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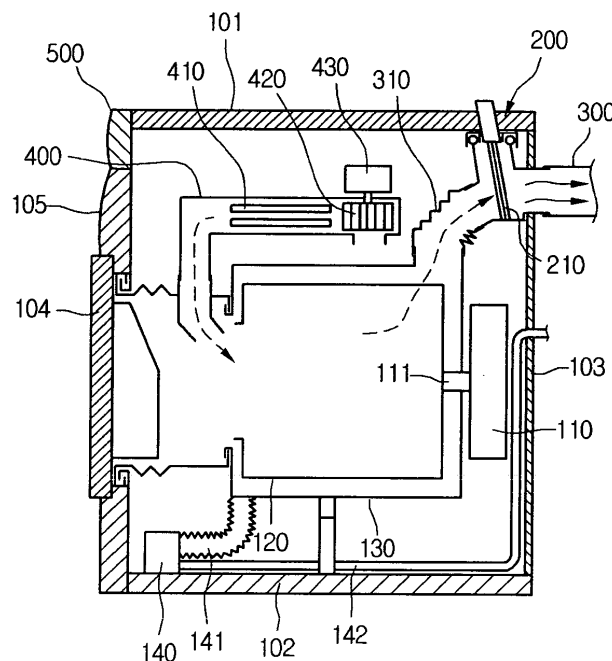
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(54) Washing machine combined with dryer

(57) There is provided a washing machine combined with a dryer (100). In the washing machine (100), a cabinet (103) is provided, a tub (130) is installed in the cabinet (103), an air-vent hose (310) is installed at an outer sur-

face of the tub (130), a lint filter assembly (200) has one end connected to the air-vent hose (310) to remove lint from air discharged from the tub (130), and an air-vent duct (300) is connected to the other end of the lint filter assembly (200).

FIG.2



## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

[0001] The present invention relates to a washing machine, and more particularly, to a washing machine combined with a dryer, in which a lint filter assembly is detachably installed to collect and remove foreign substances such as lint generated during a heat drying operation.

#### Description of the Related Art

[0002] A washing machine is a home appliance for washing clothes automatically. A typical washing machine uses an electric motor as a driving unit to agitate clothes together with water containing detergent to remove dirt from the clothes. The washing process of the washing machine generally includes washing, rinsing, spin-drying, and/or heat-drying operations.

[0003] Washing machines can be classified into a drum type washing machine, an agitator type washing machine, and a pulsator type washing machine.

[0004] The drum type washing machine includes a plurality of lifters inside of a drum to lift up and drop down clothes in the drum as the drum is rotated about a horizontal axis at a low speed. Therefore, the clothes can be cleaned by the collision with water containing detergent.

[0005] Meanwhile, a washing machine combined with a dryer is recently introduced to satisfy user's demand. In this washing machine, clothes are heat dried after washed, rinsed, and spin dried.

[0006] The washing machine combined with the dryer can be classified into a condenser type and a vented type depending on a drying method.

[0007] The washing machine combined with the condenser type dryer removes residual moisture from clothes by circulating air through a drum, a heat exchanger, and a heater without discharging the air out of the washing machine until the heat drying operation is completed. That is, the air becomes moist after passing through the drum, the moist air cools down at the heat exchanger by exchanging heat with a cooling water, the moisture in the air condenses and drops down to the bottom of the tub as the moist air cools down, and the air is heated again by the heater and then enters the drum again.

[0008] In the washing machine combined with the vented type dryer, on the contrary, a heated dry air is blew into a drum to take moisture from clothes and then the air containing lots of moisture is discharged out of the washing machine through a connecting pipe connected between a tub and a vent duct.

[0009] However, the moist air, which is discharged from the washing machine combined with the vented type dryer, contains lint such as fluff, thereby contaminating the indoor air.

[0010] Further, the lint in the moist air, though it is light, falls down and builds up while it is discharged from the tub to the outside through the vent duct. Particularly, the lint builds up on a pleated surface of the connecting pipe connected between the tub and the vent duct. The build-up of the lint becomes bigger according to the time of use, blocking the vent duct. Further, the build-up of the lint increases the possibility of fire. Therefore, there is an increasing need for a structure that can remove the problems related to the lint.

### SUMMARY OF THE INVENTION

[0011] Accordingly, the present invention is directed to a washing machine combined with a dryer that substantially obviates one or more problems due to limitations and disadvantages of the related art.

[0012] An object of the present invention is to provide a washing machine combined with a vented type dryer, in which an air-vent line, including an air-vent hose connected between a tub and the air-vent duct, is prevented from being plugged by lint generated during a heat drying operation.

[0013] Another object of the present invention is to provide a washing machine combined with a dryer, in which lint generated during a heat drying operation is prevented from building up in an air-vent line and therefore the possibility of fire reduces.

[0014] A further another object of the present invention is to provide a washing machine combined with a dryer that has a lint filter assembly to remove lint, the lint filter assembly being designed such that a user can easily install and replace it.

[0015] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0016] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, there is provided a washing machine combined with a dryer, including: a cabinet; a tub installed in the cabinet; an air-vent hose installed at an outer surface of the tub; a lint filter assembly having one end connected to the air-vent hose to remove lint from air discharged from the tub; and an air-vent duct connected to the other end of the lint filter assembly.

[0017] In another aspect of the present invention, there is provided a washing machine combined with a dryer, including: a cabinet; a top plate to cover a top of the cabinet; a tub installed in the cabinet; a lint filter assembly including a lint filter to remove lint from a moist air discharged from the tub, a filter housing to receive the lint

filter, and a seal fitted between the lint filter and the filter housing to prevent air leakage; and a dryer duct installed above the tub to supply a hot air to the tub during a heat drying operation.

**[0018]** In a further another aspect of the present invention, there is provided a washing machine combined with a dryer, including: a lint filter including a mesh type filter, a filter frame around the mesh type filter, and a handgrip formed on a top of the filter frame; a seal fitted around the lint filter; a filter housing including a filter chamber to receive the lint filter, an air inlet to introduce a moist air discharged from a tub, and an air outlet to discharge the moist air introduced through the air inlet; and a filter cover mounted on an end of the filter chamber.

**[0019]** In a still further another aspect of the present invention, there is provided a washing machine combined with a dryer, including: a tub; an air-vent hose connected to a rear of the tub; and a detachable lint filter assembly connected with the air-vent hose to remove lint from a moist air discharged through the air-vent hose.

**[0020]** According to the present invention, the lint separated from clothes during a heat drying operation can be collected and regularly removed, such that the lint does not build up in the air-vent duct.

**[0021]** Further, since the collected lint can be regularly removed by a user, the possibility of fire in the washing machine due to the build-up of the lint is reduced.

**[0022]** Further, since the lint filter can be easily detached from the washing machine, the user does not need to call a repairman to clean or replace the lint filter, thereby increasing user convenience.

**[0023]** It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0024]** The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

**[0025]** Fig. 1 is a perspective view of a washing machine combined with a dryer in which a lint filter assembly is installed according to the present invention;

**[0026]** Fig. 2 is a side sectional view of the washing machine combined with the dryer depicted in Fig. 1;

**[0027]** Fig. 3 is an exploded cut-away view of a lint filter assembly according to the present invention;

**[0028]** Fig. 4 is an enlarged sectional view showing installation of the lint filter assembly depicted in Fig. 3; and

**[0029]** Fig. 5 is a perspective view of a washing machine combined with a dryer in which a lint filter assembly is installed according to another embodiment of the

present invention.

### **DETAILED DESCRIPTION OF THE INVENTION**

**[0030]** Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

**[0031]** Fig. 1 is a perspective view of a washing machine combined with a dryer in which a lint filter assembly is installed according to the present invention, and Fig. 2 is a side sectional view of the washing machine combined with the dryer depicted in Fig. 1.

**[0032]** Referring to Figs. 1 and 2, a washing machine combined with a dryer 100 includes: an enclosing cabinet 103; a top plate 101 mounted on a top of the cabinet 103; a base plate 102 installed on a bottom of the cabinet 103; a front cover 105 mounted on a front of the cabinet 103; a door 104 rotatably installed at a center of the front cover 105; a control panel 500 installed at an upper portion of the front cover 105, the control panel 500 having a plurality of input buttons and a display; a detergent dispenser drawer 510 inserted into a side of the control panel 500 to receive detergent or fabric softener.

**[0033]** Further, the washing machine combined with the dryer 100 includes a tub 130 installed in the cabinet 103 to receive water (or mixture of water and detergent), a drum 120 installed in the tub 130 to receive clothes, and a driving motor 110 mounted on a back of the tub 130 to rotate the drum 120. The driving motor 110 includes a shaft 111 connected to a rear of the drum 120.

**[0034]** Further, the washing machine combined with the dryer 100 includes a dryer duct 400 installed between the cabinet 103 and a top of the tub 130 to introduce a surrounding air into the tub 130, an air-vent hose 310 connected to a top rear of the tub 130 to vent a moist air from the drum 120 to the outside, and a lint filter assembly 200 removably installed in the air-vent hose 310 to remove lint from the moist air passing therethrough during a heat drying operation. Herein, the term "lint" is used to refer to little pieces of thread and fluff, dust, and other particles that are contained in the air passing through the lint filter assembly 200.

**[0035]** The lint filter assembly 200 has one end connected to the tub 130 and the other end connected to an air-vent duct 300. The dryer duct 400 includes a blower fan 420 installed therein to draw air and a heater 410 to apply heat to the drawn air. Also, the dryer duct 400 includes a fan motor 430 to drive the blower fan 420.

**[0036]** Further, the washing machine combined with the dryer 100 includes a water drain tube 141 of which one end is connected to a bottom of the tub 130 to discharge water contaminated during a washing operation or a rinsing operation, a water drain pump 140 connected to the other end of the water drain tube 141 to pump out the contaminated water, and a water drain hose 142 to discharge the contaminated water pumped by the water drain pump 140 to the outside.

**[0037]** An operation of the washing machine combined

with the dryer 100 will now be described.

**[0038]** First, a user opens the door 104, loads clothes in the drum 120 through the opened door 104, and closes the door 104. Next, the user pulls out the detergent dispenser drawer 510 to fill it with detergent and fabric softener. Then, the user selects operating conditions using the control panel 500 and presses a start button on the control panel 500.

**[0039]** Upon the pressing of the start button of the control panel 500, water is supplied to the detergent dispenser drawer 510 through a water inlet hose (not shown). The water mixed with the detergent (washing water) enters the tub 130 through a bellows (not shown) connected between the detergent dispenser drawer 510 and the tub 130. The water is supplied until the tub 130 is filled with the water to a predetermined level. After the water is filled, the driving motor 110 drives the drum 120 to carry out a washing operation.

**[0040]** During the washing operation, the clothes and the washing water is lifted up by the rotation of the drum 120 and then dropped down. By these up and down motions and the detergent, the dirt can be removed from the clothes during the washing operation.

**[0041]** After the washing operation is carried out for a set time, the washing water contaminated is discharged and fresh water is supplied to the tub 130 to carry out a rinsing operation. In detail, when the contaminated water is discharged, the driving motor 110 is stopped and the water drain pump 140 is operated to drain the contaminated water from the tub 130 through the water drain tube 141 toward the water drain hose 142. After discharging the contaminated water, the fresh water (rinsing water) is supplied to the tub 130 for the rinsing operation.

**[0042]** Further, a spin drying operation is carried out after the rinsing operation to remove residual water from the clothes, and then a heat drying operation is optionally carried out.

**[0043]** In the heat drying operation, the blower fan 420 installed in the dryer duct 400 is driven to draw in a surrounding air from between the cabinet 103 and the tub 130. The heater 410 applies heat to the drawn-in air, and the heated air is directed into the tub 130 along the dryer duct 400. The heated air flows from the tub 130 into the drum 120 through the plurality of holes 141 defined in the drum 120. The heated air, having a low humidity, takes moisture from the clothes and therefore it becomes a moist air. Then, the moist air is discharged to the outside of the washing machine 100 through air-vent hose 310, the lint filter assembly 200, and the air-vent duct 300.

**[0044]** Here, the lint filter assembly 200 collects lint from the moist air passing therethrough. The collected lint builds up on a filter (as will be described later) of the lint filter assembly 200. A user can detach the filter from the washing machine 100 to clean it.

**[0045]** Fig. 3 is an exploded cut-away view of a lint filter assembly according to the present invention, and Fig. 4 is an enlarged sectional view showing installation of the lint filter assembly depicted in Fig. 3.

**[0046]** Referring to Figs. 3 and 4, the lint filter assembly 200 is located between the tub 130 and the cabinet 103 to connect the air-vent hose 310 and the air-vent duct 300.

**[0047]** In detail, the lint filter assembly 200 includes a lint filter 210 to collect lint, a filter housing 230 in which the lint filter 210 is detachably inserted, and a filter cover 220 coupled to a top of the filter housing 230, and a seal 240 fitted around the lint filter 210.

**[0048]** The lint filter 210 includes a mesh type filter 212, a filter frame 211 around the filter 212 to hold the filter 212, a handgrip 213 extended from a top of the filter frame 211 for a use to hold it, and a seal groove 214 defined between the filter frame 211 and the handgrip 213 with a predetermine depth to receive the seal 240. The handgrip 213 is sized such that it protrudes from the top plate 101 by a predetermined length when the lint filter 210 is completely inserted. Therefore, a use can easily detach the lint filter 210 from the washing machine 100 by simply pulling the handgrip 213 out. The filter frame 211 defines a hooking groove 215 at its lower end with a predetermined depth to couple with a hooking tab (as will be described later) of the filter housing 230, thereby preventing the lint filter 210 from shaking and moving out from the installed position. Since a hot, moist air discharged from the drum 120 is directed to the filter 212, the filter 212 may be made of heat resistant material for durability against the high-temperature air passing therethrough.

**[0049]** The filter housing 230 includes a filter chamber 231 having a substantially the same height as the filter frame 211 to receive the lint filter 210, an air inlet 233 extended from one side of the filter chamber 231 for connection with the air-vent hose 310, and an air outlet 234 extendedly from the other side of the filter chamber 231 for connection with the air-vent duct 300. Since the air inlet 233 and the air outlet 234 are formed in opposite directions to each other, air can smoothly flow from the air-vent hose 310 to the air-vent duct 300 after passing through the lint filter 210.

**[0050]** Further, the filter housing 230 includes a mounting groove 236 at an inner bottom to receive the lower end of the lint filter 210, a bottom guide rib 235 protruded along one side of the mounting groove 236 with a predetermined height, a hooking tab 237 protruded from the other side of the mounting groove 236 toward the bottom guide rib 235, and side guide ribs 232 at an inner side face of the filter chamber 231.

**[0051]** The side guide ribs 232 are formed in the insertion direction of the lint filter 210, i.e., in a vertical direction, to guide the insertion of the lint filter 210.

**[0052]** In detail, the side guide ribs 232 are two in number and are spaced apart from each other to receive the filter frame 211 therebetween. Therefore, air leakage can be prevented between the filter frame 211 and the inner wall of the filter chamber 231. The bottom guide rib 235 is formed on the inner bottom of the filter housing 230 to exactly and tightly receive the lower end of the lint filter 210. Also, since the lower end of the filter frame 211

is inserted into the mounting groove 236, air leakage can be prevented between the lower end of the filter frame 211 and the filter housing 230. Further, when the lower end of the filter frame 211 is inserted into the mounting groove 236, the hooking tab 237 of the filter housing 230 snaps into the hooking groove 215 of the filter frame 211 to lock the filter frame 211, thereby preventing separation of the lint filter 210.

**[0053]** The filter cover 220 covers the opened top of the filter housing 230, i.e., the opened top of the filter chamber 231. The filter cover 220 defines a filter inserting slot 221 to receive the lint filter 210. When the lint filter 210 is inserted into the filter inserting slot 221, the seal 240 fitted around the lint filter 210 is brought into tight contact with the inner surface of the filter inserting slot 221, thereby hermetically sealing the gap.

**[0054]** An installation of the lint filter 210 will now be described.

**[0055]** First, a user holds the handgrip 213 of the lint filter 210 with a hand and then he/she inserts the lint filter 210 into the filter housing 230 with the lower end of the filter frame 211 pointing to the filter inserting slot 221. The inserted lint filter 210 is guided by the side guide ribs 232 until the lower end of the filter frame 211 is completely inserted into the mounting groove 236 of the filter housing 230. Here, the bottom guide rib 235 of the filter housing 230 exactly places the lower end of the filter frame 211 into the mounting groove 236, and the hooking tab 237 of the filter housing 230 snaps into the hooking groove 215 of the filter frame 211. When the lint filter is completely inserted, the seal 240 around the lint filter 210 hermetically seals the gap between the lint filter 210 and the filter inserting slot 221 of the filter cover 220. Therefore, the lint filter 210 can collect lint from a moist air discharged from the tub 130 through the air-vent hose 230, and it can be detached from the washing machine 100 to shake build-up of the lint off the filter 212.

**[0056]** Meanwhile, the side guide ribs 232 are inclined at a predetermined angle to the vertical to receive the lint filter 210 at the predetermined angle, such that a user can easily insert and detach the lint filter 210 by pushing and pulling the handgrip 213.

**[0057]** Further, the seal 240, fitted into the seal groove 214 of the handgrip 213, may be made of rubber or the like to hermetically seal the gap between the lint filter 210 and the filter cover 220.

**[0058]** Fig. 5 is a perspective view of a washing machine combined with a dryer in which a lint filter assembly is installed according to another embodiment of the present invention.

**[0059]** Referring to Fig. 5, the lint filter assembly 200 is installed at a side of the cabinet, such that a user can insert and detach the lint filter 210 into and from the side.

**[0060]** That is, the filter chamber 231 of the filter housing 230 at a side of the washing machine 100, and the cabinet 103 defines a slot to receive the lint filter 210.

**[0061]** Therefore, other stuff such as a dish washer can be placed on the top of the washing machine 100.

That is, the top surface of the washing machine can be more effectively used. Also, when the lint filter 210 is inserted into the side of the washing machine 100, the handgrip 213 is protruded from the side surface and it is tilted toward the front of the washing machine 100, such that a use can easily insert and detach the lint filter 210.

**[0062]** It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

## 15 Claims

1. A washing machine combined with a dryer, comprising:

a cabinet;  
a tub installed in the cabinet;  
an air-vent hose installed at an outer surface of the tub;  
a lint filter assembly having one end connected to the air-vent hose to remove lint from air discharged from the tub; and  
an air-vent duct connected to the other end of the lint filter assembly.

2. The washing machine according to claim 1, wherein the lint filter assembly includes:

a filter housing connecting the air-vent hose and the air-vent duct; and  
a lint filter detachably installed in the filter

3. The washing machine according to claim 2, wherein the lint filter includes:

a filter made of mesh having a plurality of fine holes;  
a filter frame around the filter; and  
a handgrip extended from a top of the filter frame.

4. The washing machine according to claim 2, wherein the lint filter includes a seal fitted around an outer surface thereof.

5. The washing machine according to claim 2, wherein the filter housing includes:

a filter chamber to receive the lint filter;  
an air inlet connected to the air-vent hose; and  
an air outlet connected to the air-vent duct.

6. The washing machine according to claim 5, wherein the lint filter assembly further includes a filter cover

to cover a top of the filter chamber.

7. The washing machine according to claim 2, wherein the filter housing includes a guide rib at an inner surface with a predetermined length to guide the installation of the lint filter.

8. The washing machine according to claim 2, wherein the lint filter defines a hooking groove in a lower end with a predetermined depth, and the filter housing includes a protruded hooking tab for coupling with the hooking groove.

9. The washing machine according to claim 2, wherein the filter housing defines a mounting groove to receive a lower end of the lint filter.

10. A washing machine combined with a dryer, comprising:

a cabinet;  
a top plate to cover a top of the cabinet;  
a tub installed in the cabinet;  
a lint filter assembly including a lint filter to remove lint from a moist air discharged from the tub, a filter housing to receive the lint filter, and a seal fitted between the lint filter and the filter housing to prevent air leakage; and  
a dryer duct installed above the tub to supply a hot air to the tub during a heat drying operation.

11. The washing machine according to claim 10, wherein the filter housing includes:

one side connected to an air-vent hose installed at the tub; and  
the other side connected to an air-vent duct installed in the cabinet.

12. The washing machine according to claim 10, wherein the lint filter is a mesh type filter made of heat resistant material.

13. The washing machine according to claim 10, wherein the lint filter has a portion protruded to an outside of the top plate or the cabinet.

14. The washing machine according to claim 10, wherein the lint filter is inserted in the filter housing at a predetermined angle to the vertical.

15. The washing machine according to claim 10, wherein the lint filter is inserted into the filter housing from the top plate or from a side of the cabinet.

16. The washing machine according to claim 10, wherein the lint filter includes a handgrip protruded to an outside of the top plate or the cabinet, for a user to hold.

17. The washing machine according to claim 10, wherein the filter housing includes:

at least one side guide rib formed on an inner side face with a predetermined length to guide a side of the lint filter; and  
a bottom guide rib formed on an inner bottom to support an end of the lint filter.

18. The washing machine according to claim 17, wherein the at least one side guide rib is two in number in an insertion direction of the lint filter, and the side of the lint filter is inserted between the two side guide ribs.

19. A washing machine combined with a dryer, comprising:

a lint filter including a mesh type filter, a filter frame around the mesh type filter, and a handgrip formed on a top of the filter frame;  
a seal fitted around the lint filter;  
a filter housing including a filter chamber to receive the lint filter, an air inlet to introduce a moist air discharged from a tub, and an air outlet to discharge the moist air introduced through the air inlet; and  
a filter cover mounted on an end of the filter chamber.

20. A washing machine combined with a dryer, comprising:

a tub;  
an air-vent hose connected to a rear of the tub; and  
a detachable lint filter assembly connected with the air-vent hose to remove lint from a moist air discharged through the air-vent hose.

FIG.1

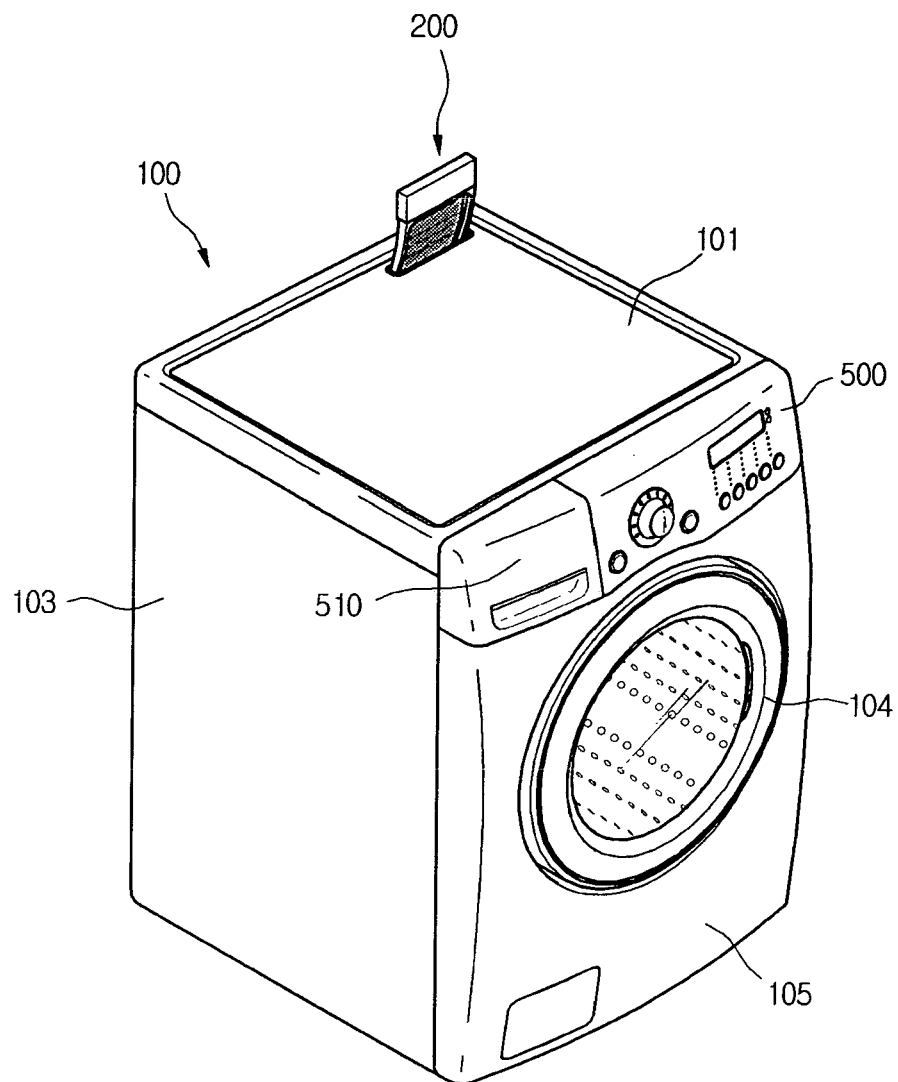


FIG.2

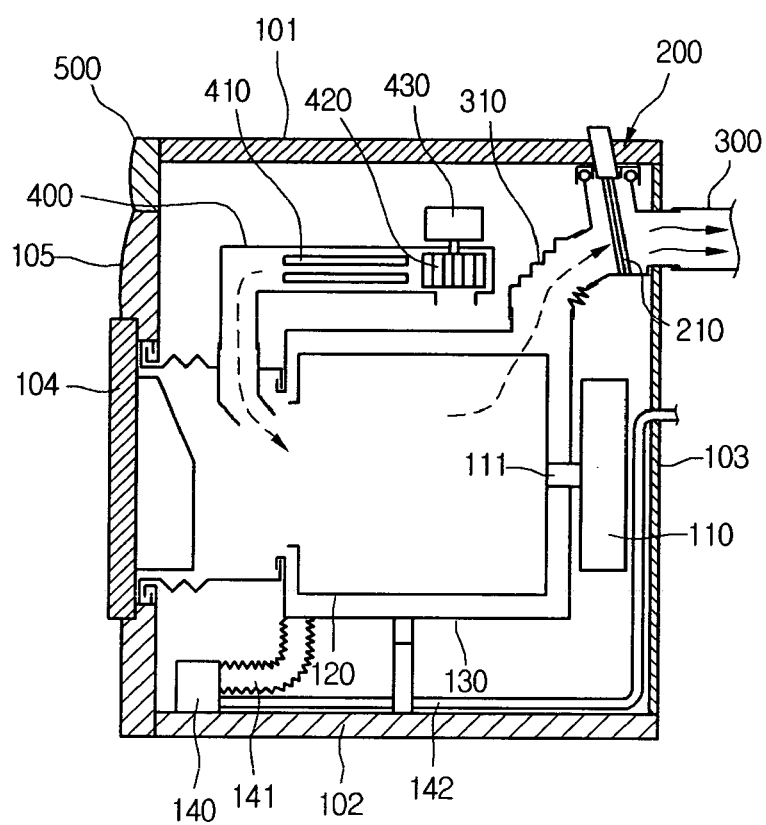


FIG.3

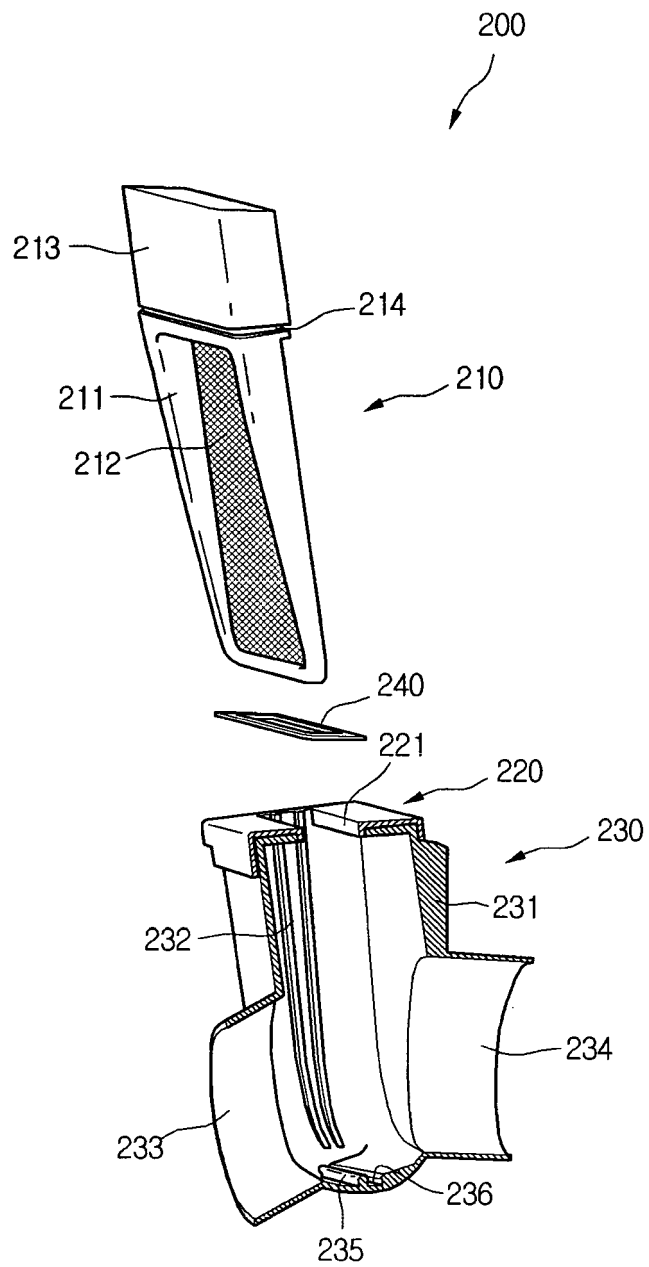


FIG.4

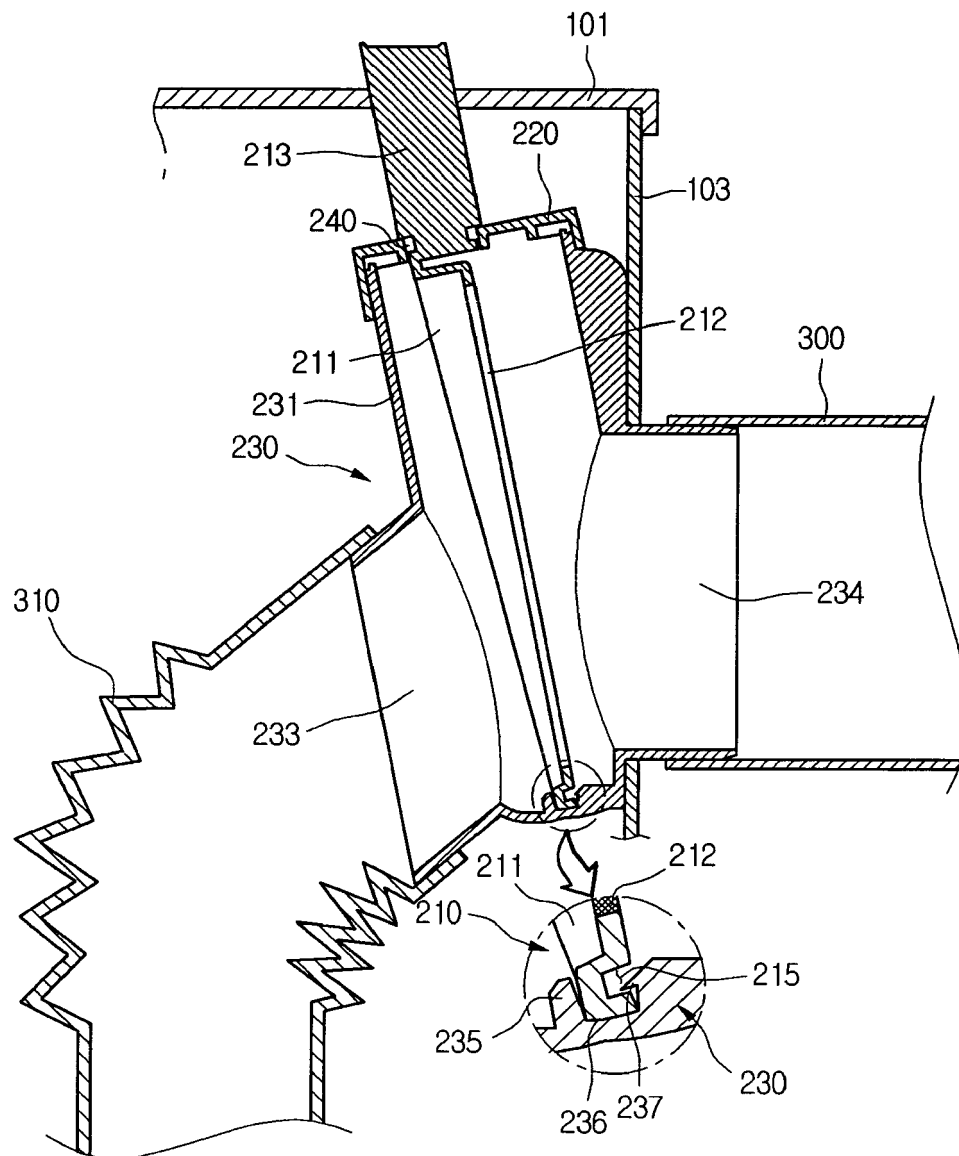
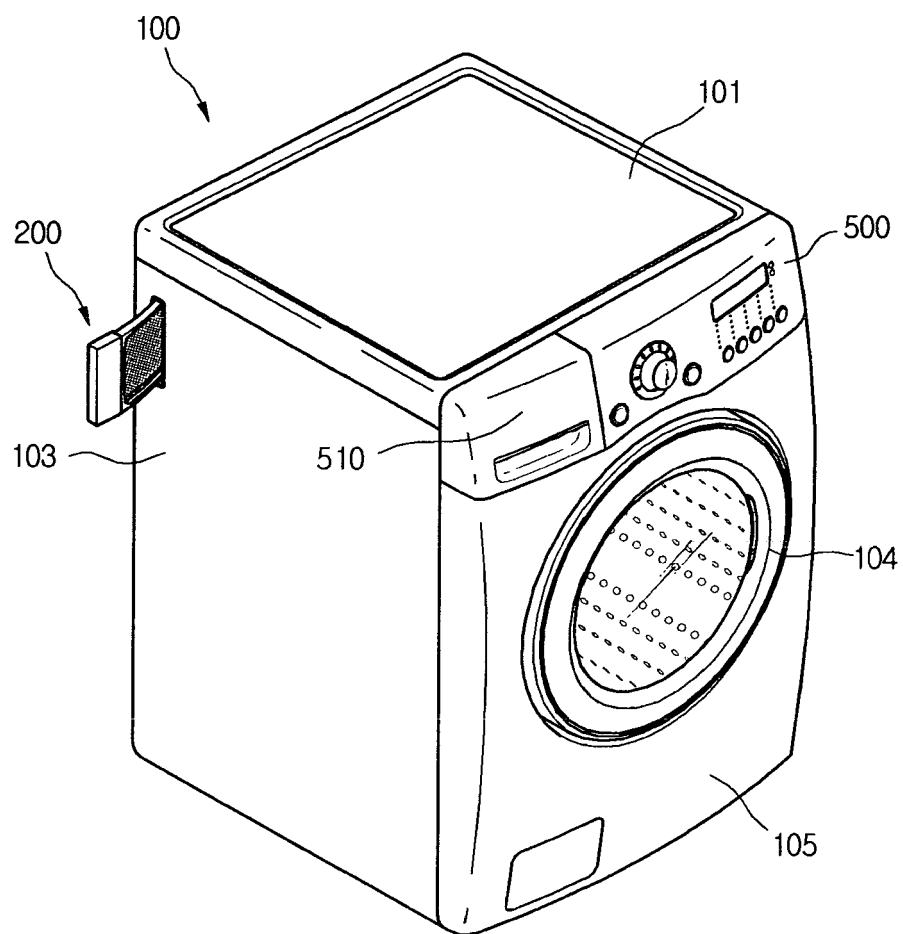


FIG.5





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 05 29 1434

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                    |                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                                     | Relevant to claim                                  | CLASSIFICATION OF THE APPLICATION (IPC)    |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 1 554 725 A (HOTPOINT LTD)<br>31 October 1979 (1979-10-31)<br>* page 1, lines 8-39 *<br>* page 2, lines 85-112 *<br>* page 4, lines 6-46 *<br>* figures 1-5 *                  | 1,2,5                                              | D06F25/00<br>D06F58/22                     |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----                                                                                                                                                                             | 3,4,6-20                                           |                                            |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 37 28 940 A1 (MIELE & CIE GMBH & CO;<br>MIELE & CIE GMBH & CO, 33332 GUETERSLOH,<br>DE) 9 March 1989 (1989-03-09)<br>* column 3, line 20 - column 4, line 19 *<br>* figure 1 * | 1                                                  |                                            |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 195 04 034 A1 (MIELE & CIE GMBH & CO,<br>33332 GUETERSLOH, DE; MIELE & CIE. GMBH &<br>CO) 7 September 1995 (1995-09-07)<br>* column 2, lines 2-55 *<br>* figures 1-5 *         | 1                                                  |                                            |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 4 653 200 A (WERNER ET AL)<br>31 March 1987 (1987-03-31)<br>* column 2, line 10 - column 3, line 52 *<br>* figures 1-6 *                                                       | 3,6,8,9                                            | TECHNICAL FIELDS<br>SEARCHED (IPC)<br>D06F |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | DE 85 35 335 U1 (BOSCH-SIEMENS HAUSGERAETE<br>GMBH, 8000 MUENCHEN, DE)<br>14 May 1987 (1987-05-14)<br>* page 3, line 16 - page 5, line 12 *<br>* figures 1-3 *                    | 4,7                                                |                                            |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 5 651 188 A (SWANSON ET AL)<br>29 July 1997 (1997-07-29)<br>* column 1, line 54 - column 5, line 50 *<br>* claims 1-15; figures 1-7b *                                         | 10-19                                              |                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -----<br>-/--                                                                                                                                                                     |                                                    |                                            |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                   |                                                    |                                            |
| Place of search<br>Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                   | Date of completion of the search<br>5 January 2006 | Examiner<br>Weinberg, E                    |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                                                   |                                                    |                                            |

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EPO FORM 1503 03.82 (P04/C01)



| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                             |                                                           |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                               | Relevant to claim                                         | CLASSIFICATION OF THE APPLICATION (IPC) |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 1 495 869 A (ZEROWATT SPA)<br>21 December 1977 (1977-12-21)<br>* page 2, lines 9-26 *<br>* figure 1 *                                                    | 20                                                        |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -----<br>EP 1 103 647 A (MIELE & CIE. GMBH & CO;<br>MIELE & CIE. KG) 30 May 2001 (2001-05-30)<br>* paragraphs [0008] - [0014] *<br>* figures 1-4 *<br>----- | 4,10-19                                                   |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                             |                                                           | TECHNICAL FIELDS<br>SEARCHED (IPC)      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                             |                                                           |                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                             |                                                           |                                         |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                             | Date of completion of the search<br><b>5 January 2006</b> | Examiner<br><b>Weinberg, E</b>          |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                             |                                                           |                                         |

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European Patent  
Office

Application Number

EP 05 29 1434

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-9

relate to a washing machine combined with a dryer with a lint filter assembly wherein the lint filter is "detachably" installed in the filter housing (see claim 2) wherein the lint filter includes a handgrip formed on a top of the filter frame (see claim 3).

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2. claims: 10-19

relate to a washing machine combined with a dryer wherein the lint filter assembly includes a seal fitted between the lint filter and the filter housing to prevent air leakage (see claims 10, 19).

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3. claim: 20

relates to a washing machine combined with a dryer with an air vent hose connected to the rear of the tub and a detachable lint filter assembly connected with the air vent hose.

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 29 1434

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-01-2006

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