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(54) Washing machine with a detergent distributor

Waschmaschine mit Waschmittelverteiler

Machine à laver avec distributeur de détergent

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Description

[0001] The present invention relates to a washing machine with a detergent distributor comprising a drawer movable within a housing provided in the front part of the machine. For front loading washing machines, extractable drawers with a plurality of compartments are commonly known, for example from document GB-A-1 211 560 and DE-A-10 061 155, into which the user fills the detergent, fabric softener, and bleach. After the drawer is pushed in and the program is started, the machine automatically flushes the detergents into the soap container of the machine at the right time. The guide of this drawer in the corresponding housing or box, into which the drawer is pushed and which is responsible for directing the water into the individual drawer chamber, consists typically of grooves on the left and right side of the box, into which two corresponding ledges of the drawer are slidably inserted. There are also models with a rib in the groove, onto which a corresponding profile of the drawer slides and along which the drawer is inserted into the box.

[0002] Due to the large tolerances of the plastic material, the guides in both cases are not without play and it is not possible to prevent the drawer from being wobbly when pulling it out or pushing it in.

[0003] In showrooms for household appliances and the like, customers inspect the products and they touch the appliances, trying the movable operating parts of the appliances. The appliances; and in particular the accessible movable operating elements thereof, are touched. The customers check the quality based on their perception of sturdiness. This perception is an important factor in the purchase decision. It is the perceived quality in the purchase decision.

[0004] As for washing machines, the main elements that can be opened are the door, the detergent drawer, and the filter door, which is why they are opened and touched by the customers. The sturdiness perceived in the inspection is a very important factor for the purchase decision.

[0005] The present invention eliminates the tolerances in the drawer guide and therefore prevents motions that are not in direction of the guide, with a predetermined spring force. The drawer can be moved only against a predetermined small resistance and the user perceives such resistance as sturdiness and therefore as good quality.

[0006] Moreover, the present invention solves the task of preventing the wobbling of the drawer when moving it in and out, allowing the drawer to be pulled out and pushing it easily without the risk of jamming. The drawer, and in particular its guide, give the user a solid, stable, and user-friendly impression. The task is solved according to the attached claims.

[0007] As will become apparent from the following description, the invention can provide a detergent distributor whose drawer is devoid of tolerances in its movement in and out of its'housing, which is therefore more reliable to use.

[0008] The features and advantages of the invention will be more clearly apparent from the following description, given solely by way of non-limiting example, of a preferred embodiment, with reference to the accompanying drawings in which:

- Figure 1 is a perspective view of a washing machine having·the detergent distributor according to a first embodiment of the invention;
- Figure 2 is a perspective exploded view of the detergent distributor used in the washing machine of figure 1;
- Figure 3 is a perspective view, similar to figure 2, of a detergent distributor according to a second embodiment of the invention;
- Figure 4 is a perspective view, similar to figure 2, of a detergent distributor according to a third embodiment which is not part of the invention;
- Figure 5 is a perspective view of a detergent distributor according to a fourth embodiment which is not part of the invention, in a closed configuration thereof;
- Figure 6 is a section taken along line VI-VI of figure 5; and
- Figure 7 is a perspective exploded view of a detergent distributor according to a fifth embodiment of the invention.

[0009] With reference to the drawings, a washing machine 10 presents a casing 12 provided, in its front wall 12a, with a detergent distributor 14 comprising a drawer 16 and a housing 18 in which the drawer 16 is slidably mounted. With reference to the first embodiment shown in figure 2, the drawer 16 is provided with detergent and/or softener/bleach compartment D and, on each of its sides, with a U-shaped edge 16a. Each edge 16a is provided with two slide bars 20 and 22, equipped with integral spring elements S, that are attached between the drawer 16 and the housing 18 so as to cooperate with corresponding rails 24 and 26 of the housing 18. Each of the slide bars 20 and 22 present, opposite to sliding surfaces 20a and 22a respectively, shaped pins 28 which are snap-engaged within corresponding openings 30 in the edges 16a of the drawer 16 so as to fix longitudinally the sliding bars 20 and 22 to the drawer 16, and allowing a lateral movement orthogonal to the movement of the drawer, on a horizontal plane for the bar 20 and on a vertical plane for the bar 22 respectively. In figure 2, these sliding bars 20 and 22 are clipped to the drawer 16 but they might also be clipped to the housing 18 as well.

[0010] The sliding bars 20 and 22, equipped with spring elements S in the form of hook-shaped integral portion, even out the tolerances between the drawer 16 and the housing 18.

[0011] They press against the surfaces of the drawer rails 24 and 26 in horizontal and vertical direction respectively, with a predetermined force of the springs S. The

drawer 16 can therefore be moved easily and only in the direction of the rails, it does not wobble, and gives to the user a guided, stable, and solid impression.

[0012] In the second embodiment shown in figure 3, where the same or similar components are indicated with the same reference numerals, the task of compensating tolerances is solved by suspending the drawer 16 on rollers 31 in horizontal and vertical direction, in addition to the sliding bars 20, 22, wherein the rollers 31 are held by roller holders 32 in corresponding horizontal and vertical roller grooves 34 and 36 respectively provided in the housing 18. Each roller holder 32 is comb shaped and has a plurality of teeth 32a on which the rollers 31 are rotatably mounted: The roller holders 32 are supported in a fixed configuration in the grooves 34 and 36 so that the rollers 31 can rotate freely and can support the sliding bars 20 and 22 when the drawer 16 is pushed in or pulled out of the housing 18 with a reduced friction compared to the first embodiment. Also in this case the resilient sliding bars could be installed in the housing 18 instead of installing them in the drawer 16; in such case the rollers 31 and related roller holders 32 would be installed in grooves of the drawer 16.

[0013] In the third embodiment shown in figure 4 and which is a not claimed embodiment the task of compensating tolerances is solved by resilient portions of the drawer and of the housing which replace the resilient sliding bars of the previous embodiments. In detail, as far as the drawer 16 is concerned, the resilient portions consist of three wave-shaped resilient elements 33 each, which are integrally molded with the drawer along the drawer edges 16a. The shape of the resilient elements 33 is so that the drawer 18 can be removed from the mould, used in the injection-molding machine, in the regular removal direction. At the back of the drawer 16, a fourth resilient element 35 is molded in a manner that such element consists of the bent rear edge of the drawer side and in addition, on the bottom part, of a protruding nipple 35a which facilitates inserting the drawer 16 into the drawer housing 18 with a suitable insertion slant. The drawer 16, at its back portion, is also provided with slots 37 that facilitates the spring movement. On the housing side, there are provided resilient portions 38 that cooperate with an upper plane surface 16a of the drawer 16. The molded resilient elements 34 and 35 of the drawer 16, together with the resilient portions 38 of the housing 18, make up for tolerances and create a wobble-free drawer guide. Of course the wave-shaped resilient elements could be integral with the side walls of the housing 18 instead of being provided on the edges 16a of the side of the drawer 16.

[0014] In the fourth embodiment shown in figures 5 and 6, and which is a not claimed embodiment as well the task of compensating tolerances is solved by a resilient element 40 that consists of an auxiliary longitudinal side wall of the drawer 16 and it is molded on the left and right side of the drawer, wherein the side wall 40 can act as a lateral spring due to its width. The longitudinal auxiliary side wall 40 can also be wave-shaped (as shown in figure 5).

[0015] In the embodiment shown in figure 7, the task of compensating tolerances is solved by a drawer 42 that is guided by one plastic rail 44 on each of the two sides, wherein the rails 44 may be extended like a telescope and inserted into the drawer 18. The rails 44 are equipped with spring elements 44a and 44b in horizontal and vertical direction respectively to make up for the tolerances between the rails and the drawer guide in the housing and to create a wobble-free drawer guide.

Claims

1. Washing machine with a detergent distributor (14) comprising a drawer (16) movable within an housing (18) provided in the front part of the machine (10), **characterized in that** between the drawer (16) and its housing (18) there are provided resilient sliding means (20, 22, 33, 35, 38, 40, 44a, 44b) adapted to compensate tolerances between the drawer (16) and the housing (18), between the drawer (16) and the housing (18) there being interposed, on each side of the detergent distributor (14), at least a sliding bar (20, 22) provided with resilient elements (S) adapted to urge with a predetermined force said sliding bar (20, 22) against the drawer (16) or the housing (18).

2. Washing machine according to claim 1, **characterized in that** the drawer (16) comprises, on each side, at least a sliding bar (20, 22) laterally movable and longitudinally fixed to the drawer (16), the resilient element (S) urging the bar (20, 22) against a corresponding rail (24, 26) of the housing (18) and being interposed between the sliding bar (20, 22) and the drawer (16).

3. Washing machine according to claim 2, **characterized in that** the drawer (16) comprises, on each side, two sliding bars (20, 22) laterally movable on a horizontal and vertical plane respectively.

4. Washing machine according to claim 3, **characterized in that** each side of the drawer (16) comprises an upper portion (16a) having a horizontal surface and a vertical surface, each of these surfaces having openings (30) for corresponding mounting pins (28) of said sliding bars (20, 22) for longitudinal fastening thereof, said resilient elements (S) being integral with the bars (20, 22) and cooperating with said horizontal and vertical surfaces of the upper portion (16a) of the drawer (16).

5. Washing machine according to claim 3 or 4, **characterized in that** between the sliding bars (20, 22) and the drawer (16) there are interposed rolling

means (31, 32) on which the sliding bars (20, 22) can move with reduced friction.

6. Washing machine according to claim 5, **characterized in that** the rolling means comprise, for each sliding bar (20, 22), a roll holder (32, 32a) fixed in a corresponding groove (34, 36) of the housing (18), on each roll holder (32, 32a) being rotatably mounted a plurality of rolls (30).

7. Washing machine with a detergent distributor (14) comprising a drawer (16) movable within an housing (18) provided in the front part of the machine (10), **characterized in that** between the drawer (16) and its housing (18) there are provided resilient sliding means (44a, 44b) adapted to compensate tolerances between the drawer (16) and the housing (18), between the housing (18) and the drawer (42) there being provided telescopic sliding elements (44).

Patentansprüche

1. Waschmaschine mit einem Waschmittelspender (14), umfassend eine Lade (16), die innerhalb eines Gehäuses (18), das im vorderen Teil der Machine (10) vorgesehen ist, beweglich ist, **dadurch gekennzeichnet, dass** zwischen der Lade (16) und ihrem Gehäuse (18) elastische Gleitelemente (20, 22, 33, 35, 38, 40, 44a, 44b) vorgesehen sind, die dazu angepasst sind, Toleranzen zwischen der Lade (16) und dem Gehäuse (18) zu kompensieren, zwischen der Lade (16) und dem Gehäuse (18) an jeder Seite des Waschmittelspenders (14) zumindest eine Gleitstange (20, 22) eingesetzt ist, die mit elastischen Elementen (S) versehen ist, die dazu angepasst sind, die Gleitstange (20, 22) gegen die Lade (16) oder das Gehäuse (18) mit einer vorab festgelegten Kraft vorzuspannen.

2. Waschmachine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Lade (16) an jeder Seite zumindest eine Gleitstange (20, 22) umfasst, die seitlich beweglich und in Längsrichtung an der Lade (16) fixiert ist, wobei das elastische Element (S) die Stange (20, 22) gegen eine korrespondierende Schiene (24, 26) des Gehäuses (18) vorspannt und zwischen der Gleitstange (20, 22) und der Lade (16) eingesetzt ist.

3. Waschmaschine gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Lade (16) an jeder Seite zwei Gleitstangen (20, 22) umfasst, die auf einer horizontalen bzw. vertikalen Ebene beweglich sind.

4. Waschmachine gemäß Anspruch 3, **dadurch gekennzeichnet, dass** jede Seite der Lade (16) einen oberen Abschnitt (16a) umfasst, der eine horizontale Oberflächen Öffnungen (30) für korrespondierende Befestigungsstifte (28) der Gleitstangen (20, 22) für deren Länsbefestigung aufweist, wobei die elastischen Elemente (S) integral mit den Stangen (20, 22) aufgebildet sind und mit den horizontalen und vertikalen Oberflächen des oberen Abschnitts (16a) der Lade (16) in Wirkverbindung stehen.

5. Waschmachine gemäß Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** zwischen den Gleitstangen (20, 22) und der Lade (16) Rollelemente (31, 32) eingesetzt sind, mit reduzierter Reibung bewegen können.

6. Waschmachine gemäß Anspruch 5, **dadurch gekennzeichnet, dass** die Rollelemente für jede Gleitstange (20, 22) eine Rollenhalterung (32, 32a) umfassen, die in einer korrespondierenden Nut (34, 36) des Gehäuse (18) fixiert sind, wobei auf jedem Rollenhalter (32, 32a) eine Vielzahl von Rollen (30) drehbar befestigt ist.

7. Waschmachine mit einem Waschmittelspender (14), umfassend eine Lade (16), die innerhalb eines Gehäuses (18), das im vorderen Teil der Maschine (10) vorgesehen ist, beweglich ist, **dadurch gekennzeichnet, dass** zwischen der Lade (16) und ihrem Gehäuse (18) elastische Gleitelemente (44a, 44b) vorgesehen sind, die dazu angepasst sind, Toleranzen zwischen der Lade (16) und dem Gehäuse (18) zu kompensieren, zwischen der Lade (16) und dem Gehäuse (18), zwischen dem Gehäuse (18) und der Lade (42) teleskopartige Gleitelemente (44) vorgesehen sind.

Revendications

1. Machine à laver avec un distributeur de détergent (14) comprenant un tiroir (16) mobile dans un boîtier (18) prévu dans la partie frontale de la machine (10), **caractérisée en ce que**, entre le tiroir (16) et son boîtier (18) sont prévus des moyens de coulissement élastiques (20, 22, 33, 35, 38, 40, 44a, 44b) adaptés à compenser des tolérances entre le tiroir (16) et le boîtier (18) étant interposées, de chaque côté du distributeur de détergent (14), au moins une barre de coulissement (20, 22) pourvue d'éléments élastiques (S) adaptés à forcer ladite barre de coulissement (20, 22) avec une force prédéterminée contre le tiroir (16) ou contre le boîtier (18).

2. Machine à laver selon la revendication 1, **caractérisée en ce que** le tiroir (16) comprend, sur chaque côté, au moins une barre de coulissement (20, 22) latéralement mobile et fixée longitudinalement sur le tiroir (16), l'élément élastique (S) forçant la barre (20, 22) contre un rail correspondant (24, 26) du boîtier

(18) et étant interposé entre la barre de coulissement (20, 22) et le tiroir (16).

3. Machine à laver selon la revendication 2, **caractérisée en ce que** le tiroir (16) comprend, sur chaque côté, deux barres de coulissement (20, 22) latéralement mobiles sur un plan horizontal et sur un plan vertical respectivement.

4. Machine à laver selon la revendication 3, **caractérisée en ce que** chaque côté du tiroir (16) comprend une portion supérieure (16a) ayant une surface horizontale et une surface verticale, chacune de ces surfaces ayant des ouvertures (30) pour des tiges de montage correspondantes (28) desdites barres de coulissement (20, 22) pour leur fixation longitudinale, lesdits éléments élastiques (S) étant réalisés de manière intégrale avec les barres (20, 22) et coopérant avec lesdites surfaces horizontale et verticale de la portion supérieure (16a) du tiroir (16).

5. Machine à laver selon la revendication 3 ou 4, **caracterisée en ce que**, entre les barres de coulissement (20, 22) et le tiroir (16) sont interposés des moyens de roulement (31, 32) sur lesquels les barres de coulissement (20, 22) puevent se déplacer avec friction réduite.

6. Machine à laver selon la revendication 5, **caracterisée en ce que** les moyens de roulement comprennent, pour chaque barre de coulissement (20, 22), un porte-rouleau (32, 32a) fixé dans une gorge correspondante (34, 36) du boîtier (18), une pluralité de rouleaux (30) étant montés en rotation sur chaque porte-rouleau (32, 32a).

7. Machine à laver avec un distributeur de détergent (14) comprenant un tiroir (16) mobile dans un boîtier (18) prévu dans la partie frontale de la machine (10), **caracterisée en ce que**, entre le tiroir (16) et son boîtier (18) sont prévus des moyens de coulissement élastiques (44a, 44b) adaptés à compenser des tolérances entre le tiroir (16) et le boîtier (18), entre le boîtier (18) et le tiroir (42) étant prévus des éléments de coulissement télescopiques (44).

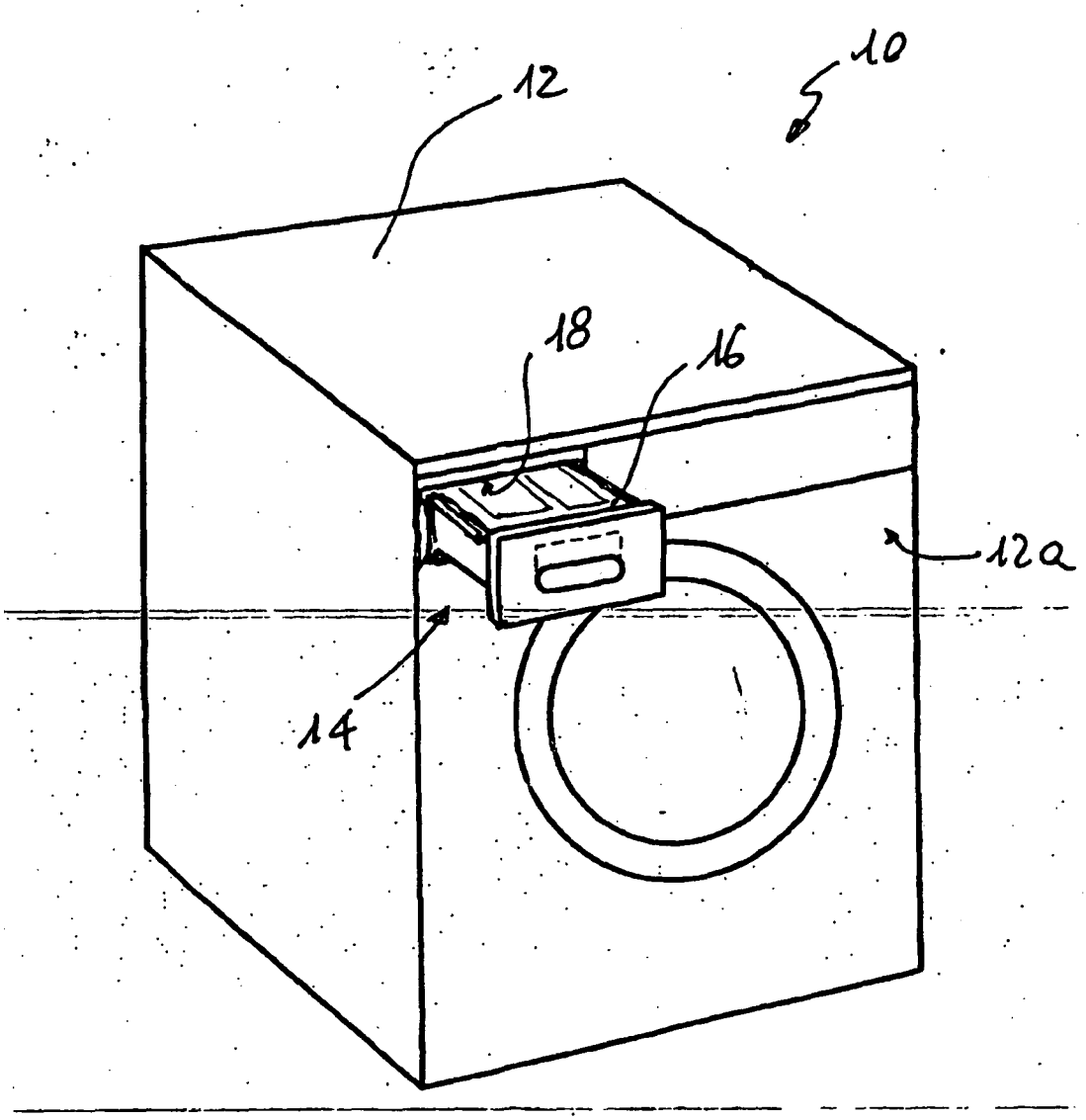

Fig. 1

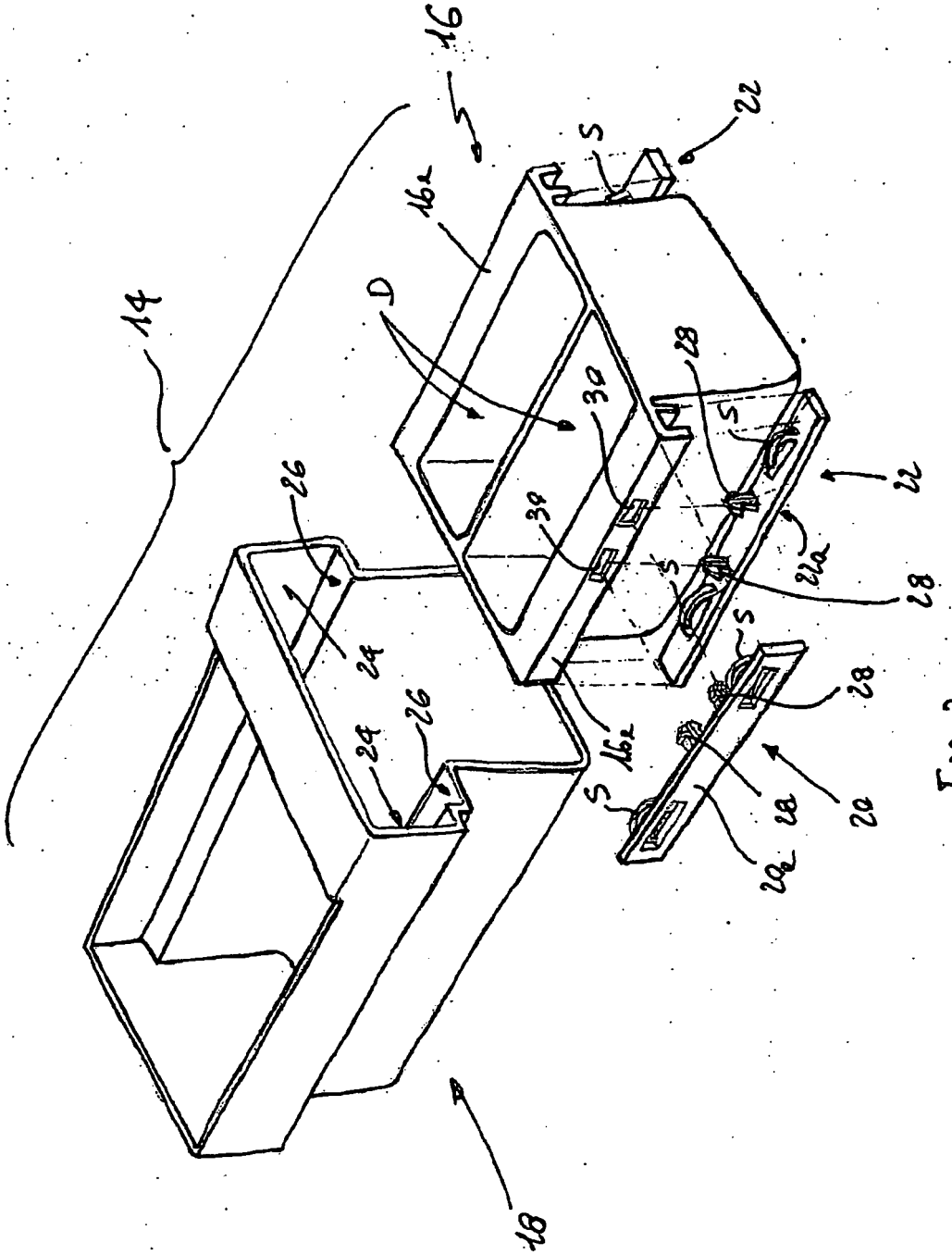
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Fig.2

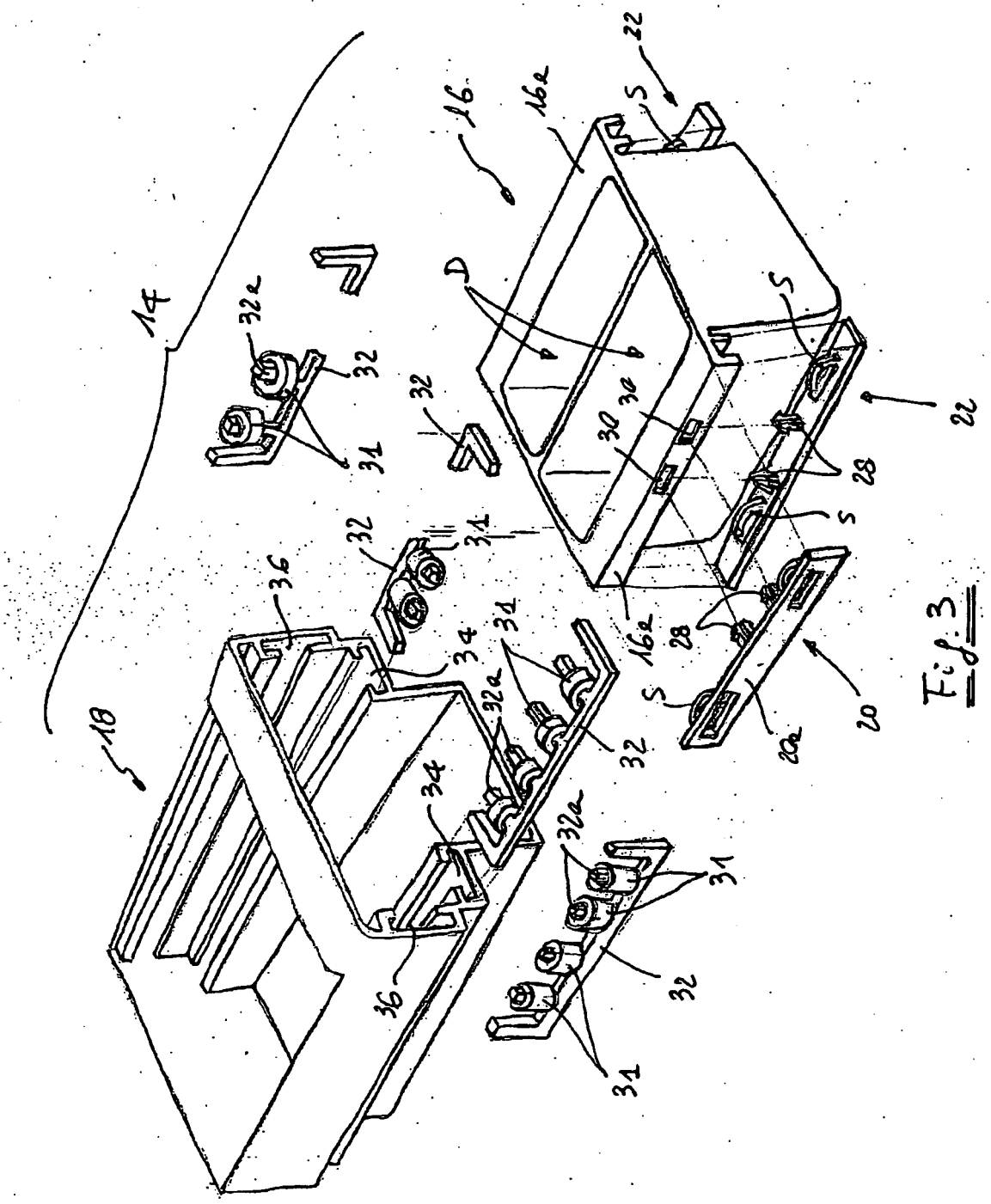

Fig. 3

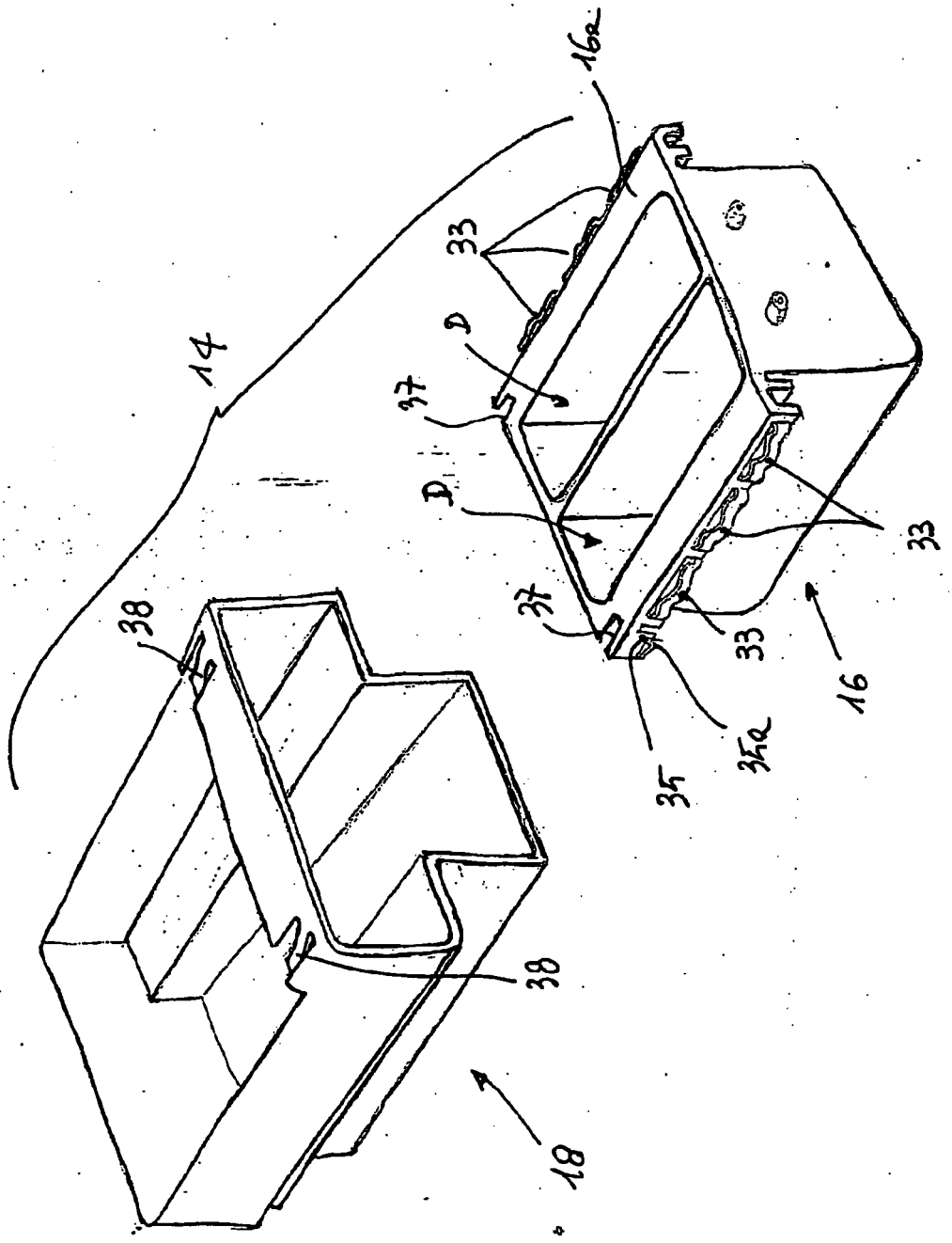

Fig. 4

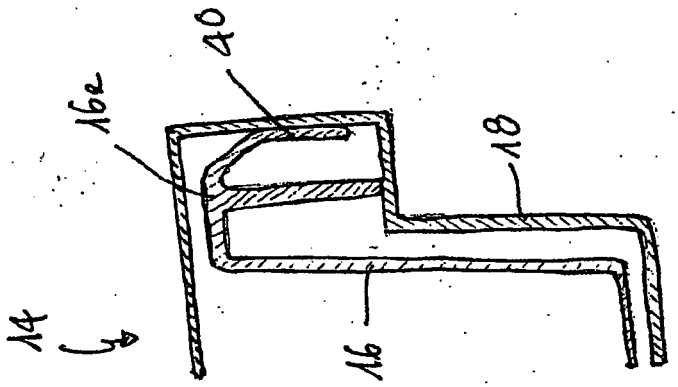

Fig. 6

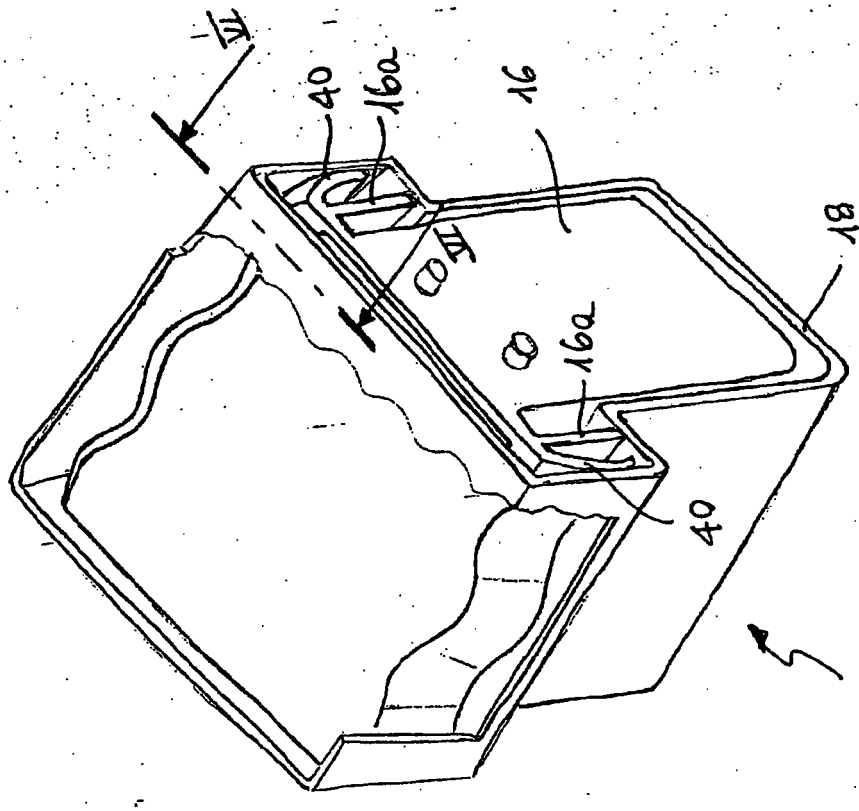

Fig. 5

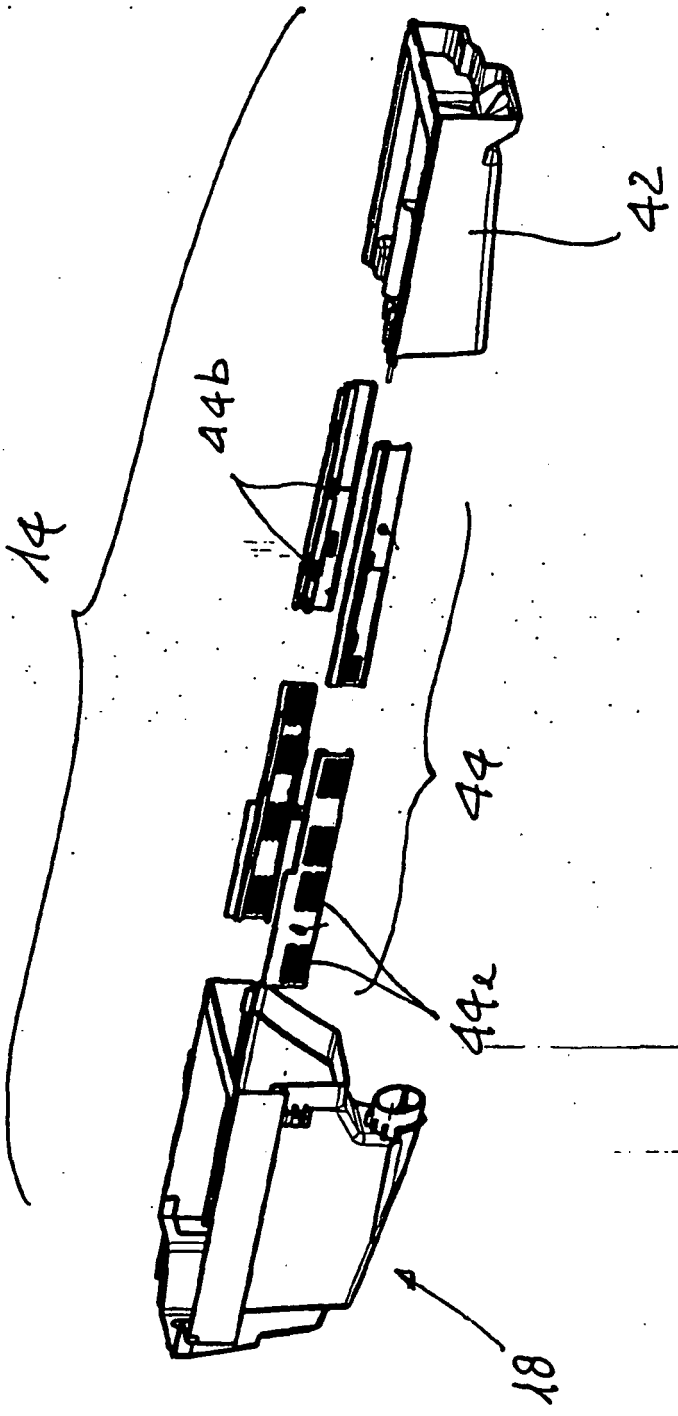

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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