

- [54] **HAIR DRYER WITH HOOD**  
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[73] Assignee: **The Gillette Company**, Boston, Mass.  
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- [52] **U.S. Cl.**..... **34/99, 34/97, 29/156.8 CF, 415/215**  
[51] **Int. Cl.**..... **A45d 20/24**  
[58] **Field of Search**..... **34/3, 96-101, 34/90, 91, 243 R, DIG. 7; 415/215; 29/156.8 CF**

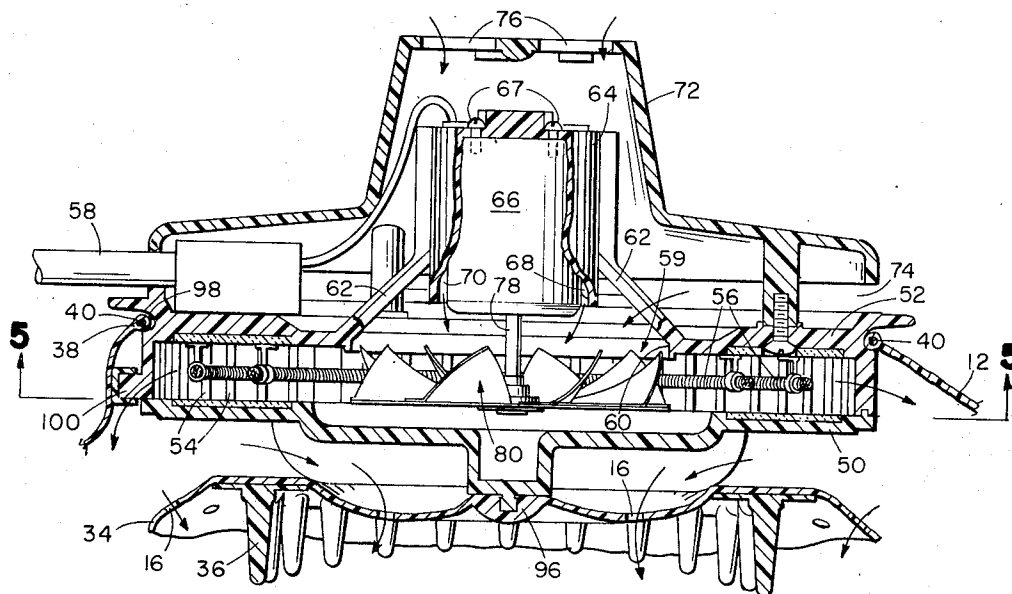
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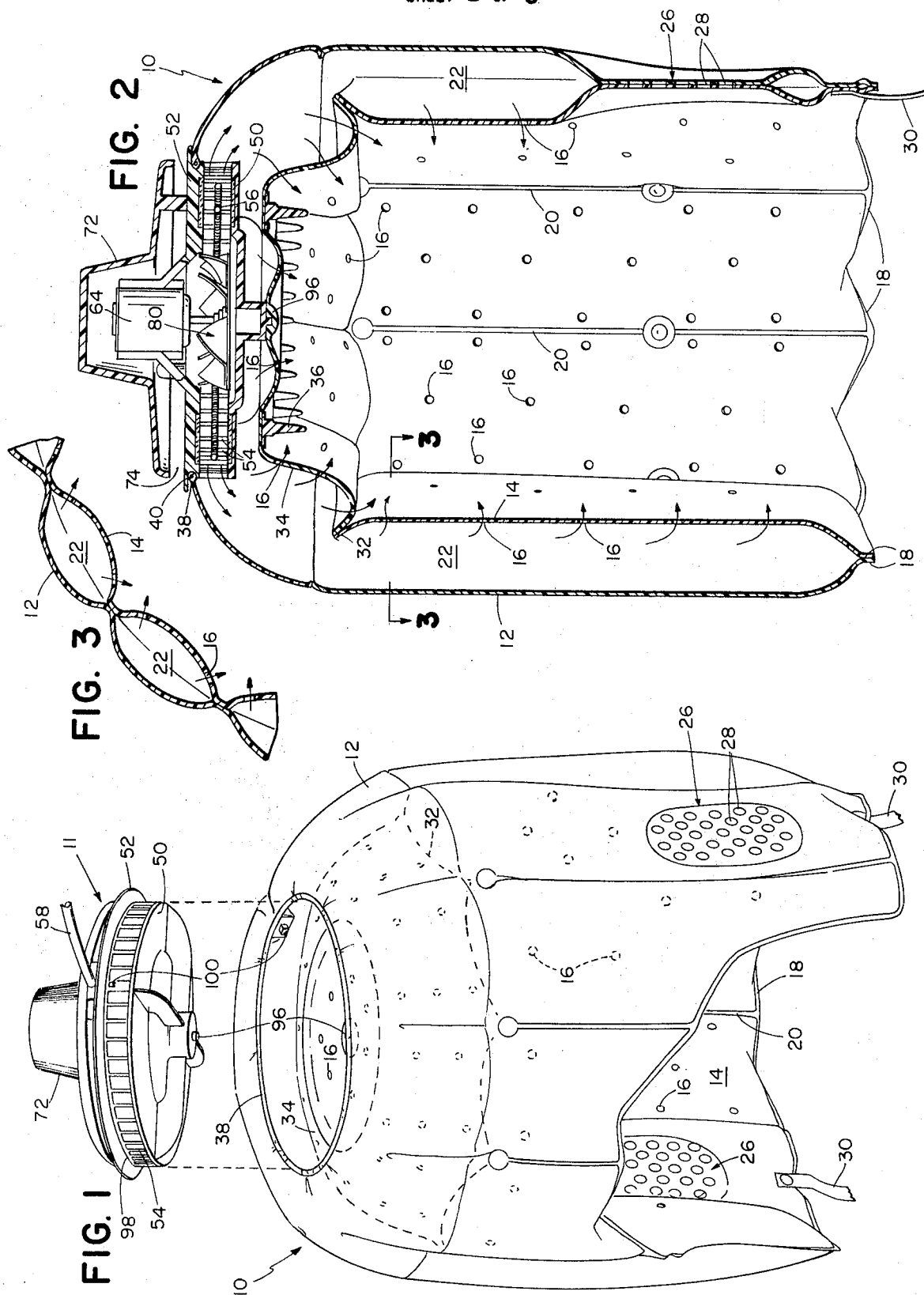
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[57] **ABSTRACT**

Portable hair dryer of the type having a hood with a blower and heater mounted on it, the blower having a centrifugal fan with radially extending blades having convexly curved leading faces, each blade being secured along its trailing edge to an imperforate disc, the fan being mounted at the exit end of a duct with the tips of the leading edges of the blades within the duct and the remainder of the blades outside the duct.

**8 Claims, 7 Drawing Figures**





SHEET 2 OF 3

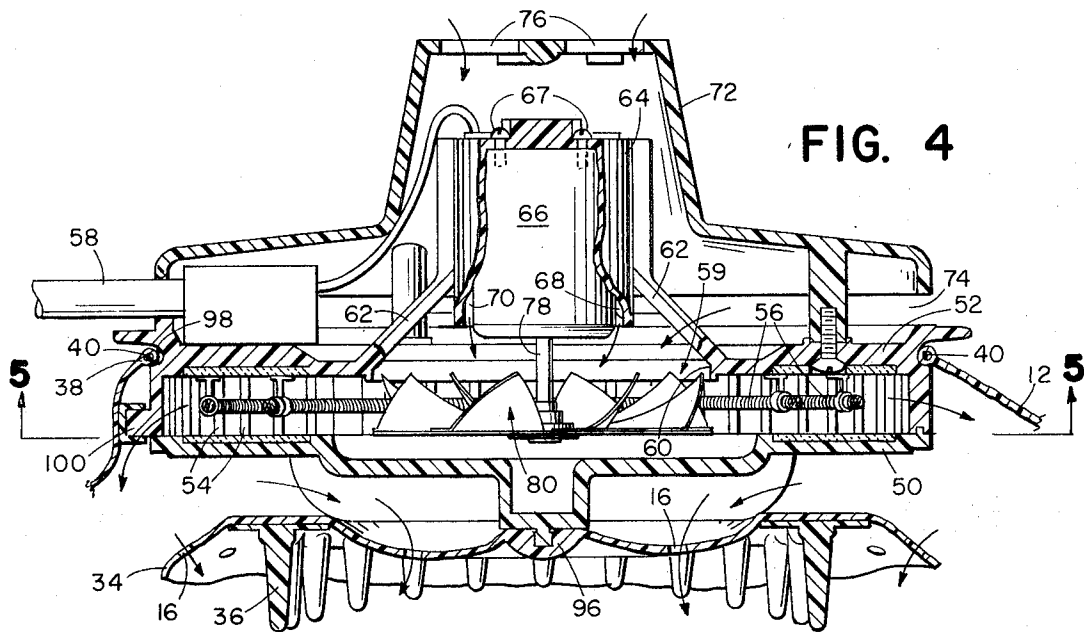


FIG. 4

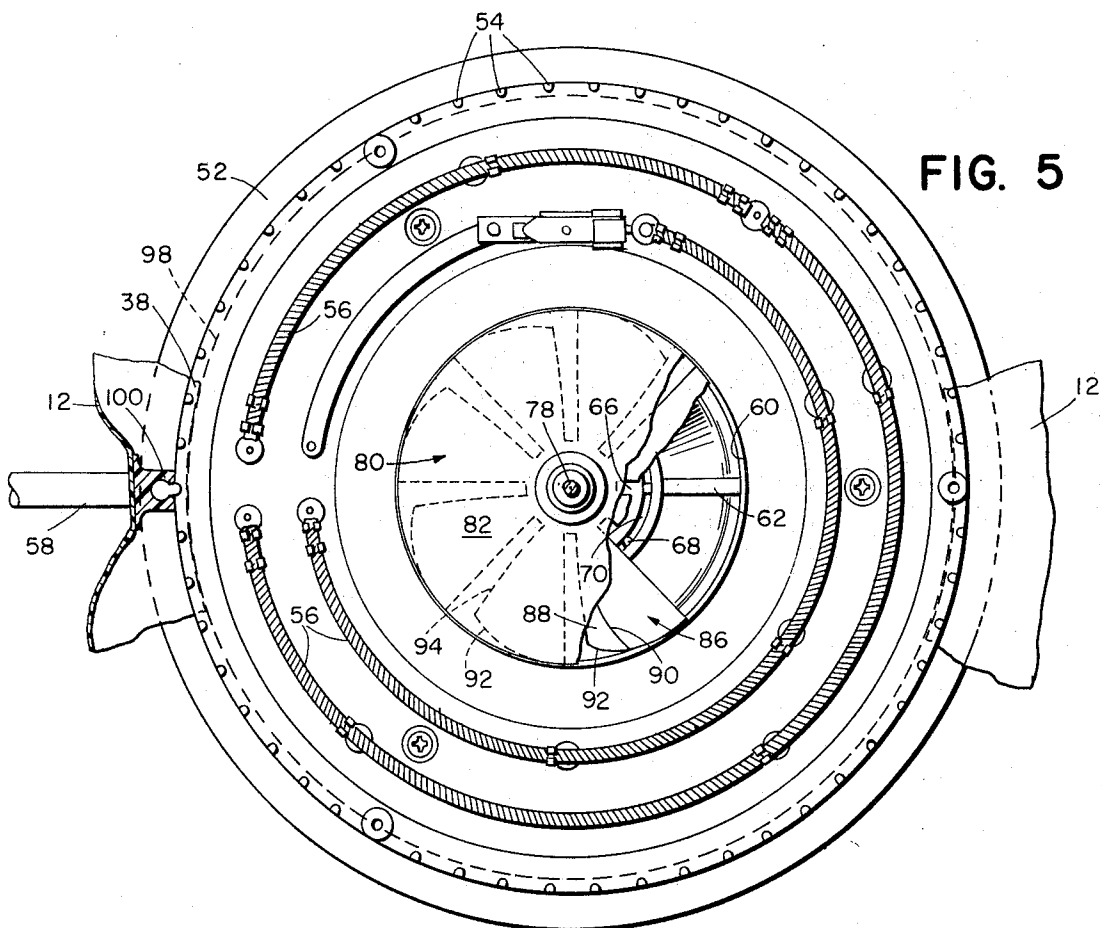


FIG. 5

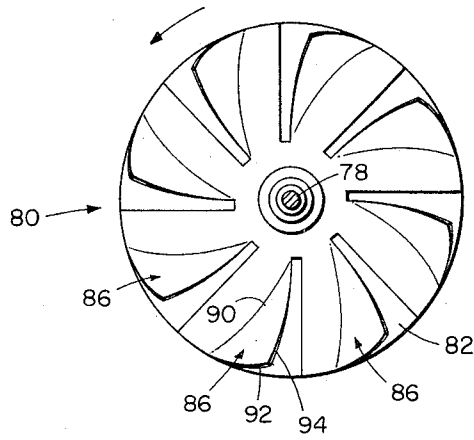


FIG. 6

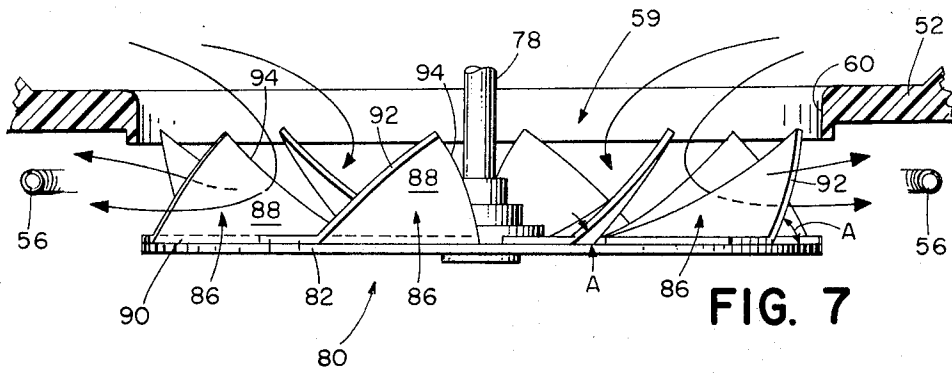


FIG. 7

## HAIR DRYER WITH HOOD

This invention relates to portable hair dryer of the type having a double-walled hood with a perforated inner wall for enveloping a head of hair having a combination blower-heater mounted on the hood, and pertains more specifically to an improvement in the blower and in means for positioning the hood with respect to the blower.

The improvement of the present invention provides a device producing

Portable hair dryers of the type having a blower mounted on a hood suffer from the disadvantage that they have a high noise level while in operation and are consequently a source of discomfort to the user. The improved blower construction of the present invention provides a reduced noise level and also provides means for ensuring proper positioning of the hood with respect to the blower.

In the drawings,

FIG. 1 is a view in perspective showing the blower-heater and hood of the dryer prior to assembly;

FIG. 2 is a view in vertical section showing the assembled dryer;

FIG. 3 is a view in section partly broken away taken along line 3—3 of FIG. 2;

FIG. 4 is a view in vertical section on an enlarged scale, partly broken away, showing the blower-heater and the upper part of the hood;

FIG. 5 is a view in section partly broken away taken along line 5—5 of FIG. 4;

FIG. 6 is a top plan view of the blower fan; and

FIG. 7 is a view in section on an enlarged scale partly broken away showing the configuration and location of the fan blades.

As appears in FIGS. 1 and 2 of the drawing, the dryer comprises a hood 10 on which is removably mounted a combination blower-heater means 11. Hood 10 has an outer wall 12 of flexible sheet plastic material and an inner wall 14 also of flexible sheet plastic provided with a plurality of spaced perforations 16, 16. Walls 12, 14 are spaced apart through most of their extent, being sealed together along their lower margins 18, 18 to form a helmet adapted to envelop a head of hair while leaving the face exposed in a cut away portion at the front of the hood. Walls 12, 14 are joined together along narrow spaced apart vertical zones 20, 20 by heat sealing to maintain the walls in the desired relation to each other and to provide channels 22, 22 for controlling the flow of air to perforations 16, 16. An ear patch 26 is provided on each side of the hood in the zone overlying the ear of the user; the inner and outer wall are sealed together throughout this zone so that none of the air stream is directed against the ear, and openings 28 extend through both walls in this zone to facilitate hearing during use of the dryer. Tie straps 30 secured adjacent bottom margins 18 near ear patches 26 are adapted to be tied beneath the chin to maintain the hood in position on the head.

Upper margin 32 of inner wall 14, forming a generally circular opening, is sealed along its circumference to a generally circular flexible sheet plastic member 34 also provided with perforations 16. Member 34 overlies an annular comb 36, the downwardly projecting teeth of which serve to support member 34 in spaced relation above the scalp to facilitate flow of heated air through the perforations. Upper margin 38 of outer wall 12 is

provided with an extensible grommet 40 arranged for removably engaging with the heater-blower means 11, as will be described below.

Heater-blower means 11 comprises a circular base plate 50 on the periphery of which is mounted annular support member 52, the two being maintained in spaced apart relation by a plurality of circumferentially spaced supporting bars 54, the spaces between which serve as the outlet for passing heated air into the hood. A pair of generally annular electric resistance heater elements 56, 56 are carried by support member 52 and connected to a suitable source of electric power (not shown) through conductor 58. Support member 52 is provided with a central circular duct 59 defined by wall 60 for conveying air to the heaters 56. Centrally mounted on support member 52 above duct 59 on spaced struts 62 is a cylindrical housing 64 within which is mounted motor 66 by means of screws 67, the motor being positioned between ribs 68 to provide a narrow channel 70 between the housing and the motor for passage of cooling air. Housing 72 mounted on support member 52 is spaced above the latter to provide a circumferential main air inlet slot 74 and is also provided with supplemental air inlet slots 76 for supplying cooling air to the motor 66. Motor 66 is also connected to a suitable source of electric power through conductor 58.

Fixed to drive shaft 78 of the motor is a fan 80 which, as best shown in FIGS. 6 and 7, consists of an imperforate circular metal sheet 82 having secured to it a circular array of circumferentially spaced radially extending blades 86 each of which increases gradually in width from its root adjacent the motor shaft toward its tip. The leading face 88 of each blade is pitched by bending a radially slotted sheet metal disc along a line 90 defining the trailing edge of the blade and extending from the root portion of each slot outwardly to the perimeter of the disc at a point spaced approximately midway between adjacent slots. The trailing edge 90 lies in a plane perpendicular to the axis of rotation of the fan on shaft 78, and the length of each blade is greater than one-half the maximum radial distance from its tip edge to the axis of rotation. The tip edge of each blade preferably is curved along an arc having as a radius the distance from the juncture of the tip edge and the trailing edge of the blade to the axis of rotation. The angle of pitch (FIG. 7) of each blade, that is, the included angle between a plane perpendicular to the axis of rotation and the leading face of the blade, measured at the trailing edge, is an acute angle less than 70°, and is preferably from 45° to 60°. In addition, the leading face of each blade is preferably gently convexly curved. The overall maximum diameter of the array of blades, measured at the junction of the tip edge and the trailing edge of the blades, is approximately equal to the diameter of duct 59, and the fan is mounted so that only a small portion, less than 15% of the total of the leading edge 94 and of the tip edge 92 of each blade lies within duct 59, the remainder of each blade lying beyond the exit end of the duct. Imperforate metal sheet 82 is spaced from the exit end of the duct wall 60 by a distance equal to at least 10% of the diameter of the duct, preferably from 13 to 20%. The radial spacing between the duct 59 and the tip edge 92 of each blade is preferably from 2 to 5% of the diameter of the duct.

The hood 10 is removably mounted on heater-blower 11 by means of a snap fastener 96 joining the center of

sheet 34 to the bottom center of base plate 50 and by inserting grommited edge 38 into a mating circumferential groove 98 in support member 52. A second snap fastener 100, one-half of which is secured to support member 52 adjacent the location of conductor 58, the other half of which is secured adjacent margin 38 of the outer wall of the hood at a point opposite the face opening. Snap fastener 100 provides interengageable positioning means for positioning the hood and heater-blower with respect to each other and ensuring that conductor 58 is always kept away from the face of the user.

In operation, electric power supplied through conductor 58 actuates motor 66 to rotate fan 80 in the direction shown in FIG. 6, drawing air in through inlets 74 and 76 and through duct 59, then forcing it radially outwardly past heaters 56 and through the spaces between supporting bars 54 into the space between outer wall 12 and inner wall 14 of the hood, whence it passes through channels 22 and perforations 16 into the head of hair. The speed of rotation of fan 80 may vary from 8,000 to 10,000 r.p.m. The rate of flow of air through the fan is relatively high at a low noise level.

What is claimed is:

1. In a portable hair dryer having a double-walled hood for enveloping a head of hair, the inner wall being perforated, and combination centrifugal blower and heater means mounted on said hood for introducing a supply of heated air into the space between the walls of said hood for discharge onto the hair through said perforations,

the improvement which comprises in said blower a duct for the supply of air having an entrance end and an exit end of circular cross section, a centrifugal fan in the form of a circular array of circumferentially spaced, radially extending blades each increasing in width from the root toward the tip with the leading face of each blade being pitched at an acute angle from the axis of rotation and the trailing edge of each blade joining along its length an imperforate disc rotatable with said array of blades, said fan being centrally mounted at the exit end of said duct with the leading edge of the tip of each blade disposed within said duct and the remainder

of each blade beyond the exit end of the duct.

2. A hair dryer as claimed in claim 1 in which said fan blades have their leading faces convexly curved.

3. A hair dryer as claimed in claim 1 in which the trailing edge of each blade lies in a plane perpendicular to the axis of rotation of the fan.

4. A hair dryer as claimed in claim 3 in which all said blades are formed of a single sheet metal member.

5. A hair dryer as claimed in claim 3 in which the angle of pitch of each blade is less than  $70^\circ$ , the overall maximum diameter of said array of blades is approximately equal to the diameter of said duct, the spacing between the trailing edge of each blade and the exit end of said duct is equal to at least 10% of the duct diameter, and the radial spacing between the duct and the tip edge of each blade is from 2 to 5% of the duct diameter.

6. A blower for use in a portable hair dryer comprising a duct for the supply of air having an entrance end and an exit end of circular cross section, a centrifugal fan in the form of a circular array of circumferentially spaced, radially extending blades each increasing in width from the root toward the tip with the leading face of each blade being pitched at an acute angle from the axis of rotation and the trailing edge of each blade joining along its length an imperforate disc rotatable with said array of blades, said fan being centrally mounted at the exit end of said duct with the leading edge of the tip of each blade disposed within said duct and the remainder of each blade beyond the exit end of the duct.

7. A blower as claimed in claim 6 in which the blades have their leading faces convexly curved and the trailing edge of each blade lies in a plane perpendicular to the axis of rotation of the fan.

8. A blower as claimed in claim 7 in which the angle of pitch of each blade is less than  $70^\circ$ , the overall maximum diameter of said array of blades is approximately equal to the diameter of said duct, the spacing between the trailing edge of each blade and the exit end of said duct is equal to at least 10% of the duct diameter, and the radial spacing between the duct and the tip edge of each blade is from 2 to 5% of the duct diameter.

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