 are presented below.

At the wall 121 of the suction device housing section 120 with the suction unit 24, a bypass inlet 22 is provided for a bypass valve not shown in the drawing, through

which cooling air for the suction unit 24 can flow into the interior of the housing section 120 if required, e.g. if the suction inlet 100 is closed.

The main filter 49 comprises a seal 123 and a filter surface 124. The filter surface 124, which may for example comprise a non-woven fabric filter or a pleated filter, is accommodated in a frame 125 of the filter holder 47. At the front of the frame 125 there is a step 126, which supports the seal 123 at the rear. Consequently the main filter 49 is also supported at the rear by the filter holder 47 on the side opposite the wall 121, so that the dirt collecting container 46 presses against the seal 123 from the rear as it were and thus pushes it against the wall 121, i.e. against an inlet housing region 127 with the suction unit inlet 61. As a result the seal 123 is in tight contact with the wall 121, so that the suction flow S first flows from the suction inlet 27 through the dirt collecting chamber 25, where a filter bag 50 retains particles as a rule and in any case the main filter 49 located in front of the suction unit inlet 61 fulfils this function, so that in principle only clean air or in any case air of the suction flow S which contains relatively few particles enters the suction unit inlet 61.

But even if the sealing plane between the seal 123 and the inlet housing region 127 and/or between the seal 123 and the dirt collecting container 45 does not function perfectly, i.e. if secondary air N enters through a sealing gap 129 between the inlet housing region 127 and the dirt collecting container 46, this does not pose any problems because of the convenient arrangement of the seal 123, the outer circumference 130 of which forms the outer circumference of the main filter 49.

If the suction unit 24 is in operation, a vacuum U prevails in the dirt collecting chamber 25, so that a vacuum region 131 forms there. The secondary air N is not drawn in from the vacuum region 131, i.e. the dirt collecting chamber 25, however, but from the environment of the suction device 10, i.e. from a region with atmospheric pressure. In this region the particle loading is substantially lower, so that in any case only air not at all or only slightly laden with dirt, i.e. the secondary air N, flows into the suction unit inlet 61.

A protective grid 128 projecting in front of the wall 121 is provided in front of the suction unit inlet 61. The grid 128 can project into the interior of the seal 123. The

seal 123 is in any case in tight contact with the wall 121 at its end face and surrounds the suction unit inlet 61 in an annular fashion. It is expediently provided that the bypass inlet 122 is also in the interior and thus in the flow-through cross-section of the seal 123. This does not have to be the case, however.

A particularly good tight seat of the seal 123 in the inlet housing region 127, which to this extent forms a seat for the seal 123, is also ensured by the clamping device 140 described below.

The clamping device 140 comprises as an operating element a carrying handle 141, which is pivotably mounted at the dirt collecting container 46, for example at its side walls 55, 57, next to the suction flow outlet 60, by means of swivel bearings 142.

The carrying handle 141 is used for carrying the dirt collecting container 46. The carrying handle 141 can be pivoted between a carrying position T (Figure 17), in which the carrying handle 141 projects upwards in front of the side walls 55 to 58 and its base leg 143 can be gripped comfortably by an operator, and a position of non-use N (Figure 16), in which the base leg 143 projects only slightly, if at all, upwards in front of the upper edges of the side walls 55 to 58. Side legs 144, the free ends of which are located at the swivel bearings 142, project from the base leg 143 in a U-shape. Bearing pins 145 for example project in front of the side walls 55, 57 and engage with corresponding bearing receptacles at the side legs 144 of the carrying handle 141.

The carrying handle 141 is expediently not hinged in a longitudinal central region of the side walls 55, 57, so that the housing of the dirt collecting container 46, when being carried with the carrying handle 141, has a tendency towards tilting, so that any dirt in the dirt collecting container 46 does not exert pressure on the main filter 49, so that the latter is not pushed out of the filter holder 47 but has a good hold there. This tilting tendency is indicated by an arrow in Figure 17. The bearing concept of the carrying handle 141 thus advantageously provides for a relief of the main filter 49.

The dirt collecting container 46 can easily be inserted into the container receptacle 45 from above by an operator holding the carrying handle 141. This is indicated by an

arrow 146. The carrying handle 141 is then pivoted in the direction of an arrow 147, while the clamping device 140 at the same time adopts its clamping position P (Figure 18). In this process a clamping surface 148 presses against an abutment surface 149 of the suction device housing 21. The abutment surface 149 is for example provided by a web 150 in the region of the container receptacle 45. One web 150 each is provided on opposite sides of the container receptacle 45, i.e. on the insides of the opposite side walls 29 and 31. To that effect the carrying handle 141 also has a clamping surface 148 each at the side legs 144.

The clamping surface 148 is provided at a clamping cam 151, which projects outwards in front of the respective side legs 144. The two clamping cams 151 and thus the clamping surfaces 148 are eccentric with respect to the pivot axis 152 of the two swivel bearings 142, about which the carrying handle 141 is pivoted.

The webs 150, 158 for side walls of a reception groove 161 for the clamping cam 151. The clamping cam 151 is thus guided and accommodated in said reception groove.

As a result of the orientation of the clamping surfaces 148 and the associated abutment surfaces 149 parallel to the end face of the seal 123 and the wall 121 opposite, the seal 123 is evenly pressed against the inlet housing region 127 transversely to the insertion axis indicated by the arrow 146, along which the dirt collecting container 46 is inserted into the container receptacle 45. The corresponding load is indicated by an arrow 139 in Figure 15. This has the advantageous result that the seal 123 bears very evenly against the opposite seal seat of the wall 121 and is not stretched or canted in an undesirable way. The clamping device 140 is thus designed for a linear relative adjustment of the components to be clamped and to be brought into sealing contact, i.e. the inlet housing region 127 and the end face of the seal 123 to be brought into contact therewith. Consequently the clamping force in the direction of the arrow 139 is substantially constant at the end face along the entire circumference of the seal 123.

The clamping device 140 also clamps the dirt collecting container 46 in the container receptacle 45.

In the clamping position P a catch 153 of a latching device 155 engages with a latching receptacle 154 at the suction device housing 21. The catch 153 is for example situated approximately in the transverse centre at the base leg 143 of the carrying handle 141 and engages with a corresponding mating contour, for example an upper edge of the wall 121, in a latching engagement. This latches not only the carrying handle 141, but also the clamping device 140 in their clamping position P.

The clamping device 140 at the same time forms or comprises a releasing device 160 for releasing the clamping of the dirt collecting container 46 in the container receptacle 45 and the clamping between the seal 123 and the inlet housing region 127. For at the clamping cam 151 there is provided a releasing bevel 156 supported on a support surface 157 of the suction device housing 21 if the carrying handle 141 is pivoted against the direction of the arrow 147, i.e. towards a release position L. The support surface 157 lies opposite the abutment surface 149. The support surface 157 is provided at a further wall projection or web 158, for example. The webs 158, 150 are situated opposite each other and, as mentioned previously, provided opposite each other in the container receptacle 45 at the side walls 29, 31.

There is advantageously also provided an insertion bevel 159, along which the clamping cam 151 slides with its releasing bevel 156 when the dirt collecting container 46 is inserted into the container receptacle 45. The insertion bevel 159 thus forms an assembly aid. The insertion bevel 159 is for example provided on top at the web 158.

Figures 20 to 23 show a first clamping device 240 with a bevel mechanism as an alternative to the clamping device 140, and Figures 24 to 27 show a second alternative clamping device 340. The clamping devices 240, 340 are provided at dirt collecting containers 246, 346. In the following description and in Figures 20 to 27, identical or similar components are partially given the same, already explained, reference numbers. The dirt collecting containers 246 and 346 with the clamping devices 240 and 340 intrinsically correspond to the dirt collecting container 46.

A carrying handle 241, which forms an actuating element of the clamping device 240, has at each of its side legs 244 projecting from a base leg 243 a groove 251, with

which a bearing pin 245 of a sliding bearing 242 engages. The bearing pins 245 project laterally from the dirt collecting container 246.

The carrying handle 241 can be moved up and down along a sliding axis 247 between a carrying position T and a position of non-use N. In the carrying position T the carrying handle 241 projects upwards in front of the dirt collecting container 246, and in the position of non-use N it is moved closer to the housing of the dirt collecting container 246, so that it projects only slightly, if at all, upwards on front of the cover 34, for example, if the dirt collecting container 246 is accommodated in the suction device housing 21.

The grooves 251 extend at an angle to the sliding axis 247 and in the present case also to the longitudinal directions of the side legs 244. Owing to their oblique orientation, the inner walls of the grooves 251 provide a bevel arrangement.

If the carrying handle 241 is moved from the carrying position T into the position of non-use N, it actuates the clamping device 240 from the release position L into the clamping position P. In this process the groove 251 slides along the bearing pin 245, which in this respect forms a gate follower or sliding block, wherein the carrying handle 241 is moved towards an abutment surface 249 with a clamping surface 248. A clamping surface 248 is provided at each side leg 244 by its longitudinal narrow side. An abutment surface 249 is assigned to each clamping surface 248. The abutment surfaces 249 are for example provided by webs similar to the web 150, which project inwards into the container receptacle 45. If the carrying handle 241 is now moved towards the position of non-use N, the clamping surfaces 248 are clamped against the abutment surfaces 249, thereby applying a force to the main filter 49 in the direction of the suction unit inlet 61 (in the direction of the arrow 139).

In the longitudinal end regions of the groove 251 which are assigned to the clamping position P, a latching recess 254 is provided, into which the bearing pin 245 latches in the clamping position P. To this extent the bearing pin 245 and the latching recess 254 form a latching device 255.

The clamping device 340 comprises a carrying handle 341, which serves as an actuating element for the clamping device 340. At side legs 344 projecting from a base leg 343 of the carrying handle 341, rollers 348 of a roller assembly 353, which are supported on an abutment surface 349 in a clamping position P, are rotatably mounted. Like the abutment surfaces 149 and 249, the abutment surface 349 is represented by a reception groove or by a corresponding web, e.g. in the manner of the web 150.

The carrying handle 341 is mounted at the dirt collecting container 346 by means of pivot levers 350. The side legs 344 are for example pivotably mounted at a respective pivot lever 350 by means of a swivel bearing 345 each. Other joints can obviously be provided as well. The carrying handle 341 could furthermore be pivotably mounted at the dirt collecting container 346 by means of two pivot levers, for example.

The pivot levers 350 are in turn mounted at the dirt collecting container 346 by means of swivel bearings 342.

The carrying handle 341 performs a substantially linear movement between the carrying position T and the position of non-use N. In the movement between the carrying position T and the position of non-use N, the two rollers 348 for example move up and down in the reception groove 161.

In this process the rollers 348 are supported on the right-hand side of the reception groove 161 as shown in Figures 26 and 27, for example on the web 150. If the dirt collecting container 346 hits the base of the container receptacle 45, the actual movement of the carrying handle 341 from the carrying position T to the position of non-use N begins, the rollers 348 rolling downwards. At the same time the pivot levers 350 pivot about the swivel bearings 342. In this process the pivot levers 350 move across their dead centres from the upper pivoting position shown in Figures 25 and 26 into a lower pivoting position shown in Figure 27, so that a clamping force is applied in the direction of an arrow 139 by the rollers 348 by way of the support. The seal 123 is thereby clamped against the inlet housing region 127. The pivot lever 350 thus forms a part of a lever assembly 352.

The clamping devices 240 and 340 at the same time act as releasing devices when the respective carrying handles 241 and 341 are moved into the carrying position T.

Other actuating elements than the carrying handles 141 to 341 could obviously be provided, for example a toggle assembly, slides, bolts, wedges or the like. Bevels could also be provided, for example to act on the housing of a dirt collecting container. By way of example a bevel 360 is sketched in Figure 15, which could for example act on a mating contour 361 of the dirt collecting container 46 between the base 54 and the rear wall 56.

Carrying handles not used as actuating elements can also be provided for carrying a dirt collecting container.

The substantially linear insertion/clamping movement involved in installing the dirt collecting container 46 into the container receptacle 45 as in the embodiments according to Figures 13 to 27 should furthermore be understood to be described by way of example. Also conceivable, for example, is an embodiment in which the dirt collecting container 46 is pivoted into the container receptacle 45 about a pivot axis 363 shown in Figure 14 by way of example, e.g. using a swivel bearing with bearing pins and bearing receptacles at the dirt collecting container 46 and the container receptacle 45, wherein in the last movement step the bevels 360 and the mating contour 361 act to clamp the main filter 49 to the opposite seal seat at the inlet housing region 127, for example. An additional catch, clamping lever or the like can then ensure a firm hold of the dirt collecting container 46 in the container receptacle 45 and thus a firm seal seat of the main filter 49 at the housing section 120.

P a t e n t k r a v

- 5 1. Mobil sugeindretning (10), især sugeindretning til byggepladser eller værks-
steder, som omfatter et sugerhus (21) og et deri anbragt sugeaggregat (24) til
generering af en sugestrøm (S), hvor sugerhuset (21) har en sugeindgang (27)
til tilslutning af en sugeledning (14), og der i sugerhuset (21) foran sugeaggre-
gatet (24) er anbragt en filteranordning (26) og et snavsopsamlingsrum (25),
hvor sugerhuset (21) på sin overside (69) til stabling af en beholder (400, 450)
er udformet langs en stablingsretning (H), hvor sugerhuset (21) omfatter et
10 grundhus (22) og et låg (23), hvormed et inderrum af grundhuset (22) kan luk-
kes, **kendetegnet ved, at** sugeindgangen (27) på oversiden (69) af sugerhu-
set (21), der er tilvejebragt til stabling af den øvre beholder (400, 450) på låget
(23) eller ved siden af låget (23) er anbragt på et faststående område af over-
siden (69) af sugerhuset (21), og at sugerhuset (21) i området ved oversiden
15 (69) af sugerhuset (21) omfatter første koblingsmidler (90) til samarbejde med
andre koblingsmidler (110) af den øvre beholder (400, 450) til en trækfast sam-
menkobling af sugerhuset (21) med den øvre beholder (400, 450) i stablings-
retningen (H).
- 20 2. Sugeindretning ifølge krav 1, **kendetegnet ved, at** snavsopsamlingsrum-
met (25) er tilvejebragt i en snavsopsamlingsbeholder (46), der især har faste
vægge og kan indføres i en beholderoptagelse (45) af sugerhuset (21) og en
sugestrømodgang (60) af snavsopsamlingsbeholderen (46) der i en sugedrift-
stilling af snavsopsamlingsbeholderen (46) er strømningsforbundet med en su-
25 geaggregatindgang (61) af sugeaggregatet (24), hvor snavsopsamlingsbehol-
deren (46) til fjernelse af snavs, der opsamles i snavsopsamlingsrummet (25)
kan fjernes fra sugerhuset (21), og at der i snavsopsamlingsbeholderen (46)
er tilvejebragt mindst en filterholder (47, 48) til at holde mindst et filterelement
(49, 50) af filteranordningen (26).
- 30 3. Sugeindretning ifølge krav 2, **kendetegnet ved, at** beholderoptagelsen (45)
omfatter en indføringsoptagelse, som snavsopsamlingsbeholderen (46) kan
indføres i, og/eller en udvendig omkredskontur (62) af snavsopsamlingsbehol-
deren (46) i det mindste afsnitvist passer til en indvendig omkredskontur (63)

af sugerhusets (21) beholderoptagelse (45).

5 **4.** Sugeindretning ifølge krav 2 eller 3, **kendetegnet ved, at** den mindst ene filterholder (47, 48) omfatter en filterholder (48) til en filterpose (50) og/eller en filterholder (47) til et hovedfilter (49), især et foldefilter.

10 **5.** Sugeindretning ifølge et af kravene 2 til 4, **kendetegnet ved, at** sugerhuset (21) og/eller snavsopsamlingsbeholderen (46) kan lukkes ved hjælp af et låg (23), der dækker en åben overside af snavsopsamlingsbeholderen (46).

15 **6.** Sugeindretning ifølge krav 5, **kendetegnet ved, at** låget (23) er udformet til lukning af snavsopsamlingsbeholderen (46) ved hjælp af et låg (23) af sugerhuset (21), og/eller der mellem låget (23) og snavsopsamlingsbeholderen (46) er tilvejebragt en tætningsanordning (65), der især er anbragt på låget (23).

20 **7.** Sugeindretning ifølge et af de foregående krav, **kendetegnet ved, at** den omfatter en beholderopsats (70), der kan anbringes på oversiden (69) af sugerhuset (21) i stablingsretningen (H), og som omfatter forbindelsesmidler (80) til fremstilling af en forbindelse med mindst en støvsugertilslutning (100), der er tilvejebragt på sugerhuset (21).

25 **8.** Sugeindretning ifølge krav 7, **kendetegnet ved, at** forbindelsesmidlerne (80) omfatter mindst en gennemgangsåbning (81, 84, 87a, 88a) til en ledning, der kan tilsluttes eller er tilsluttet til støvsugertilslutningen (100), og/eller at støvsugertilslutningen (100) omfatter sugeindgangen (27), der er anbragt på oversiden (69) af sugerhuset (21), på hvilken overside beholderopsatsen (70) kan anbringes, og gennemgangsåbningen (81, 84, 87a, 88a) kommunikerer med sugerhusets (21) sugeindgang (27), således at sugeledningen (14) kan forbindes eller er forbundet med sugeindgangen (27) gennem gennemgangs-
30 åbningen (81, 84, 87a, 88a).

9. Sugeindretning ifølge krav 8, **kendetegnet ved, at** gennemgangsåbningen (81) muliggør gennemføring af sugeledningen (14), eller der på gennemgangs-

åbningen (81) er tilvejebragt et tilslutningselement til forbindelse med sugerhusets (21) sugeindgang (27), og sugeledningen (14) med tilslutningselementet til fremstilling af en strømningsforbindelse kan forbindes med sugerhusets (21) sugeindgang (27), især ved hjælp af en stikforbindelse.

5

10 **10.** Sugeindretning ifølge et af de foregående krav, **kendetegnet ved, at** beholderopsatsen (70) omfatter andre koblingsmidler (110), der arbejder sammen med sugerhusets (21) første koblingsmidler (90), til trækfast kobling med sugerhuset (21) i stabelretningen (H), og/eller at et låseelement (96), der er anbragt på sugerhuset (21) og især udgør en bestanddel af de første koblingsmidler (90), til låsning af beholderopsatsen (70) med sugerhuset (21) i en stilling, der låser beholderopsatsen (70), låser beholderopsatsen (70) med grundhuset (22) gribende over låget (23).

15

20 **11.** Sugeindretning ifølge et af de foregående krav, **kendetegnet ved, at** der i snavsopsamlingsbeholderens (46) snavsopsamlingsrum (25) dannes et undertryksområde (131) ved drift af sugeaggregatet (24), og snavsopsamlingsbeholderen (46) omfatter en indstrømningsåbning (132), der kommunikerer med sugeindgangen (27) eller danner denne, til indstrømning af sugestrømmen (S) og en sugestrømodgang (60) til udstrømning af luft til sugeaggregatet (24), hvor snavsopsamlingsrummets (25) sugestrømsudgang (60) og en sugeaggregatindgang (61) af sugeaggregatet (24) er i strømningsforbindelse via et hovedfilter (49) af filteranordningen (26) til tilbageholdelse af snavs i snavsopsamlingsrummet (25), og hvor en udvendig omkreds (130) af hovedfilteret (49) ligger uden for snavsopsamlingsrummets (25) undertryksområde (131), således at eventuel yderligere sekundærluft, der strømmer ind i sugeaggregatindgangen (61), ud over sugestrømmen (S) strømmer fra ydersiden af snavsopsamlingsrummet (25).

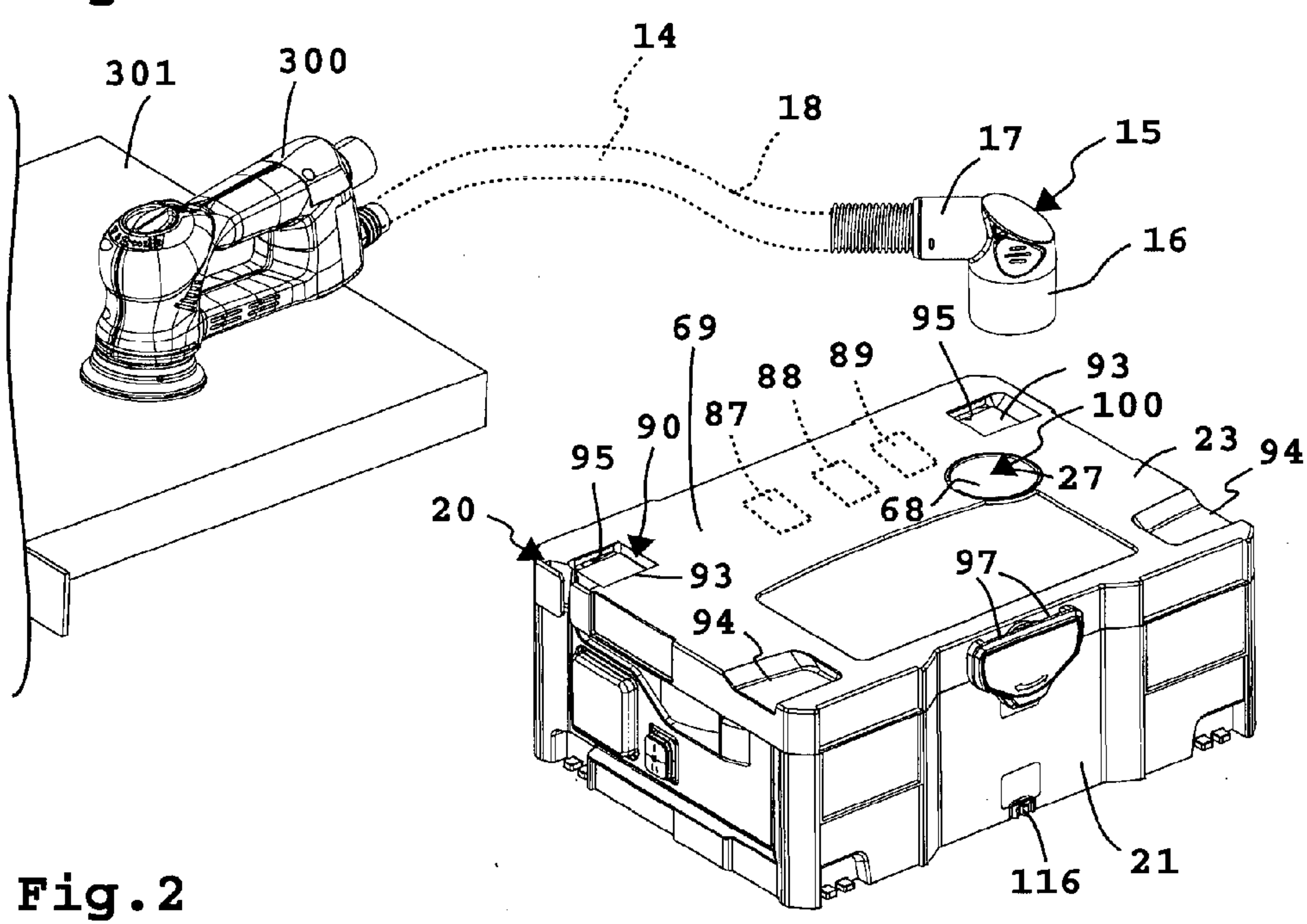
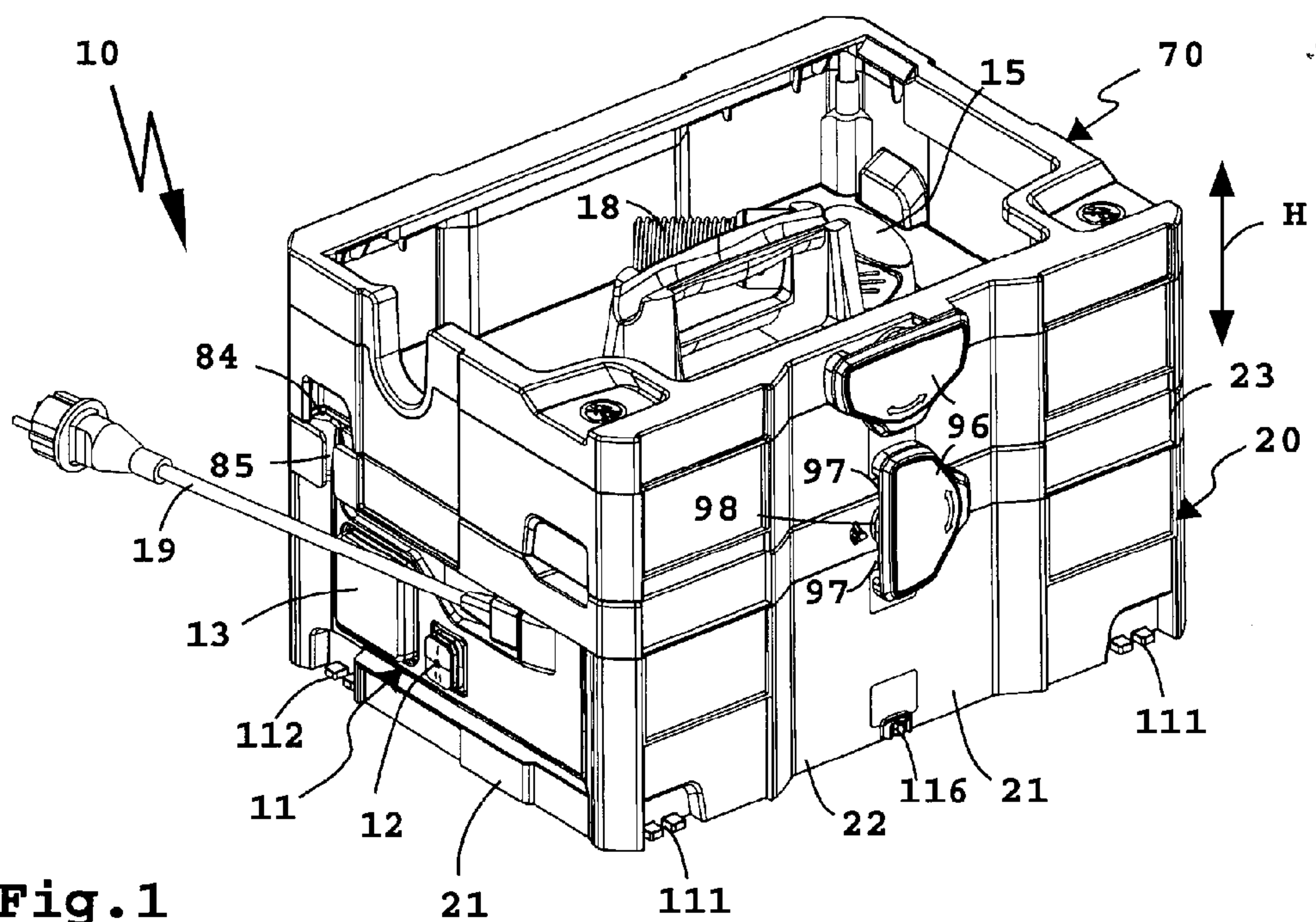
25

30

12. Sugeindretning ifølge krav 11, **kendetegnet ved, at** den omfatter en spændeindretning (140-340), der især omfatter et spændegear, til at spænde hovedfilteret (49) mellem sugestrømodgangen (60) og et indgangshusområde (127) af sugerhuset (21), hvorpå sugeaggregatindgangen (61) er anbragt, hvor hovedfilteret (49) er spændt i en spændestilling (P) af spændeindretningen

(140-340) mellem sugestrømudgangen (60) og indgangshusområdet (127).

13. Sugeindretning ifølge et af de foregående krav, **kendetegnet ved, at** den omfatter et bæregreb (141-341), især i form af en bøjle eller hank, til at bære snavsopsamlingsbeholderen (46).



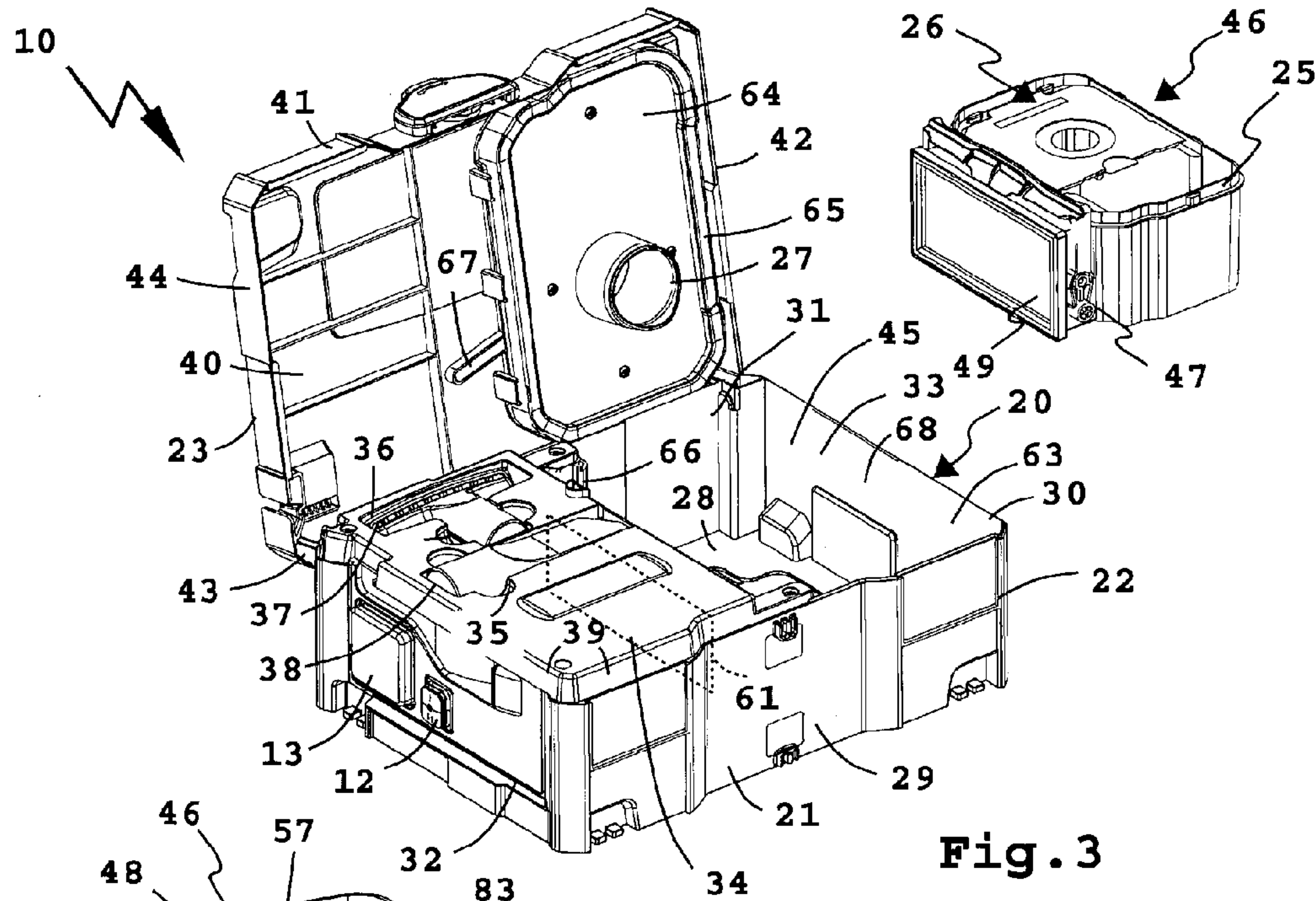


Fig. 3

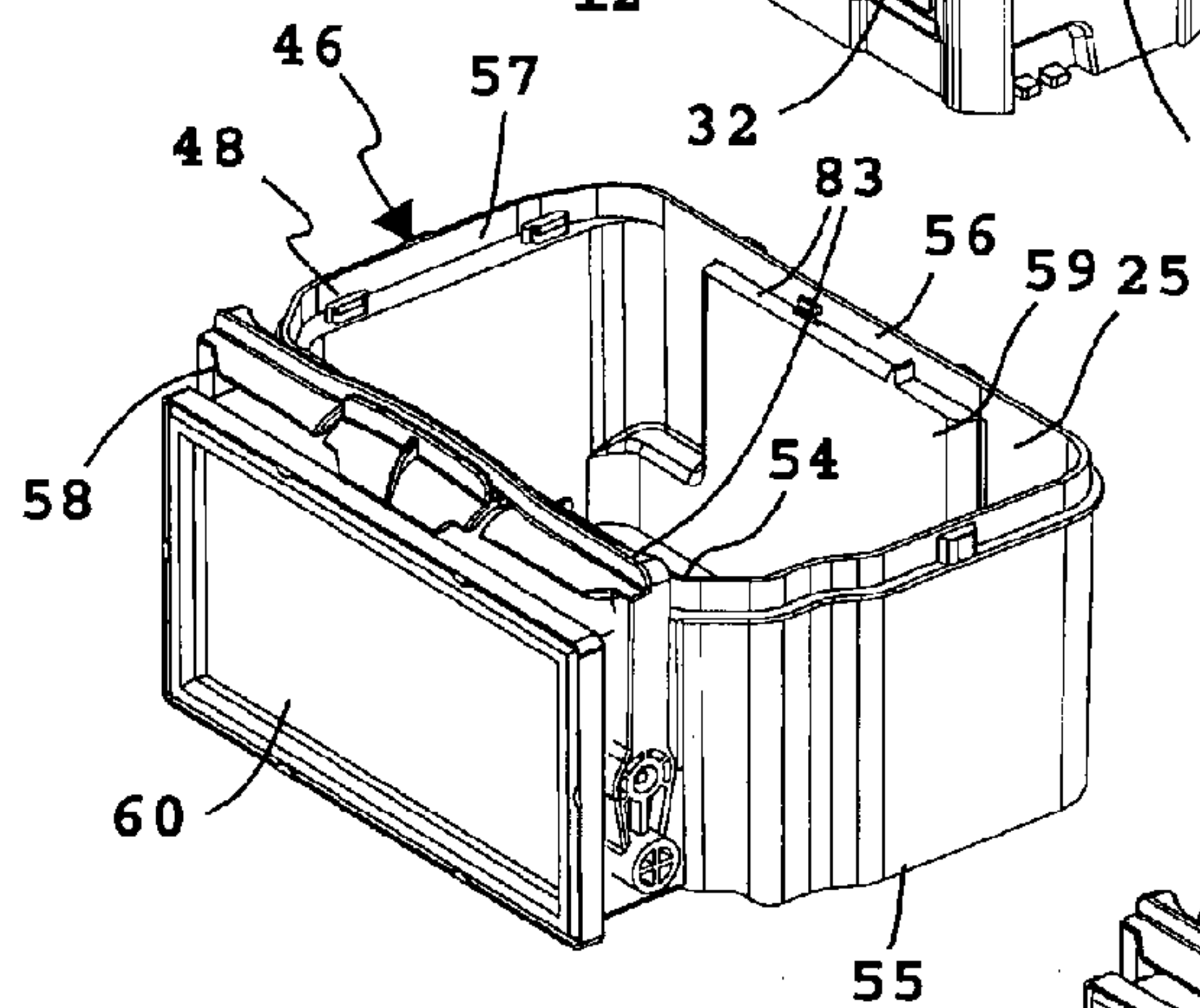


Fig. 4

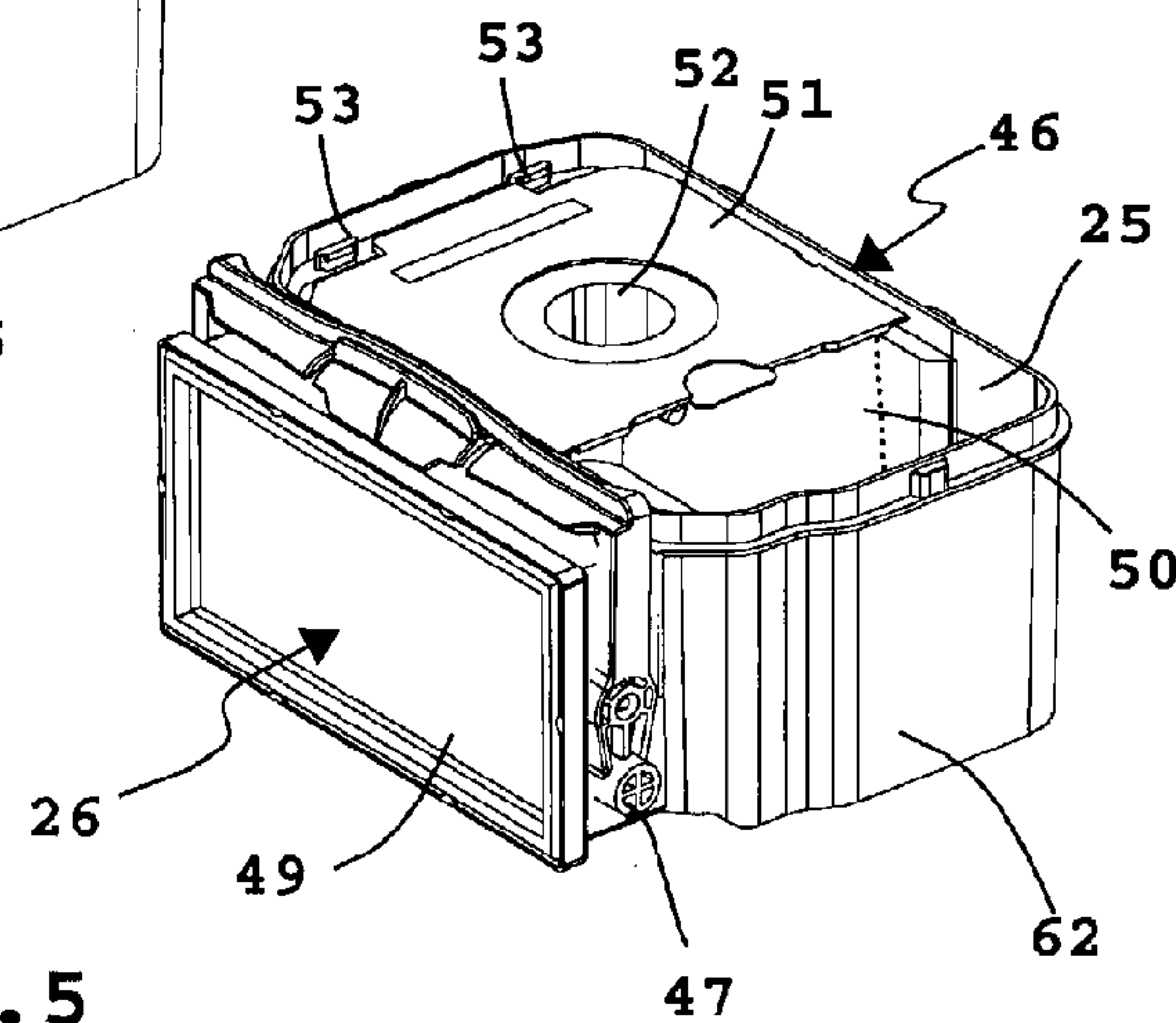


Fig. 5

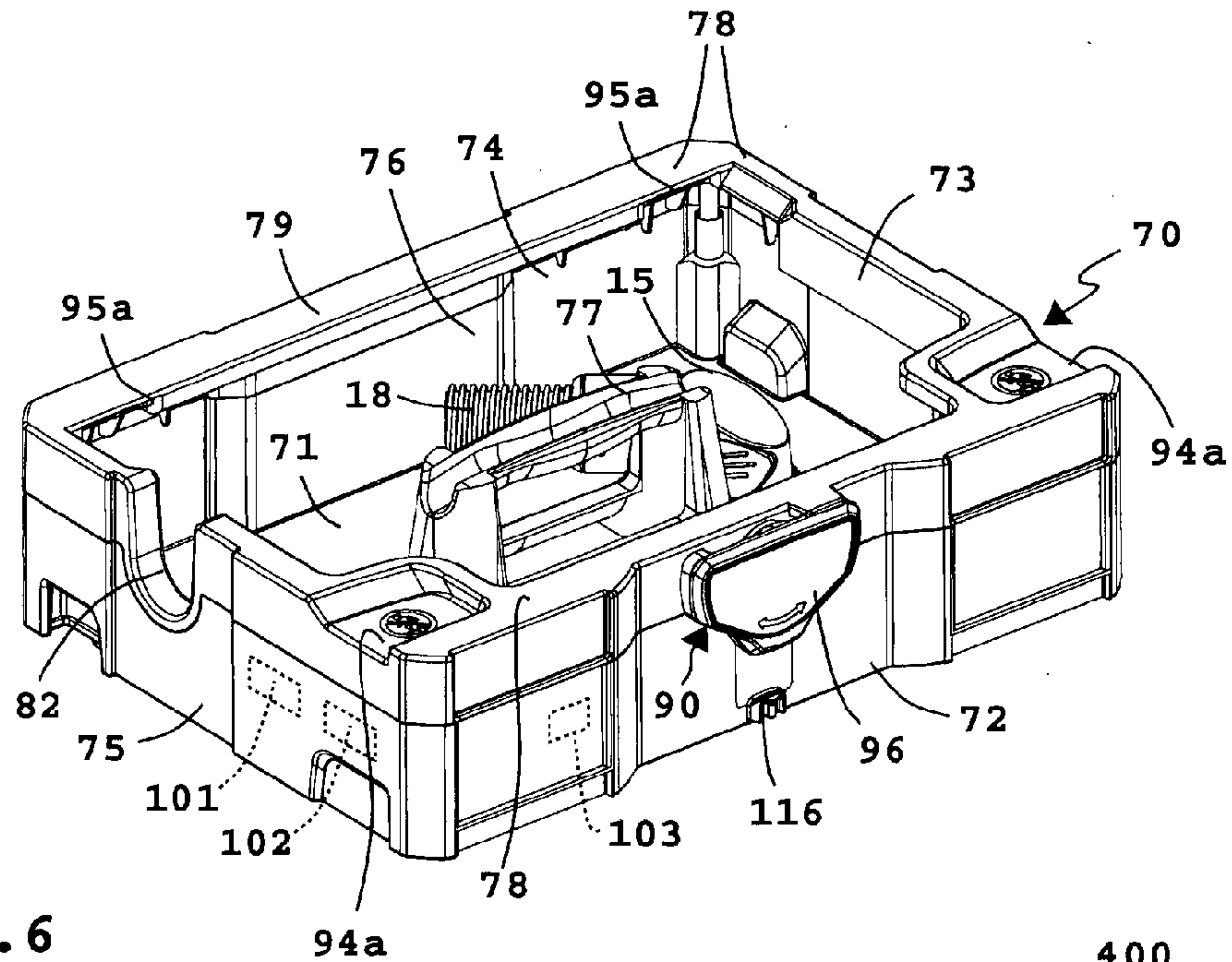


Fig. 6

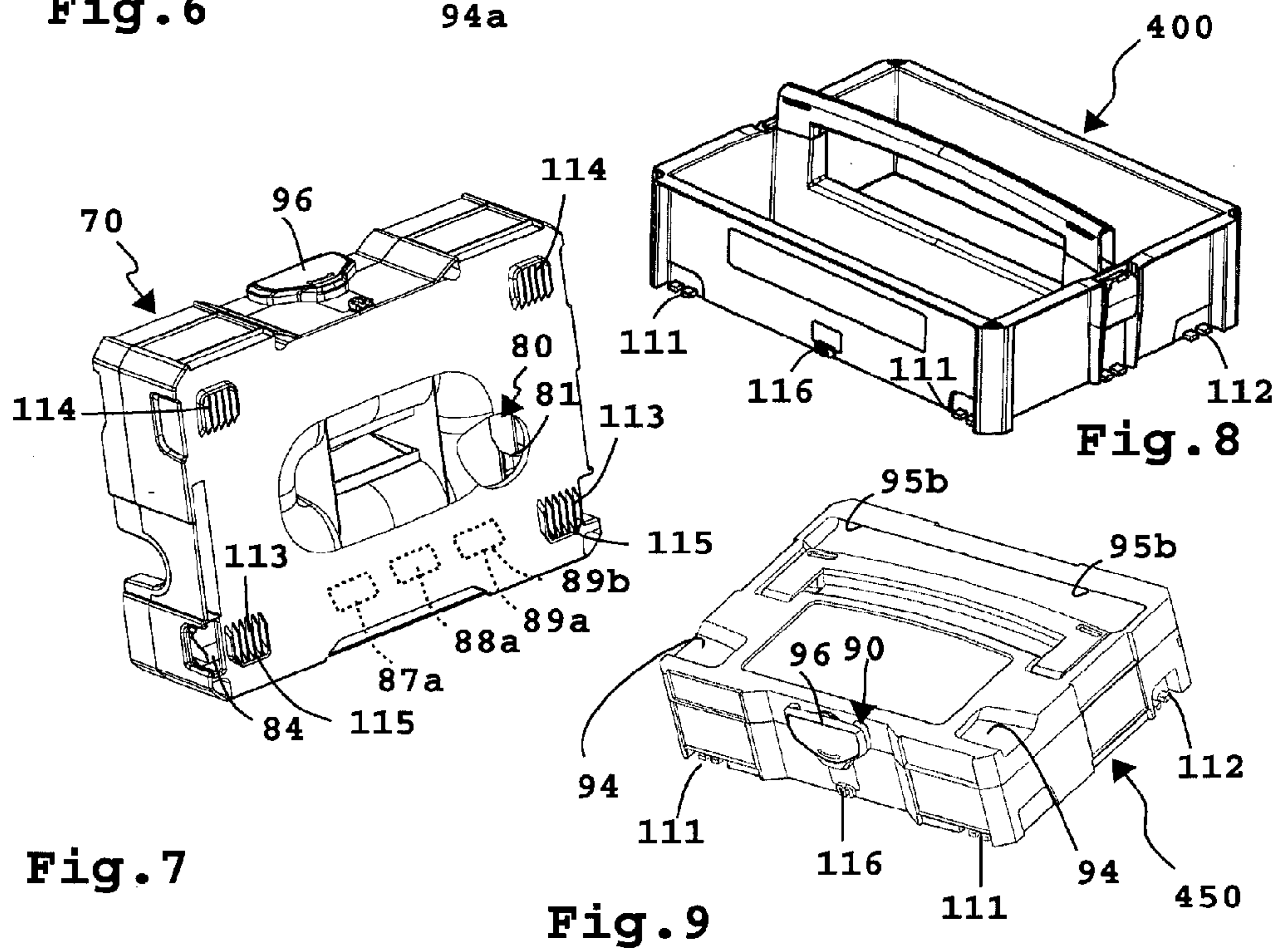


Fig. 7

Fig. 9

Fig. 8

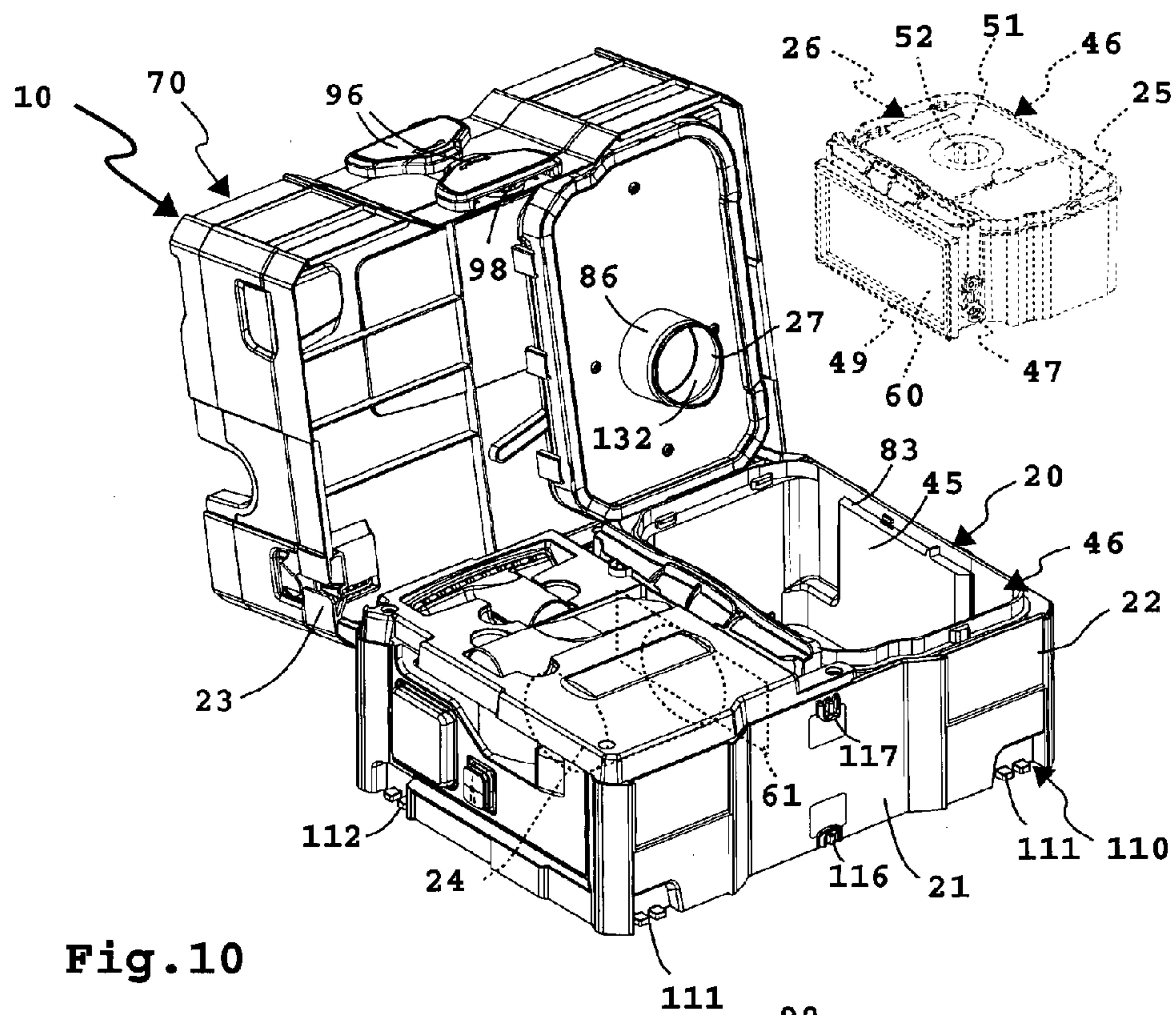


Fig. 10

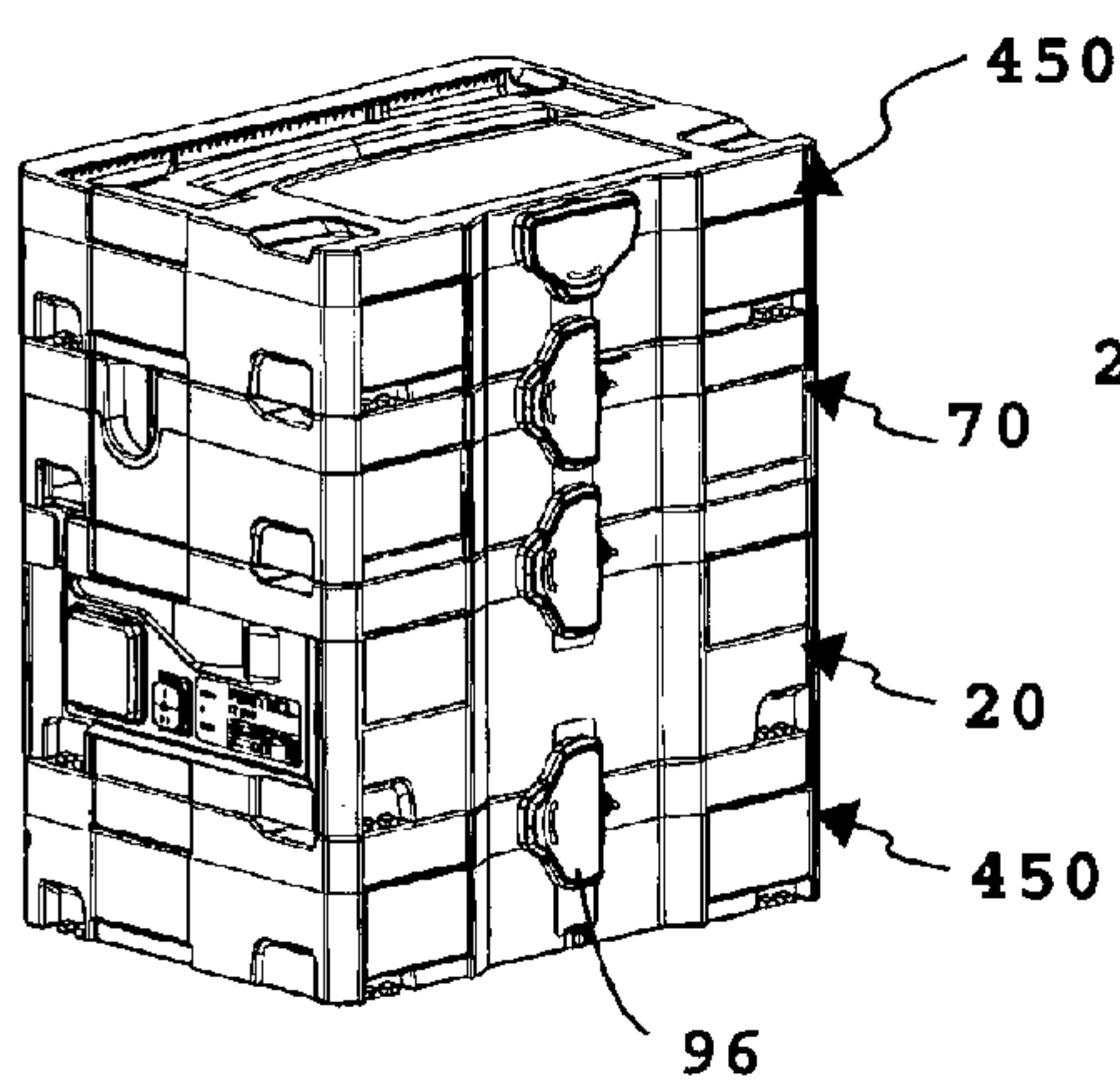


Fig. 12

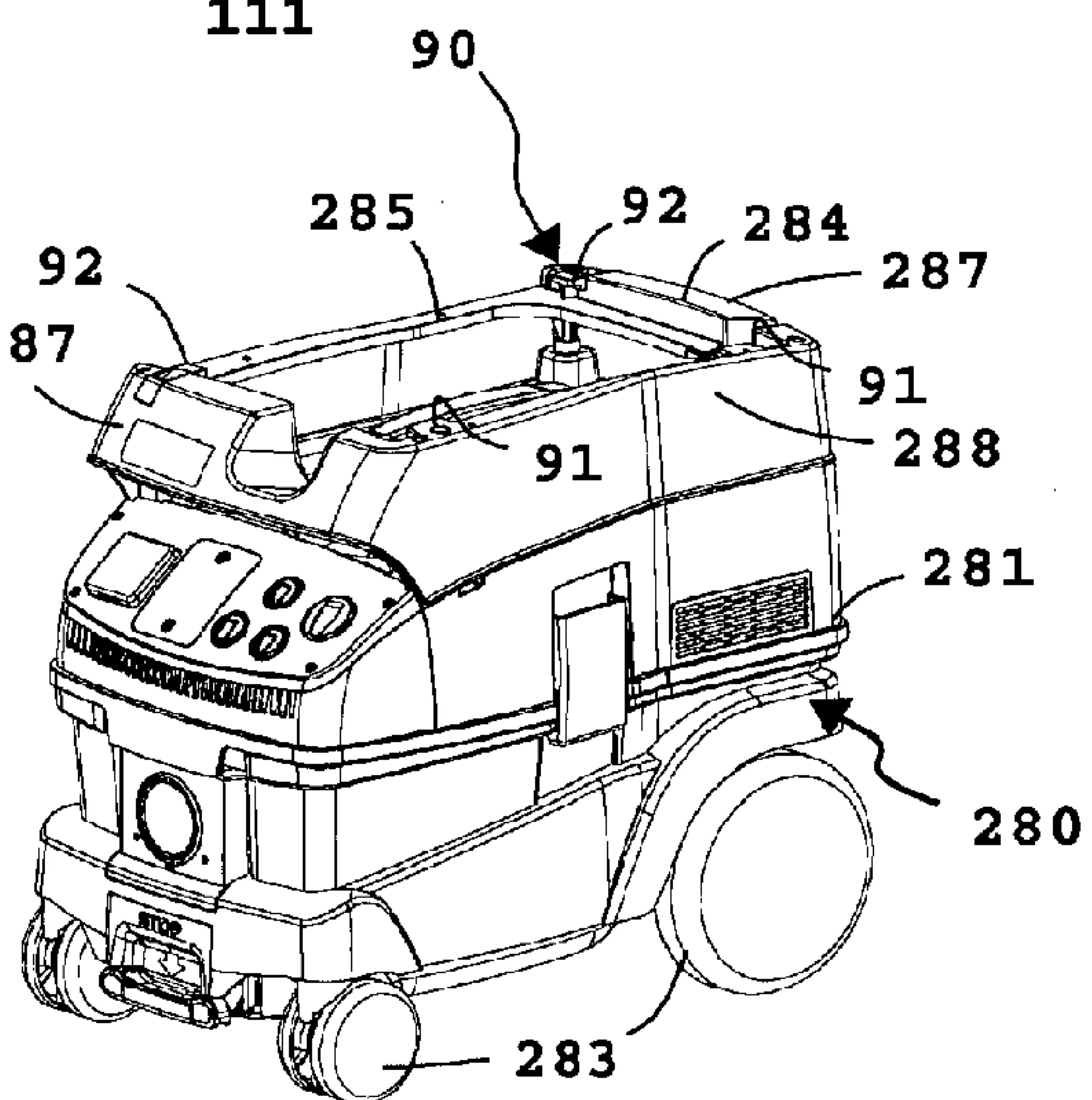
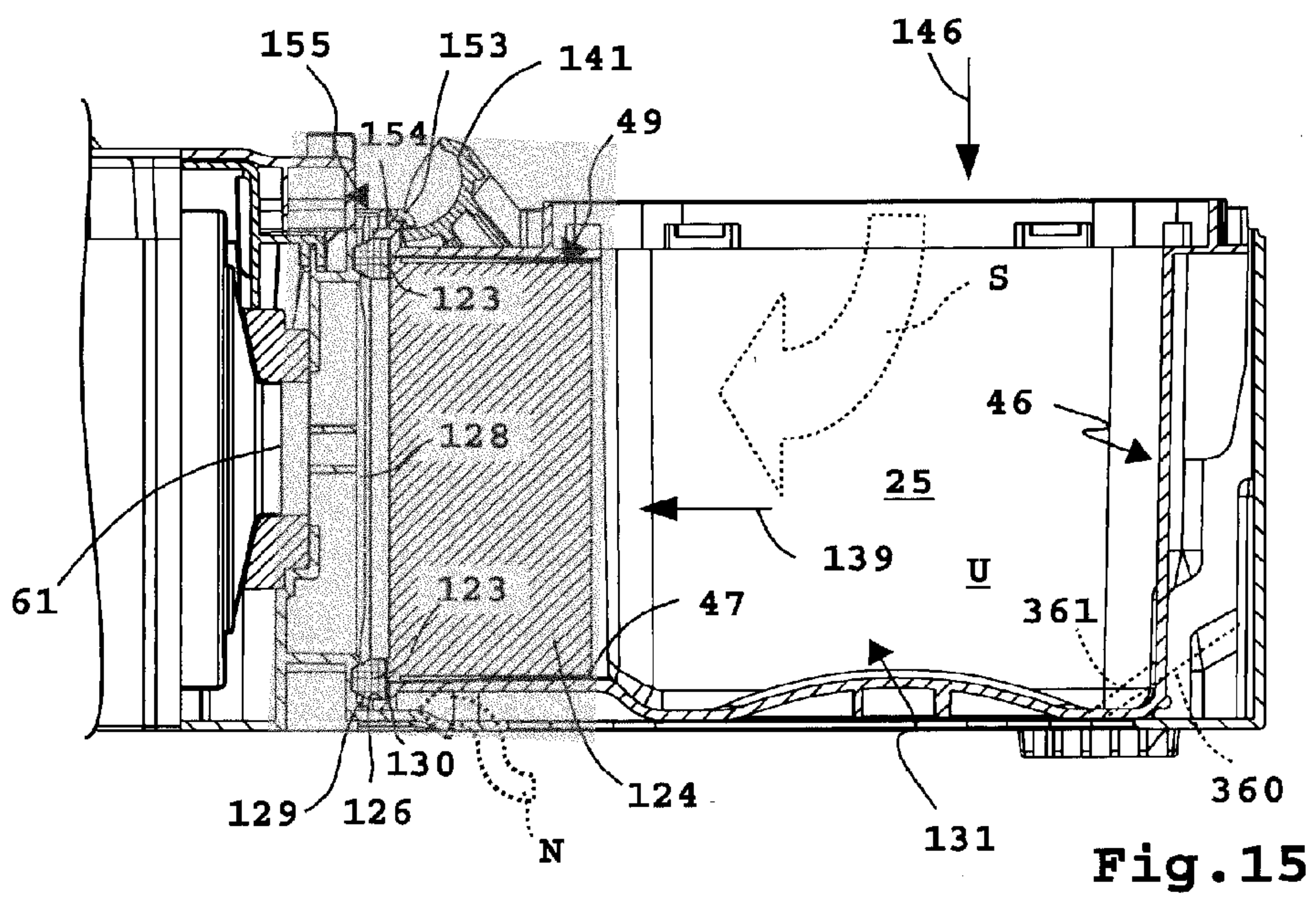
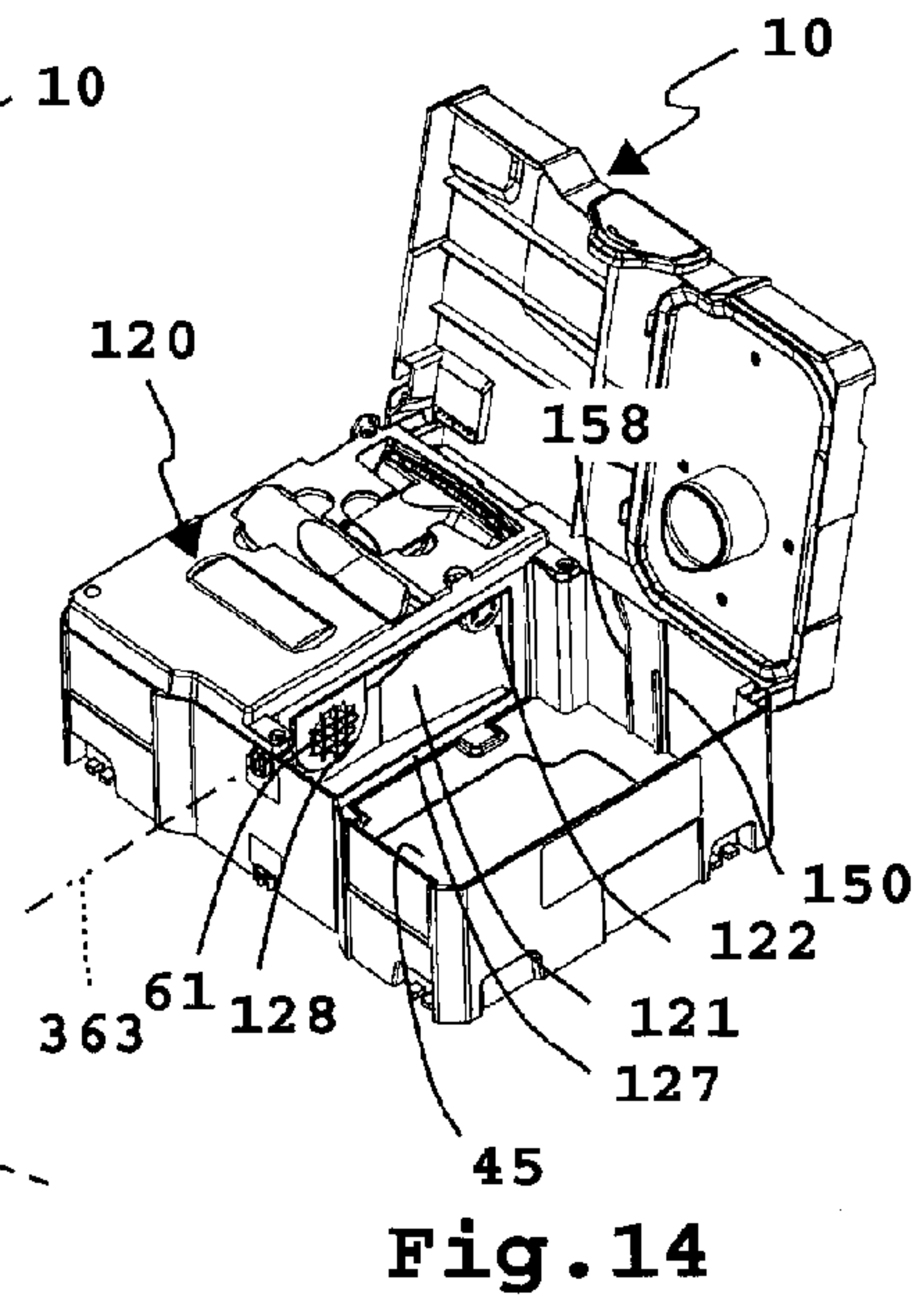
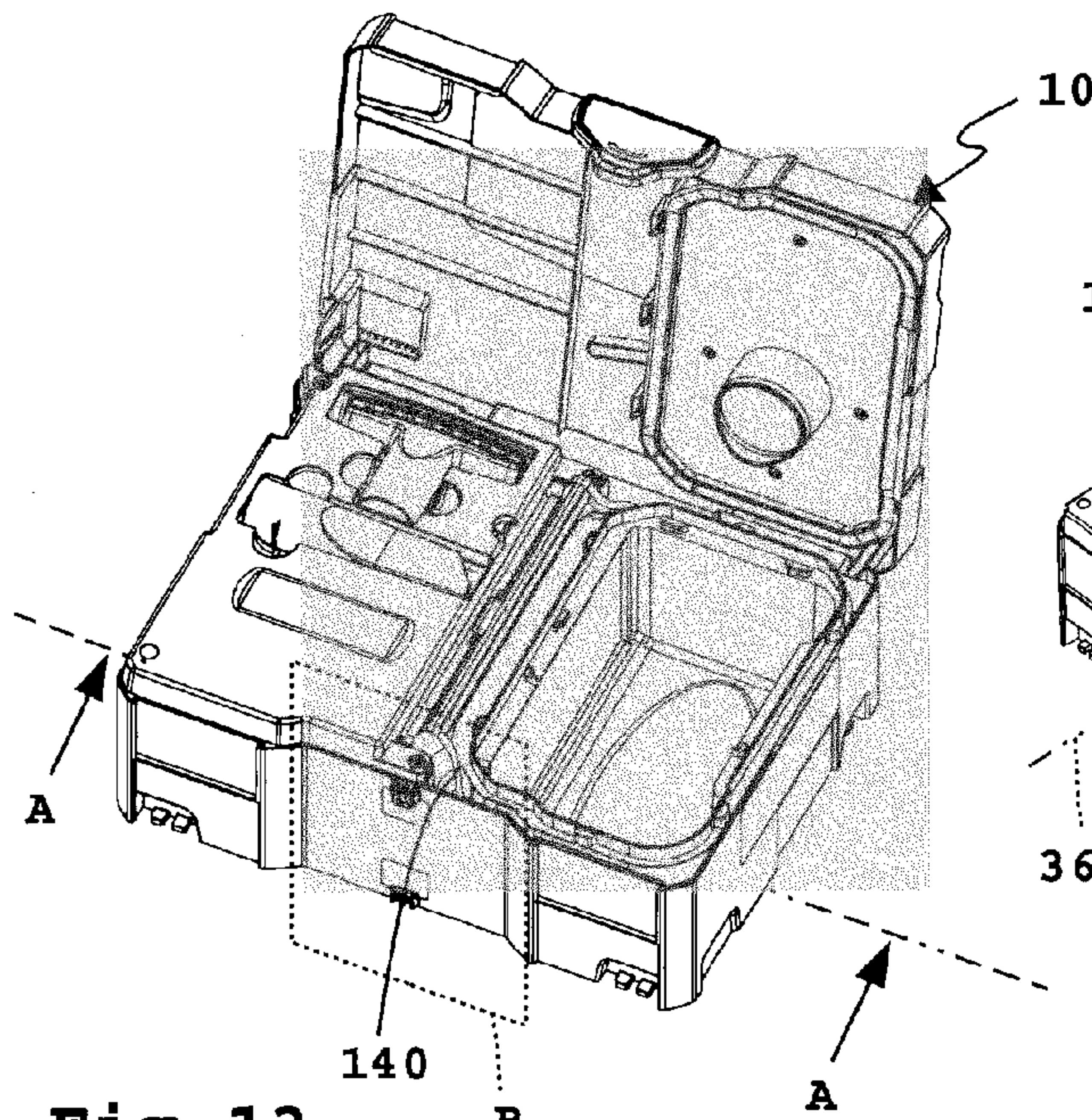


Fig. 11



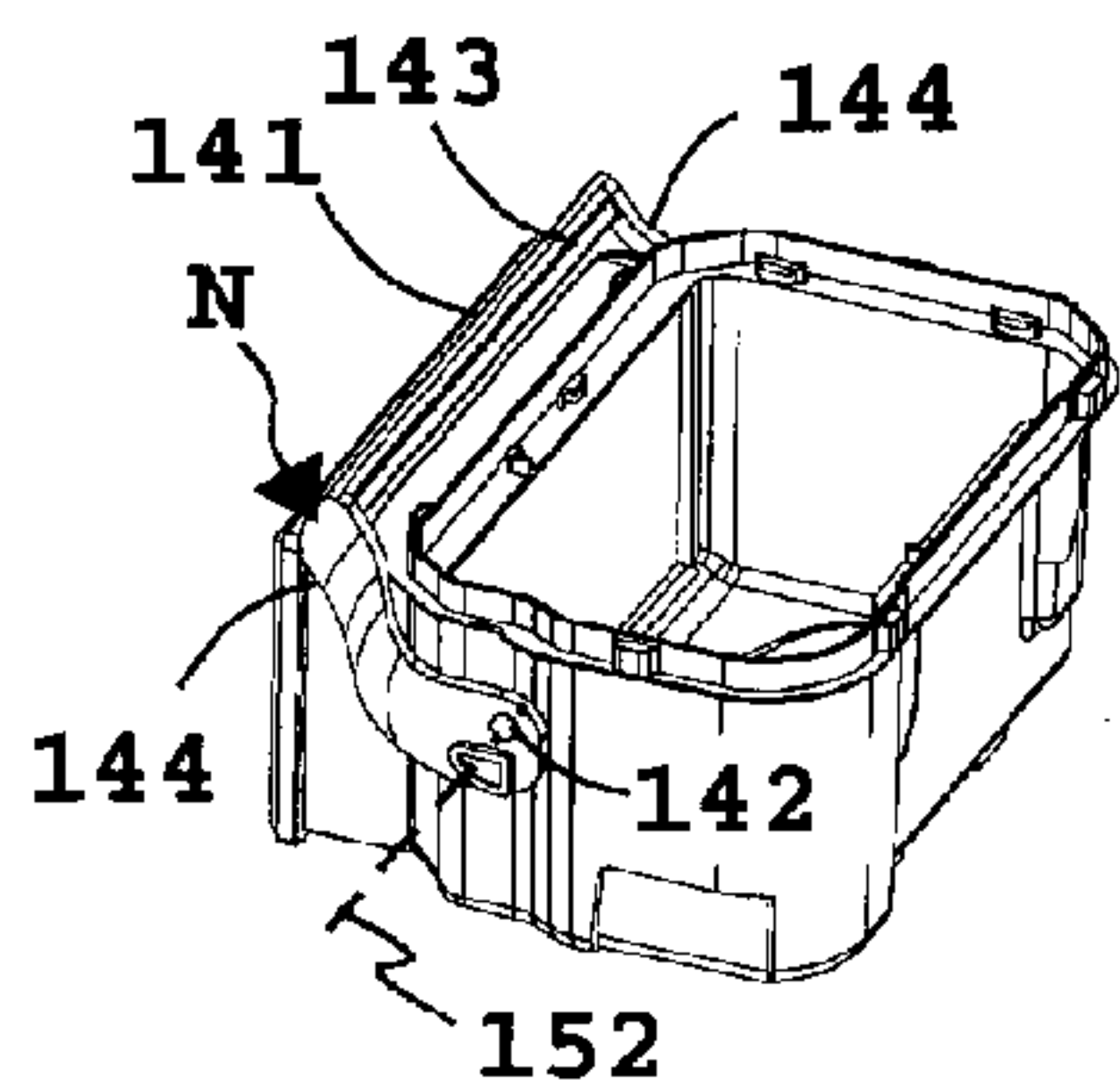


Fig. 16

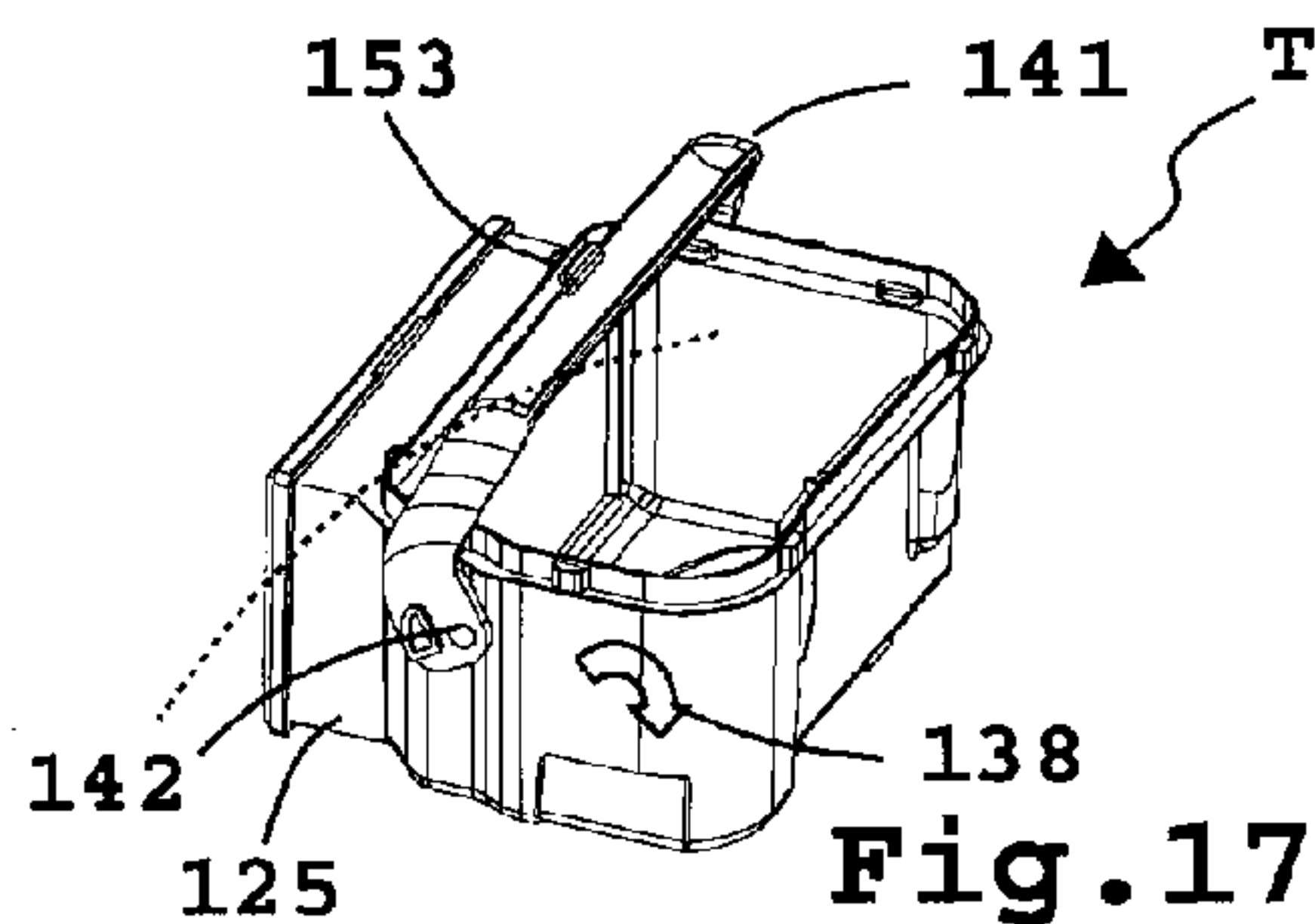


Fig. 17

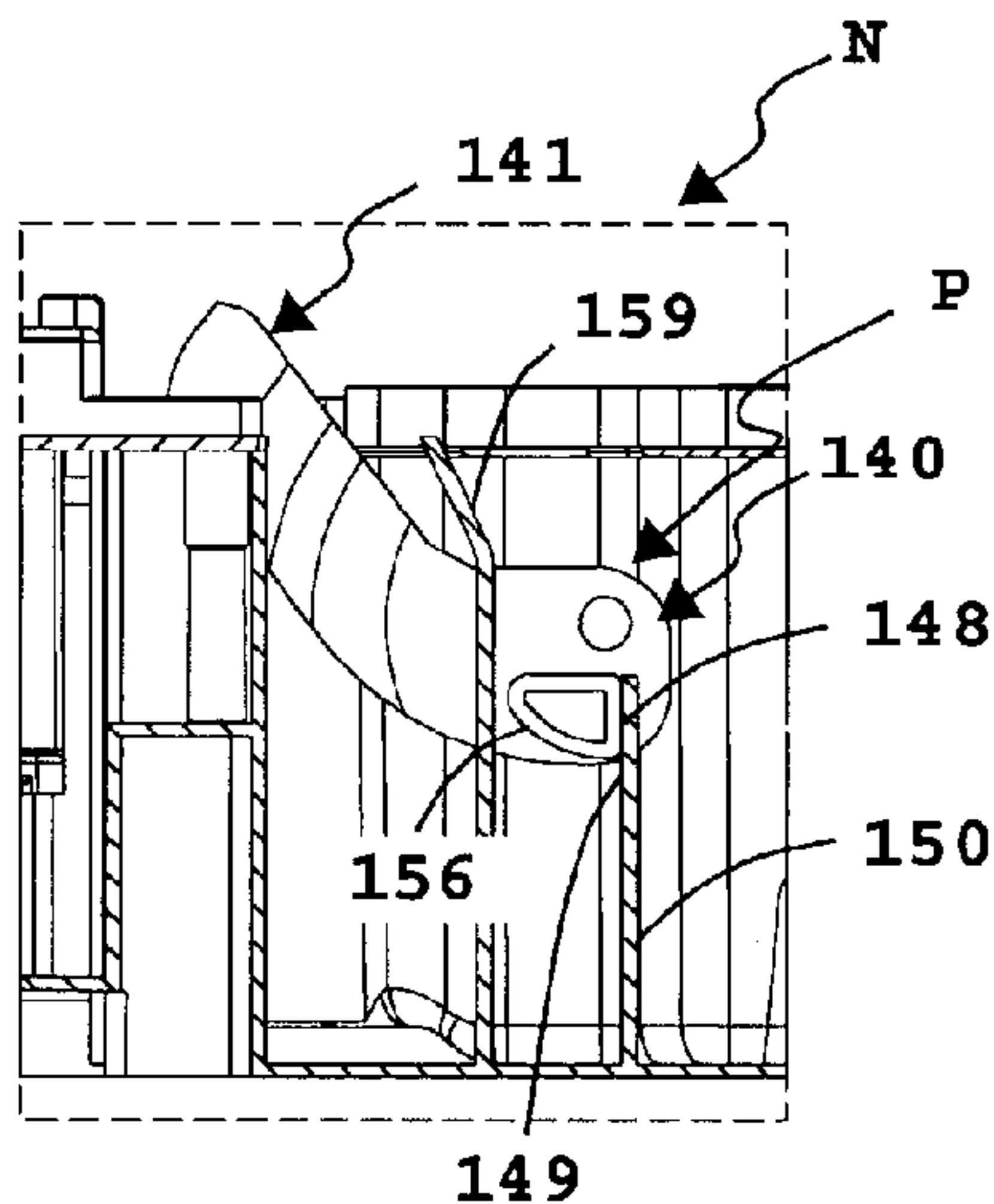


Fig. 18

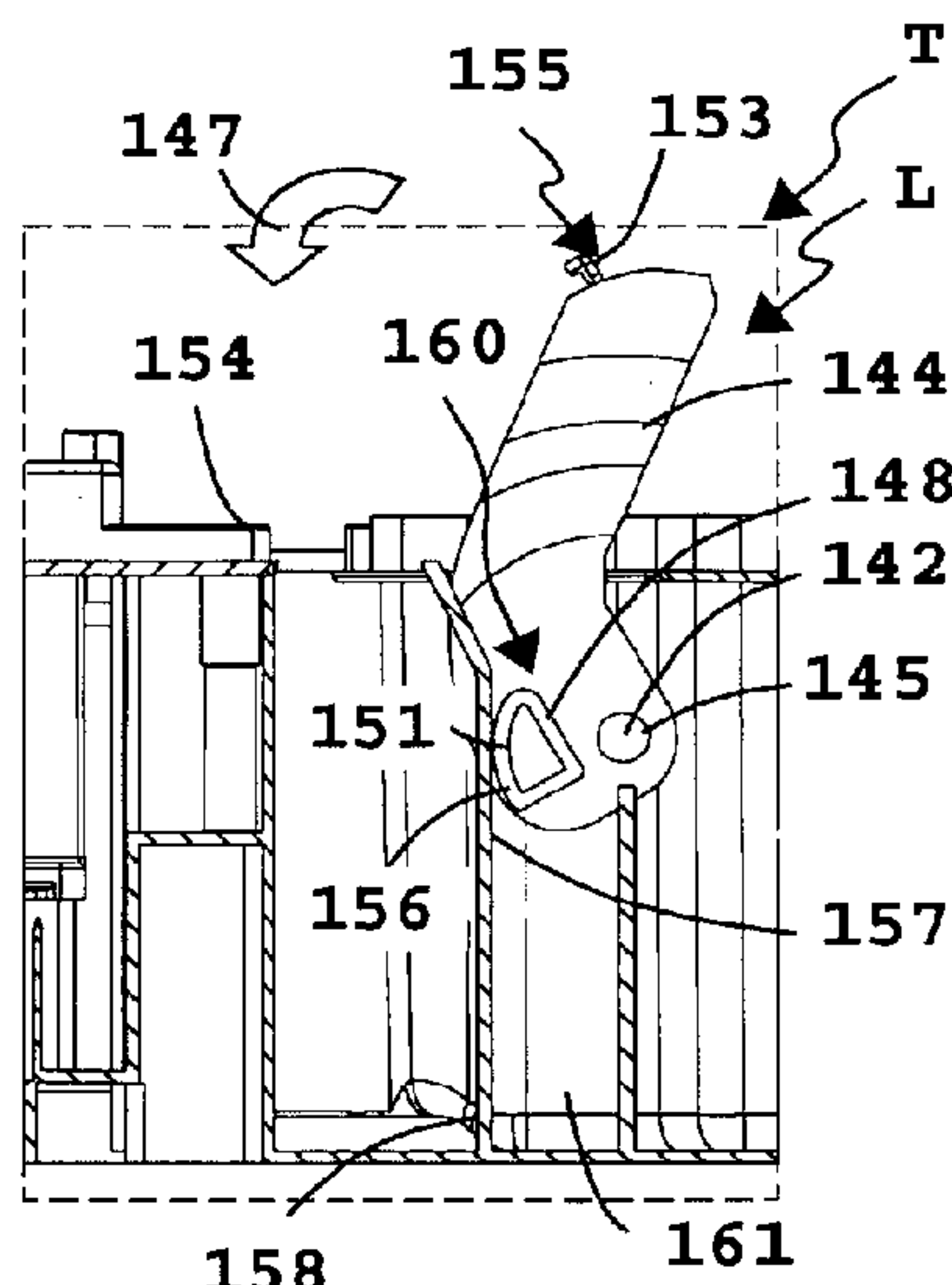


Fig. 19

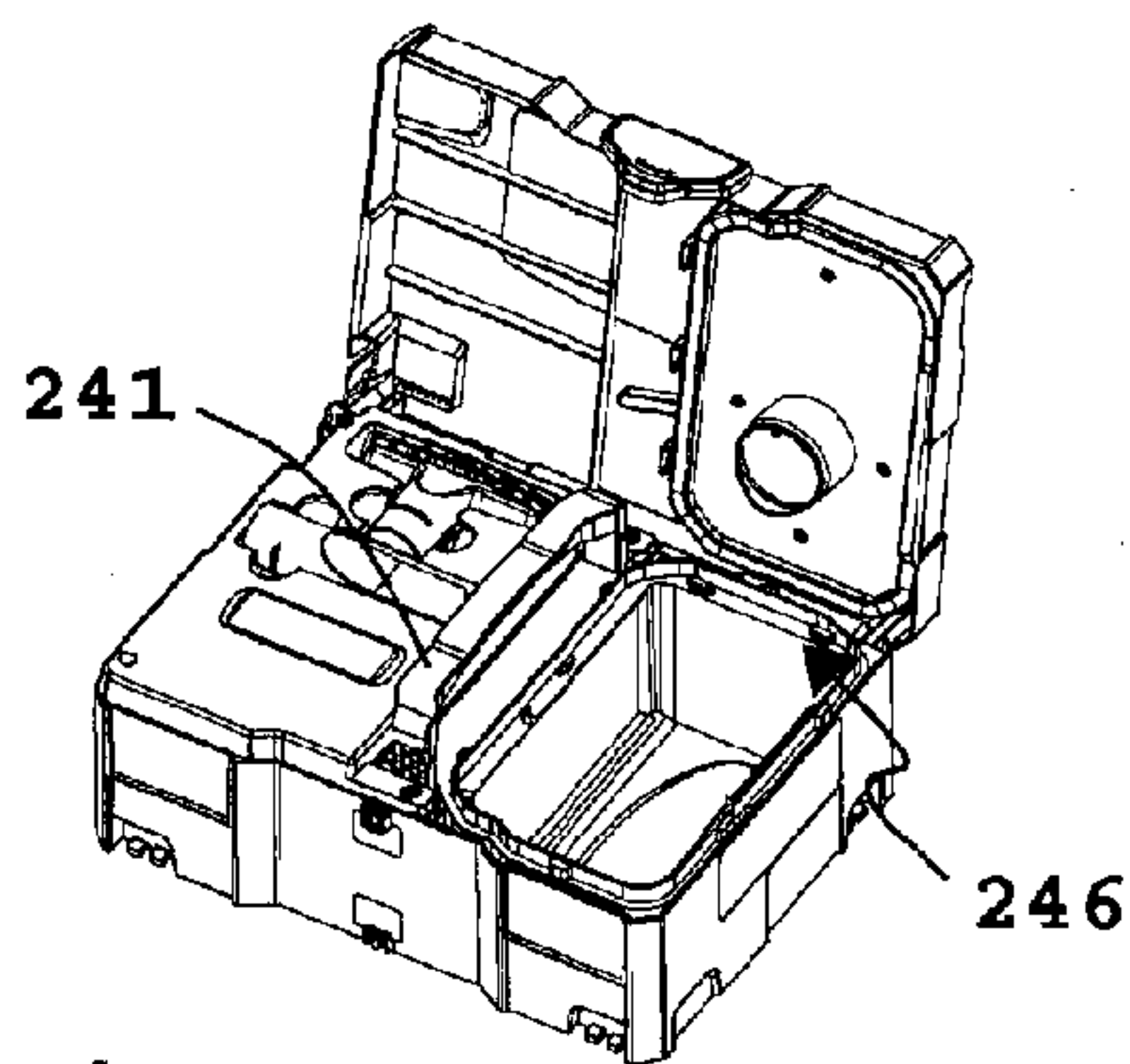


Fig. 20

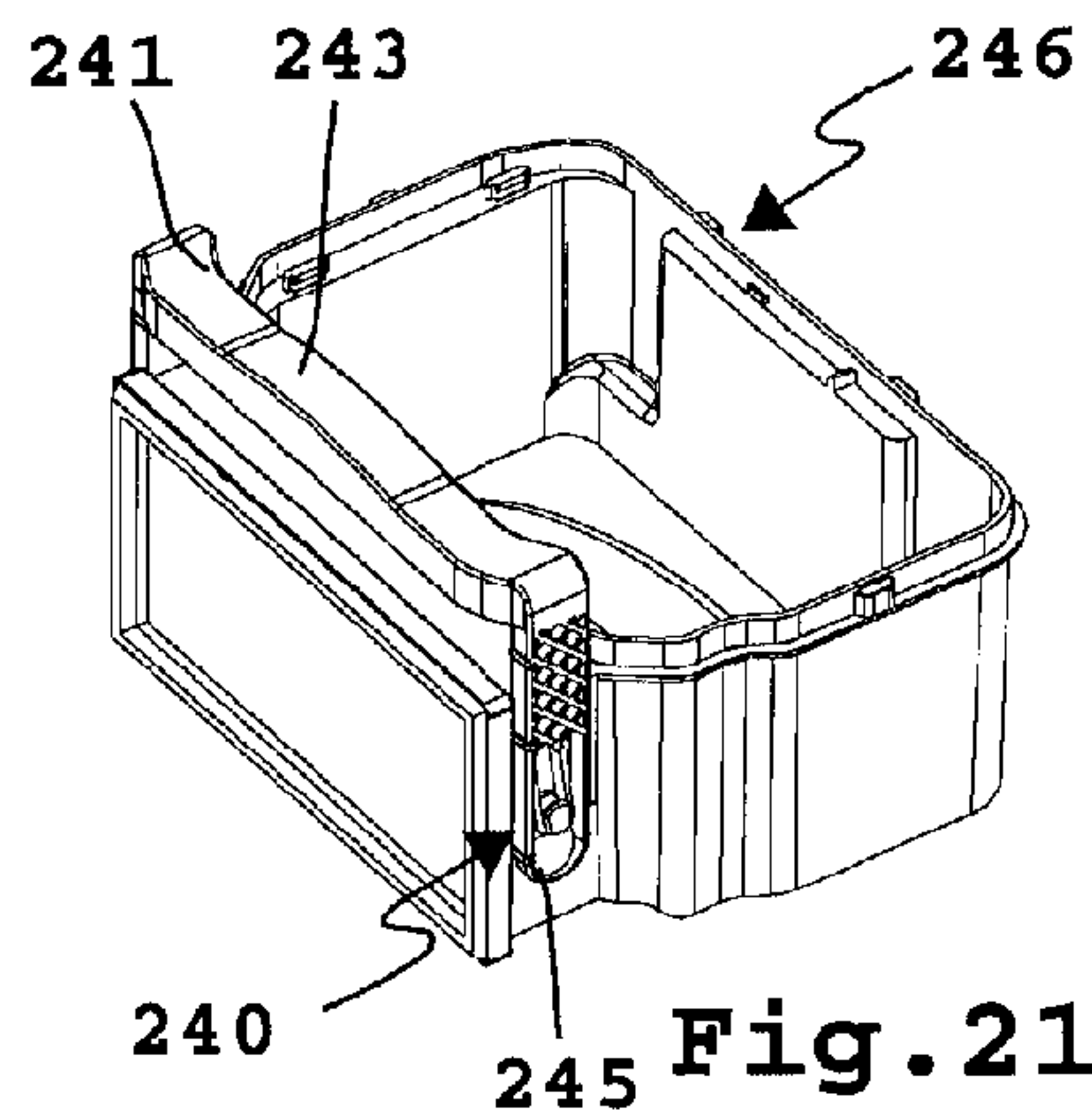


Fig. 21

