

HAIR-DRIER WITH VALVE FOR CONTROLLING THE AIR FLOW

The invention relates to a hair-drier comprising a housing which has an air outlet and houses a heating element, a fan and a valve comprising a pair of valve members which are pivotally mounted in the housing for controlling the air flow from the fan through the housing and which can be actuated by means of an actuating member which is rotatably supported in the wall of the housing.

Such a hair-drier is disclosed in United States Patent Specification 4,232,454. The known hair-drier has two diametrically arranged valve members which are situated in the space between the heating element and the air outlet. Both valve members are formed with a hole through which an actuating rod extends, the rod being provided over a part of its length with a right-hand screw-thread which engages in the hole in one valve member and over another part of its length with a left-hand screw-thread which engages in the hole in the other valve member. Outside the housing of the hair-drier the rod is provided with a knob. By turning the knob the valve members are pivoted towards or away from each other to reduce or increase the passage for the flow of air through the housing.

The known hair-drier has the disadvantage that assembling the valve members and the actuating rod in the hair-drier housing is an intricate procedure since the actuating rod has to be screwed into the holes in both valve members. An additional disadvantage is that during operation of the hair-drier the actuating rod is constantly exposed to the hot air, so that the knob becomes unnecessarily warm as a result of heat conduction.

It is an object of the invention to provide a hair drier of the construction mentioned in the opening paragraph in which these drawbacks are mitigated.

According to the invention there is provided a hair-drier comprising a housing which has an air outlet and houses a heating element, a fan and a valve comprising a pair of valve members which are pivotally mounted beside one another in the housing for controlling the air flow from the fan through the housing and which

can be actuated by means of an actuating member which is rotatably mounted in an opening in the wall of the housing, each valve member having a projection which is disposed eccentrically of the pivotal axis of that valve member and which slidably engages in an associated one of two curved grooves or slots which are formed in a side of the actuating member that faces the interior of the housing, and which act as cam means whereby upon rotation of the actuating member the projections are displaced about the pivotal axes of the valve members to pivot these members.

In the assembly of the hair-drier according to the invention, the coupling of the actuating member to the valve members is achieved simply by engaging the projections on the valve members in the respective curved grooves or slots in the actuating member during the mounting of the latter member in the opening in the wall of the housing.

Since the actuating member does not extend across the interior of the housing it is not heated to any significant extent by the hot air flowing through the housing in the operation of the hair-drier.

In a preferred embodiment of the invention the actuating member comprises two interengaging parts of which a first part is disposed mainly outside the housing and a second part is disposed inside the housing, the grooves or slots being formed in said second part.

The two-part actuating member has the advantage that it is secured to the housing wall by simply sliding the two parts into one another. A more permanent coupling between the two parts can be obtained through frictional forces or by means of a snap connection.

In this preferred embodiment one of the parts of the actuating member may comprise a projection which co-operates with an arcuate groove in the housing wall, which groove adjoins the opening in the wall.

When the actuating member is turned the projection moves along the groove, and the two ends of the groove form stops to determine

the maximum angle through which the actuating member can be rotated. An advantage of this embodiment is that the valve members are not loaded unnecessarily in their extreme positions.

5 The actuating member may carry a spring latch of rectangular form having a projecting portion which is selectively engageable with one or the other of two recesses which are formed in the housing wall and adjoin the opening in the wall.

By means of this construction the valve members can be latched in specific positions, from which they cannot be displaced by the
10 air flowing past them.

An embodiment of the invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which

Fig. 1 is a perspective view of a hair-drier in accordance
15 with the invention, and

Fig. 2 is a partly cut-away exploded perspective view of a part of the hair-drier shown in Fig. 1.

The hair-drier shown in Fig. 1 comprises a housing 1 which comprises a housing section 3 and a housing section 5 which is
20 rotatable relative to the section 3. The housing section 3 is provided with an air inlet and houses a heating element and a fan, which parts are not shown. The housing section 3 also carries a switch 7 for the actuation of the fan and the heating element. The housing section 5 has an air outlet 9 and an actuating member 11,
25 by means of which the air-flow velocity can be adjusted.

A butterfly valve comprising a pair of valve members 13 and 15, shown in Fig. 2, can be actuated by means of the actuating member 11. In the assembled condition these valve members are pivotally mounted beside one another in the housing section 5. The
30 following part of the description relates to the fully assembled condition of the hair-drier. The valve members 13 and 15 are formed with a pair of coaxial holes 17 and a pair of coaxial holes 19 respectively which engage with a pair of coaxial pins 21 and a pair of coaxial pins 23 respectively on the wall 25 of the housing
35 section 5. In Fig. 2 only two of the four pins are visible. The

valve members 13 and 15 are further provided with pin-like projections 27 and 29 respectively which, as can be seen in Fig. 2, are disposed eccentrically of the axes of the holes 17 and the holes 19 respectively.

5 The actuating member 11 is rotatable and comprises two interengaging parts 31 and 33. The first part 31 extends into an opening 35 in the wall 25 and is mainly situated outside the housing section 5. This part 31 is formed as a knob with a recess 39 in its underside 37. The second part 33 is situated inside the
10 housing section 5 and is provided with a coupling element 41 which engages in the recess 39 in the first part 31. The second part 33 has two curved, preferably arcuate, grooves 45 and 47 in the side 43 facing the valves. The projection 27 engages in the groove 45 and the projection 29 in the groove 47. When the knob 31 is turned
15 the projections 27 and 29 move in the respective grooves 45 and 47, which grooves form cam means on the actuating member and act on the projections 27 and 29 in such a way that the valve members 13 and 15 are pivoted towards or away from each other, depending on the direction of rotation of the knob, about the pins 21 and 23
20 respectively. When the valve members 13 and 15 are pivoted away from each other the passage for the flow of air through the housing section 5 is reduced and the flow velocity increases if the speed of the fan remains the same. If the valve members 13 and 15 are pivoted towards each other the air passage becomes larger so that
25 the flow velocity decreases. The valve members 13 and 15 are formed with a plurality of apertures 49 and 51 respectively in order to ensure that the passage cannot be closed completely by the valve members.

30 The first part 31 of the actuating member 11 comprises a projection 53 which engages in an arcuate groove 55 in the wall 25. When the actuating member 11 is rotated the projection 53 moves in the groove 55, and the ends 57 and 59 of the groove 55 act as stops to determine the maximum angle through which the actuating member 11 can be rotated.

35 On the coupling element 41 of the second part 33 is mounted a

wire spring latch 61 of rectangular form having a portion 63 projecting from one side. The latch 61 is accommodated in the opening 35 in the wall 25 of the housing section 5, and by rotation of the actuating member 11 the projecting portion 63 of the latch can be brought selectively into engagement with one or the other of two recesses 65 or 67 which adjoin the opening 35, to latch the valve members 13 and 15 in a corresponding position from which they cannot be displaced by the air flowing past them.

The housing section 5 is rotationally adjustable relative to the housing section 3 and can be latched in the position to which it is adjusted. For this purpose the housing section 5 is provided with at least one but preferably a plurality of coupling portions 69 and with a blade spring 71, and the housing section 3 is provided with a circumferentially extending groove 73 in its wall 26 and with a circumferentially extending series of teeth 75 on the wall 26. The portions 69 engage in the groove 73 to couple the housing sections together in the axial direction, and the blade spring 71 engages in a selected one of the recesses between the teeth 75 to latch the housing section 5 in the position to which it is rotationally adjusted. By holding the housing section 3 and exerting a torsional force on the housing section 5 in a desired direction the housing section 5 is rotated relative to the housing section 3. The coupling portions 69 then slide in the groove 73 and the blade spring 71 is moved across the teeth 75. In the desired position of adjustment of the housing section 5 the blade spring 71 engages in a corresponding one of the recesses between the teeth 75, so that the housing sections 3 and 5 are latched relative to each other in the rotational direction.



(16)

CLAIMS:

1. A hair-drier comprising a housing which has an air outlet and houses a heating element, a fan and a valve comprising a pair of valve members which are pivotally mounted beside one another in the housing for controlling the air flow from the fan through the housing and which can be actuated by means of an actuating member which is rotatably mounted in an opening in the wall of the housing, each valve member having a projection which is disposed eccentrically of the pivotal axis of that valve member and which slidably engages in an associated one of two curved grooves or slots which are formed in a side of the actuating member that faces the interior of the housing, and which act as cam means whereby upon rotation of the actuating member the projections are displaced about the pivotal axes of the valve members to pivot these members.

2. A hair-drier as claimed in Claim 1, wherein the actuating member comprises two interengaging parts of which a first part is disposed mainly outside the housing and a second part is disposed inside the housing, the grooves or slots being formed in said second part.

3. A hair-drier as claimed in Claim 2, wherein one of the parts of the actuating member comprises a projection which co-operates with an arcuate groove in the housing wall, which groove adjoins the opening in the wall.

4. A hair-drier as claimed in Claim 1, 2 or 3, wherein the actuating member carries a spring latch of rectangular form having a projecting portion which is selectively engageable with one or the other of two recesses which are formed in the housing wall and adjoin the opening in the wall.

5. A hair-drier substantially as herein described with reference to the accompanying drawings.