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3,264,673

DOCTORS FOR PAPERMAKING MACHINES

Filed Aug. 6, 1964

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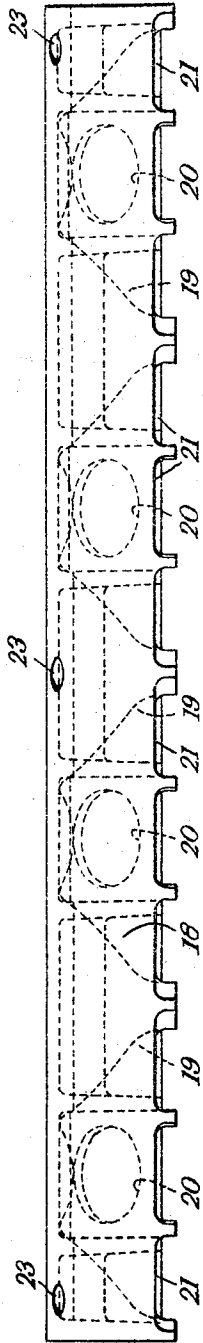


Fig. 1.

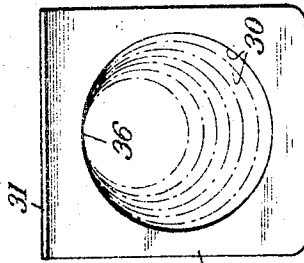


Fig. 6.

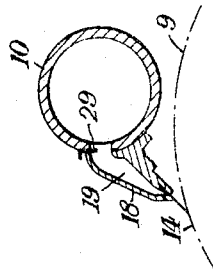


Fig. 7.

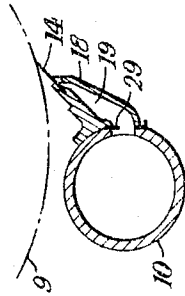


Fig. 9.

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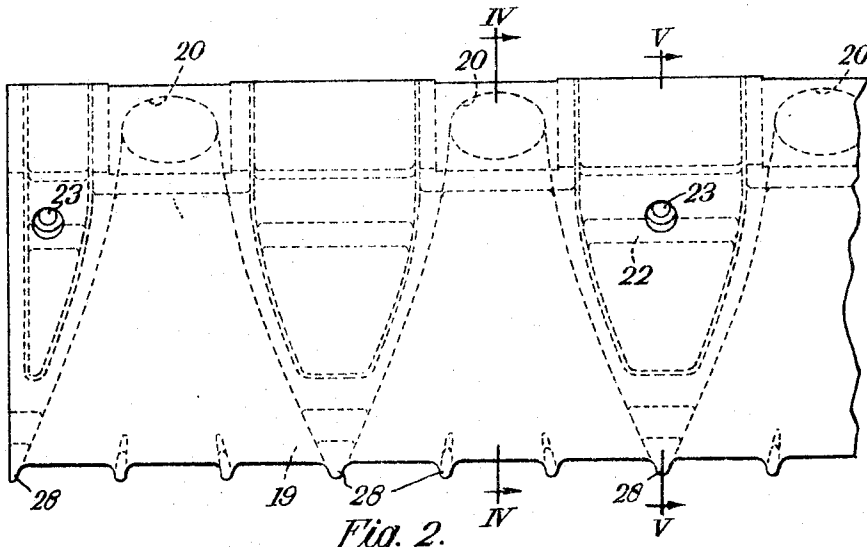


Fig. 2.

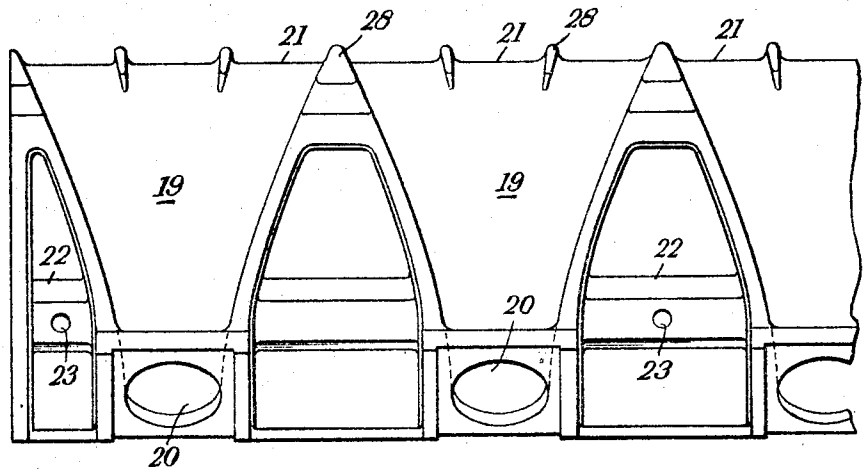


Fig. 3.

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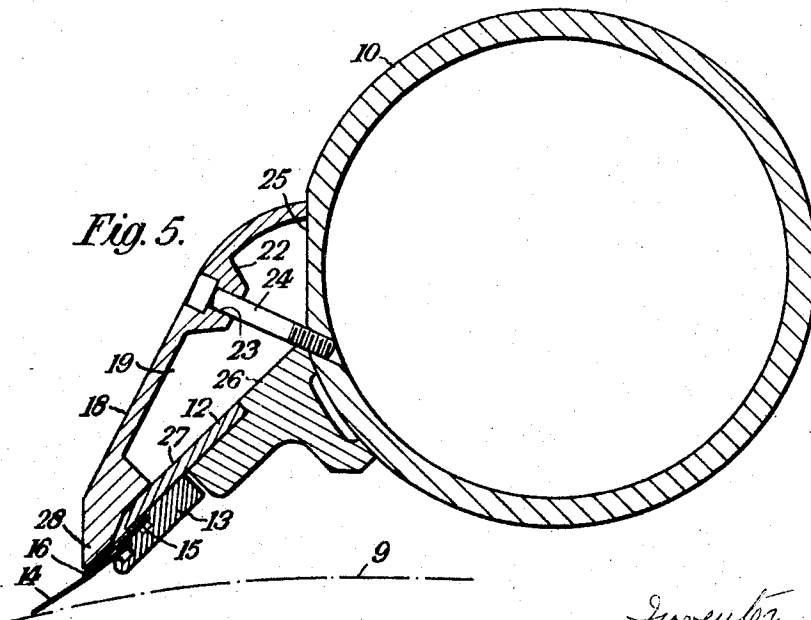
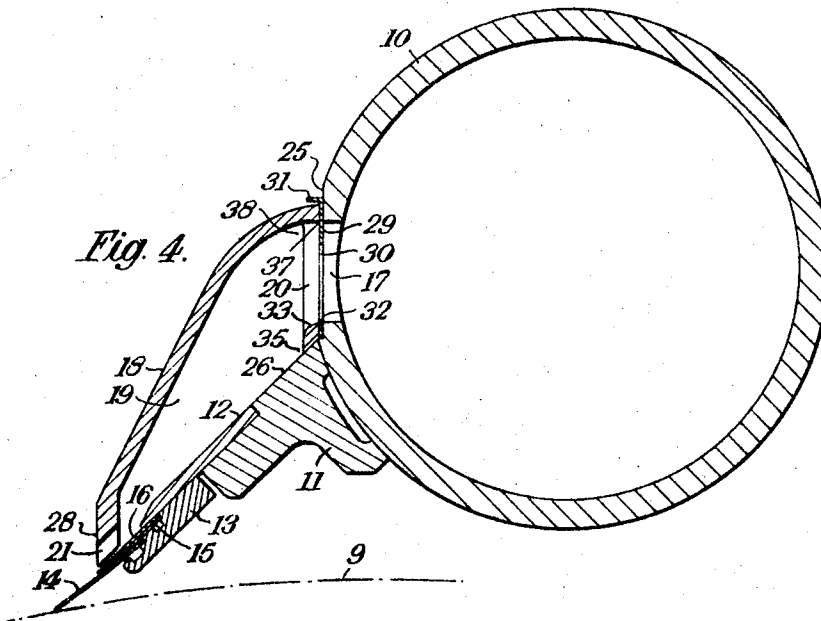
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DOCTORS FOR PAPERMAKING MACHINES

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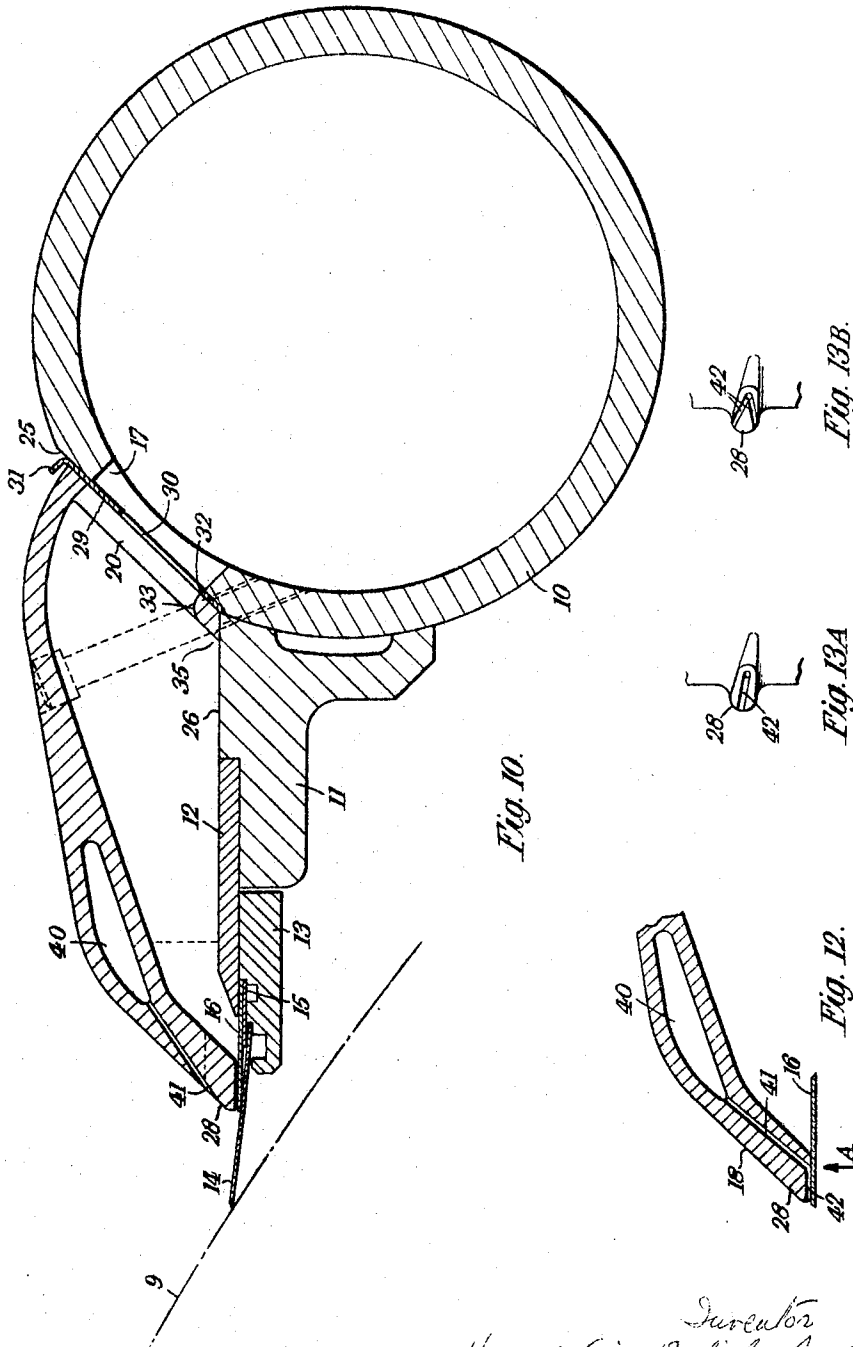
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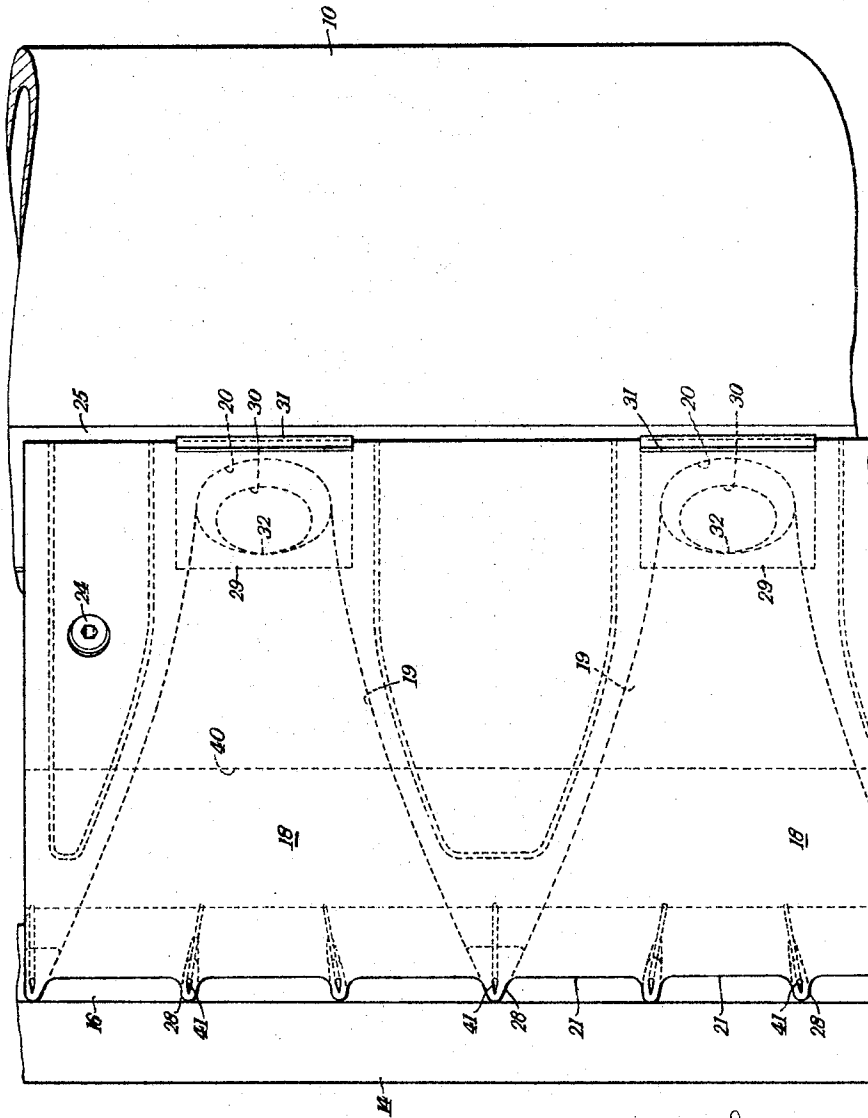
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Fig. II.



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## DOCTORS FOR PAPERMAKING MACHINES

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32,965/63

7 Claims. (Cl. 15—308)

This invention relates to a doctor for doctoring a roll of a papermaking machine of the type in which the support for the doctor blade includes a suction duct extending for the length of the doctor blade and provided with suction nozzles, which extend forwardly from the suction duct to the vicinity of the tip of the doctor blade and which apply uniform suction to the blade over the zone exposed to the action of the doctor blade.

The present invention provides a doctor of this type in which the nozzles are contiguous and provide a continuous wall extending rearwardly at a gradual inclination from the side of the doctor blade remote from the roll, and in which each nozzle contains a readily removable orifice plate accommodated in a slot in the nozzle, the orifice plates having graded orifices which provide uniformity of suction through the nozzles and being removable from and replaceable into their slots by sliding movement.

The wall provided by the contiguous suction nozzles serves to guide broken paper web away from the doctor blade and to prevent such broken web from bunching up around the nozzles. Since the orifice plates are slidable in their slots, they may be exchanged for others, as and when necessary, without disturbance or dismantling of any other part of the doctor.

Certain embodiments of doctor in accordance with the invention are illustrated in the accompanying drawings in which:

FIG. 1 is a front elevation of an assembly of four suction nozzles,

FIG. 2 is a corresponding top plan view,

FIG. 3 is a corresponding bottom plan view,

FIG. 4 is a section on the line IV—IV in FIG. 2 showing the suction nozzles mounted on the doctor support,

FIG. 5 is a similar section on the line V—V in FIG. 2,

FIG. 6 is a front view of an orifice plate for use when the doctor is installed above the roll as shown in FIG. 7,

FIG. 8 is a front view of an orifice plate for use when the doctor is installed below the roll as shown in FIG. 9,

FIG. 10 is a cross section showing an alternative form of doctor,

FIG. 11 is a corresponding plan view,

FIG. 12 is a detail view showing a minor variant of the doctor shown in FIG. 10, and

FIGS. 13A and 13B are alternative detail views looking in the direction of the arrow A in FIG. 12 with the doctor blade and pressure plate removed.

Like reference numerals indicate like parts throughout the figures.

In each of the embodiments illustrated, the doctor includes a suction tube 10 extending for the length of the roll 9 (FIGS. 7 and 9) to be doctored. Welded to the tube 10 is a bracket 11 (FIG. 4) to which is fixed, by screws (not shown), the blade holder of the doctor. This consists of plates 12, 13 fixed together by screws (not shown) and carrying the doctor blade 14, a keep plate 15 and a pressure plate 16. Orifices 17 are formed at regularly spaced intervals in the tube 10 which communicate with suction nozzles. These, for convenience, are made up in units of four, but other similar nozzle

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units are provided which consist respectively of two nozzles and of a single nozzle. These nozzle units are mounted side by side so that they constitute a continuous gradually inclined wall 18 which effectively guides broken paper web away from the nozzles.

The nozzle units are castings and they are formed with flared nozzles 19, which extend forwardly from orifices 20, which register with the orifices 17 in the suction tube 10, to elongated suction orifices 21 situated above the doctor blade 14 and through which is sucked the debris removed from the roll by the doctor blade.

As will be apparent from FIG. 4, the boundary wall of each suction orifice 21 is formed by the blade 14 and the pressure plate 16 and the opposing wall 18 forms a hood over the blade and pressure plate.

The castings are formed at intervals with webs 22 formed with holes 23 (FIG. 3) to accommodate screws 24 (FIG. 5) which secure the castings to the suction tube. As will be seen from FIG. 5, the castings abut, when mounted in position, against machined faces 25 on the tube 10 and 26, 27 on the bracket 11 and plate 12 respectively, which locate it positively and the construction is thus extremely rigid. The castings terminate at their forward end in tips 28 which are slightly spaced from the doctor blade 14 to permit of deflection of the blade and the pressure plate 16 under the doctoring pressure.

All the suction nozzles are of the same dimensions, but it is necessary to grade their effective areas so as to provide a uniform suction along the length of the roll. Thus in the case where suction is applied at the end of the suction tube 10 it is necessary that the effective areas of the nozzles should increase from this end of the suction tube to the other. This grading of the suction nozzles is provided by removable and interchangeable orifice plates 29 (FIG. 4) which are fitted into slots between the rear faces of the castings and the front wall of the tube 10 and can be slid into and out of their slots without disturbance of the rest of the mechanism. Each plate 29 has a circular orifice 30 determining the suction exerted in its nozzle and a flange 31 which provides a finger grip.

The orifice plates 29 for use on a doctor mounted above a roll, as in FIG. 7, have orifices 30 of varying size which are all tangent to a common point 32 (FIG. 6) which adjoins a rounded shoulder 33 on the casting (FIG. 4) so as to facilitate passage into the suction tube of dust which may accumulate in the portion 35 of the nozzle. The orifice plates for use in a doctor mounted below the roll, as in FIG. 9, have orifices 30 of varying size all of which are tangent to a common point 36 (FIG. 8) nearer the flange 31, which adjoins the point 37 (FIG. 4) in the nozzle and facilitates passage into the suction tube of dust which may then tend to accumulate in the portion 38 of the nozzle.

The doctor is thus streamlined and of rigid construction, while interchange of the orifice plates and fitting of the appropriate orifice plates into the appropriate slots to give uniform suction is a very simple matter.

With certain classes of paper or board, the debris doctoring off the drying cylinders of the papermaking machine may contain long fibres known as fuzz as distinct from dust. These fibres may be sticky from traces of latex, bitumen or the like used in the furnish of the paper or board.

These long fibres may build up for a period on the tips 28 and then break away and be drawn into the suction orifice 21. However, it is possible for the build-up to be too great to pass into the suction orifices.

The modified form of doctor shown in FIGS. 10 and 11 overcomes this trouble by providing an intermittent air blast to dislodge the build-up from the tips 28 before

it becomes too large. This air blast is derived from an air duct 40 which extends for the whole width of the doctor and is connected to small orifices 41 in the tips 28. The air duct 40 can be integral with the suction nozzles as shown in FIG 10, or can be a tube attached to or sunk into the nozzles to provide a streamlined contour which will not catch the paper when the web breaks.

The orifices 41 for the air blast can be in the front edge of the tips 28 (FIG. 10) or may be on the underside of the tips (FIG. 12), with one or more channels 42 (FIGS. 13A and 13B) to direct the air blast to remove any dust or fuzz which may collect between the tips 28 and the pressure plate 16.

The air blast can be controlled manually but it is preferably controlled by an automatic timer which turns on the blast for a short period at predetermined intervals according to the rate of accumulation of the fuzz. A typical setting may be air blast on for one second at intervals of five minutes.

The intensity of the air blast should be sufficient to dislodge the fuzz into the suction orifices but should not be so severe as to blow it about the machine and beyond the range of the suction orifices.

What I claim as my invention and desire to secure by Letters Patent is:

1. A doctor for doctoring a roll of a papermaking machine comprising a doctor blade, a blade holder mounting said blade, a pressure plate also mounted on said holder and bearing against the face of the doctor blade remote from the roll, a suction duct extending for the length of said blade, means attaching said blade holder to said suction duct, a plurality of contiguous, rigid suction nozzles attached to said suction duct which extend forwardly from the suction duct to the vicinity of the tip of the doctor blade, each suction nozzle terminating at its forward end in an elongated suction orifice adjacent the pressure plate and having one side defined by said pressure plate, and having at its near end an orifice communicating with an orifice in the suction duct, said suction nozzles collectively defining a continuous wall, extending rearwardly at a gradual inclination from the doctor blade to the suction duct, and orifice plates accommodated in slots in the suction nozzles, said orifice plates controlling the flow of air through the suction nozzles to the orifices in the suction ducts, having graded orifices which provide uniformity of suction through the suction nozzles, being accommodated in slots in the suction nozzles and being manually removable from and replaceable in said slots by sliding movement.

2. A doctor for doctoring a roll of a papermaking machine comprising a doctor blade, a blade holder mounting said blade, a pressure plate also mounted on said holder and bearing against the face of the doctor blade remote from the roll, a suction duct extending for the length of said blade, means attaching said blade

holder to said suction duct, a plurality of contiguous, rigid suction nozzles attached to said suction duct which extend forwardly from the suction duct to the vicinity of the tip of the doctor blade, each suction nozzle terminating at its forward end in an elongated suction orifice adjacent the pressure plate and having one side defined by said pressure plate, and having at its near end an orifice communicating with an orifice in the suction duct, said suction nozzles collectively defining a continuous wall, extending rearwardly at a gradual inclination from the doctor blade to the suction duct, said wall having tip portions between said elongated suction orifices and situated adjacent the pressure plate, means for intermittently directing individual air blasts upon said tip portions to dislodge from them fibres removed by the doctor blade from the roll, and orifice plates accommodated in slots in the suction nozzles, said orifice plates controlling the flow of air through the suction nozzles to the orifices in the suction ducts, having graded orifices which provide uniformity of suction through the suction nozzles, being accommodated in slots in the suction nozzles and being manually removable from and replaceable in said slots by sliding movement.

3. A doctor as claimed in claim 2, in which said air blast directing means comprises an air duct extending for the length of said wall and individual orifices in said tip portions which communicate with said air duct.

4. A doctor as claimed in claim 3, in which said orifices are open to the faces of the tip portions remote from the suction duct.

5. A doctor as claimed in claim 3, in which said orifices are open to the faces of the tip portions opposite the doctor blade.

6. A doctor as claimed in claim 1, in which the suction nozzles are formed in a number of abutting nozzle units each containing at least one nozzle, in which said suction duct carries a forwardly projecting bracket supporting the blade holder and in which said nozzle units abut against machined faces on the suction duct, the bracket and the blade holder.

7. A doctor as claimed in claim 1, in which the orifice plates have circular orifices of varying sizes, all of which orifices are tangent to a common point.

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