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(54) Tumble dryer

(57) A tumble dryer has the usual vent to the exterior, but in a cooling part of the drying cycle, a valve 13 is operated so that fresh air is drawn into the dryer for a period of time, in order to improve the drying results.

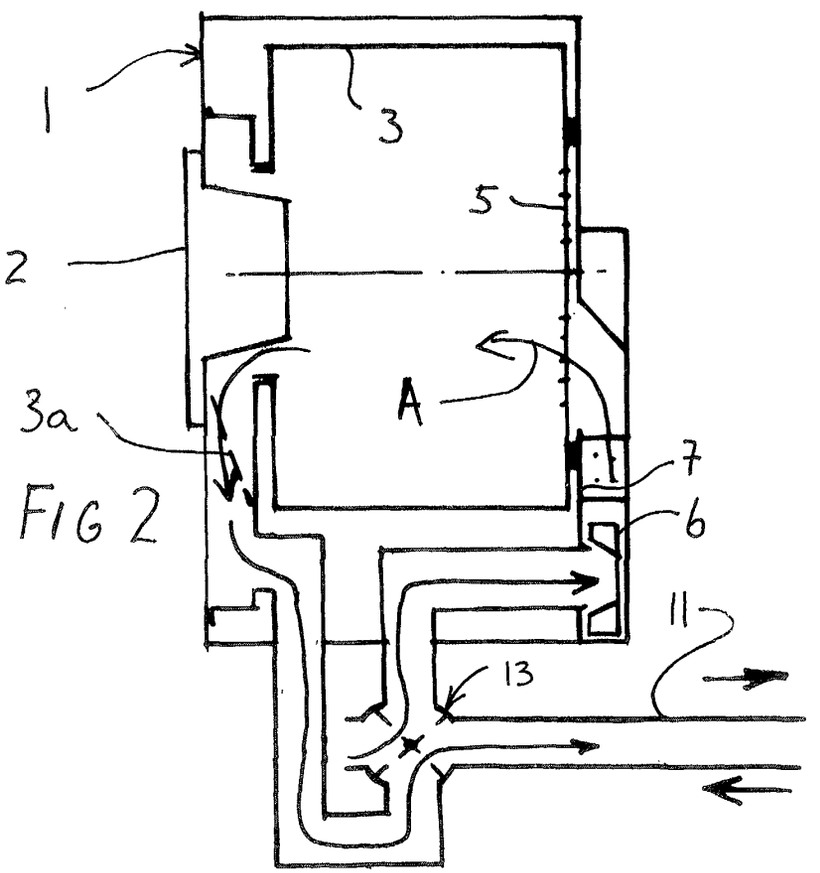

FIG 2

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Description

[0001] This invention relates to domestic tumble dryers.

[0002] Typically, a tumble dryer gently tumbles wet clothes in a current of warm air after they have been spun in a washing machine. Moisture is evaporated until the clothes are dry. In most instances, the advantages of drying clothes indoors in a mechanical dryer outweigh the benefits of drying clothes on a line outside. For example, a mechanical dryer is not weather dependent, is much quicker and easier to load, can be used during the day or night, produces fully dry or ironing dry results at the push of a button, and generally fluffs up the load.

[0003] However, clothes which have been dried outdoors in a clean atmosphere do smell fresher and, for this reason, dryers have been proposed which add perfume to the clothes as they dry. However, such perfumes have not found universal acceptance.

[0004] The invention provides a domestic tumble dryer, comprising air circulating means for passing a stream of air through the load in the tumble dryer, in order to dry the load, the air circulating means being capable of communicating with a vent to the outside air so that the drying stream includes outside air for at least part of the drying cycle.

[0005] The advantages of a tumble dryer are maintained while providing a fresher smell to the finished load.

[0006] The drying stream may include heated inside air over a first part of the drying cycle and unheated outside air over a second part of the drying cycle.

[0007] In the case of those tumble dryers which require venting to the outside (condenser tumble dryers do not require such venting), an additional vent may be provided to allow outside air to be drawn in, but preferably there is a single vent to the outside, and a valve which enables moist air to be exhausted or outside air to be drawn in.

[0008] A domestic tumble dryer constructed in accordance with the invention will now be described in greater detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic sectional view of a first tumble dryer;

Figure 2 is a diagrammatic sectional view of a second tumble dryer;

Figure 3 is a diagrammatic view of a valve of the second tumble dryer with the valve member in one position;

Figure 4 is a diagrammatic view of a valve of the second tumble dryer with the valve member in a second position; and

Figure 5 is a diagrammatic view of an alternative form of valve.

[0009] Like reference numerals have been given to like parts throughout all the figures.

[0010] Referring to Figure 1, a tumble dryer is housed in a cabinet 1. The load is loaded through a door 2 into a drum 3 which is rotated by means of a motor 4. The central part 5 of the rear of the drum is perforated to allow the intake of heated air in the direction of the arrow A, which is driven into the drum by means of an impeller 6 mounted on the motor 4 which forces air through a heater 7. The heated air which is passed through the load is filtered by filter 3a before being exhausted via a conduit 8 in the direction of arrow B. The conduit 8 communicates with a vent 9 which passes through an external wall of a room in which the dryer is housed and communicates with the air outside. The dryer could as an alternative exhaust via arrow B through a window by means of a hose.

[0011] The air drawn into the tumble dryer which forms the drying stream A would normally be drawn from within the room in which the dryer was housed but, in accordance with one aspect of the invention, the air is drawn in directly from outside via vent 10, which allows fresh air to be drawn in in the direction of arrow C. In this case, the clothes are dried solely using a stream of outside air which is drawn through vent 10 communicating with the outside air into the dryer where it is heated and passes through the clothes in the direction of arrow A, before being exhausted in the direction of arrow B. A load produced by the dryer has a fresher smell than a load produced by a dryer using indoor air solely.

[0012] In a second embodiment of the invention shown in Figures 2 to 4, the second dryer has a single vent 11 extending through an exterior wall of the room in which the dryer is located. Like the dryer of Figure 1, heated air passes in the direction of arrow A through the load which is contained in a drum 3 rotatable by a motor (not shown) in a cabinet 1, loaded through a door 2. The motor also rotates the impeller 6 as in the first embodiment and passes the air stream through heater 7 before entering the drum through a perforated region 5 on the rear wall. In this embodiment there is a single vent to the outside. As such, the dryer needs a single hole through an exterior wall, which is required at the present time for current dryers which vent to the outside.

[0013] Referring to Figure 3, during a first part of the drying operation, a valve member 12 of a valve 13 is in a first position. In this first position, the dryer picks up inside air from the room in which the dryer is housed (arrow D) by means of the impeller 6 which drives it into the drum 3 via the heater 7 (arrow A). The moist air is exhausted through vent 11 first of all passing through filter 3a before leading back to the valve 13 (arrow E).

[0014] Referring to Figure 4, in a second stage of the drying operation in which the heater 7 is switched off, the valve member 12 has been moved to a second po-

sition, and impeller 6 now draws outside air through the vent 11 (arrow F) to pass through the load (arrow A) whereupon the cool dry air stream passes through the filter 3a and is exhausted to the interior of the room (arrow G) at the other side of the valve member.

[0015] As an alternative to carrying out the cooling stage using only outside air, the dryer may carry out a cooling operation following the drying one by using indoor air drawn in by impeller 6 but with the heater elements 7 switched off. Then, at the end of the normal drying operation, a special "fresh air" programme on the timer could then move the valve member 12 from the position shown in Figure 3 to the position shown in Figure 4 to allow an additional "fresh air" stage. The valve member 12 may be controlled automatically by the programme control of the dryer, or it may be controlled manually.

[0016] Variations may be made without departing from the scope of the invention. Thus, in the first dryer described, the vents 9 and 10 could be run parallel to each other so that the incoming fresh air (C) is preheated by the outgoing moist air (B).

[0017] Referring to Figure 5, an alternative form of valve 15 may be used in the embodiment of Figure 2 in place of the valve 13. With this valve, a movable tube 14 slides from the solid line position to the dotted line position to register with different holes in the valve body, while still remaining connected to the vent 11, which connects directly to a flexible bellows section 16.

[0018] In the solid line position, room air is drawn into (not shown) the dryer of Figure 2 as modified by the valve 15, and warm moist air is exhausted to the outside (arrow H). At cool run, or when a separate fresh air cycle on the dryer is selected, the tube 14 is moved to the dotted position, and fresh air is drawn in (arrow I), and is blown through the load in the drum. This produces a fresh air fragrance when the load is removed from the drum.

Claims

1. A domestic tumble dryer comprising air circulating means for passing a stream of air through the load in the tumble dryer, in order to dry the load, the air circulating means being capable of communicating with a vent to the outside air so that the drying stream includes outside air for at least part of the drying cycle.

2. A tumble dryer as claimed in Claim 1, in which the drying stream includes heated inside air for a first part of the drying cycle and unheated outside air over a second part of the drying cycle.

3. A tumble dryer as claimed in Claim 1 or Claim 2, including a valve which enables moist air to be exhausted through the vent or outside air to be drawn in through the vent.

4. A domestic tumble dryer substantially as herein described with reference to the accompanying drawings.

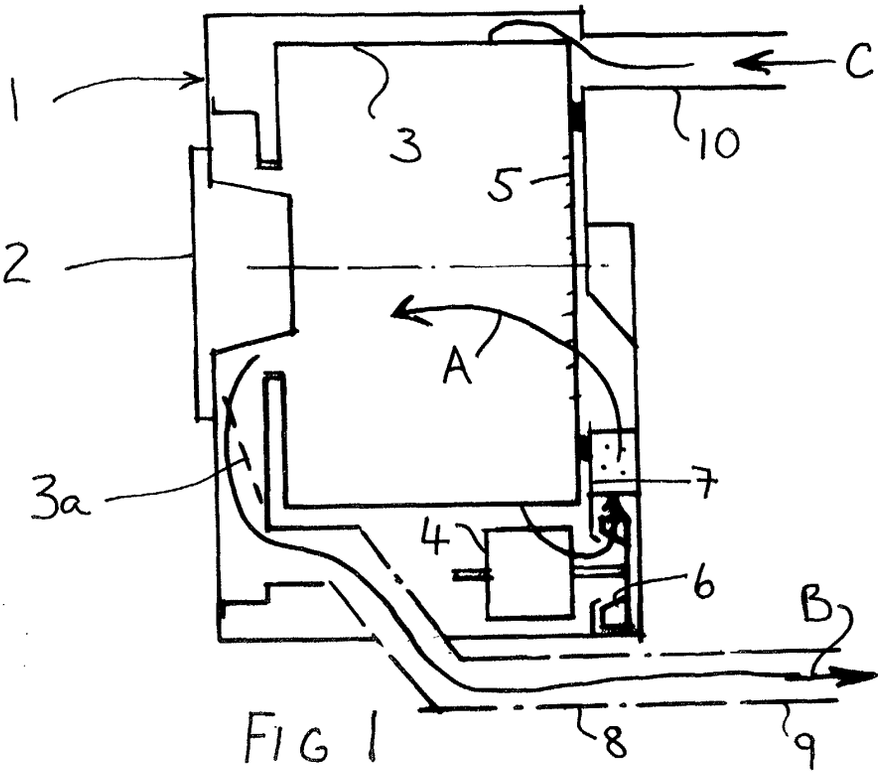

FIG 1

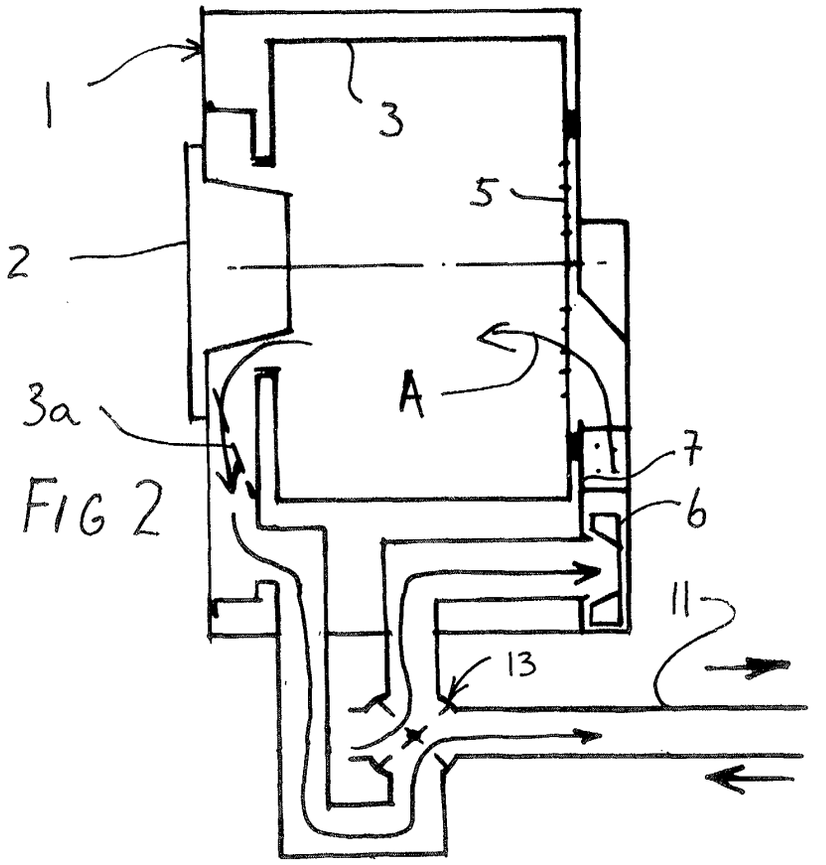

FIG 2

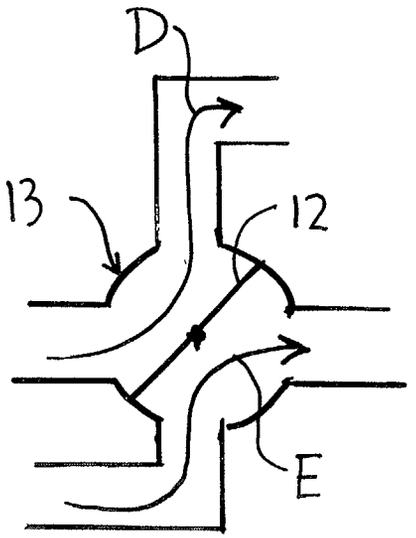

FIG 3

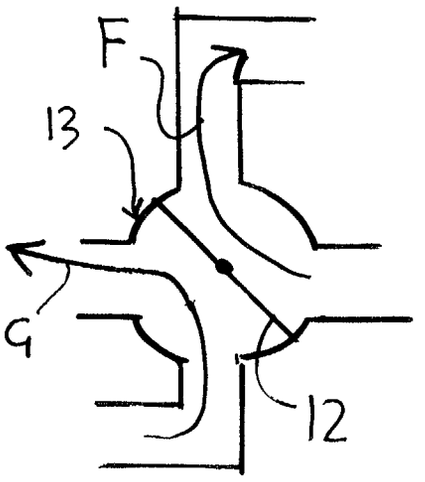

FIG 4

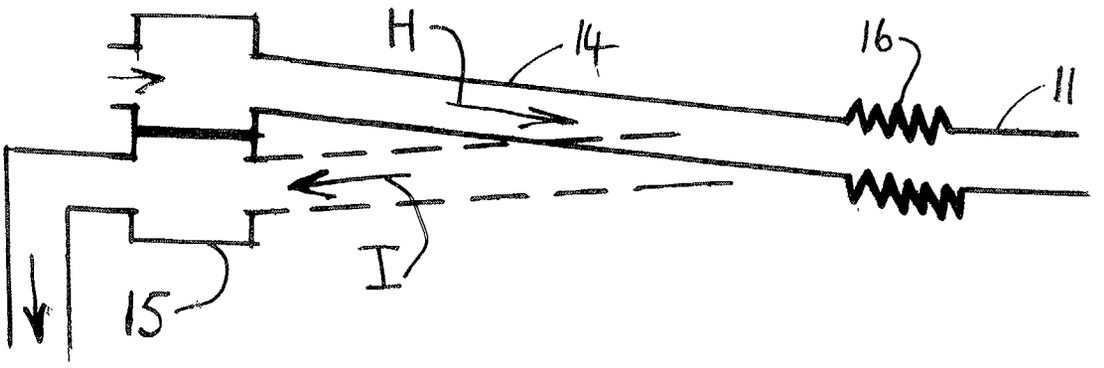

FIG 5

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Application Number
EP 01 30 9486

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 April 2002	Norman, P

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 30 9486

This annex lists the patent family membersrelating 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
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