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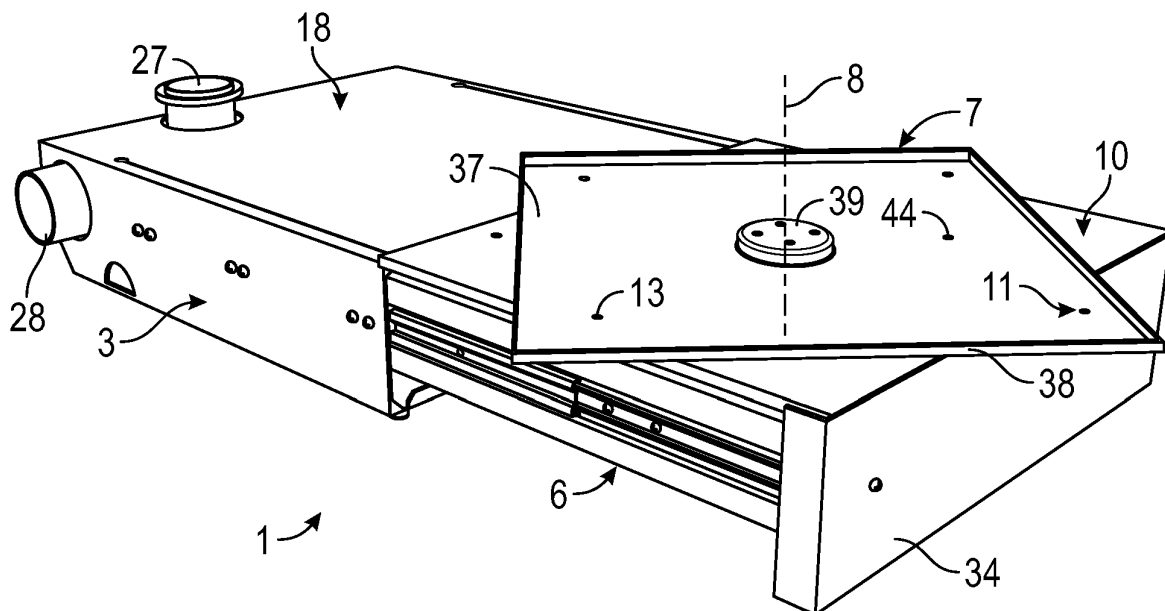
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(54) **SUPPORT FOR AN APPLIANCE, SUCH AS A WASHER OR DRYER**

(57) The support (1) includes a base part (3) adapted to be mounted on a support surface of a building and a displaceable part (6) adapted to carry an appliance. The displaceable part is arranged displaceably in relation to the base part (3) between a retracted operating position and an extended service position so that the appliance

may be displaced in relation to the building in an at least substantially horizontal direction. The displaceable part is adapted to carry said appliance by means of a rotatable part (7) arranged rotatably in relation to the displaceable part (6) so that the appliance (2) may be rotated about an at least substantially vertical axis.



**FIG. 5**

## Description

**[0001]** The present invention relates to a support for an appliance, such as a washer or dryer, the support including a base part adapted to be mounted on a support surface of a building and a displaceable part adapted to carry said appliance, wherein the displaceable part is arranged displaceably in relation to the base part between a retracted operating position and an extended service position so that the appliance may be displaced in relation to the building in an at least substantially horizontal direction.

**[0002]** US 2003/0201375 A1 discloses a support for moving a washing machine or dryer, including first and second brackets for mounting on a base surface, a slide assembly connected to the first and second brackets, and a frame for mounting the appliance. The frame is connected to the slide assembly for slidable movement relative to the first and second brackets whereby the appliance moves in unison with the frame. The slide assembly includes two sets of interconnected slide tracks cooperating with each other and a plurality of rollers to facilitate sliding movement of the frame. By means of this support device, it is possible to obtain access to the area behind a freestanding washing machine or dryer in order to clean said area or in order to repair the machine from behind. However, the available working space behind the appliance is limited and may typically result in poor working postures with limited access to required tools.

**[0003]** Moreover, in a laundry where several washing machines or dryers are lined up next to each other, the above-mentioned support device is not useful, because it would still not be possible to gain access to the back of the washing machine or dryer when the appliance has been moved away from the wall by means of the device. This is due to the fact that the sliding displacement of the device has a limited travel so that the neighbouring appliances still prevent access to the area behind the washing machine or dryer. Even if the device would be modified for a longer travel, it would generally not be useful, because it would interfere with oppositely arranged appliances. Also in private households, this device is generally not useful, because dish washers, washing machines and dryers are often arranged between cabinets under a desk. The generally limited space in combination with the neighbouring cabinets would prevent access to the area behind the appliance even when the appliance has been moved away from the wall by means of the device.

**[0004]** FR 1.379.612 discloses a base support for a washing machine or the like. The base support may be provided with both fixed and orientable wheels. However, in particular for moving heavy industrial washing machines and the like, this device does not provide a solution for easy movement of the appliance. Furthermore, the floor may be easily be scratched by the use of this device.

**[0005]** GB 846,251 discloses a washing machine having an internally arranged chassis supporting machinery.

The chassis may be withdrawn from the washing machine in order to perform service. However, this arrangement requires that the appliance is specifically modified for the purpose and it does not provide access to the area behind the appliance, which will often be required in connection with repair service or cleaning.

**[0006]** The object of the present invention is to provide a support for an appliance whereby access to the back of the appliance is facilitated.

**[0007]** In view of this object, the displaceable part is adapted to carry said appliance by means of a rotatable part arranged rotatably in relation to the displaceable part so that the appliance may be rotated about an at least substantially vertical axis.

**[0008]** In this way, when the displaceable part has been displaced from its retracted operating position to its extended service position, the appliance may be rotated in relation to the displaceable part by means of the rotatable part. Thereby, access is easily obtained to the back of the appliance.

**[0009]** In an embodiment, the rotatable part is adapted to be locked in a rotational operating position in relation to the displaceable part by means of a locking device. The locking device may ensure that the appliance is positioned in a stable manner during its normal operation.

**[0010]** In an embodiment, the rotatable part is supported rotatably on the displaceable part about a central axis at least by means of a first glide surface arranged at least substantially peripherally on the rotatable part and adapted to glide on a second glide surface arranged on the displaceable part. Thereby, generally heavy appliances may be supported rotatably in a simple way without the use of expensive bearings. Furthermore, it may be an advantage that the rotatable part does need not to be very rigid itself, and it may therefore be made for instance from a relatively thin piece of metal plate with appropriate fittings.

**[0011]** In an embodiment, the rotatable part is adapted to support the appliance at a number of supporting areas on the rotatable part, and the at least substantially peripherally arranged first glide surface is formed by respective glide blocks arranged on the rotatable part at respective areas below each respective supporting area. Thereby, by arranging the glide blocks at the support points for the appliance, the rotatable part does need not to be very rigid itself, because the rotatable part may be supported just where it has to carry the load of the appliance, for instance where the appliance is provided with feet, mounting screws or the like.

**[0012]** In an embodiment, the rotatable part is at each supporting area provided with a fixation device for fixation of the appliance to the rotatable part. Typically, the appliance is provided with means for mounting at its corners, and the load of the device will typically be transferred to the rotatable part at these points, where the supporting areas may be provided on the rotatable part. Therefore, by providing fixation devices at the supporting areas, the load may be transferred to the supporting ar-

eas.

**[0013]** In an embodiment, the second glide surface on the displaceable part has the form of a support surface having a generally rectangular periphery and being adapted to support respective glide blocks arranged on the rotatable part and forming the at least substantially peripherally arranged first glide surface, and the distance from each glide block to said central axis is smaller than half the length of the shortest side of the generally rectangular periphery of the support surface. Thereby, it may be ensured that the glide blocks of the rotatable part may be supported by the support surface of the displaceable part in any rotational position of the rotatable part in relation to the displaceable part. At the same time, the extent of the support surface of the displaceable part may be maximised under the given circumstances.

**[0014]** In an embodiment, the rotatable part is supported rotatably on the displaceable part at least by means of a central bearing. Thereby, a rotational movement of the rotatable part may be ensured in a simple manner. Preferably the central bearing has the form of a plain bearing adapted to take up both radial and axial forces. Thereby, the rotatable part may carry the entire load of the appliance. Otherwise, if the rotatable part is supported both centrally and peripherally, it may be an advantage that the rotatable part does need not to be very rigid itself.

**[0015]** In an embodiment, the base part is provided with a top surface adapted for walking thereon when the displaceable part is in the extended service position. This may be advantageous, in particular when two or more appliances are arranged beside each other, because it may be possible to walk behind a row of appliances when they are in the extended service position which may further facilitate maintenance and cleaning.

**[0016]** In a structurally particularly advantageous embodiment, the base part is at least substantially box-shaped with opposed side walls, the displaceable part is at least substantially box-shaped with opposed side walls, and each side wall of the base part is connected to a corresponding side wall of the displaceable part by means of a sliding device, such as a telescopic slide.

**[0017]** In an embodiment, a top surface of the base part is provided with two spaced grooves through which respective side walls of the displaceable part extend when the displaceable part is in the retracted operating position. Thereby, the displaceable part may be arranged slidably inside the base part as a drawer, except for that a top wall of the displaceable part may be arranged above a top wall of the base part in the retracted operating position of the displaceable part so that a support surface for a glide surface on the rotatable part may be arranged on said top wall of the displaceable part.

**[0018]** In an alternative embodiment, the opposed side walls of the displaceable part are arranged outside in relation to the opposed side walls of the base part. Thereby, the top wall of the displaceable part may be connected directly with the opposed side walls of the displaceable part without need for grooves in the top wall of the base

part in that the top wall of the displaceable part may be arranged above the top wall of the base part in the retracted operating position.

**[0019]** In an embodiment, the base part and the displaceable part are provided with respective front openings and respective bottom openings. Thereby, cleaning of the floor under the support may be facilitated.

**[0020]** In an embodiment, the base part includes a drain pipe adapted to connect an outlet of the appliance with a drain pipe of the building. Thereby, the arrangement of the drain pipe in the building may be facilitated because the drain pipes of neighbouring base parts may simply be connected in a modular way so that only one of the base parts has to be connected to a drain in the building.

**[0021]** In an embodiment, the drain pipe included by the base part is provided with a splash guard at least partly surrounding the opening of the drain pipe.

**[0022]** In an embodiment, the support includes a flexible tube elbow adapted to be mounted on an outlet of an appliance so that, when the appliance is positioned on the displaceable part and the displaceable part is displaced from its extended service position to its retracted operating position, the flexible tube elbow flexes so that an end of the flexible tube elbow slides over an edge of the end of the drain pipe of the base part and positions itself inside the drain pipe when the displaceable part has reached its retracted operating position. Thereby, the outlet of in particular an industrial washing machine or dishwasher may automatically connect to the drain pipe of the base part when the appliance has been repaired and the displaceable part is displaced to its retracted operating position.

**[0023]** The invention furthermore relates to an appliance including a support as described above, wherein the appliance is positioned on the displaceable part, and wherein the appliance is provided with an outlet arranged to be positioned at an end of the drain pipe of the base part when the displaceable part is in its retracted operating position. Thereby, the outlet of in particular an industrial washing machine or dishwasher may automatically connect to the drain pipe of the base part when the appliance has been repaired and the displaceable part is displaced to its retracted operating position.

**[0024]** In an embodiment, the outlet of the appliance is provided with a flexible tube end adapted to flex when the displaceable part is displaced from its extended service position to its retracted operating position so that the flexible tube end may slide over an edge of the end of the drain pipe of the base part and position itself inside the drain pipe when the displaceable part has reached its retracted operating position. Thereby it may be obtained that, in the retracted operating position of the displaceable part, the flexible tube end extends a certain distance downwards into the drain pipe of the base part. Thereby, it may be avoided that water splashes to the surroundings of the drain pipe.

**[0025]** In an embodiment, the support is integrated into

the appliance. Thereby, under certain circumstances, a lower total height of the appliance may be obtained. This may be advantageous in particular in the case of household appliances adapted to be placed below a desk or in a column.

**[0026]** The invention will now be explained in more detail below by means of examples of embodiments with reference to the very schematic drawing, in which

Fig. 1 is a perspective view illustrating a launderette incorporating the support according to the invention;

Fig. 2 is a top view illustrating a laundry room incorporating three conventionally arranged appliances;

Fig. 3 is a top view illustrating a laundry room corresponding to that of Fig. 2, but wherein six appliances have been incorporated by means of respective supports according to the invention;

Fig. 4 is a perspective view seen obliquely from above of a support according to the invention, whereby the displaceable part is in its retracted operating position and whereby the rotatable part is in its initial rotational operating position;

Fig. 5 is a corresponding perspective view of the support of Fig. 4, whereby the displaceable part is in its extended service position and whereby the rotatable part has been rotated in relation to the initial rotational operating position;

Fig. 6 is a view corresponding to that of Fig. 5, whereby the rotatable part has been rotated to another rotational position;

Fig. 7 is a perspective view seen obliquely from below of the support as seen in Fig. 5;

Fig. 8 is an exploded view of the support according to the invention as illustrated in Figs. 4 to 7;

Fig. 9 is a perspective view seen obliquely from above of the displaceable part of the support according to the invention as illustrated in Figs. 4 to 8;

Fig. 10 is a perspective view seen obliquely from below of the displaceable part in Fig. 9;

Fig. 11 is a perspective view seen obliquely from below of the rotatable part of the support according to the invention as illustrated in Figs. 4 to 8;

Fig. 12 is a perspective view seen obliquely from above of the rotatable part in Fig. 11;

Fig. 13 is a perspective view seen obliquely from above of the base part of the support according to

the invention as illustrated in Figs. 4 to 8;

Fig. 14 is a perspective front view of the base part in Fig. 13;

Fig. 15 is a cross-sectional view of part of an appliance and an embodiment of the rotatable part of the support according to the invention;

Fig. 16 is a side view of a support according to the invention with an appliance positioned thereon, whereby part of the drain tubing has been illustrated in cross-section;

Figs. 17 to 19 are perspective views illustrating different embodiments of a drain pipe included in the base part of the support according to the invention;

Fig. 20 is a cross-sectional view of an alternative embodiment of the rotatable part of the support according to the invention;

Fig. 21 is a top view of an alternative embodiment of a top part of the displaceable part of the support according to the invention; and

Fig. 22 is a side view of the top part in Fig. 20.

**[0027]** Fig. 1 illustrates the use of a support 1 according to the present invention for an appliance 2 in the form of a washing machine arranged in a laundry room. The support 1 is applicable to a variety of different industrial or household appliances such as washing machines, tumbler dryers, dishwashers and the like. Fig. 2 illustrates a conventional laundry room incorporating three appliances 2 arranged at a distance  $d_b$  of approximately 60 cm from a wall behind the appliances. This distance is required in order to perform maintenance of the appliances without having to move them. In this case, the distance  $d_f$  from the appliances to a wall in front of the appliances is approximately 160 cm. Fig. 3 illustrates a laundry room corresponding to that of Fig. 2, but wherein six appliances 2 have been incorporated by means of respective supports 1 according to the present invention. According to the invention, when maintenance or cleaning is required, the appliances 2 may easily be displaced away from the wall behind the appliances and rotated about a vertical axis. Therefore, it is possible to position the appliances 2 in their normal operational position very close to the wall behind the appliances. As it is seen, in the same size of room as illustrated in Fig. 2, it is now possible to incorporate six appliances 2 with a mutual distance  $d_{ff}$  of approximately 145 cm. In this way, the area in the laundry room may be much better utilised.

**[0028]** Furthermore, it should be noted that in the conventional laundry room illustrated in Fig. 2, the available distance  $d_b$  of approximately 60 cm behind the appliances provides for only very limited working space when

repair has to be performed. The result may typically be poor working postures with limited access to required tools, especially when appliances in the middle of a row have to be repaired. The repair therefore becomes more time-consuming and therefore more expensive.

**[0029]** On the contrary, as illustrated in Fig. 1, by means of the support 1 according to the present invention, an appliance 2 may be displaced away from the wall and rotated about a vertical axis, whereby access to the back of the appliance 2 is facilitated. Thereby, ample working space and easy access to required tools may be obtained.

**[0030]** Moreover, even though an available distance  $d_p$  of approximately 60 cm behind the appliances is usually prescribed, due to limited space in smaller rooms, appliances are often mounted close to a wall on a conventional fixed base. In this case, the appliances have to be removed from their base for repair. In order to do this, two persons are required to carry an appliance. The repair in this case becomes even more time-consuming and therefore even more expensive.

**[0031]** Figs. 4 to 8 illustrate the support 1 according to the invention including a base part 3 adapted to be mounted on a support surface 4 in the form of a floor of a building 5 by means of fixation feet 51. The fixation feet may typically attach to the floor by means of nuts mounted on threaded spindles inserted into the floor by means of dowels or the like; however, any suitable type of attachment means may be employed. Furthermore, the base part 3 may alternatively or additionally be adapted to be mounted on a support surface 4 in the form of a wall of a building 5, and/or the base part 3 may be adapted to be mounted or arranged on top of another appliance. The latter may be advantageous in particular in the case of household appliances adapted to be placed in a column.

**[0032]** The support 1 further includes a displaceable part 6 adapted to carry said appliance 2, wherein the displaceable part 6 is arranged displaceably in relation to the base part 3 between a retracted operating position illustrated in Fig. 4 and an extended service position illustrated in Figs. 5, 6 and 7. Thereby, the appliance 2 may be displaced in relation to the building 5 in an at least substantially horizontal direction as illustrated in Fig. 1, wherein one of the appliances has been brought to an extended service position. The displaceable part 6 is adapted to carry said appliance 2 by means of a rotatable part 7 arranged rotatably in relation to the displaceable part 6 so that the appliance 2 may further be rotated about an at least substantially vertical and central axis 8. It is seen that in Fig. 1, said appliance has also been rotated in the extended service position, whereby access to the back of the appliance is greatly facilitated.

**[0033]** In the embodiment illustrated, the base part 3 is at least substantially box-shaped with opposed side walls 19, 20, and the displaceable part 6 is at least substantially box-shaped with opposed side walls 21, 22. Each side wall 19, 20 of the base part 3 is connected to a corresponding side wall 21, 22 of the displaceable part

6 by means of a respective sliding device 23, 24 in the form of a telescopic slide. As it is further seen, the opposed side walls 21, 22 of the displaceable part 6 are arranged inside in relation to the opposed side walls 19, 20 of the base part 3. The base part 3 is provided with a top surface 18 connected to the side walls 19, 20 of the base part and adapted for walking thereon when the displaceable part 6 is in the extended service position. The top surface 18 thereby forms a so-called service deck. The base part 3 is furthermore provided with bottom 47 which is provided with a cut-out 46 and is connected to the side walls 19, 20.

**[0034]** The top surface 18 of the base part 3 is provided with two spaced grooves 25, 26 through which the respective side walls 21, 22 of the displaceable part 6 extend when the displaceable part is in the retracted operating position. Thereby, the displaceable part is arranged slidably inside the base part 3 as a drawer, except for that a top wall of the displaceable part 6 is arranged above the top wall of the base part 3, i.e. the top surface 18, in the retracted operating position of the displaceable part 6 so that said top wall may be connected to the side walls 21, 22 of the displaceable part 6 and form a support surface 14 for a glide surface on the rotatable part 7 which will be explained in further detail below. It is understood that alternatively, the two spaced grooves 25, 26 could be arranged in the respective opposed side walls 19, 20 of the base part 3. This would simply mean that the respective side walls 21, 22 of the displaceable part 6 would have to be formed slightly differently than illustrated in order to extend through said two spaced grooves. In order to support the part of the top surface 18 of the base part 3 extending between the two spaced grooves 25, 26, three triangular support plates 48 are arranged under the top surface 18, so that these are attached to both the top surface 18 and a back wall of the base part 3.

**[0035]** In the embodiment illustrated, the displaceable part 6 is furthermore provided with a front plate 34 covering the internal part of the support 1 for aesthetic purposes. However, in an alternative, not shown embodiment, the displaceable part 6 has an open front. This means that the front plate 34, the front support beam 35 and the lower support beam 36 of the displaceable part 3 have been omitted. Furthermore, the cut-out 46 in the bottom 47 of the base part 3 covers at least substantially the entire bottom 47 of the base part 3. Preferably, the triangular support plates 48 of the base part 3 have been omitted or at least reduced in size. In order to achieve sufficient rigidity of the base part 3 and the displaceable part 6, these parts may be manufactured from relatively thicker metal plates. Furthermore, sufficient stability of the base part 3 may be achieved in that the base part is fixed to a floor. According to this alternative embodiment it may be preferred to form the base part 3 as a U-formed part formed by the top surface 18 and the opposed side walls 19, 20 and to form the displaceable part 6 as a U-formed part formed by the top surface, in form of the support surface 14, and the opposed side walls 21, 22.

Optionally, the base part 3 and the displaceable part 6 may be provided with respective back walls. This alternative embodiment provides for easy cleaning of the floor under the support 1 which may be required for instance in hospitals.

**[0036]** Each side wall 19, 20 of the base part 3 is provided with an access hole 49 in order to facilitate attachment of the fixation feet 51 to the floor. Similarly, the top wall of the base part 3 is provided with an access hole 50 for insertion of a mounting tool.

**[0037]** In the illustrated embodiment, each sliding device 23, 24 has the form of a so-called heavy duty telescopic slide composed by a number of telescopically arranged profiles with intermediate stainless steel ball bearings. A suitable choice is a telescopic slide such as marketed by Accuride (Registered Trademark), for instance of the type 5321 with a load rating up to 150/170kg per telescopic slide. In this way, the support 1 may be suitable for heavy industrial appliances. However, any other suitable kind of sliding device 23, 24 may be used for the support 1, although some kind of telescopic arrangement of profiles or the like is preferred, because in general, a relatively long extension of the displaceable part 6 is required. For instance, the displaceable part 6 could be provided with rollers adapted to roll on a track of the base part 3 or directly on the floor, thereby forming or assisting the sliding devices 23, 24.

**[0038]** As an alternative to the illustrated embodiment, the opposed side walls 21, 22 of the displaceable part 6 could be arranged outside in relation to the opposed side walls 19, 20 of the base part 3. Thereby, the top wall of the displaceable part 6 forming the support surface 14 could be connected directly with the opposed side walls 21, 22 of the displaceable part 6 without need for grooves in the top wall of the base part 3, because the top wall of the displaceable part 6 may be arranged above the top wall of the base part 3 in the retracted operating position. In this embodiment, the opposed side walls 21, 22 of the displaceable part 6 could further be connected at their lower edges by means of one or more support beams which could extend through and be displaceably arranged in grooves arranged in the opposed side walls 19, 20 of the base part 3.

**[0039]** As seen in Figs. 4 to 8, the rotatable part 7 is supported rotatably on the displaceable part 6 about the at least substantially vertical and central axis 8 by means of a central bearing. As further seen in Figs. 9 to 10, said central bearing is formed by a first part 16 arranged centrally on the rotatable part 7 and a second part 17 arranged centrally on the displaceable part 6. The first part 16 of the central bearing is formed by a central nylon disc 39 mounted on the upper side of the rotatable part 7 by means of screws and a central nylon pin 40 extending from the central nylon disc 39 through a hole in the centre of the rotatable part 7. The central nylon disc 39 and the central nylon pin 40 are formed in one piece. The second part 17 of the central bearing is formed by a central nylon disc 41 mounted on the upper side of the displaceable

part 6 by means of screws and a central nylon bushing 42 from the central nylon disc 41 through a hole in the centre of the displaceable part 6. The central nylon disc 41 and the central nylon bushing 42 are formed in one piece and the central nylon bushing 42 extends through the central nylon disc 41, so that the central nylon pin 40 of first part 16 of the central bearing may be inserted into the central nylon bushing 42 thereby forming the central bearing. It is understood that thereby a plain bearing adapted to take up both radial and axial forces has been formed. The radial forces are taken up by the central nylon pin 40 and the central nylon bushing 42. The axial forces are taken up by the lower side of a rectangular metal plate 37 forming a main part of the rotatable part 7 sliding on top of the central nylon disc 41 of the second part 17 of the central bearing. The skilled person will understand that the nylon material provides for low friction.

**[0040]** As understood from in particular Figs. 7, 9 and 11, the rotatable part 7 is furthermore supported rotatably on the displaceable part 6 about the central axis 8 by means of a first glide surface 9 arranged peripherally on the lower side of the rectangular metal plate 37 of the rotatable part 7 and adapted to glide on a second glide surface 10 arranged on the displaceable part 6.

**[0041]** As seen in particular in Fig. 12, the rotatable part 7 is adapted to support the appliance 2 at a number of supporting areas 11 on the rotatable part, and the peripherally arranged first glide surface 9 is formed by respective glide blocks 12 arranged on the rotatable part 7 at respective areas below each respective supporting area 11. Thereby, by arranging the glide blocks 12 at the supporting areas 11 for the appliance, the rectangular metal plate 37 of the rotatable part 7 does need not to be very rigid itself, because the rotatable part 7 part may be supported just where it has to carry the load of the appliance 2, for instance where the appliance is provided with feet, mounting screws or the like.

**[0042]** As seen for instance in Figs. 5, 7 and 9, the second glide surface 10 on the displaceable part 6 has the form of a support surface 14 having a generally rectangular periphery 15 and being adapted to support the respective glide blocks 12 arranged on the rotatable part 7 and forming the peripherally arranged first glide surface 9. The distance  $d$  from an edge of each glide block 12 to the central axis 8, as illustrated in Fig. 11, is smaller than half the length  $L$  of the shortest side of the generally rectangular periphery 15 of the support surface 14, indicated in Fig. 9. The skilled person will understand that it may thereby be ensured that the glide blocks 12 of the rotatable part 7 may be supported by the support surface 14 of the displaceable part in any rotational position of the rotatable part 7 in relation to the displaceable part 6. At the same time, the extent of the support surface 14 of the displaceable part 6 may be maximised under the given circumstances. As seen in Fig. 7, the glide blocks 12 may in some rotational positions of the rotatable part 7 extend partly from the generally rectangular periphery 15 of the support surface 14. Therefore, the peripheral edge

of the support surface 14 is formed with a bent down part of the metal plate forming the support surface 14 so that friction loss is reduced. The peripheral edge of the support surface 14 could also be formed smoothly in any other suitable way. Similarly, of course, the glide blocks 12 are preferably formed with a smooth edge in order to reduce friction.

**[0043]** The glide blocks 12 are made of nylon material. As mentioned above, the skilled person will understand that the nylon material provides for low friction. However, all friction reducing parts that has been mentioned as being made from nylon material may just as well be made from any other suitable friction reducing material, such as a plastic material, for instance PTFE. In the illustrated embodiment, the second glide surface 10 is formed by a metal plate; however, the second glide surface 10 could alternatively be formed by any other suitable material, such as for instance nylon, which could directly form the support surface 14 or which could be arranged on the support surface 14.

**[0044]** In the embodiments illustrated in the figures, the rotatable part 7 is arranged rotatably in relation to the displaceable part 6 both by means of a the central bearing 16, 17 and by means of the first glide surface 9 arranged peripherally on the rotatable part 7 and adapted to glide on the second glide surface 10 arranged on the displaceable part 6. However, if the central bearing 16, 17 is provided as a suitably strong bearing, for instance a ball bearing, the first and second glide surfaces 9, 10 may of course be omitted. In that case, the top wall of the displaceable part 6 may in fact be arranged below the top wall of the base part 3, and the central bearing 16, 17 may be fixed to the top wall of the displaceable part 6 via a central slot in the top wall of the base part 3. Thereby, the two spaced grooves 25, 26 could be omitted. Alternatively, the central bearing 16, 17 could be omitted and the rotatable part 7 could be arranged rotatably in relation to the displaceable part 6 by means of the first glide surface 9 arranged peripherally on the rotatable part 7 and adapted to glide on the second glide surface 10 arranged on the displaceable part 6. This would require a kind of guides on one of the first or second glide surfaces 9, 10. Furthermore, it is noted that the rotatable part 7 does not need to be arranged rotatably in relation to the displaceable part 6 about a central axis, although this is preferred. A rotation axis could be arranged out of centre of the displaceable part 6 and/or the rotatable part 7. Furthermore, the rotation could result from a kind of guides on one of the first or second glide surfaces 9, 10 following another track than a circular track, such as an oval track. The other one of the first or second glide surfaces 9, 10 could then have the form of a number of pins fitting in said track. It is also noted that of course, any suitable strong bearing, such as a ball bearing, could also be combined with the first and second glide surfaces 9, 10.

**[0045]** Furthermore, the first glide surface 9 could be arranged peripherally on the rotatable part 7 in different configurations than what is illustrated in the figures. For

instance, the first glide surface 9 could form a closed ring surrounding the central axis 8. The first glide surface 9 could of course also cover a large part of or the entire bottom of the rotatable part 7. Similarly, the second glide surface 10 could also be arranged predominantly or only peripherally on the displaceable part 6 and in different configurations than what is illustrated in the figures. For instance, the second glide surface 10 could form a closed ring surrounding the central axis 8. Preferably, the first and second glide surfaces 9, 10 are adapted to abut each other in all rotational positions of the rotatable part 7 in relation to the displaceable part 6.

**[0046]** Figs. 20 to 22 illustrate an alternative embodiment for the arrangement of the rotatable part 7 on the displaceable part 6. According to this embodiment, the rotatable part 7 is provided with a central bearing in the form of a central bolt 59, or a threaded spindle, extending downward and screwed into a central nut 60 of a top part 61 of the displaceable part 6. The top part 61 is a plate of nylon or similar friction reducing material which is mounted on the top of the displaceable part 6. The rotatable part 7 is further provided with respective support pins 63 fitting into respective grooves 62 in the top surface of the top part 61 of the displaceable part 6. In the illustrated embodiment, the central bolt 59 and central nut 60 have right-handed threads, and as indicated in Fig. 22, the respective grooves 62 correspondingly have a varying depth in the top surface of the top part 61, so that a right-handed thread is simulated. Therefore, the rotatable part 7 may be rotated clockwise seen from above until a situation, wherein the lower side of the metal plate of the rotatable part 7 touches the top surface of the top part 61. This is in the initial rotational operating position of the rotatable part 7. The large contact surface between the rotatable part 7 and the top part 61 results in a very stable support for the appliance during normal operation. When the appliance is to be rotated, the rotatable part 7 is rotated counter-clockwise seen from above. Thereby, the central thread connection and the respective support pins 63 sliding in the respective grooves 62 support and lift the rotatable part 7 in relation to the top part 61. During rotation, said large contact surface between the rotatable part 7 and the top part 61 is eliminated, which may facilitate rotation. The central thread connection may be axially so positioned so that it takes up a relatively larger part of the weight of the appliance during rotation than the respective support pins 63 sliding in the respective grooves 62. This may reduce friction, depending on how rigid the rotatable part 7 is configured. As seen, the respective grooves 62 allow a rotation of about 90 degrees which is usually sufficient. However, other configurations could be possible allowing for more rotation.

**[0047]** Fig. 15 illustrates part of an appliance 2 and the rotatable part 7 of the support 1 according to the invention. It is emphasised that this figure is in particular not to scale, but is only to be understood as a schematic illustration. As is normal for this kind of appliances 2, the bottom metal plate of the appliance is provided with a

pressed down mounting nut 52 in which a bolt is normally inserted from beneath, when the appliance is mounted on a conventional fixed base. As is seen, the rotatable part 7 is at each supporting area 11 corresponding to the area of the mounting nuts 52 of the appliance 2 provided with a fixation device 13 for fixation of the appliance 2 to the rotatable part 7. This fixation device 13 is formed by a nut 53 pressed down in the rectangular metal plate 37 of the rotatable part 7. The nut 53 has a smaller nominal diameter than the mounting nut 52 of the appliance 2, so that a corresponding mounting bolt 54 may be inserted from above through a mounting nut 52 and screwed into the thread of the nut 53 of fixation device 13. This may be done when a front cover of the appliance 2 has been removed. As it is also seen, the rectangular metal plate 37 has a bent up edge 38.

**[0048]** Fig. 15 furthermore illustrates that the glide blocks 12 are formed as discs with a central hole in which the nut 53 pressed down in the rectangular metal plate 37 is located.

**[0049]** As seen in Figs. 9, 11 and 12, the rotatable part 7 is adapted to be locked in its rotational operating position in relation to the displaceable part 6 by means of a locking device including a nylon locking disc 43 on the displaceable part 6 and a locking hole 44 in the rotatable part 7. The rotatable part 7 may be locked in its rotational operating position by inserting a not shown bolt through the locking hole 44 in the rotatable part 7 and tightening the bolt in a thread of the nylon locking disc 43 on the displaceable part 6. The bolt may be inserted and tightened when the front cover of the appliance is removed. Any other kind of suitable locking device could just as well be used. The locking device may ensure that the appliance is positioned in a stable manner during its normal operation.

**[0050]** As seen for instance in Figs. 4, 14 and 16, the base part 3 includes a drain pipe 27, 28 adapted to connect an outlet 29 of the appliance 2 with a drain pipe of the building 5.

**[0051]** The pipe 27 is an upward leg of a T-piece connecting with the pipe 28 which extends out through holes in the side walls 19, 20 of the base part 3 near the back wall thereof. The pipe 28 may in modular fashion be connected with similar pipes of neighbouring supports 1 according to the invention. At one end of a row of appliances, the pipe 28 may be connected to a drain of the building, and at another end of said row of appliances, the pipe 28 may be closed by a cover.

**[0052]** As seen in Fig. 16, the support 1 includes a flexible tube elbow 30 mounted on an outlet 29 of an appliance 2 positioned on the rotatable part 7 on the displaceable part 6 so that, when the appliance 2 is positioned on the displaceable part 6 and the displaceable part is displaced from its extended service position to its retracted operating position, the flexible tube elbow 30 flexes so that an end 33 of the flexible tube elbow slides over an edge 31 of the end 32 of the drain pipe 27 of the base part 3 and positions itself inside the drain pipe 27 when

the displaceable part 6 has reached its retracted operating position, as illustrated in Fig. 16. Thereby it may be avoided that water splashes to the surroundings. As seen, the flexible tube elbow 30 has a smaller diameter than the drain pipe 27. Suitably, for a flexible tube elbow 30 having a diameter of 50 mm and a wall thickness of approximately 3,5 mm, the end 33 of the flexible tube elbow 30 may in this position extend for instance about 10 to 15 mm into the drain pipe 27. However, for a flexible tube elbow 30 having a diameter of 50 mm and a wall thickness of approximately 5 mm, the end 33 of the flexible tube elbow 30 may in this position extend for instance about 3 to 4 mm into the drain pipe 27. Typically, the drain pipe may have a diameter of 110 mm. The flexible tube elbow 30 may be made from EPDM or any other suitable flexible material. Depending on the outlet 29 of the appliance, the flexible tube elbow 30 may not have to be an elbow but may rather have another configuration fitting the outlet of the appliance. For instance, alternatively to the flexible tube elbow 30, an at least substantially straight tube part may be fitted on the outlet 29 of the appliance 2, and the drain pipe 27 may be formed as an elbow having an at least substantially horizontally extending end part directed at the outlet 29 of the appliance 2, so that the at least substantially straight tube part may slide into the at least substantially horizontally extending end part of the drain pipe 27 when the displaceable part 6 is displaced from its extended service position to its retracted operating position. The at least substantially horizontally extending end part of the drain pipe 27 may be provided with a flexible lip seal adapted to close the opening between the end part of the drain pipe 27 and the at least substantially straight tube part. Thereby it may also be avoided that water splashes to the surroundings.

**[0053]** It is understood that the provision of a drain pipe 27, 28 integrated into the base part 3 as illustrated and also the provision of the flexible tube elbow 30 or similar tube adapted to flex and/or slide into the drain pipe 27 are in fact separate inventions that may just as well be employed with prior art supports that have a displaceable part, but do not have a rotational part as according to the present invention.

**[0054]** Whether the outlet 29 of the appliance 2 is provided with a flexible tube elbow 30 or similar flexible tube or simply a rigid tube end adapted to be positioned in or over the drain pipe 27, then the drain pipe 27 may have different configurations of which some are illustrated in Figs. 17 to 19. These embodiments provide different kinds of shield so that water does not splash to the surroundings. As seen in Fig. 17, a collar 56 having a vertical groove may form a splash guard and be applied to the drain pipe 27, so that the tube end of the appliance 2 may slide through said groove. In Figs. 17 and 18, a plug 57 having a hole 58 is inserted in the end of the drain pipe 27. The plug 57 may preferably have a surface tapering downwards towards the centre of the plug in order for water to flow into the hole 58. In the embodiment of Fig.



17, the plug 57 may be omitted. In Fig. 19, collar 56 is provided on a plug 57 so that it partly surrounds the hole 58 of the plug. The embodiments illustrated in Figs. 17 to 19 may of course be combined in different ways, and other configurations of a splash guard partly surrounding the opening of the drain pipe 27 are possible.

**[0055]** It should be noted that an appliance 2 with an outlet positioned as illustrated in Fig. 16 is typically an industrial washing machine. Household washing machines and dishwashers are typically provided with a relatively long, flexible drain tube, and the drain tube may therefore be permanently connected to a drain pipe 27 integrated in the base part 3 or it may simply be directly connected to a drain pipe of the building in the usual way. Because of the length of said drain tube, the appliance may be displaced on the support 1 between its retracted operating position and its extended service position without disconnecting the flexible drain tube of the appliance from the drain pipe 27 integrated in the base part 3 or from the drain pipe of the building.

**[0056]** In the case of the appliance being a dryer, an air vent pipe may be integrated in the base part 3 of the support 1 just as the integrated drain pipe 27, 28 illustrated in Figs. 4 to 14. Alternatively, the dryer may simply be directly connected to an air vent pipe of the building in the usual way. The outlet of the dryer may be connected to the air vent pipe integrated in the base part 3 or the air vent pipe of the building by means of a standard flexible air vent hose sufficiently long that the dryer may be displaced on the support 1 between its retracted operating position and its extended service position without disconnecting the flexible air vent hose of the dryer from the air vent pipe integrated in the base part 3 or from the air vent pipe of the building.

**[0057]** The skilled person will understand that the support 1 according to the present invention may be integrated into the appliance 2. In this case, the rotatable part 7 may for instance form a bottom or bottom part of the appliance 2.

#### LIST OF REFERENCE NUMBERS

##### [0058]

d	distance
L	length
d <sub>b</sub>	distance from back to wall
d <sub>f</sub>	distance from front to wall
dff	distance from front to front
1	support
2	appliance
3	base part
4	support surface
5	building
6	displaceable part
7	rotatable part
8	central axis
9	first glide surface

10	second glide surface
11	supporting area
12	glide block
13	fixation device
5 14	support surface
15	generally rectangular periphery
16	first part of central bearing
17	second part of central bearing
18	top surface of base part
10 19, 20	side wall of base part
21, 22	side wall of displaceable part
23, 24	sliding device
25, 26	groove
27, 28	drain pipe
15 29	outlet of appliance
30	flexible tube elbow
31	edge of end of drain pipe
32	end of drain pipe
33	flexible tube end
20 34	front plate of displaceable part
35	front support beam of displaceable part
36	lower support beam of displaceable part
37	rectangular metal plate of rotatable part
38	bent up edge of metal plate
25 39	central nylon disc of rotatable part
40	central nylon pin of rotatable part
41	central nylon disc of displaceable part
42	central nylon bushing of displaceable part
43	locking disc of displaceable part
30 44	locking hole of rotatable part
45	bent down edge of support surface of displaceable part
46	cut-out in bottom of base part
47	bottom of base part
35 48	triangular support plate of base part
49, 50	access hole in base part
51	fixation foot of base part
52	mounting nut in bottom of appliance
53	pressed down nut in rectangular metal plate of rotatable part
40 54	mounting bolt
55	washer
56	collar of drain pipe
57	plug of drain pipe
45 58	hole in plug
59	central bolt of rotatable part
60	central nut of top part of displaceable part
61	top part of displaceable part
62	groove in top part of displaceable part
50 63	support pin of rotatable part

#### Claims

- 55 1. A support (1) for an appliance (2), such as a washer or dryer, the support including a base part (3) adapted to be mounted on a support surface (4) of a building (5) and a displaceable part (6) adapted to carry

- said appliance, wherein the displaceable part (6) is arranged displaceably in relation to the base part (3) between a retracted operating position and an extended service position so that the appliance (2) may be displaced in relation to the building (5) in an at least substantially horizontal direction, **characterised in that** the displaceable part (6) is adapted to carry said appliance (2) by means of a rotatable part (7) arranged rotatably in relation to the displaceable part (6) so that the appliance (2) may be rotated about an at least substantially vertical axis.
2. A support according to claim 1, wherein the rotatable part (7) is supported rotatably on the displaceable part (6) about a central axis (8) at least by means of a first glide surface (9) arranged at least substantially peripherally on the rotatable part (7) and adapted to glide on a second glide surface (10) arranged on the displaceable part (6).
  3. A support according to claim 2, wherein the rotatable part (7) is adapted to support the appliance (2) at a number of supporting areas (11) on the rotatable part, and wherein the at least substantially peripherally arranged first glide surface (9) is formed by respective glide blocks (12) arranged on the rotatable part (7) at respective areas below each respective supporting area (11).
  4. A support according to claim 3, wherein the rotatable part (7) at each supporting area (11) is provided with a fixation device (13) for fixation of the appliance (2) to the rotatable part (7).
  5. A support according to any one of the claims 2 to 4, wherein the second glide surface (10) on the displaceable part (6) has the form of a support surface (14) having a generally rectangular periphery (15) and being adapted to support respective glide blocks (12) arranged on the rotatable part (7) and forming the at least substantially peripherally arranged first glide surface (9), and wherein the distance (d) from each glide block (12) to said central axis (8) is smaller than half the length (L) of the shortest side of the generally rectangular periphery (15) of the support surface (14).
  6. A support according to any one of the preceding claims, wherein the rotatable part (7) is supported rotatably on the displaceable part (6) at least by means of a central bearing (16, 17), preferably in the form of a plain bearing adapted to take up both radial and axial forces.
  7. A support according to any one of the preceding claims, wherein the base part (3) is provided with a top surface (18) adapted for walking thereon when the displaceable part (6) is in the extended service position.
  8. A support according to any one of the preceding claims, wherein the base part (3) is at least substantially box-shaped with opposed side walls (19, 20), wherein the displaceable part (6) is at least substantially box-shaped with opposed side walls (21, 22), and wherein each side wall (19, 20) of the base part (3) is connected to a corresponding side wall (21, 22) of the displaceable part (6) by means of a sliding device (23, 24), such as a telescopic slide.
  9. A support according to any one of the preceding claims, wherein a top surface (18) of the base part (3) is provided with two spaced grooves (25, 26) through which respective side walls (21, 22) of the displaceable part (6) extend when the displaceable part is in the retracted operating position.
  10. A support according to claim 8, wherein the opposed side walls (21, 22) of the displaceable part (6) are arranged outside in relation to the opposed side walls (19, 20) of the base part (3).
  11. A support according to any one of the preceding claims, wherein the base part (3) includes a drain pipe (27, 28) adapted to connect an outlet (29) of the appliance (2) with a drain pipe of the building (5).
  12. A support according to claim 11, wherein the support (1) includes a flexible tube elbow (30) adapted to be mounted on an outlet (29) of an appliance (2) so that, when the appliance (2) is positioned on the displaceable part (6) and the displaceable part is displaced from its extended service position to its retracted operating position, the flexible tube elbow (30) flexes so that an end of the flexible tube elbow slides over an edge (31) of the end (32) of the drain pipe (27) of the base part (3) and positions itself inside the drain pipe (27) when the displaceable part (6) has reached its retracted operating position.
  13. An appliance (2) including a support (1) according to claim 11, wherein the appliance (2) is positioned on the displaceable part (6), and wherein the appliance (2) is provided with an outlet (29) arranged to be positioned at an end (32) of the drain pipe (27) of the base part (3) when the displaceable part (6) is in its retracted operating position.
  14. An appliance according to claim 13, wherein the outlet (29) of the appliance (2) is provided with a flexible tube end (33) adapted to flex when the displaceable part (6) is displaced from its extended service position to its retracted operating position so that the flexible tube end (33) may slide over an edge (31) of the end (32) of the drain pipe (27) of the base part (3) and position itself inside the drain pipe (27) when the

displaceable part has reached its retracted operating position.

15. An appliance including a support according to any one of the preceding claims, wherein the support (1) is integrated into the appliance (2).

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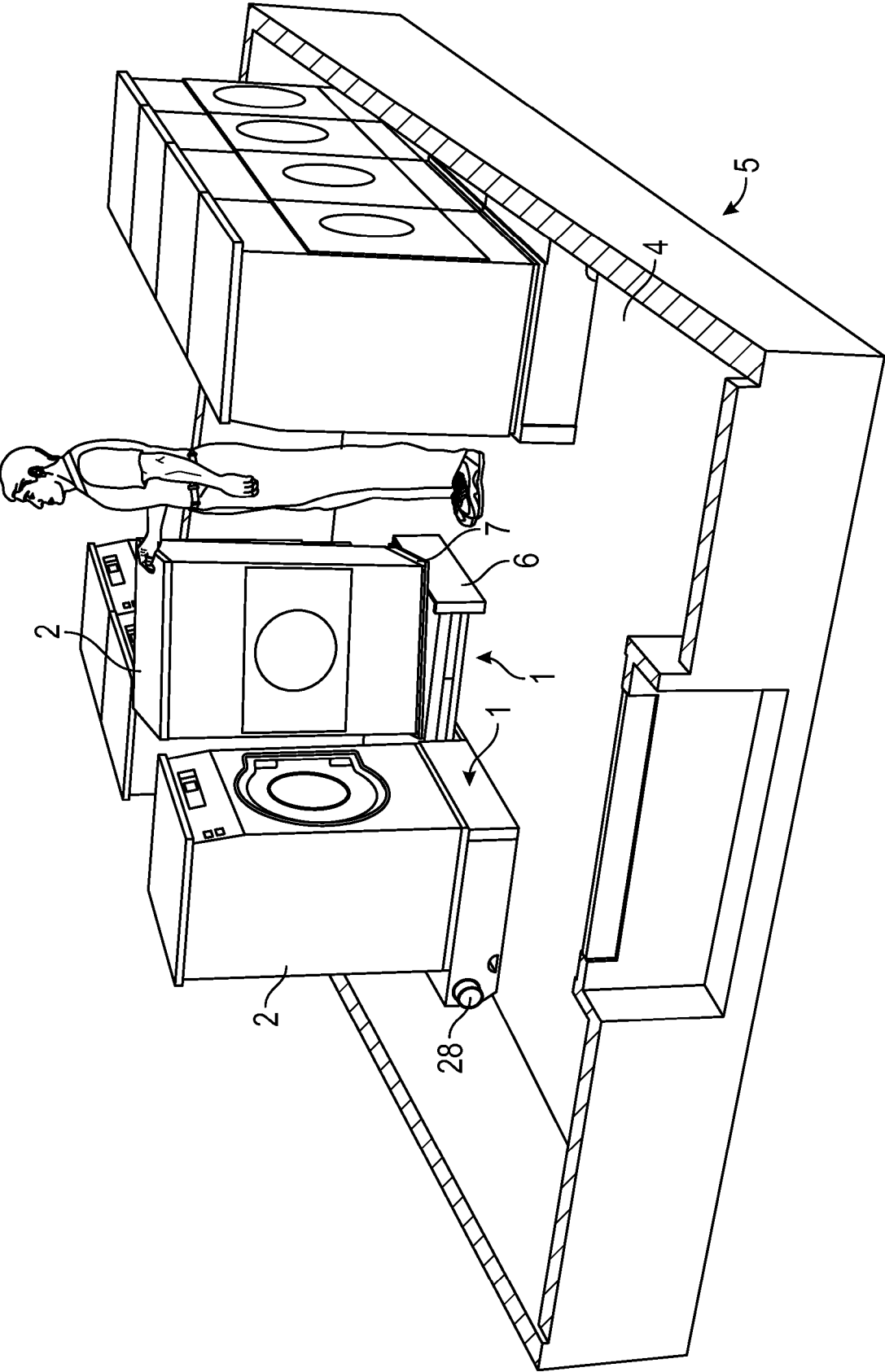


FIG. 1

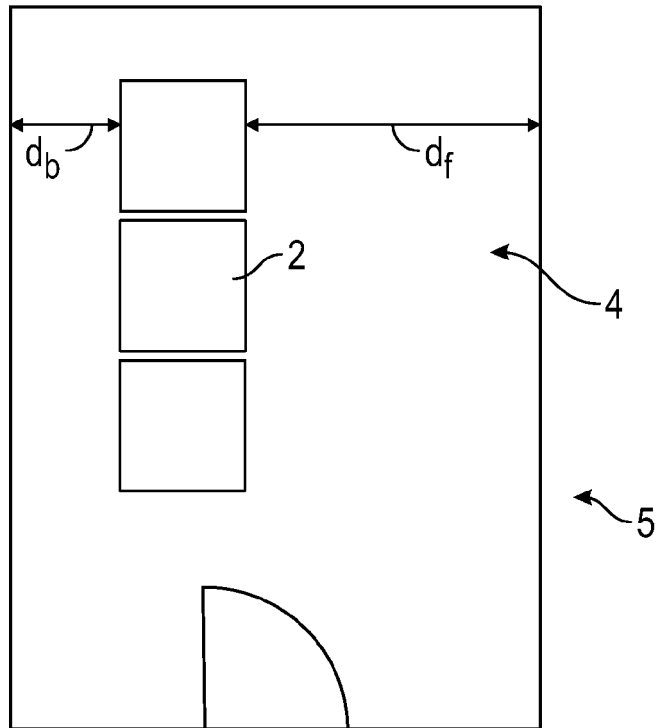


FIG. 2

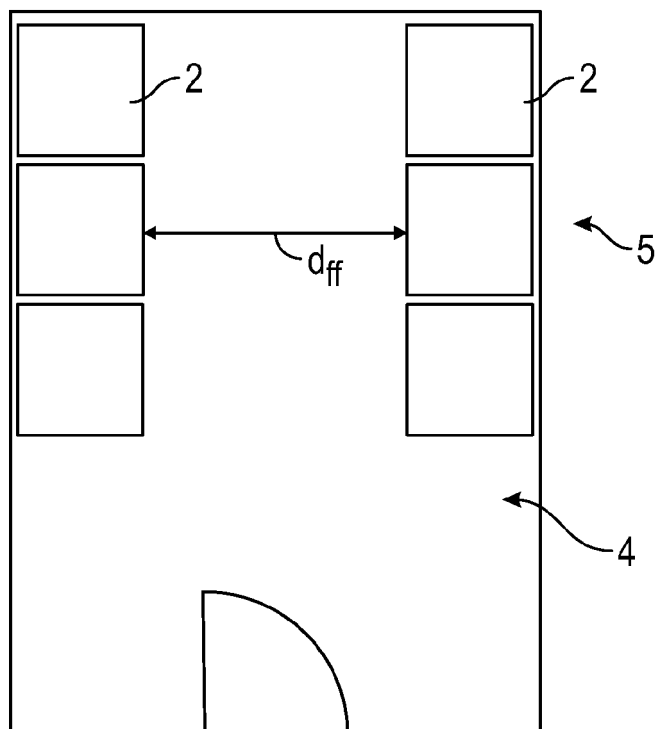


FIG. 3

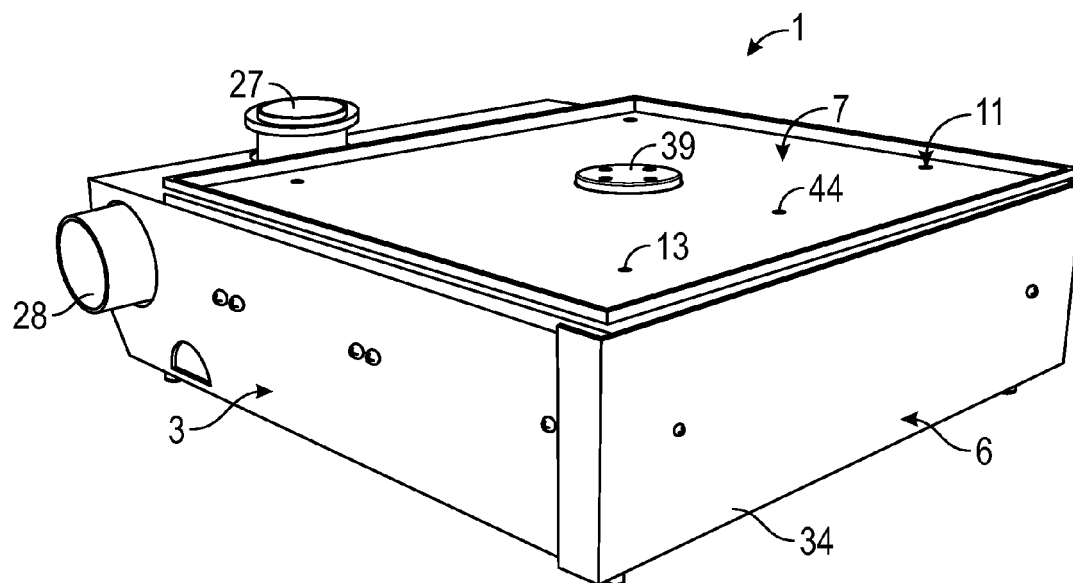


FIG. 4

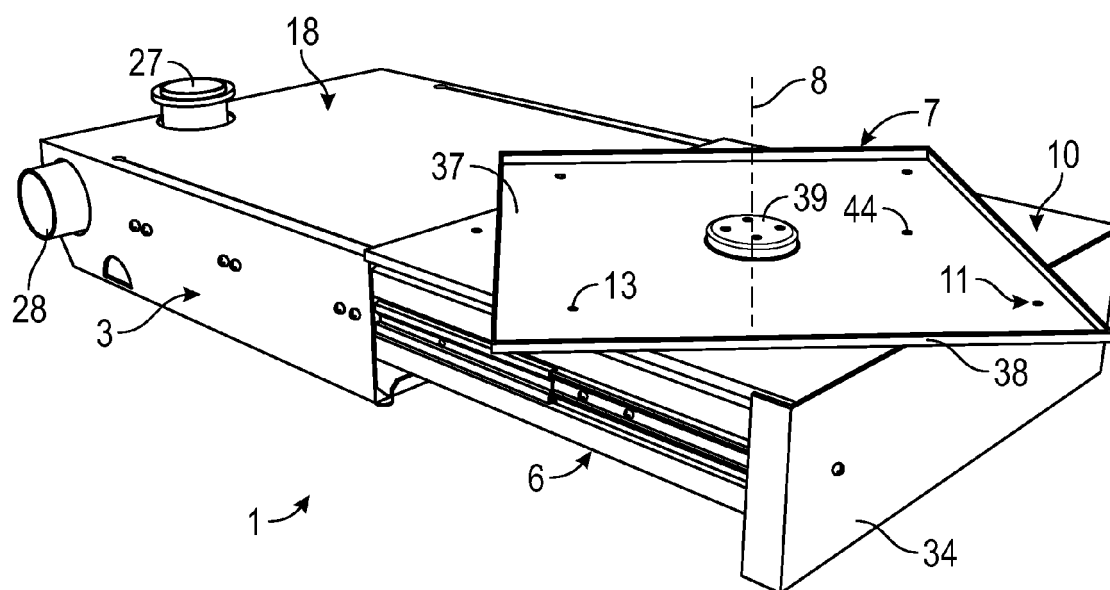


FIG. 5

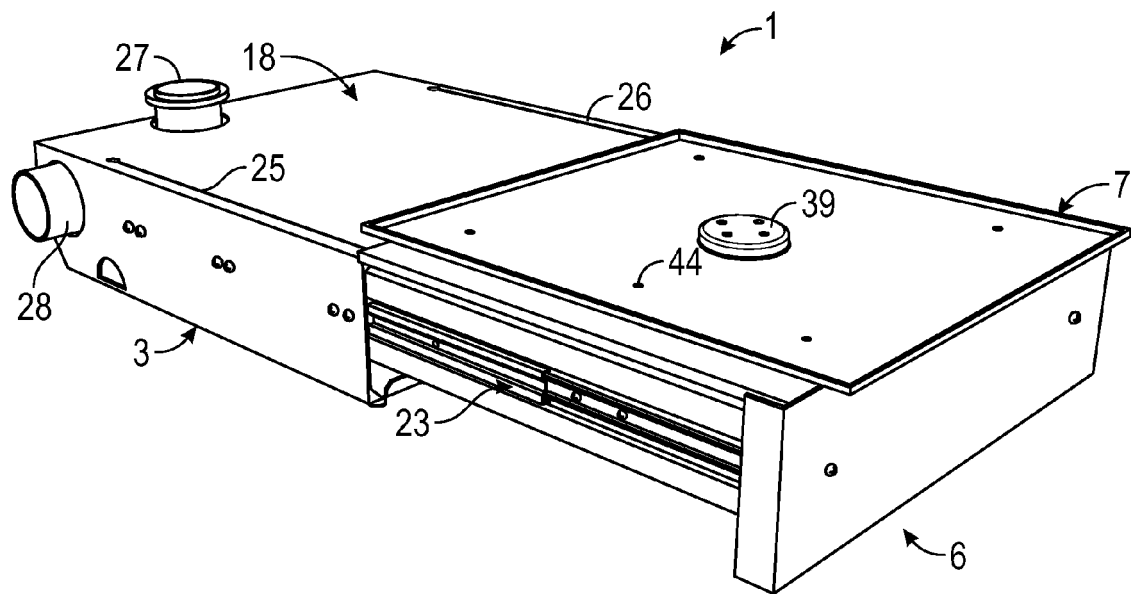


FIG. 6

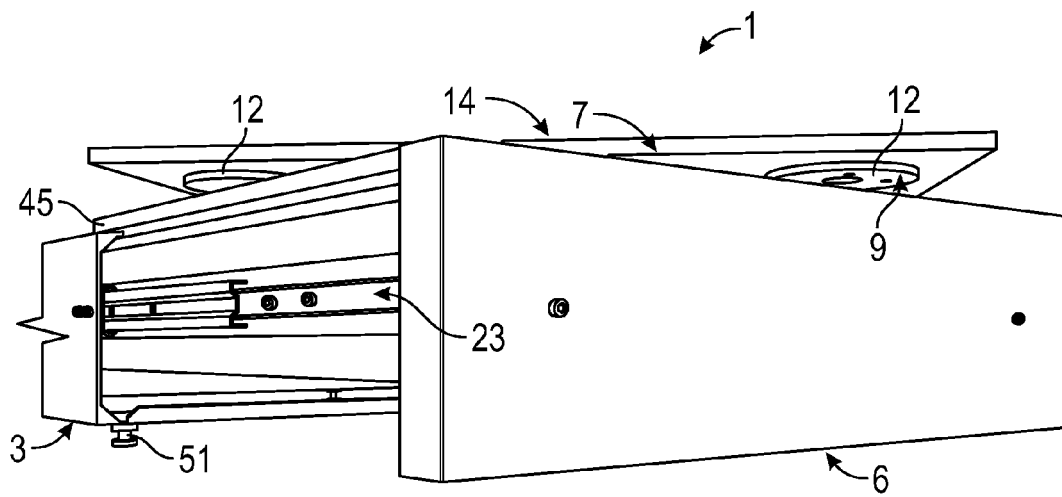


FIG. 7

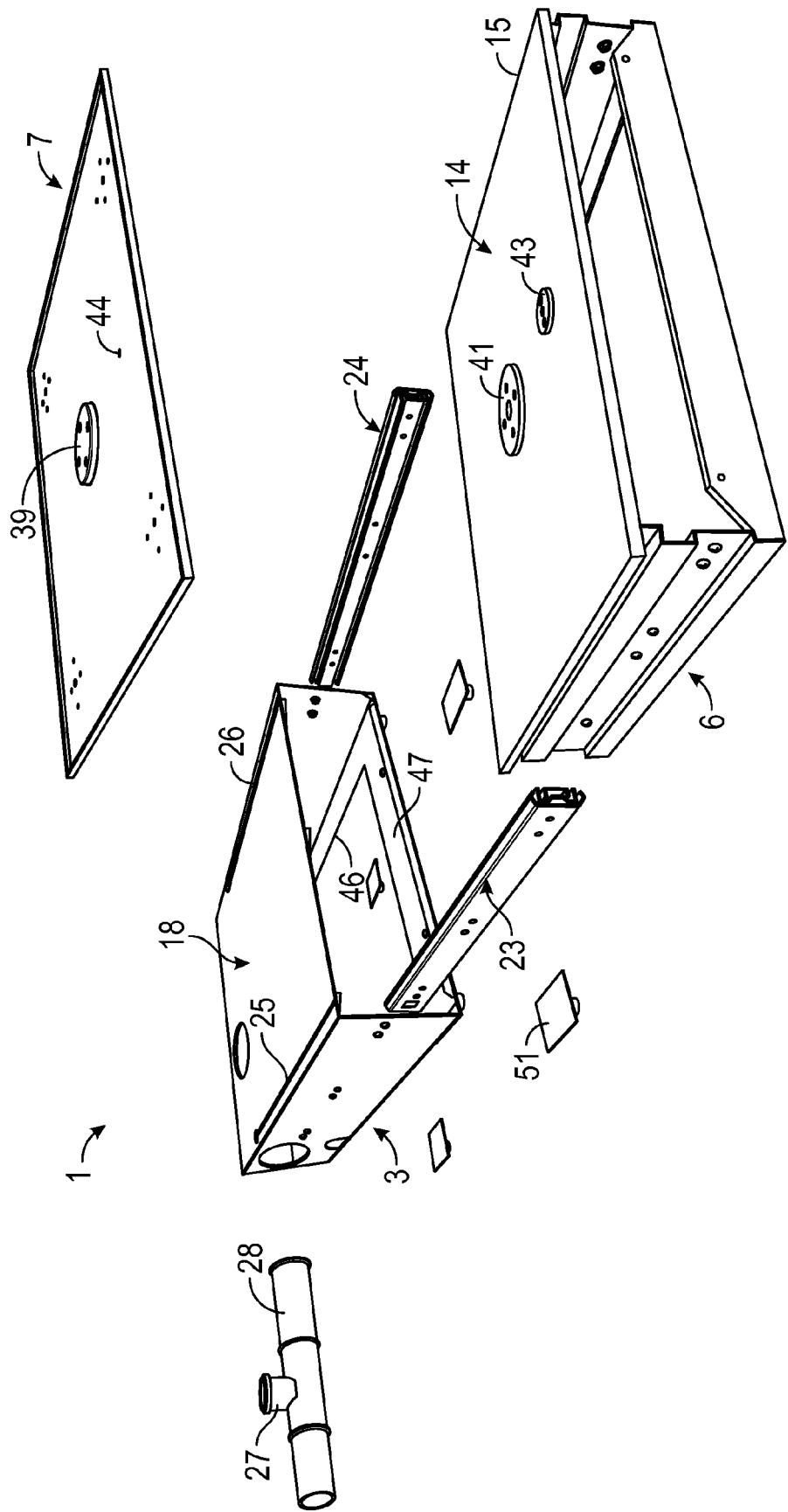


FIG. 8



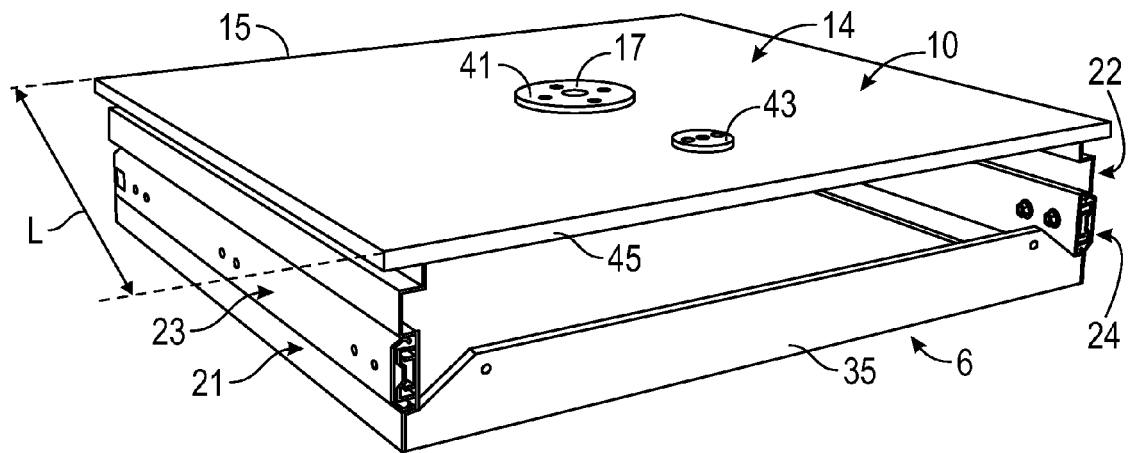


FIG. 9

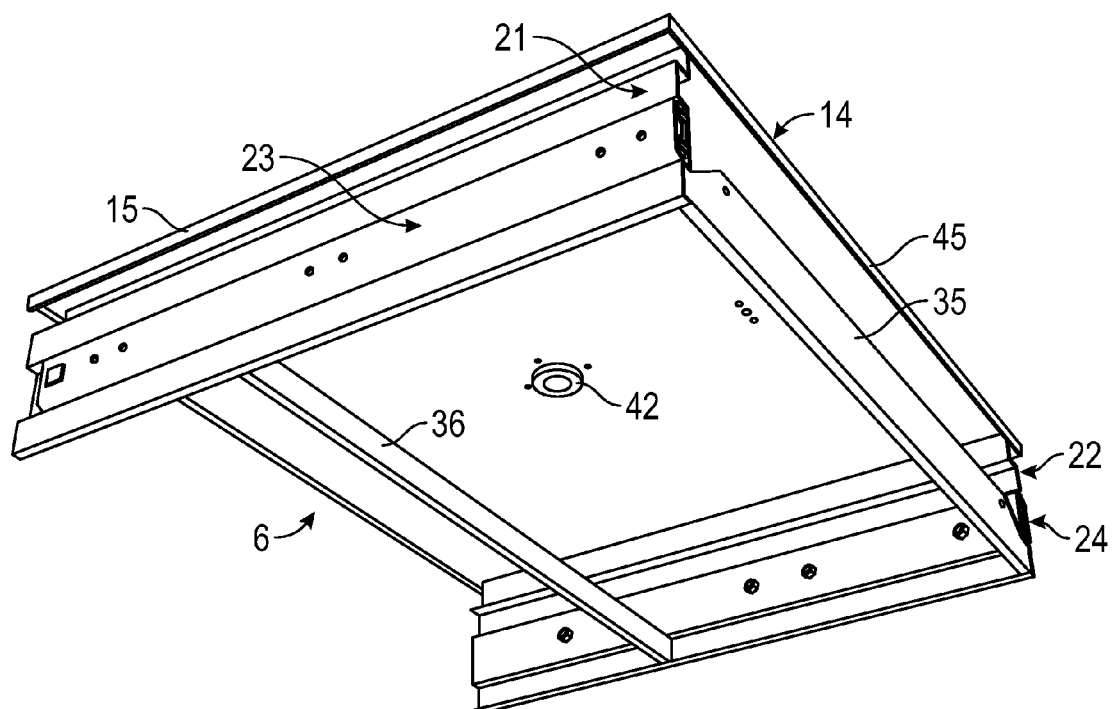


FIG. 10

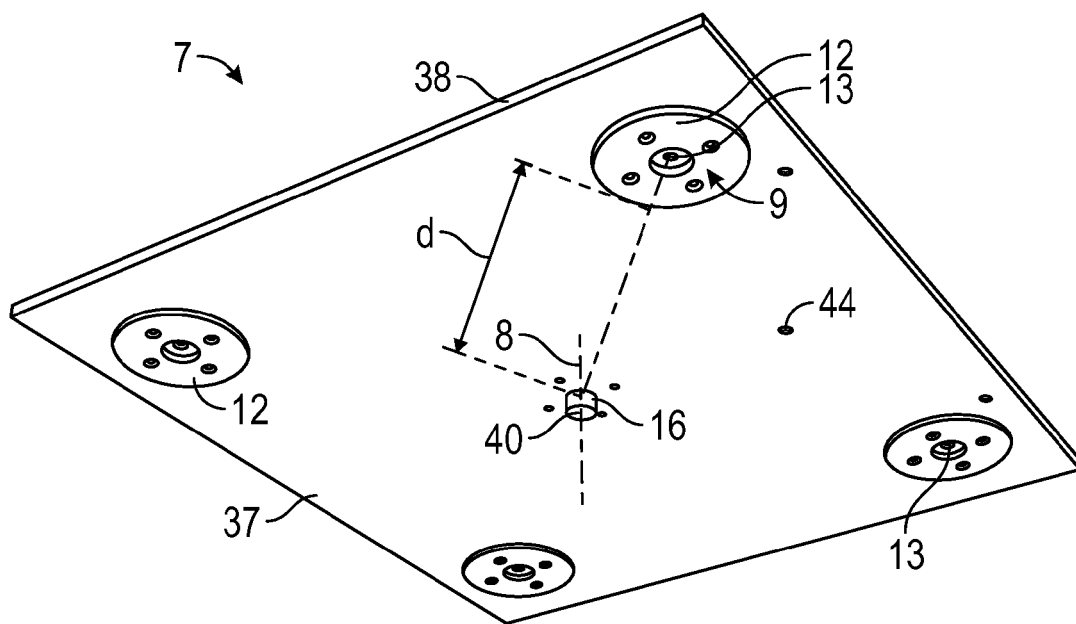


FIG. 11

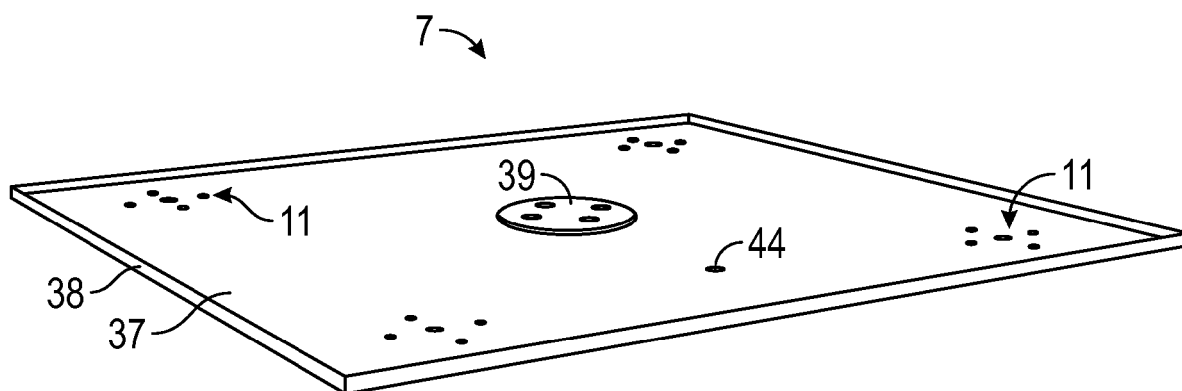


FIG. 12

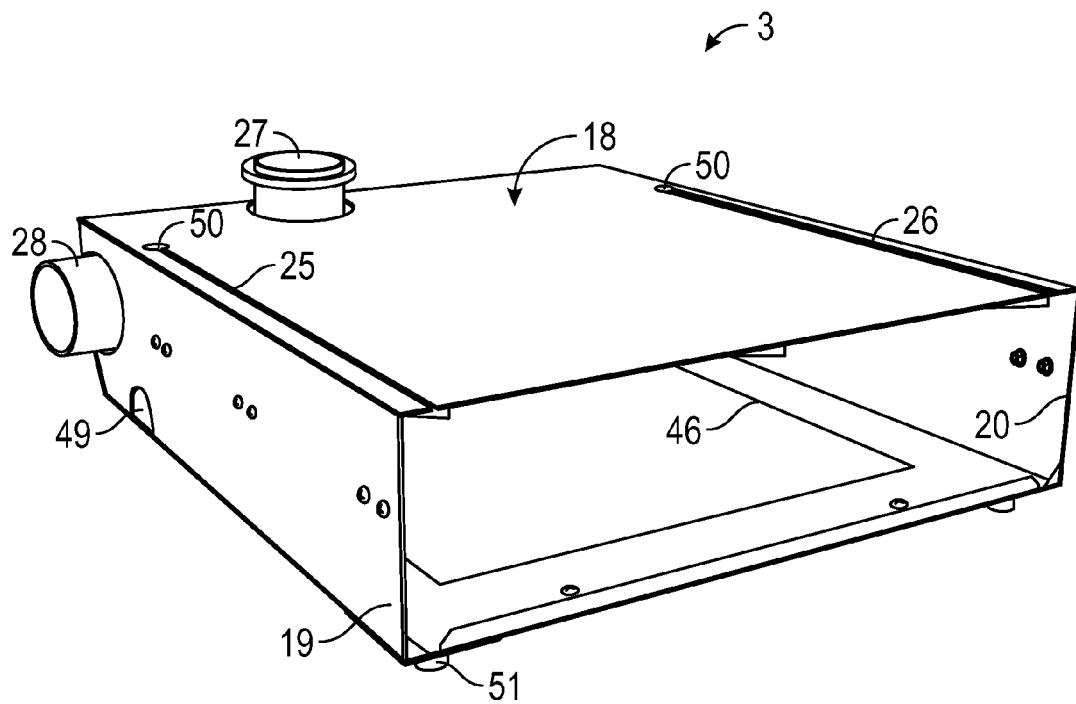


FIG. 13

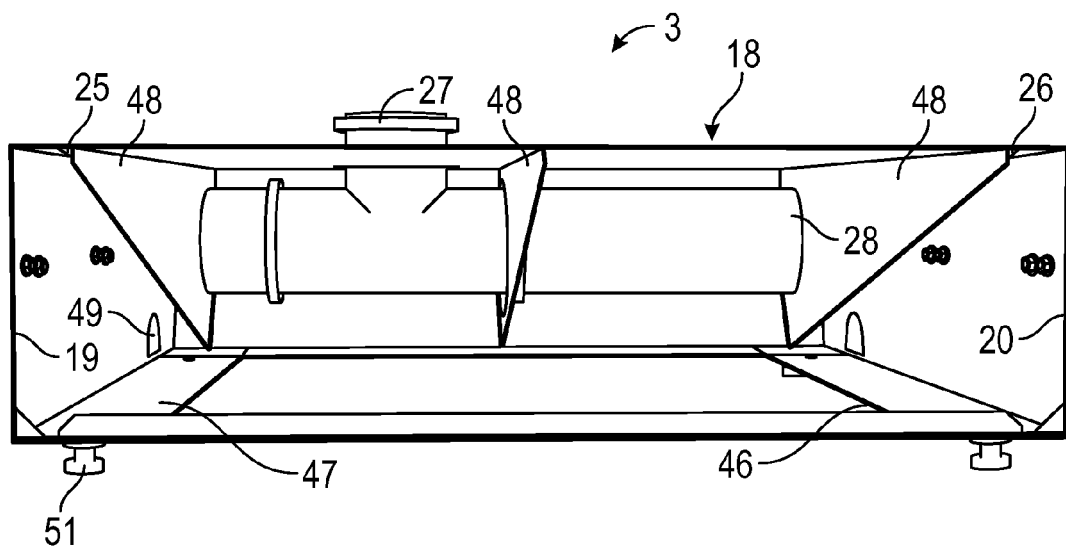
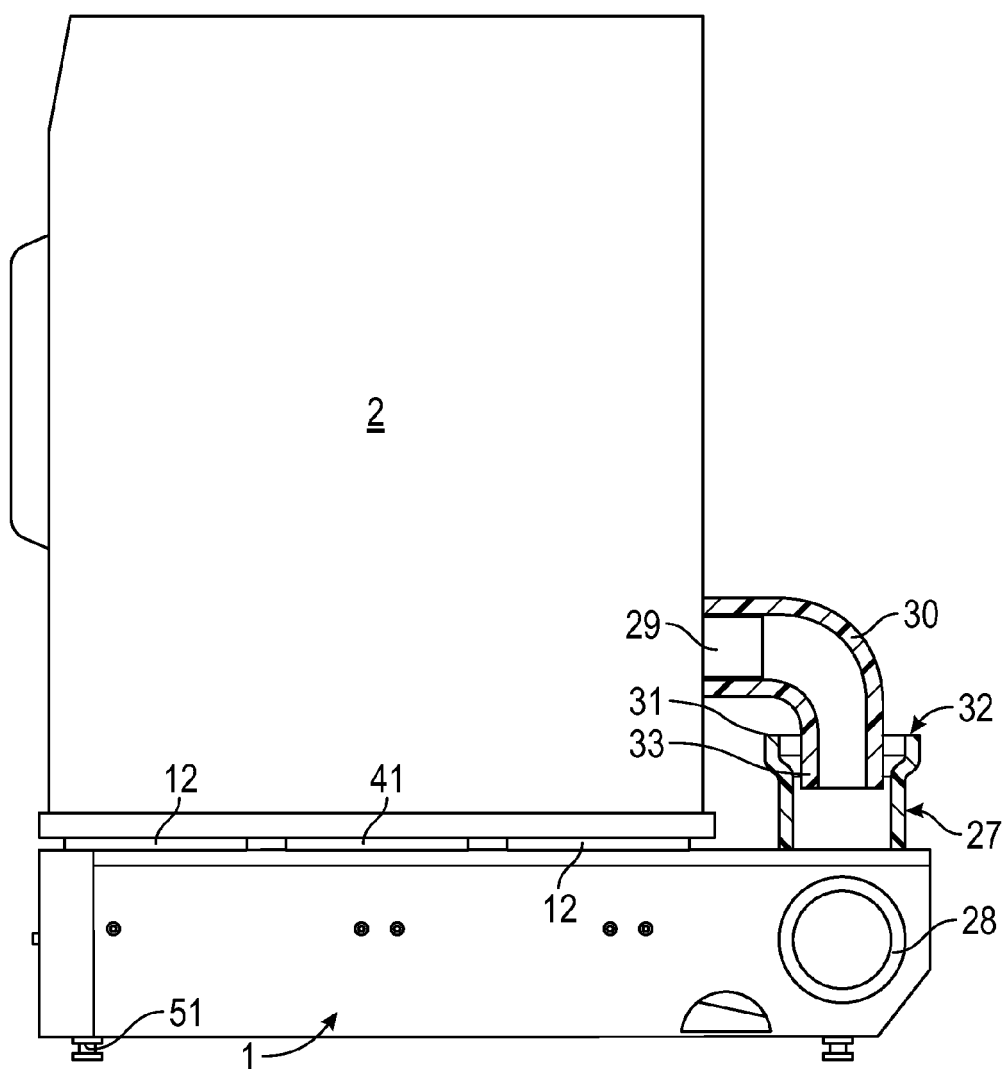
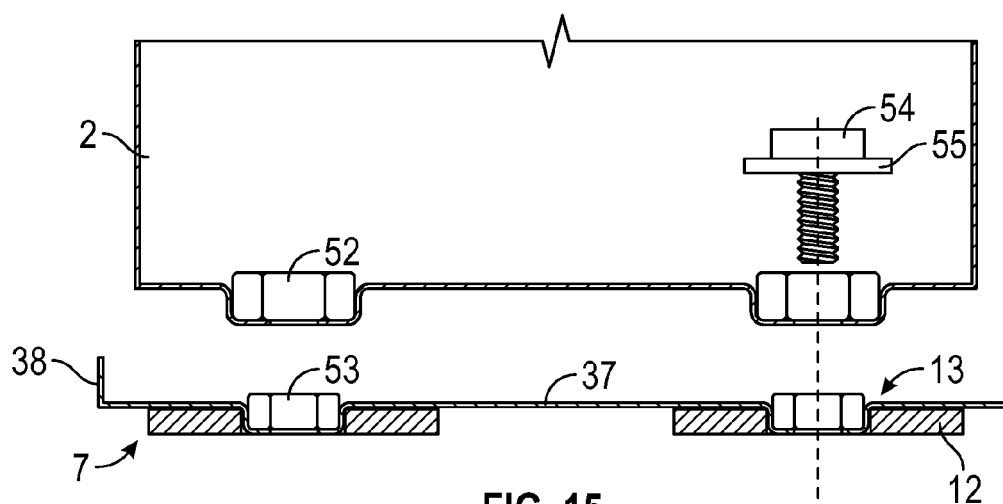


FIG. 14



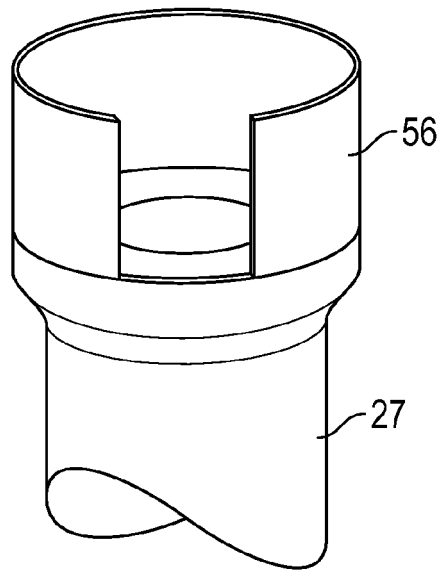


FIG. 17

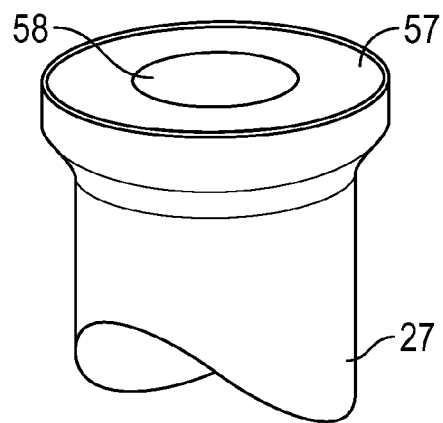


FIG. 18

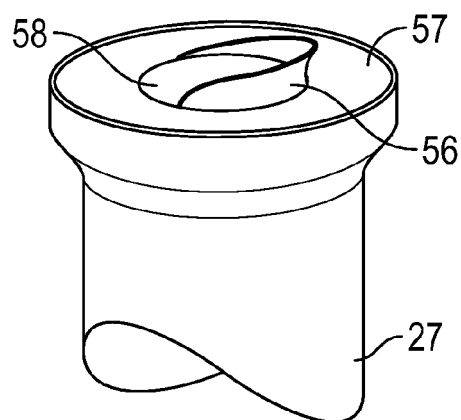


FIG. 19

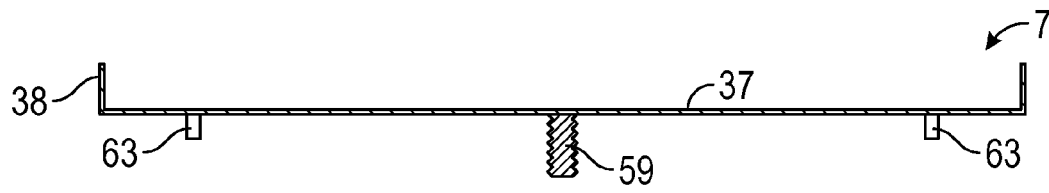


FIG. 20

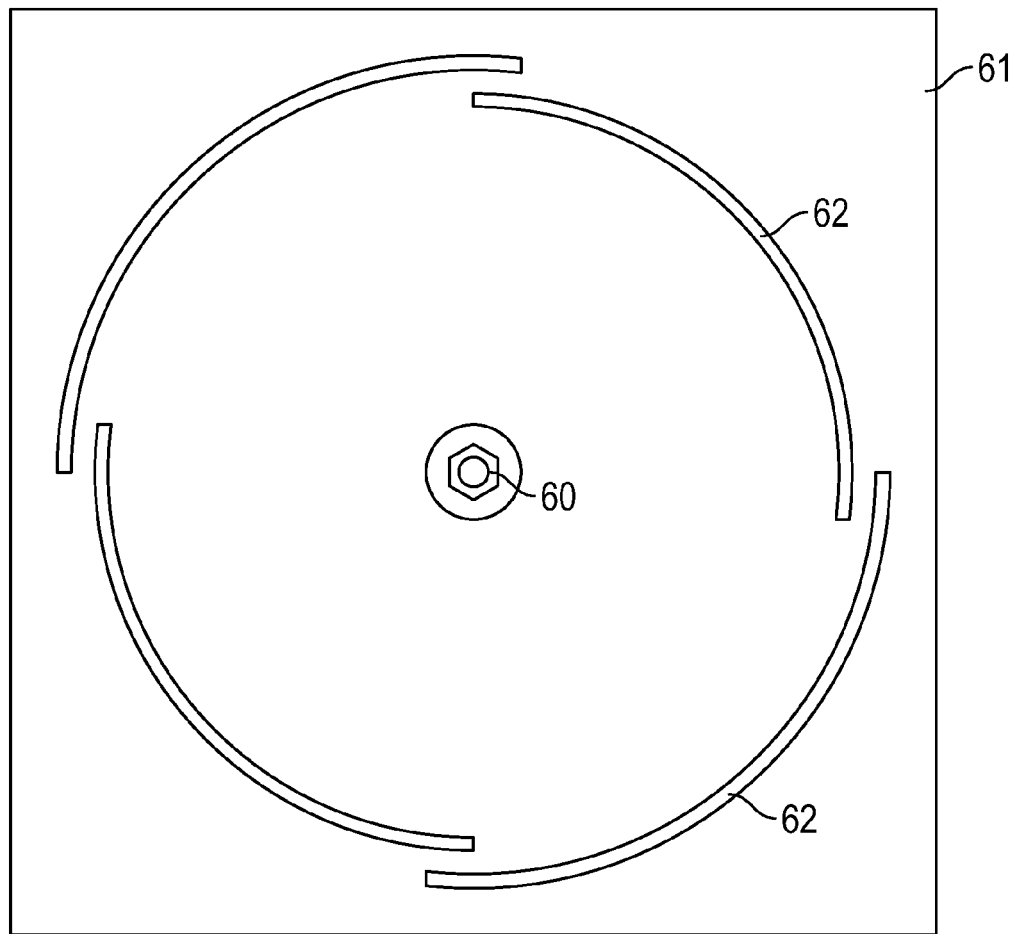


FIG. 21

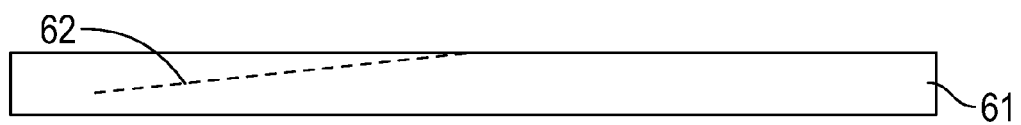


FIG. 22



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A	* paragraphs [0009], [0016], [0022] - [0026]; claims; figures *	12-14	
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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>18 March 2016</b>	Examiner <b>Prosig, Christina</b>
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