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for the foot (10) which is limited by side walls (13, 14, 15) and an upper wall (16) having at least one recess (17) for the passage of the stem (11) of the foot (10). To allow a better arrangement of the upper appliance at the top of the lower appliance, the invention proposes that at least one of the recesses (17) of the receptions (8, 9) has at least two adjacent sections (18, 19), each forming a housing or a dead stop for the stem (11) of the second appliance (3).

Description

[0001] The invention relates to a device for connecting a first appliance with a second appliance, wherein the second appliance is arranged on top of the first appliance, wherein the device comprises a frame element which is designed to be fixed on top of the first appliance and having two side regions and a rear region, wherein the frame element comprises at least two receptions for a foot arranged at a stem of the second appliance, wherein the at least two receptions are arranged in the side regions of the frame element, wherein each reception has a carrier surface for the foot which is limited by side walls and an upper wall having at least one recess for the passage of the stem of the foot.

[0002] A connection device for connecting a first appliance, being for example a domestic washing machine, with a second appliance, being for example a domestic dryer, of the kind mentioned above is known e.g. from DE 10 2005 026 134 A1. Here, the connection device comprises receptions for the feet of the upper appliance, wherein the feet are arranged at respective stems. The reception has a recess for the passage of the stem. The foot itself is securely fixed in the reception when the foot is pushed into the reception. Each reception is arranged at the correct position for the respective upper appliance which has to be arranged onto the lower appliance.

[0003] With regard to the solution according mentioned DE 10 2005 026 134 A1 is has been found detrimental that the location of the size of the receptions and more specifically of the recesses in the receptions do not allow to install variants of a second appliance onto the first appliance with the same connection device. Each appliance needs to have its individual connection device. This makes logistics complicated and causes respective costs.

[0004] Thus, it is an object of the invention to propose a solution for a connection device of the kind mentioned above which allows a secure arrangement of a second appliance onto a first appliance even when the upper appliance and more specifically its feet are arranged within certain tolerances which is the case when different second appliances have to be mounted on top of the first appliance.

[0005] The solution of this object is characterized in that at least one of the recesses of the receptions has at least two adjacent sections, each forming a housing or a dead stop for the stem of the second appliance.

[0006] Preferably, the recess or at least one of the recesses has a form defined by two adjacent concave lines seen in a top view. Advantageously, the concave lines can have the shape of a circular arc. Here, it can be provided that each circular arc extends around an angle between 60° and 120°. The radius of the circular arc is preferably between 100 % and 150 % of the radius of the stem of the second appliance.

[0007] An apex is preferably formed at the transition from one concave line to the other concave line.

[0008] The points of the concave lines being located closest to the rear end of the device can be arranged with different distances to the rear end. So, the seats for the stems - each being defined by one of the concave sections of the recess - are placed at different levels, so that it is possible to house feet differently spaced to another also in direction from the front to the rear of the appliance.

[0009] The frame element has preferably a receiving space for a panel element.

[0010] Also, a second recess can be formed into the upper wall of the reception laterally to the recess. The upper wall can then form a tongue between the recess and the second recess extending longitudinally in the direction from the front to the rear of the device.

[0011] The receptions can be arranged in the rear region of the frame element. Further receptions (for the front feet) can be arranged in the front region of the frame element.

[0012] The device can comprise a fixation device for the fixation of the device on the top side of the first appliance. Those fixation device can comprise a holding element having at least one hook element, wherein the hook element is designed to be engaged with a top plate of the first appliance. The holding element can be connected with the frame element by means of a screw connection.

[0013] The device can be designed to connect a first domestic appliance with a second domestic appliance, especially a washing machine and a dryer.

[0014] Due to the proposed design according to the invention (at least) two seats (housings, dead stops) for the stem of a foot of the upper appliance are created, so that in the reception there can be positioned a feet of different upper appliances in a stable manner.

[0015] The proposed concept allows pushing the upper appliance during the assembly on top of the lower appliance in a quite easy way as it is not necessary to lift the whole appliance. The appliance to be mounted on top of the lower appliance must only be placed on the connecting device. Then it is pushed into the receptions. Due to the construction different arrangement of feet of the upper appliance can securely be fixed with the proposed design.

[0016] Thus, only one kit (connection device) is necessary to connect two appliances of different design.

[0017] In the drawings embodiments of the invention are depicted.

FIG 1 shows a front view of a first appliance being a washing machine to be connected with a second appliance being a dryer by means of a device according to the invention, before connection,

FIG 2 shows a perspective view of the arrangement of FIG 1,

FIG 3 shows a front view of the first appliance and

- of the second appliance after connection,
- FIG 4 shows the corresponding side view of FIG 3,
- FIG 5 shows a perspective view of a device according to the invention for connecting a first with a second appliance,
- FIG 6 shows a perspective view of the device according to FIG 5 with a panel element being drawn out from the device,
- FIG 7 shows a top view onto the device,
- FIG 8 shows the detail "VIII" according to FIG 7,
- FIG 9 shows the top view onto a reception being part of the device to be brought into engagement with a foot of the second appliance,
- FIG 10 shows the top view onto a reception according to FIG 9 but according to the state or the art,
- FIG 11 shows the top view onto a reception according to FIG 9 according to the invention, wherein the stem of the foot of the second appliance is in a first position,
- FIG 12 shows the top view onto a reception according to FIG 9 and according to the invention, wherein the stem of the foot of the second appliance is in a second position,
- FIG 13 shows the section A-B according to FIG 3 for a first kind of second appliance,
- FIG 14 shows the section A-B according to FIG 3 for a second kind of second appliance,
- FIG 15 shows the section A-B according to FIG 3 for a third kind of second appliance,
- FIG 16 shows the enlarged depiction according to FIG 13,
- FIG 17 shows the enlarged depiction according to FIG 15,
- FIG 18 shows a perspective view of the device for connecting the first with the second appliance with a fixation device for the fixation of the device on top of a first appliance and
- FIG 19 shows a perspective view of a part of a first and a second appliance being connected by the device, seen from the rear.

[0018] In FIG 1 and FIG 2 a first appliance 2, preferably

being a washing machine, and a second appliance 3, preferably being a dryer, are shown which has to be arranged one above the other in a stable manner. For doing so, a device 1 for connecting is employed. The upper appliance, i.e. the second appliance 3, has four feet 10 which are arranged at stems which often are designed as a threaded rod.

[0019] While FIG 1 and FIG 2 show the two appliances 2, 3 before connection above each other, FIG 3 and FIG 4 show the appliances 2, 3 after connection by the device 1. Advantageously, the device 1 may comprise a panel element 24 which can be extracted from the device 1, as illustrated for example in FIG 4 and 6, so as to define a supporting plane or shelf adapted, for example, for holding a container of laundry before loading it into the household appliance 2 positioned over the device 1. Advantageously, as illustrated in FIG 5, the panel element 24 may be pushed into a respective receiving space of the device 1, so as to reduce the encumbrance of the device 1 when the panel element 24 is not used and to guarantee a convenient appearance of the device 1.

[0020] The connection device 1 is depicted in the following figures, partially some details only.

[0021] In FIG 5 and FIG 6 the device 1 is shown having advantageously basically a frame element 4. The frame element 4 has preferably a substantial U-shaped form. So, a receiving space 23 is formed for the panel element 24 as mentioned above. The receiving space 23 may be closed at its bottom - as in the embodiment illustrated - by a panel which connects the base and the arms of the U-shaped frame element 4.

[0022] The device 1 has four receptions 8, 9, 27, 28 for the rear feet of the upper appliance (receptions 8, 9) and for the front feet of the upper appliance (receptions 27, 28). Consequently, the receptions 8 and 9 are arranged in a side regions 5 and 6 of the device 1 and in a rear region 7. The receptions 27 and 28 are consequently arranged in a side regions 5, 6 and in a front region of the device 1.

[0023] The design of the reception 8, 9 is of a specific kind as becomes apparent from FIG 7 and FIG 8. Each reception 8, 9 has a preferably flat or slightly slanted carrier surface 12 on which a foot of the second appliance 3 can be placed. The reception 8, 9 has side walls 13, 14, 15 as can be seen in FIG 8. The reception 8, 9 has furthermore an upper wall 16 in which a recess 17 is machined. Thus, the reception 8, 9 forms a containing cavity for the foot of the upper appliance 3 which is open at its front side. In this opening the foot is inserted during assembly.

[0024] The receptions 8 and 9 are opened in the shown embodiment towards the front of the device (i.e. towards the front side of the appliances when the device 1 is connected to the latter), so that the feet of the upper appliance enters the receptions 8, 9 from the front, by a sliding movement.

[0025] An essential design feature of the recess 17 is that it has at least two adjacent sections 18, 19, each

forming a housing or a dead stop for the stem 11 of the second (upper) appliance 3.

[0026] In the depicted embodiment the recess 17 has advantageously a form defined by two adjacent concave lines 18 and 19 when seen in a top view. This becomes specifically apparent from FIG 9. The two concave lines 18, 19 are preferably circular arcs in the present case which, for example both extend along a circumferential extension of about a quarter circle. Consequently, the angle α , which is shown in FIG 9, is about 90°. At the transition from one concave line 18 to the other concave line 19 preferably an apex 20 is formed. Furthermore, it can be seen that the two concave lines 18, 19 need not necessarily to be symmetrically. Specifically, the points 21 and 22 of the concave lines 18, 19 may have different distances "a" and "b" from the rear end of the device 1.

[0027] In spite of the given example according to above mentioned figures the design of the "concave lines" 18, 19 is to be understood in a wide interpretation. This comprises for example a design in which the shape of the concave lines is polygonal (for example lines 18 and 19 may be trapezoidal).

[0028] In the present application the expression "concave lines" can generally being understood as a concave form (not necessarily curve, but also polygonal, or a combination thereof) which ensures a receiving of the stem 11 as a housing or dead stop. Thus, the shape of the lines 18, 19 is adapted for partially housing the stem 11. The shown form of the lines 17, 18 is only a particular example. Of course, not only two but also more than two adjacent concave lines 18, 19 can be arranged.

[0029] In FIG 9 the cross section of a stem 11 which holds a foot of the upper appliance 3 is shown having a radius R_S . It can be seen that this radius is preferably a bit smaller than the radius R of the concave lines 18, 19 (which in this case are advantageously circular arcs).

[0030] As can be seen from FIG 7 and FIG 8, beside the recess 17 a second recess 25 can be arranged. This second recess 17 can be of a pre-known type; in this case it has - as depicted - only on circular curved line, delimiting the upper wall 16. It can of course be of the kind as mentioned above, i.e. with two or more concave lines.

[0031] A tongue 26 is advantageously extending between the two recesses 17 and 25.

[0032] The second recess 25 allows the entry of a foot of an upper appliance into the reception having other dimensions, i.e. the distance between the two rear feet is different as in the case, when the recess 17 is used.

[0033] In FIG 10, FIG 11 and FIG 12 the concept of the invention is illustrated again:

[0034] In FIG 10 a pre-known solution (prior art) is shown. The recess 17 has a semi-circular shape and the stem 11 is placed into the reception 8, 9. The recess 17 must have a bigger width of its sides than the diameter of the stem 11, so that assembly is possible. Consequently, a movement between the reception 8, 9 and the stem 11 is possible detrimentally as illustrated by the arrow.

[0035] This is not the case when the solution according to the invention is employed as can be seen in FIG 11 and in FIG 12. Here the stem 11 has a substantially definite contact surface defined by the concave line 18 or the concave line 19. So, a movement in the direction of the arrow (as in the case of FIG 10) is not possible. However, due to tolerances it is to be understood that very small movements are allowed.

[0036] In FIG 13, FIG 14 and FIG 15 the section A-B according to FIG 3 is shown for three different upper appliances 3 having stems 11 with different distances to another. Depending on the effective distance between the two stems 11 of the rear side of the appliance the final location in the receptions 8, 9 are different but always defined.

[0037] In FIG 13 and FIG 15 the two concave lines 18 or 19 of the recess 17 are employed alternatively. In FIG 14 the second recess 25 is used by the stems 11.

[0038] From FIG 13, FIG 14 and FIG 15 it can also be seen that the width of the recess 17 of the front receptions 27, 28 can be significantly greater than in the case of the receptions 8, 9, so that differences in the distances between the stems 11 can be absorbed. The precise location of the upper appliance is defined by the rear receptions 8, 9.

[0039] The same can be seen in FIG 16 and FIG 17 which show enlarged depictions of the drawings according to FIG 13 and FIG 15. Here, also the foot 10 is depicted which is pushed into the receiving chamber which is defined in a reception 8, 9, 27, 28.

[0040] In FIG 18 and FIG 19 it can be seen how the device 1 is fixed at a top plate 32 of the lower appliance 2. The device 1 advantageously comprises a fixation device 29 for firmly arrange the device 1 on the top plate 32. The fixation device comprises a holding element 30 which has one or more hook elements 31. The hook elements 31 grab the bottom side of the top plate 32 and are itself fixed at the frame element 4. The fixation takes place preferably by means of a screw connection 33.

[0041] So, the device 1 is firmly arranged on top of the top plate 32 of the bottom appliance 2.

[0042] Consequently, a secure connection between the two appliances 2, 3 is established.

[0043] Even if the fixation device 29 has been described with reference to the device 1, it is clear that such fixation device 29 can be used also for other kinds of connection devices, even not provided with the recesses 17 according to the invention, provided that such connection devices are provided with a frame adapted to be fixed to the top plate 32 of a lower appliance 2.

Reference Numerals

[0044]

- 1 Device for connecting
- 2 First appliance (washing machine)

3	Second appliance (dryer)
4	Frame element
5	Side region
6	Side region
7	Rear region
8	Reception
9	Reception
10	Foot
11	Stem
12	Carrier surface
13	Side wall
14	Side wall
15	Side wall
16	Upper wall
17	Recess
18	Section (housing, dead stop), concave line
19	Section (housing, dead stop), concave line
20	Apex
21	Point
22	Point
23	Receiving space
24	Panel element
25	Second recess
26	Tongue
27	Reception
28	Reception
29	Fixation device
30	Holding element
31	Hook element

32	Top plate
33	Screw connection
5	α Angle
R	Radius
R _S	Radius of stem
a	Distance
b	Distance

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Claims

1. Device (1) for connecting a first appliance (2) with a second appliance (3), wherein the second appliance (3) is arranged on top of the first appliance (2), wherein the device (1) comprises a frame element (4) which is designed to be fixed on top of the first appliance (2), wherein the frame element (4) comprises at least two receptions (8, 9) for a foot (10) arranged at a stem (11) of the second appliance (3), wherein each reception (8, 9) has a carrier surface (12) for the foot (10) which is limited by side walls (13, 14, 15) and an upper wall (16) having at least one recess (17) for the passage of the stem (11) of the foot (10),
- characterized in that**
- at least one of the recesses (17) of the receptions (8, 9) has at least two adjacent sections (18, 19), each forming a housing or a dead stop for the stem (11) of the second appliance (3).
2. Device according to claim 1, **characterized in that** the recess (17) or at least one of the recesses (17) has a form defined by two adjacent concave lines (18, 19) seen in a top view.
3. Device according to claim 1 or 2, **characterized in that** the frame element (4) has two side regions (5, 6) and a rear region (7), wherein the at least two receptions (8, 9) are arranged in the side regions (5, 6) of the frame element (4).
4. Device according to claim 2 or 3, **characterized in that** the concave lines (18, 19) have the shape of a circular arc.
5. Device according to claim 4, **characterized in that** each circular arc (18, 19) extends around an angle (α) between 60° and 120°.
6. Device according to claim 4 or 5, **characterized in that** the radius (R) of the circular arc (18, 19) is be-

tween 100 % and 150 % of the radius (R_S) of the stem (11) of the second appliance (3).

7. Device according to one of claims 2 to 6, **characterized in that** an apex (20) is formed at the transition from one concave line (18) to the other concave line (19). 5
8. Device according to one of claims 2 to 7, **characterized in that** the points (21, 22) of the concave lines (18, 19) being located closest to the rear end of the device (1) are arranged with different distances (a, b) to the rear end. 10
9. Device according to one of claims 1 to 8, **characterized in that** the frame element (4) has a receiving space (23) for a panel element (24). 15
10. Device according to one of claims 1 to 9, **characterized in that** a second recess (25) is formed into the upper wall (16) laterally to the recess (17). 20
11. Device according to claim 10, **characterized in that** the upper wall (16) forms a tongue (26) between the recess (17) and the second recess (25) extending longitudinally in the direction from the front to the rear of the device (1). 25
12. Device according to one of claims 1 to 11, **characterized in that** the receptions (8, 9) are arranged in the rear region (7) of the frame element (4) and/or in that further receptions (27, 28) are arranged in the front region of the frame element (4). 30
13. Device according to one of claims 1 to 12, **characterized in that** is comprises a fixation device (29) for the fixation of the device (1) on the top side of the first appliance (2). 35
14. Device according to claim 13, **characterized in that** the fixation device (29) comprises a holding element (30) having at least one hook element (31), wherein the hook element (31) is designed to be engaged with a top plate (32) of the first appliance (2). 40
15. Device according to claim 13 or 14, **characterized in that** the holding element (30) is connected with the frame element (4) by means of a screw connection (33). 45

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FIG 1

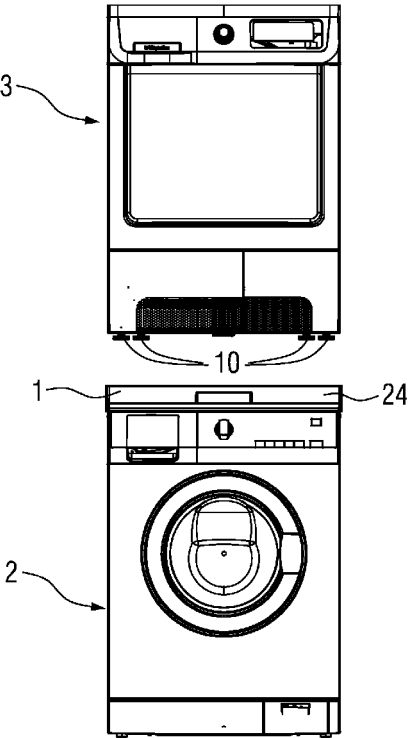


FIG 2

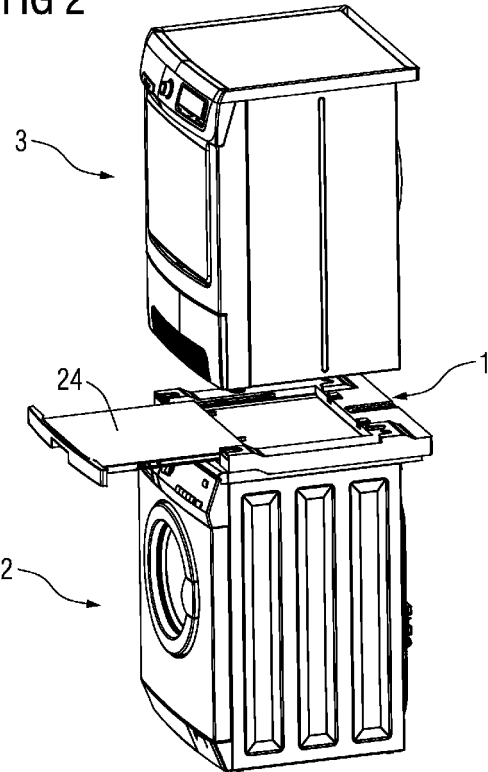


FIG 3

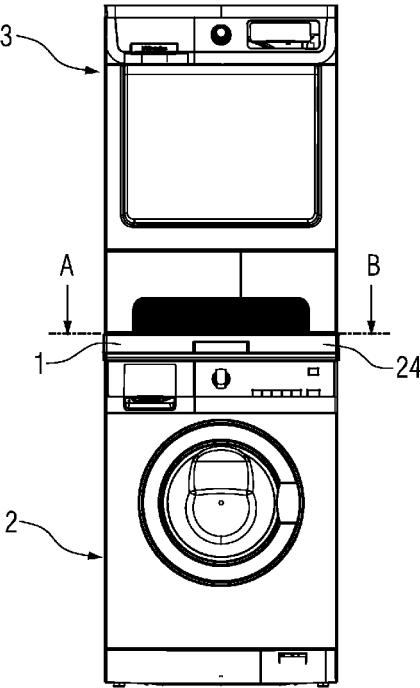


FIG 4

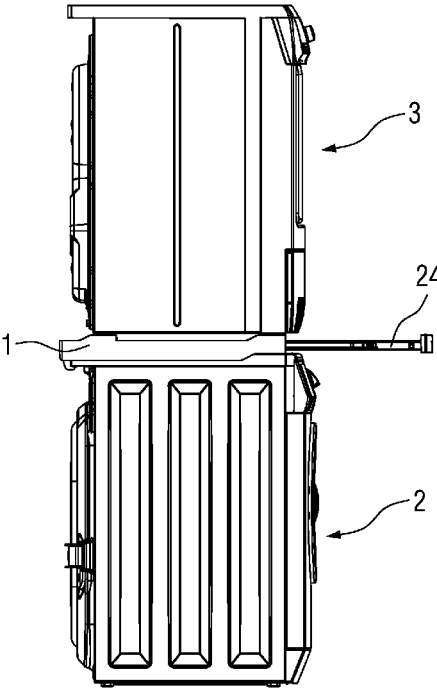


FIG 5

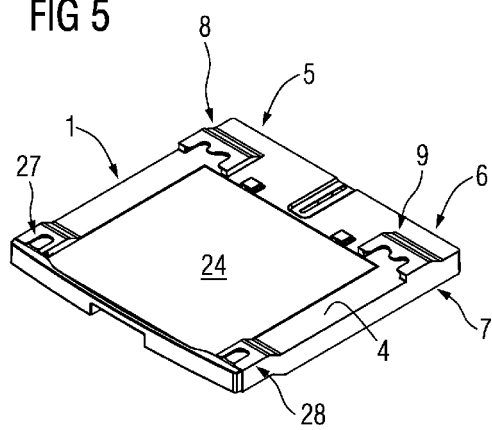


FIG 6

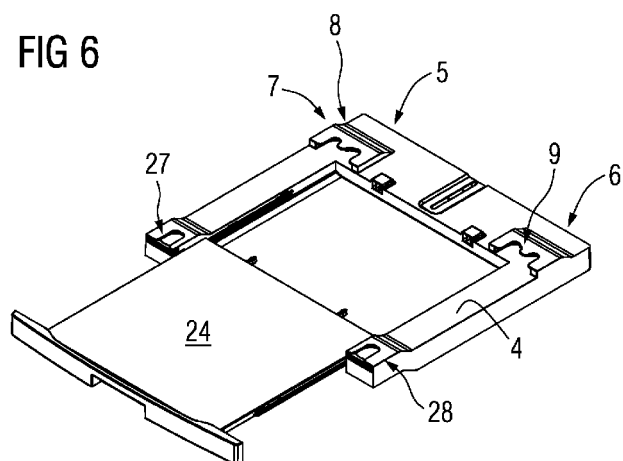


FIG 7

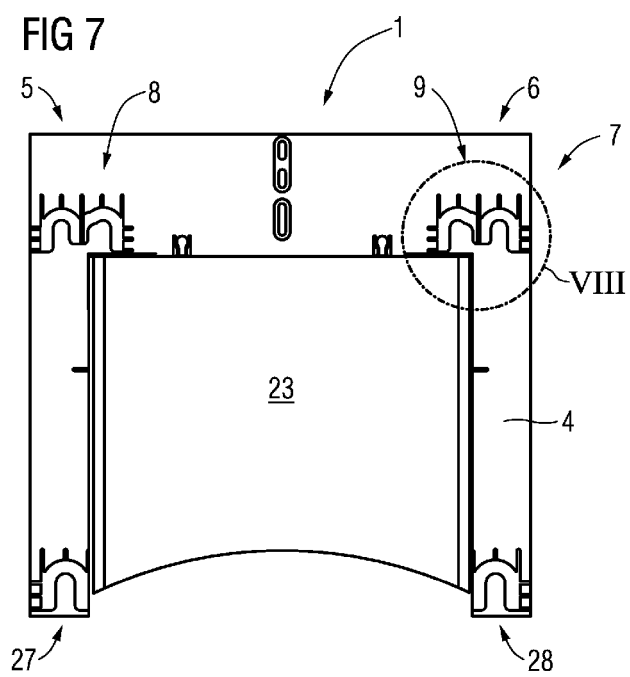


FIG 8

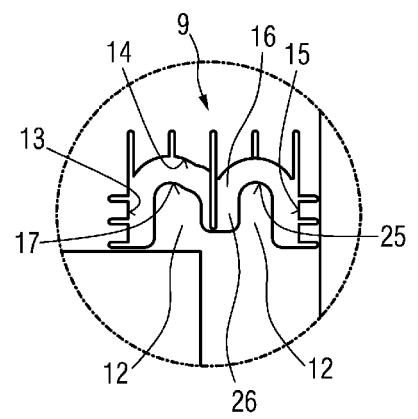


FIG 9

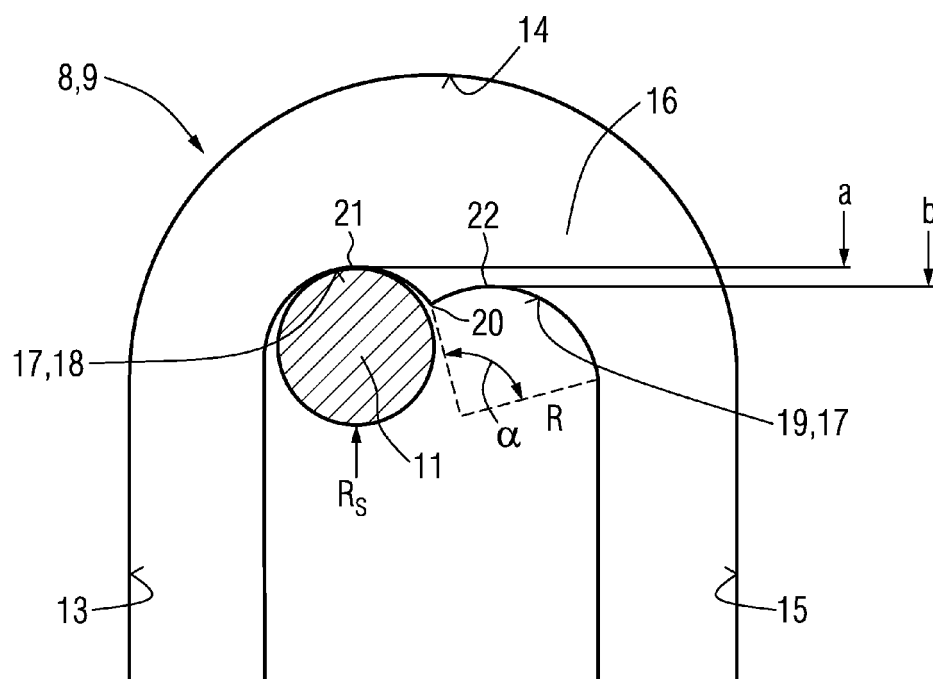


FIG 10
(PRIOR ART)

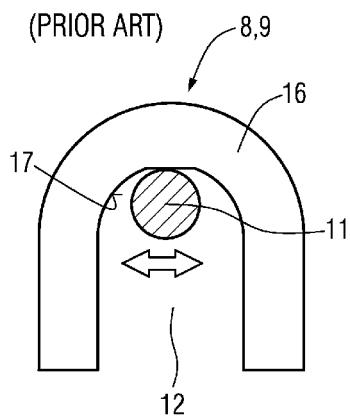


FIG 11

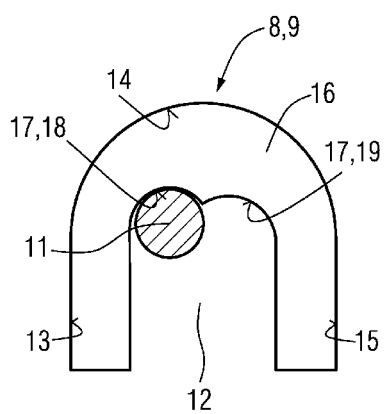


FIG 12

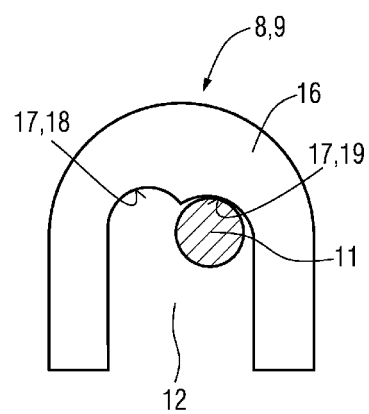


FIG 13

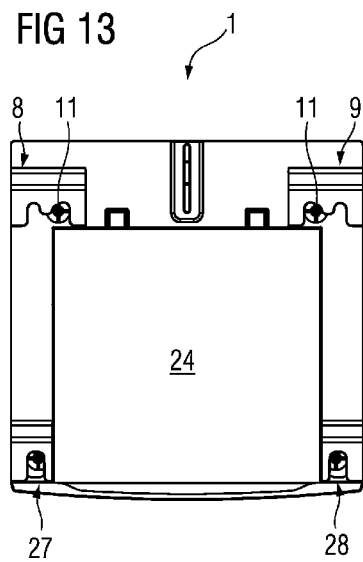


FIG 14

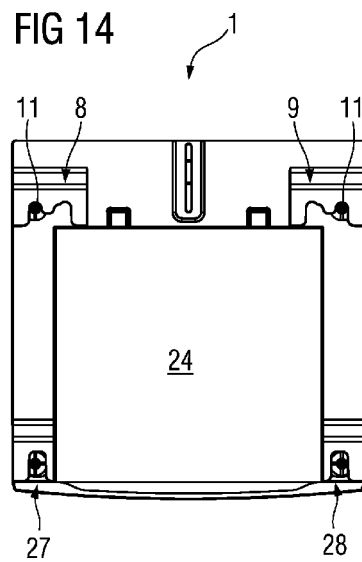
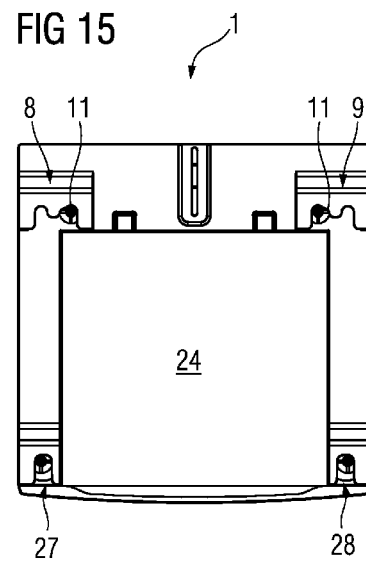


FIG 15



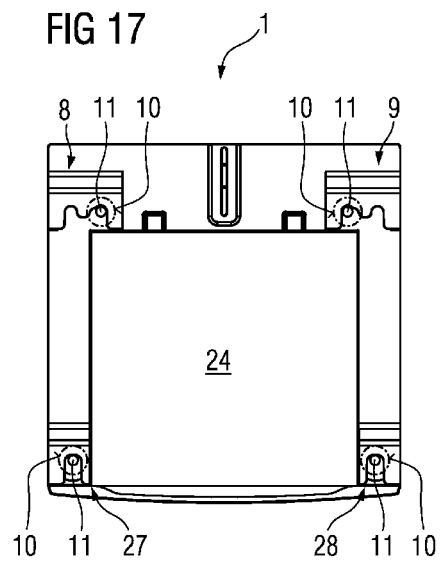
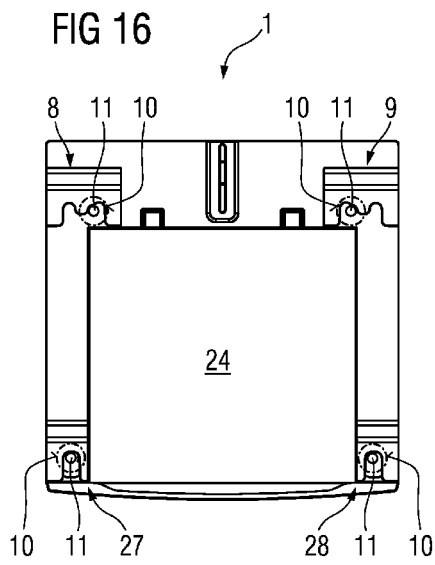


FIG 18

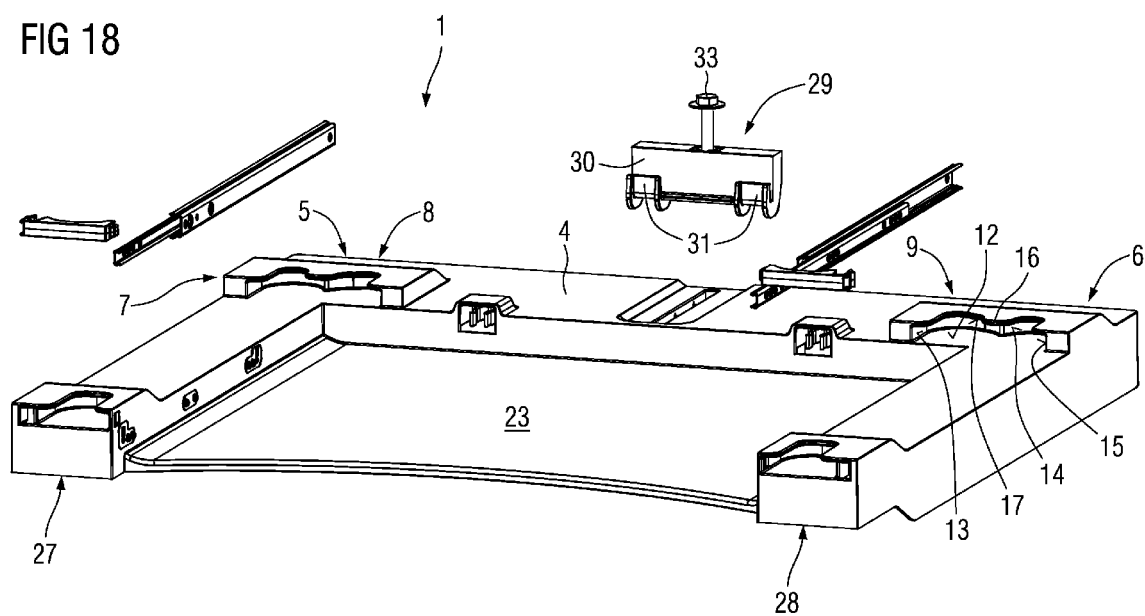
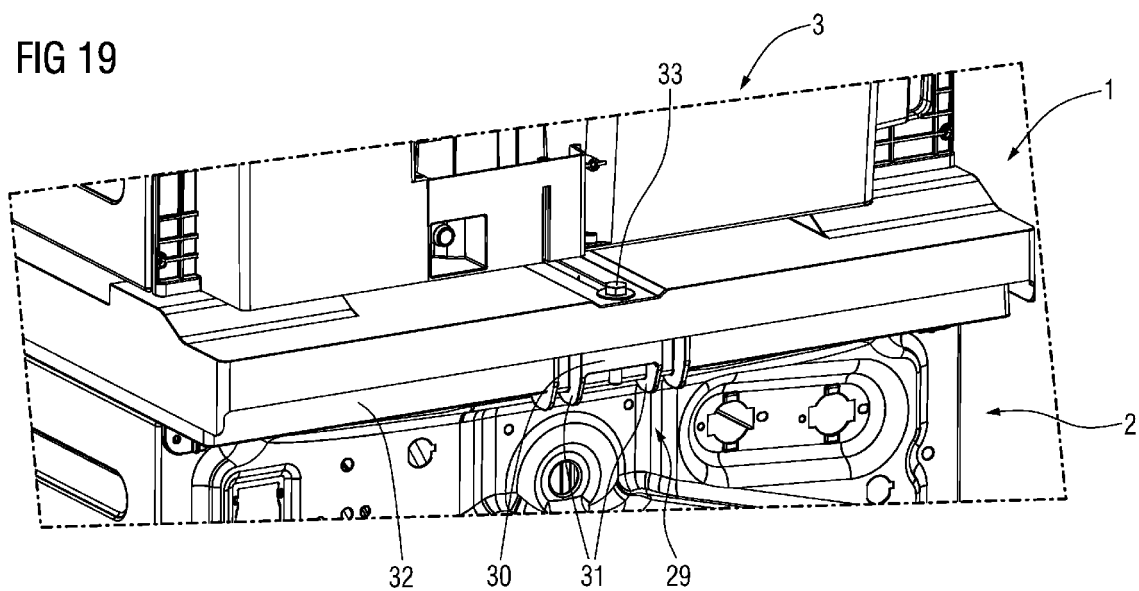


FIG 19





EUROPEAN SEARCH REPORT

Application Number
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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