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(54) **Dishwasher**

Geschirrspüler

Lave-vaisselle

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EP 1 929 922 B1

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Description

Technical Field

[0001] The present disclosure relates to a dishwasher. More particularly, the disclosure relates to the design of the bottom of a tub of a drawer dishwasher.

Background

[0002] When designing dishwashers, there are space constraints imposed by standards for kitchen appliances, cabinetry, etc. For example, a dishwasher cabinet may need to fit within a space that is 817.5-877.5 mm high, 595 mm wide and 570 mm deep. A dishwasher has a tub, in which items to be washed can be placed. In the tub, a dish rack is situated, in which the items to be washed are placed.

[0003] Drawer dishwashers are known from e.g. US 6,460,555B1 and US 6,447,081B1. A drawer dishwasher has at least one drawer, each drawer comprising a tub. In US 6,447,081 B1 a drawer dishwasher having two drawers arranged on top of each other in a cabinet is described.

[0004] In dishwashers in general, and especially in a two-drawer dishwasher such a described above, there are space constraints related to the height of each tub. For example, there may be a problem to fit in large items, such as large plates, e.g. plates adapted for receiving a pizza, in such a dishwasher tub.

[0005] JP-A-2001 046307 discloses a drawer dishwasher, according to the preamble of claim 1. The object of the invention is to be able to provide a rather large plinth area below the bottom of the front side of the drawer dishwasher, while maximizing usage of the space within the dishwasher, to be able to receive large items in the tub of the dishwasher.

Summary

[0006] The object of the invention is solved by the characterizing part of claim 1 in which a drawer dishwasher is arranged such that a tub bottom is downwardly inclined from a first portion of the tub close to a first side of the tub towards a second portion of the tub close to a second side of the tub, which second side is situated opposite to the first side of the tub, such that a distance between the tub bottom and a plane comprising an upper edge of the tub increases towards the second portion of the tub.

[0007] By arranging the tub of the dishwasher with such an inclined tub bottom, the dishwasher allows for receiving large objects to be washed, such as plates with a large diameter, in the second part of the tub, while providing a space for functional components of the dishwasher below the tub and still being able to keep the total height of the dishwasher at a limited height.

[0008] According to the invention, the tub bottom is downwardly inclined from a front part of the tub towards

a rear part of the tub. Due to this inclination of the bottom of the tub, a rather large plinth area can be provided below the bottom of the front side of the dishwasher. Thereby, a kitchen can be equipped with uniform plinths for all appliances of a kitchen, including the dishwasher, which is a demand from some kitchen manufacturers. Also, if the dishwasher is not equipped with such a uniform plinth, the plinth area provided by the invention would allow the user to stand close to the kitchen counter without his or her feet striking against the dishwasher.

[0009] According to an embodiment of the invention a filter receptacle is placed at the lowermost position of the tub bottom. By providing the tub with an inclined bottom and placing the filter receptacle at the lowermost portion of the bottom, the inclination would, at operation of the dishwasher, direct water in the tub to the filter receptacle. Thereby, water will circulate quicker through a pump circulation system of the dishwasher, which would result in low water consumption.

[0010] Also, by placing the filter receptacle at the lowermost position of the tub bottom, the risk of air getting into a washing pump connected to the filter receptacle via a pump inlet is reduced.

[0011] According to an embodiment of the invention, the filter receptacle is placed in a back corner of the tub. An advantage with this embodiment is that there will be more space for functional components below the tub compared to if the filter receptacle is placed in the middle of the tub, or in the middle of the rear part of the tub.

[0012] The invention is especially advantageous in a drawer dishwasher wherein the space constraints are normally stricter than for conventional dishwashers.

Brief Description of the Drawings

[0013]

Fig. 1 schematically illustrates, in cross section, a side view of a drawer dishwasher including two drawers.

Fig. 2 schematically illustrates, in cross section, a side view of a dishwasher drawer according to an embodiment of the invention.

Fig. 3 schematically illustrates a cross section, in section I-I in figure 2, of the dishwasher drawer according to an embodiment of the invention.

Description of Embodiments

[0014] Fig. 1 illustrates a drawer dishwasher 20, according to an embodiment of the invention. The dishwasher 20 has a front portion 23, which in a normal installation would be visible to the user, and a rear portion 24, which in the normal installation would be non-visible to the user, e.g. since it faces a wall. The dishwasher 20 also has an upper portion 26, which normally faces the underside of a counter, under which the dishwasher is arranged. The dishwasher is typically positioned on a

horizontal surface 25, such as a floor or a shelf. This dishwasher 20 has a first drawer 21 and a second drawer 22 arranged on top of each other. However, the invention may be used for other configurations of dishwashers, such as conventional dishwashers or drawer dishwashers comprising only one drawer, or comprising more than two drawers.

[0015] Fig. 2 schematically illustrates a dishwasher drawer 1 according to an embodiment of the invention, which may be arranged in a drawer dishwasher 20.

[0016] The drawer 1 has a washing tub 2 for receiving plates, cutlery, glasses, bowls, etc. that are to be washed. The inner volume of the tub 2 is limited by a tub bottom 7, substantially vertical inner sides 5, 6 of the tub and a substantially horizontal plane 11 comprising an upper edge of the tub. The horizontal plane 11 comprising the upper edge of the tub 2 is normally closed by a lid, which can be opened to allow for access to the tub from above. The tub bottom 7 is downwardly inclined from a front portion of the tub towards a rear portion of the tub. The front portion of the tub is adjacent to a vertical front side 6 of the tub facing a front side of the dishwasher drawer 1, and the rear portion of the tub is adjacent to a vertical rear side 5 of the tub facing a rear side of the dishwasher drawer. Thanks to the inclined tub bottom 7, the height of the tub increases in a direction from the front portion of the tub towards the rear portion of the tub. Due to this measure, large objects can be placed in the rear portion of the tub 2, without having to increase the total height of the tub.

[0017] Below the tub bottom 7, there is an enclosure 3 formed for receiving functional components 4 of the dishwasher, such as a heater, a pump, a softener, control electronics, valves etc. The enclosure 3 is defined by the tub bottom 7 and a drawer bottom 8 situated below the tub bottom 7.

[0018] The tub also has a filter receptacle 10 arranged in the bottom 7 of the tub. The filter receptacle 10 is further connected to a washing pump (not shown) via a pump inlet (not shown). The filter receptacle 10 is preferably arranged in the lowest part of the tub bottom 7, preferably close to the rear side 5 of the tub 2. Thereby, the inclination of the tub bottom 7 would, at operation of the dishwasher, direct water in the tub to the filter receptacle 10. The result would be a quick circulation of water through the pump circulation system of the dishwasher, and low water consumption.

[0019] The functional components 4 are arranged to allow for a low total height of the drawer. For this reason, the functional components placed in the enclosure 3 below the tub are essentially placed outside the lowest portion of the tub. Thereby, the height of the enclosure 3 below the lowest portion of the tub can be very low.

[0020] According to an embodiment, the tub bottom 7 has an inclination of about 3.5° to 10° relative to a horizontal plane, preferably about 4° to 7° relative to the horizontal plane, and most preferably about 5° relative to the horizontal plane. 5° has been found to be an optimal

value for the inclination. If the inclination is lower than 5°, some drops of the water may remain on the tub bottom. Then a number of drops of water have to accumulate before the water drops will flow into the filter receptacle. Also, if the inclination is higher than 5°, there will be too less space in the tub where the tub bottom has its highest altitude.

[0021] The dishwasher drawer 1 preferably has a rotatable sprinkler arm 13 for spraying water into the tub; water which is circulated by a washing pump through a water circulation system from the tub via the filter receptacle 10 and the pump back to the tub. The sprinkler arm 13 may be arranged to rotate in a plane that is substantially parallel to the tub bottom 7. According to one embodiment, the sprinkler arm 13 is rotatably connected to the tub bottom 7.

[0022] In the tub there is also preferably situated a dish rack for receiving the items to be washed. The dish rack is preferably situated close to the bottom of the tub and inclined with an inclination similar to the inclination of the tub bottom.

[0023] Also, according to the invention, which is illustrated in figure 2, the tub 2 extends further outwards from a rear portion of the drawer 1 than the enclosure 3, such that a plinth area 12 is created at the bottom of the front of the dishwasher drawer, outside the drawer. The user of the dishwasher may place his or her feet in the plinth area 12, such that he or she can take an ergonomically advantageous position when e.g. placing dish in the dishwasher.

[0024] When the tub bottom 7 is downwardly inclined from a front portion to a rear portion it will be possible to have a high relationship between the highest tub height D and the total height of the drawer, and anyhow be able to design the plinth area 12 in an ergonomically advantageous way. This is achieved by inclining the tub bottom from a front portion of the tub and downwards towards a rear portion of the tub. Then it is possible to make the distance between the tub bottom at the front portion of the tub and the floor, when the drawer 1 stands on a floor, high enough for a pair of feet to conveniently fit under the front part of the dishwasher.

[0025] According to an embodiment of the invention, a front portion of the tub bottom 7 and a front portion of the drawer bottom 8 are connected by a downwardly inclined portion 9 limiting the plinth area 12. The downwardly inclined portion may be curved for achieving a more ergonomically advantageous embodiment. The plinth area 12 typically has the following measures: The drawer bottom 8 is typically retracted from a cabinet front of the drawer dishwasher by about 140 mm; the height from the floor to the bottom of the dishwasher, at the front portion of the drawer, is typically about 100 mm, including the distance from the drawer bottom 8 to the tub bottom 7 at the front of the tub. Thereby, the drawer can be equipped with a uniform plinth, which is a demand from kitchen manufacturers for achieving a uniform shape for all appliances at a kitchen worktop.

[0026] Figure 3 schematically illustrates a cross section in section I-I of a rear section of the dishwasher drawer in figure 2, according to an embodiment of the invention. Figure 3 shows side portions 14, 15 of the tub, the tub top plane 11, the tub bottom 7 and the bottom 8 of the drawer. In this embodiment, the filter receptacle 10 is arranged in a lowermost portion of the tub bottom 7 in the rear portion of the tub, and the surrounding tub bottom will be on a higher level than the portion in which the filter receptacle is arranged.

[0027] As is shown in figure 3, the filter receptacle 10 and the lowermost portion are placed in a back corner of the tub bottom 7. Thereby, there will be more space for the functional components 4 compared to if the filter receptacle 10 is placed in the middle of the tub 2, or in the middle of the rear portion of the tub.

[0028] Alternatively, all components provided in the enclosure 3 may be mounted in an underside of the tub bottom 7. Hence, there need not be any drawer bottom 8, or actually, the drawer bottom would then be the tub bottom 7.

[0029] The detailed description has been directed to a drawer dishwasher, although, as mentioned, the invention might also be used for saving space in a conventional dishwasher.

[0030] In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

Claims

1. A drawer dishwasher, having a tub (2) situated in a drawer (1) of the drawer dishwasher for receiving at least one object that is to be washed, the tub (2) having a tub bottom (7) and substantially vertical sides (5, 6, 14, 15), an enclosure (3) for receiving at least one functional component (4) of the dishwasher, the enclosure (3) being defined at least partially by the tub bottom (7) and a drawer bottom (8), wherein the tub bottom (7) is downwardly inclined from a first portion of the tub (2) close to a first front side (6) of the tub towards a second portion of the tub (2) close to a second rear side (5) of the tub, which second rear side is situated opposite to the first front side of the tub (2), such that a distance (D) between the tub bottom (7) and a plane (11) comprising an upper edge of the tub increases towards the second portion of the tub, **characterized in that** a retracted plinth area (12) is formed below a portion of the tub (2) and horizontally outside the enclosure (3), creating a distance between the tub bottom (7) and the drawer bottom (8).

2. The dishwasher as claimed claim 1, wherein the

plinth area (12) is limited by a downwardly inclined portion (9), connecting the tub bottom (7) and the drawer bottom (8).

3. The dishwasher as claimed in any of claims 1-2, wherein the tub bottom (7) and the drawer bottom (8) extends from a rear portion of the drawer (1) and outwards towards a front portion of the drawer (1), and the tub bottom (7) extending further outwards towards the front portion of the drawer (1) than the drawer bottom (8).

4. The dishwasher as claimed in any of claims 1-3, wherein the tub bottom (7) presents an inclination of about 3.5° to 10° relative to a horizontal plane, preferably about 4° to 7° relative to the horizontal plane, and most preferably about 5° relative to the horizontal plane.

5. The dishwasher as claimed in any of claims 1-4, wherein the tub bottom (7) presents an inclination that is substantially continuous from the first portion of the tub (2) towards the second portion of the tub (2).

6. The dishwasher as claimed in any of claims 1-5, further comprising a filter receptacle (10) arranged in a rear portion of the tub bottom (7).

7. The dishwasher as claimed in any of claims 1-6, wherein a filter receptacle (10) is arranged in a lowermost portion of the tub bottom (7).

8. The dishwasher as claimed in claim 6 or 7, wherein the filter receptacle (10) is arranged in a corner of the tub bottom (7).

9. The dishwasher as claimed in any of the preceding claims, wherein a rotatable sprinkler arm (13) is arranged to rotate in a plane that is substantially parallel to the tub bottom (7).

Patentansprüche

1. Geschirrspüler mit Schubladen, aufweisend einen Bottich (2), der sich in einer Schublade (1) des Geschirrspülers mit Schubladen befindet, zur Aufnahme wenigstens eines Objekts, das gespült werden soll, wobei der Bottich (2) eine Bottichunterseite (7) und im Wesentlichen vertikale Seiten (5, 6, 14, 15) aufweist, ein Gehäuse (3) zur Aufnahme wenigstens einer Funktionskomponente (4) des Geschirrspülers, wobei das Gehäuse (3) wenigstens teilweise durch die Bottichunterseite (7) und eine Schubladenunterseite (8) definiert ist, wobei die Bottichunterseite (7) von einem ersten Abschnitt des Bottichs (2) in

der Nähe einer ersten, vorderen Seite (6) des Bottichs in Richtung eines zweiten Abschnitts des Bottichs (2) in der Nähe einer zweiten, hinteren Seite (5) des Bottichs nach unten geneigt ist, wobei sich die zweite, hintere Seite gegenüber der ersten, vorderen Seite des Bottichs (2) befindet, derart dass ein Abstand (D) zwischen der Bottichunterseite (7) und einer Ebene (11), die eine Oberkante des Bottichs umfasst, in Richtung des zweiten Abschnitts des Bottichs zunimmt, **dadurch gekennzeichnet, dass** ein zurückgezogener Sockelbereich (12) unter einem Abschnitt des Bottichs (2) und horizontal außerhalb des Gehäuses (3) ausgebildet ist und einen Abstand zwischen der Bottichunterseite (7) und der Schubladenunterseite (8) erzeugt.

2. Geschirrspüler nach Anspruch 1, wobei der Sockelbereich (12) durch einen nach unten geneigten Abschnitt (9) begrenzt ist, der die Bottichunterseite (7) und die Schubladenunterseite (8) verbindet.
3. Geschirrspüler nach einem der Ansprüche 1 bis 2, wobei die Bottichunterseite (7) und die Schubladenunterseite (8) sich von einem hinteren Abschnitt der Schublade (1) in Richtung eines vorderen Abschnitts der Schublade (1) nach außen erstrecken, und die Bottichunterseite (7) sich in Richtung des vorderen Abschnitts der Schublade (1) weiter nach außen erstreckt als die Schubladenunterseite (8).
4. Geschirrspüler nach einem der Ansprüche 1 bis 3, wobei die Bottichunterseite (7) eine Neigung von etwa 3,5° bis 10° in Bezug auf eine horizontale Ebene, vorzugsweise etwa 4° bis 7° in Bezug auf die horizontale Ebene und insbesondere 5° in Bezug auf die horizontale Ebene aufweist.
5. Geschirrspüler nach einem der Ansprüche 1 bis 4, wobei die Bottichunterseite (7) eine Neigung aufweist, die vom ersten Abschnitt des Bottichs (2) zum zweiten Abschnitt des Bottichs (2) im Wesentlichen durchgehend ist.
6. Geschirrspüler nach Anspruch 1 bis 5, ferner umfassend ein Filterbehältnis (10), das in einem hinteren Abschnitt der Bottichunterseite (7) angeordnet ist.
7. Geschirrspüler nach Anspruch 1 bis 6, wobei ein Filterbehältnis (10) in einem untersten Abschnitt der Bottichunterseite (7) angeordnet ist.
8. Geschirrspüler nach Anspruch 6 oder 7, wobei das Filterbehältnis (10) in einer Ecke der Bottichunterseite (7) angeordnet ist.
9. Geschirrspüler nach einem der vorhergehenden Ansprüche, wobei ein drehbarer Sprüharm (13) angeordnet ist, um sich in einer Ebene zu drehen, die im

Wesentlichen parallel zur Bottichunterseite (7) ist.

Revendications

1. Lave-vaisselle à tiroir, ayant une cuve (2) située dans un tiroir (1) du lave-vaisselle à tiroir pour recevoir au moins un objet qui doit être lavé, la cuve (2) ayant un fond de cuve (7) et des côtés sensiblement verticaux (5, 6, 14, 15), une enceinte (3) pour recevoir au moins un composant fonctionnel (4) du lave-vaisselle, l'enceinte (3) étant définie au moins partiellement par le fond de cuve (7) et un fond de tiroir (8), dans lequel le fond de cuve (7) est incliné vers le bas à partir d'une première partie de la cuve (2) à proximité d'un premier côté avant (6) de la cuve vers une seconde partie de la cuve (2) à proximité d'un second côté arrière (5) de la cuve, lequel second côté arrière est situé à l'opposé du premier côté avant de la cuve (2), de sorte qu'une distance (D) entre le fond de cuve (7) et un plan (11) comprenant un bord supérieur de la cuve augmente vers la seconde partie de la cuve, **caractérisé en ce qu'**une zone de plinthe rétractée (12) est formée au-dessous d'une partie de la cuve (2) et horizontalement à l'extérieur de l'enceinte (3), créant une distance entre le fond de cuve (7) et le fond de tiroir (8).
2. Lave-vaisselle selon la revendication 1, dans lequel la zone de plinthe (12) est limitée par une partie inclinée vers le bas (9), raccordant le fond de cuve (7) et le fond de tiroir (8).
3. Lave-vaisselle selon l'une quelconque des revendications 1 à 2, dans lequel le fond de cuve (7) et le fond de tiroir (8) s'étendent à partir d'une partie arrière du tiroir (1) et vers l'extérieur vers une partie avant du tiroir (1), et le fond de cuve (7) s'étendant davantage vers l'extérieur vers la partie avant du tiroir (1) que le fond de tiroir (8).
4. Lave-vaisselle selon l'une quelconque des revendications 1 à 3, dans lequel le fond de cuve (7) présente une inclinaison d'environ 3,5° à 10° par rapport à un plan horizontal, de préférence d'environ 4° à 7° par rapport au plan horizontal, et de manière préférée entre toutes, d'environ 5° par rapport au plan horizontal.
5. Lave-vaisselle selon l'une quelconque des revendications 1 à 4, dans lequel le fond de cuve (7) présente une inclinaison qui est sensiblement continue à partir de la première partie de la cuve (2) vers la seconde partie de la cuve (2).
6. Lave-vaisselle selon l'une quelconque des revendications 1 à 5, comprenant en outre un réceptacle de

filtre (10) agencé dans une partie arrière du fond de cuve (7).

7. Lave-vaisselle selon l'une quelconque des revendications 1 à 6, dans lequel un réceptacle de filtre (10) est agencé dans la partie la plus basse du fond de cuve (7). 5
8. Lave-vaisselle selon la revendication 6 ou 7, dans lequel le réceptacle de filtre (10) est agencé dans un coin du fond de cuve (7). 10
9. Lave-vaisselle selon l'une quelconque des revendications précédentes, dans lequel un bras de pulvérisation rotatif (13) est agencé pour tourner dans un plan qui est sensiblement parallèle au fond de cuve (7). 15

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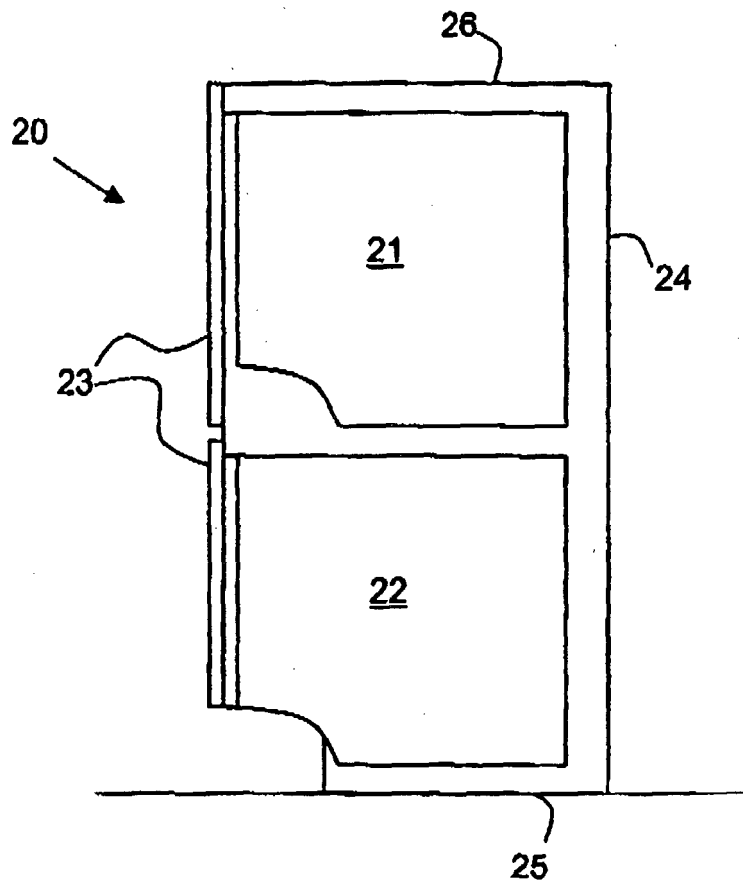
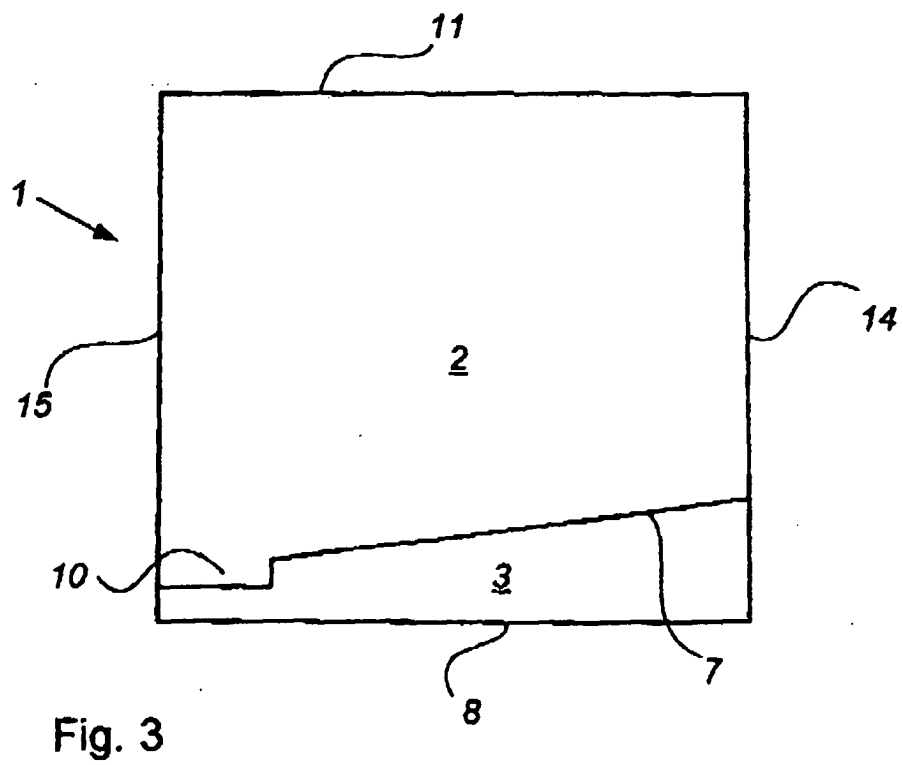
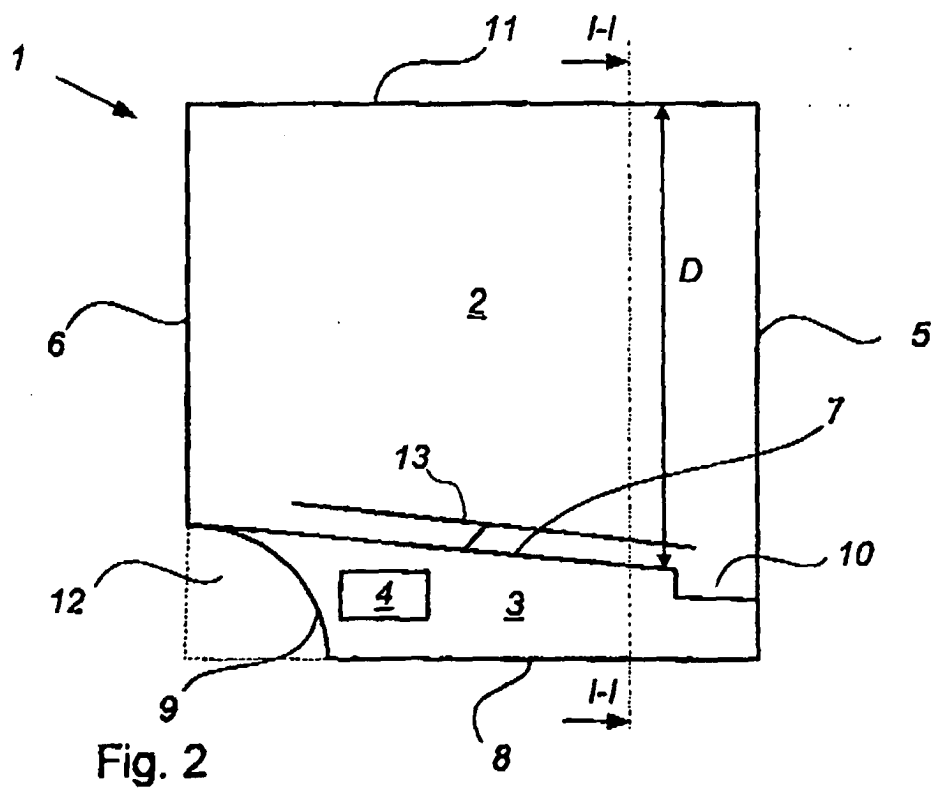


Fig 1.



REFERENCES CITED IN THE DESCRIPTION

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