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(54) **A LAUNDRY WASHER-DRYER**

WÄSCHEWASCHMASCHINE/-TROCKNER

LAVE-LINGE/SÈCHE-LINGE

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Description

[0001] The present invention relates to a laundry washer-dryer in which the air passed through the laundry items is discharged from a body.

[0002] In vented type laundry washer-dryers, the drying air sucked from the environment is blown onto the damp laundry items in a drum, and the drying air loaded with humidity by being passed through the laundry items is discharged from a body by means of a discharge duct through an opening provided on said body. This process is repeatedly continued until the laundry items are completely dehumidified. The main problem encountered in vented type laundry washer-dryers is that the humidity contained in the air discharged from the body may damp other appliances or furniture disposed on the laundry washer-dryer body or in the vicinity of the laundry washer-dryer by condensing thereon. This causes user discontent.

[0003] State of the art European patent document no. EP2279297 describes a dryer having an additional duct opening to the discharge duct so as to enable mixing the humid air with the air drawn from the laundry washer-dryer's environment.

[0004] State of the art American patent document no. US2012227279 describes a dryer having structure for enhanced drying efficiency and method of use.

[0005] State of the art American patent document no. US2010263225 describes a household appliance comprising a first air conduit and a heat pump.

[0006] The aim of the present invention is to achieve a laundry washer-dryer in which the humidity concentration of the air discharged from its body is reduced.

[0007] The laundry washer-dryer realized to achieve the aim of the present invention and disclosed in the first claim and the dependent claims, comprises a feeding duct having a suction port and a blowing port opening into a drum, a fan provided in the feeding duct, enabling the drying air to be blown into the feeding duct through the suction port, and to be blown onto the laundry items in the drum through the blowing port, a conduit through which the humid drying air from the drum is conveyed, a discharge line connected to the conduit, having an aperture opening out of the body, and a bypass line extending between the feeding duct and the discharge line, having an air inlet opening into the feeding duct and an air outlet opening to the discharge line. The bypass line enables sending a portion of the dry air in the feeding duct to be directly conveyed to the discharge duct without being sent to the drum, and the dry air is thus mixed with the humid air from the conduit in the discharge duct before the humid air is discharged through the aperture. The humidity concentration of the air discharged through the aperture is thereby reduced. A high amount of dry air can be conveyed to the discharge line by means of the bypass line without requiring using a secondary fan. The humidity concentration of the air discharged through the aperture is thus reduced in a simple and effective manner.

[0008] In an embodiment of the invention, the suction port of the feeding duct opens into the body. This embodiment is advantageous in that the air in the body has a lower proportion of humidity compared to the air right out of the body, and enables the air routed onto the laundry items by means of the feeding duct and to the discharge duct to be much drier.

[0009] In another embodiment of the invention, the air inlet opens to the feeding duct such that it is disposed at the fan outlet. The dry air is enabled to enter into the bypass line with a higher flow rate by means of the air inlet being adjacent to the fan, and humid air and dry air are mixed effectively in the discharge duct.

[0010] A heater is provided in the feeding duct, enabling heating the air therein, and the air inlet is disposed before the heater so as to enable a portion of the air in the feeding duct to enter into the bypass line before reaching the heater. By this, the dry air sent to the discharge duct is enabled to be cooler than the humid air, decreasing the temperature of the mixture air discharged through the aperture.

[0011] In another embodiment of the invention, at least one barrier is placed in the discharge duct, on which at least one hole is provided, enabling air flow. The air in the discharge duct is thus enabled to release its humidity on the barrier before it reaches the aperture. In a preferred version of this embodiment, the hole is placed eccentrically on the barrier. The air flow direction is thus changed, increasing thermal transmission between air and the barrier.

[0012] The laundry washer-dryer realized to achieve the aims of the present invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a schematic view of the laundry washer-dryer of an embodiment of the invention.

Figure 2 is a partial view of the laundry washer-dryer of another embodiment of the invention.

Figure 3 is an exploded view of the discharge duct, cover and the barrier of another embodiment of the invention.

[0013] The elements in the figures are numbered individually and the correspondence of these numbers are given hereinafter.

1. Laundry washer-dryer
2. Body
3. Drum
4. Suction port
5. Blowing port
6. Feeding duct
7. Fan
8. Aperture
9. Discharge duct
10. Conduit
11. Air inlet
12. Air outlet

- 13. Bypass line
- 14. Heater
- 15. Flap
- 16. Barrier
- 17. Hole
- 18. Cover
- A: Ambient air
- HA: Humid air
- MA: Mixture air

[0014] The laundry washer-dryer (1) comprises a body (2), a drum (3) provided in the body (2), in which the laundry items are placed, a feeding duct (6) having a suction port (4) through which ambient air is sucked, and a blowing port (5) through which the sucked ambient air is fed into the drum (3), at least one fan (7) provided in the feeding duct (6), enabling air flow, a discharge duct (9) opening out of the body (2) by means of an aperture (8) provided on the body (2), and a conduit (10) extending between the drum (3) and the discharge duct (9), enabling transmitting the humid air (HA) coming from within the drum (3) to the discharge duct (9). The laundry washer-dryer (1) may be a laundry dryer or a combined laundry washer-dryer. The dry ambient air (A) sucked into the feeding duct (6) by means of the fan (7) is routed through the blowing port (5) onto the damp laundry items, and collects humidity of the laundry items while passing through the drum (3). The humid air (HA) passes through the conduit (10), reaches the discharge duct (9), and leaves the body (2) through the aperture (8). The laundry items are thus dried by being ventilated.

[0015] The laundry washer-dryer (1) of the invention comprises a bypass line (13) having an air inlet (11) opening to the feeding duct (6) and an air outlet (12) opening to the discharge duct (9), enabling conveying at least part of the ambient air (A) in the feeding duct (6) directly to the discharge duct (9). A portion of, preferably almost half of the ambient air (A) sucked into the feeding duct (6), before reaching to the blowing port (5), enters the bypass line (13) by passing through the air inlet (11) opening to the feeding duct (6), and reaches the discharge duct (9) through the air outlet (12). The remaining ambient air (A) in the feeding duct (6) is routed into the drum (3), and reaches the discharge duct (9) by means of the conduit (10) after being passed through the drum (3). The humid air (HA) from the drum (3) and the dry ambient air (A) conveyed by means of the bypass line (13), are thus mixed in the discharge duct (9) before being sent out of the body (2) through the aperture (8). The bypass line (13) enables transmitting a high amount of dry ambient air (A) to the discharge duct (9), required for effectively diluting the humid air (HA). By this, mixture air (MA) is discharged from the body (2) through the aperture (8), whose humidity concentration being lower compared to the humid air (HA).

[0016] In an embodiment of the invention, the suction port (4) opens into the body (2) so as to enable drawing of the ambient air (A) from within the body (2). The suction

port (4) is disposed on the feeding duct (6) so as to remain inside the body (2). The inner volume of the body (2) is isolated from the outer environment by means of body (2) walls, and the ambient air (A) reaches into the body (2) by means of the gaps on the body (2). This embodiment is advantageous in that the ambient air (A) in the body (2) is drier compared to the ambient air (A) out of the body (2), particularly compared to the air in the vicinity of the aperture (8). This prevents sucking humid air (HA) from out of the body (2) into the feeding duct (6), further reducing the humidity amount of the discharged mixture air (MA).

[0017] In another embodiment of the invention, the air inlet (11) is disposed right after the fan (7) in air flow direction. The air inlet (11) is disposed close to the fan (7) so as to allow part of the ambient air (A) blown by the fan (7) to directly pass into the bypass line (13). This enables the air inlet (11) to be disposed in the portion of the feeding duct (6) with the highest air flow rate, providing air flow with a high flow rate within the bypass line (13).

[0018] At least one heater (14) is provided in the feeding duct (6), enabling heating of the ambient air (A) in the feeding duct (6), and the air inlet (11) is disposed before the heater (14) in air flow direction. A portion of the dry ambient air (A) sucked through the suction port (4), is heated by being passed over the heater (14), and is routed onto the laundry items through the blowing port (5). The dry ambient air (A) enables the laundry items in the drum (3) to be dried quickly and effectively. The air inlet (11) is positioned after the fan (7) and before the heater (14) in air flow direction. By this, a portion of the ambient air (A) sucked from the feeding duct (6) is drawn into the bypass line (13) without being heated, enabling the room temperature dry ambient air (A) to reach the discharge duct (9). The hot and humid air (HA) leaving the laundry items is enabled to be mixed with the dry and cold ambient air (A) before being discharged from the body (2) through the aperture (8), reducing condensation amount of the mixture air (MA) discharged from the body (2).

[0019] In another embodiment of the invention, a flap (15) is provided on the discharge duct (9), enabling blocking of the discharge duct (9) so as to prevent the air to reach to the aperture (8). The flap (15) can be moved between a closed position in which it blocks the discharge duct (9) so as to cut fluid communication between the outer environment and the drum (3), and an open position in which it allows the humid air (HA) from the drum (3) to reach the aperture (8). This embodiment is advantageous in a case in which a process other than the drying/ventilation process, for example the washing process is performed in the drum (3), preventing steam and heat in the drum (3) from escaping to the outside.

[0020] In another embodiment of the invention, at least one barrier (16) is provided in the discharge duct (9), shaped as a disc provided thereon with at least one hole (17) enabling air passage therethrough, on which humidity of the humid air (HA) is condensed. The barrier (16) is placed in the discharge duct (9) preferably so as to

remain right behind the aperture (8). The humid air (HA) in the discharge duct (9) collides the barrier (16) of a temperature close to room temperature, and the humidity in the humid air (HA) condensates on the barrier (16), thereby further reducing humidity of the mixture air (MA).

[0021] In another embodiment of the invention, a cover (18) is mounted on the body (2), shaped as a grill covering the aperture (8). The cover (18) enables retaining particles such as lint or fibers conveyed in the humid air (HA) coming from the drum (3), and blocks access into the discharge duct (9) from out of the body (2).

[0022] By means of the invention, ambient air (A) is enabled to be transferred to a discharge duct (9) with high flow rate without requiring a further forced transmission. The humid air (HA) from a drum (3) is thus enabled to mix with dry ambient air (A) in a simple and effective manner, minimizing the amount of condensation forming on and in the vicinity of a laundry washer-dryer (1).

Claims

1. A laundry dryer or a combined laundry washer-dryer (1) **comprising** a body (2), a drum (3) provided in the body (2), in which the laundry items are placed, a feeding duct (6) having a suction port (4) through which ambient air (A) is sucked, and a blowing port (5) through which the sucked ambient air (A) is fed into the drum (3), at least one fan (7) provided in the feeding duct (6), enabling air flow, a discharge duct (9) opening out of the body (2) by means of an aperture (8) provided on the body (2), and a conduit (10) extending between the drum (3) and the discharge duct (9), enabling transmitting the humid air (HA) coming from within the drum (3) to the discharge duct (9); a bypass line (13) having an air inlet (11) opening to the feeding duct (6) and an air outlet (12) opening to the discharge duct (9), enabling at least part of the ambient air (A) in the feeding duct (6) to be conveyed directly to the discharge duct (9) **characterized by** at least one heater (14) provided in the feeding duct (6), enabling heating of the ambient air (A) in the feeding duct (6), and by the air inlet (11) disposed before the heater (14) in air flow direction.
2. A laundry dryer or a combined laundry washer-dryer (1) according to claim 1, **characterized by** the suction port (4) opening into the body (2) so as to enable drawing of the ambient air (A) from within the body (2).
3. A laundry dryer or a combined laundry washer-dryer (1) according to claim 1 or claim 2, **characterized by** the air inlet (11) disposed right after the fan (7) in air flow direction.
4. A laundry dryer or a combined laundry washer-dryer (1) according to any one of the preceding claims,

characterized by a flap (15) provided on the discharge duct (9), enabling blocking of the discharge duct (9) so as to prevent the air to reach to the aperture (8).

5. A laundry dryer or a combined laundry washer-dryer (1) according to any one of the preceding claims, **characterized by** at least one barrier (16) provided in the discharge duct (9), shaped as a disc provided thereon with at least one hole (17) enabling air passage therethrough, on which humidity of the humid air (HA) is condensed.
6. A laundry dryer or a combined laundry washer-dryer (1) according to any one of the preceding claims, **characterized by** a cover (18) mounted on the body (2), shaped as a grill covering the aperture (8).

Patentansprüche

1. Ein Wäschetrockner oder kombinierter Waschtrockner (1) **umfasst** einen Körper (2), eine in dem Körper (2) vorgesehene Trommel (3), in der die Wäschestücke platziert werden, eine Zuführleitung (6) mit einer Saugöffnung (4), durch die Umgebungsluft (A) angesaugt wird, und eine Blasöffnung (5), durch die die angesaugte Umgebungsluft (A) in die Trommel (3) geleitet wird, mindestens ein in der Zuführleitung (6) vorgesehene Gebläse (7), das einen Luftstrom ermöglicht, eine Abführleitung (9), die aus dem Körper (2) mittels einer Öffnung (8) mündet, die an dem Körper (2) vorgesehen ist, und eine Leitung (10), die sich zwischen der Trommel (3) und dem Abführleitung (9) erstreckt und die Übertragung der aus dem Innern der Trommel (3) kommenden feuchten Luft (HA) zum Abführleitung (9) ermöglicht; eine Umgehungslleitung (13) mit einem zum Zuführleitung (6) mündenden Lufteinlass (11) und einem zum Abführleitung (9) mündenden Luftauslass (12), die es ermöglicht, zumindest einen Teil der Umgebungsluft (A) im Zuführleitung (6) direkt zum Abführleitung (9) zu leiten, **gekennzeichnet ist es durch** mindestens eine im Zuführleitung (6) vorgesehene Heizeinrichtung (14), der eine Erwärmung der Umgebungsluft (A) im Zuführleitung (6) ermöglicht, und durch den Lufteinlass (11), der in Luftströmungsrichtung vor der Heizung (14) angeordnet ist.
2. Ein Wäschetrockner oder kombinierter Waschtrockner (1), wie in Anspruch 1 aufgeführt, **ist dadurch gekennzeichnet, dass** die Saugöffnung (4) in den Körper (2) mündet, um das Ansaugen der Umgebungsluft (A) aus dem Inneren des Körpers (2) zu ermöglichen.
3. Ein Wäschetrockner oder kombinierter Waschtrockner (1), wie in Anspruch 1 oder 2 aufgeführt, **ist da-**

durch gekennzeichnet, dass der Lufteinlass (11) in Luftströmungsrichtung unmittelbar hinter dem Gebläse (7) angeordnet ist.

4. Ein Wäschetrockner oder kombinierter Waschtrockner (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** eine Klappe (15), die an der Abführleitung (9) vorgesehen ist und ein Blockieren der Abführleitung (9) ermöglicht, um zu verhindern, dass die Luft die Öffnung (8) erreicht. 5 10
5. Ein Wäschetrockner oder kombinierter Waschtrockner (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** mindestens eine Barriere (16), die in dem Abführleitung (9) vorgesehen ist, geformt als eine darauf vorgesehene Scheibe mit mindestens einem Loch (17), das einen Luftdurchgang ermöglicht, an dem Feuchtigkeit der feuchten Luft (HA) kondensiert. 15 20
6. Ein Wäschetrockner oder kombinierter Waschtrockner (1), wie in einem der vorherigen Ansprüchen aufgeführt, **ist dadurch gekennzeichnet, dass** eine Abdeckung (18), die auf dem Körper (2) montiert ist und als Gitter geformt ist, die Öffnung (8) abdeckt. 25

Revendications

1. Un sèche-linge ou un lave-linge-sécheur combiné (1) **comprenant** un corps (2), un tambour (3) prévu dans le corps (2), dans lequel les articles de linge sont placés, un conduit d'alimentation (6) ayant un orifice d'aspiration (4) à travers lequel l'air ambiant (A) est aspiré, et un orifice de soufflage (5) à travers lequel l'air ambiant aspiré (A) est introduit dans le tambour (3) au moins un ventilateur (7) prévu dans le conduit d'alimentation (6), permettant une circulation d'air, un conduit d'évacuation (9) s'ouvrant hors du corps (2) au moyen d'une ouverture (8) prévue sur le corps (2), et un conduit (10) s'étendant entre le tambour (3) et le conduit de décharge (9), permettant de transmettre l'air humide (HA) provenant de l'intérieur du tambour (3) au conduit de décharge (9); une conduite de dérivation (13) ayant une entrée d'air (11) s'ouvrant sur le conduit d'alimentation (6) et une sortie d'air (12) s'ouvrant sur le conduit de décharge (9), permettant à au moins une partie de l'air ambiant (A) dans le conduit d'alimentation (6) d'être acheminé directement vers le conduit de décharge (9), **caractérisé par** au moins un dispositif de chauffage (14) prévu dans le conduit d'alimentation (6), permettant de chauffer l'air ambiant (A) dans le conduit d'alimentation (6), et par l'entrée d'air (11) disposée avant le réchauffeur (14) dans le sens du flux d'air. 30 35 40 45 50 55

2. Un sèche-linge ou un lave-linge-sécheur combiné (1) selon la déclaration 1, **caractérisé par** l'orifice d'aspiration (4) s'ouvrant dans le corps (2) de manière à permettre l'aspiration de l'air ambiant (A) depuis l'intérieur du corps (2).
3. Un sèche-linge ou un lave-linge-sécheur combiné (1) selon la déclaration 1 ou la déclaration 2, **caractérisé par** l'entrée d'air (11) disposée juste après le ventilateur (7) dans la direction du flux d'air.
4. Un sèche-linge ou un lave-linge-sécheur combiné (1) selon l'une quelconque des déclarations précédentes, **caractérisé par** un volet (15) prévu sur le conduit d'évacuation (9), permettant de bloquer le conduit d'évacuation (9) de manière à empêcher l'air d'atteindre l'ouverture (8).
5. Un sèche-linge ou un lave-linge-sécheur combiné (1) selon l'une quelconque des déclarations précédentes, **caractérisé par** au moins une barrière (16) prévue dans le conduit d'évacuation (9), en forme de disque muni d'au moins un trou (17) permettant le passage de l'air à travers celui-ci, sur lequel l'humidité de l'air humide (HA) est condensée.
6. Un sèche-linge ou un lave-linge-sécheur combiné (1) selon l'une quelconque des déclarations précédentes, **caractérisé par** un couvercle (18) monté sur le corps (2), en forme de grille recouvrant l'ouverture (8).

Figure 1

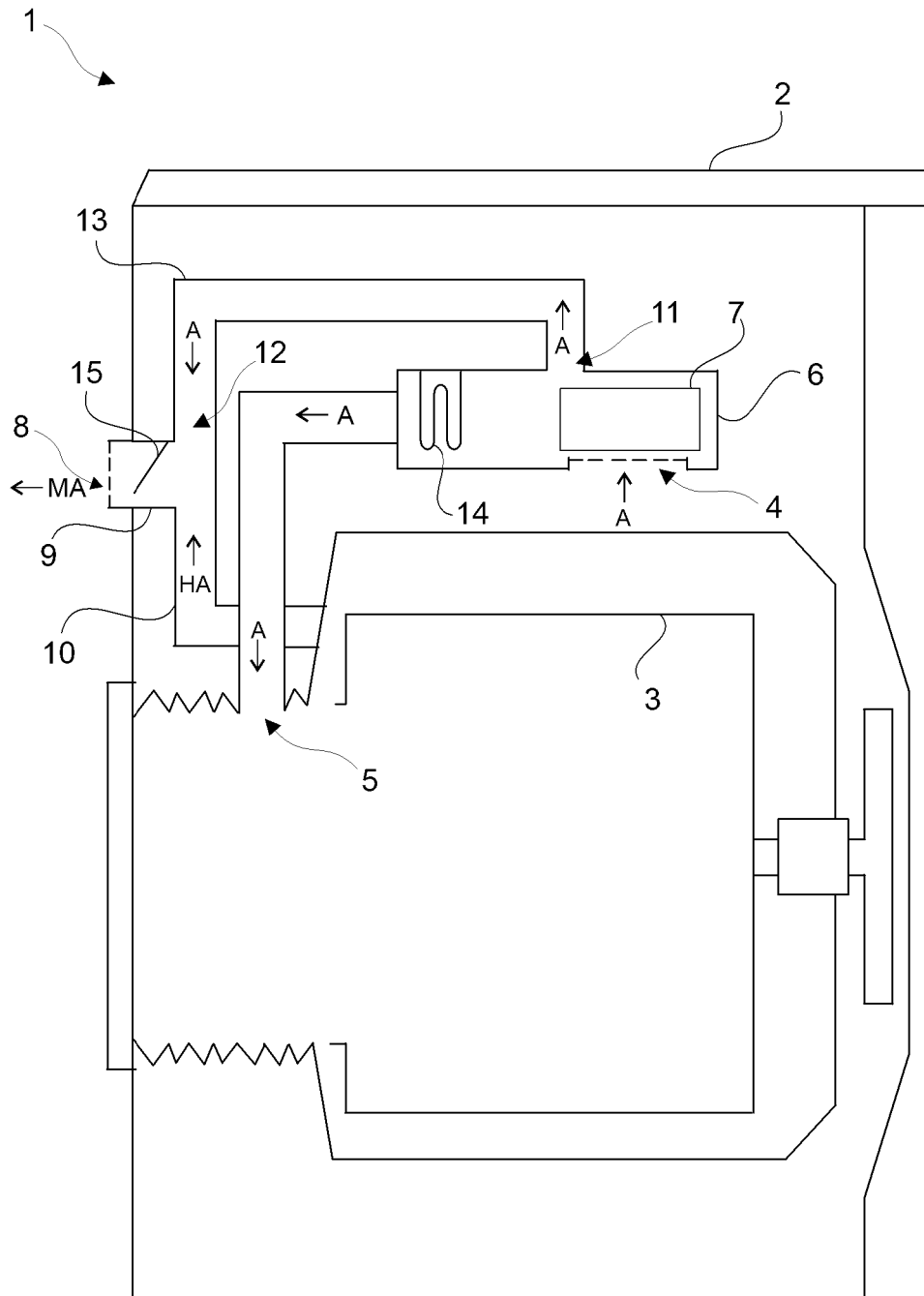


Figure 2

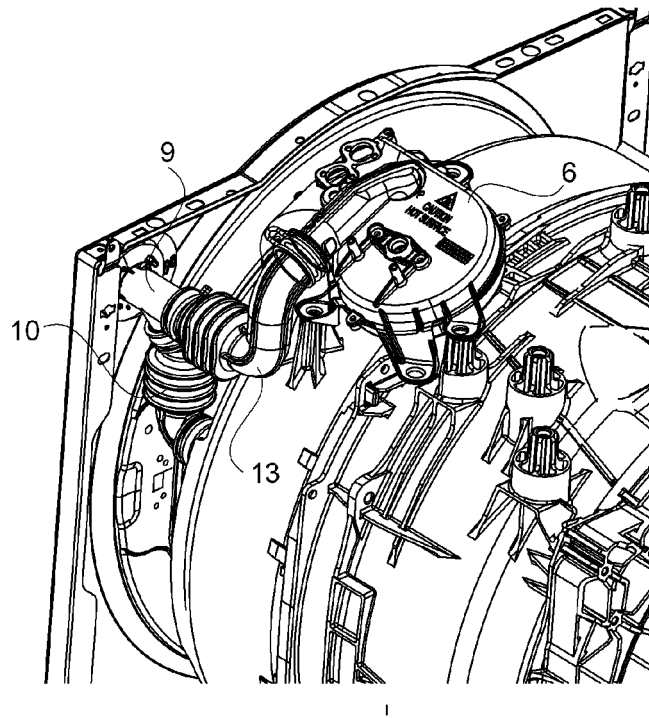
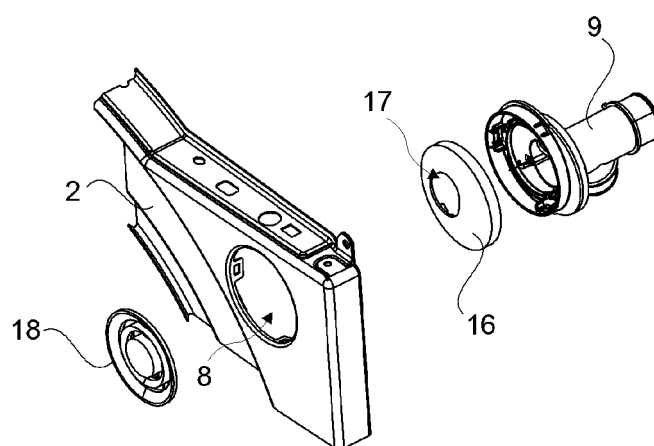


Figure 3



REFERENCES CITED IN THE DESCRIPTION

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