April 4, 1950 F. B. SCHNEIDER 2,503,072

AXIAL FLOW IMPELLER

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Fig. 1.

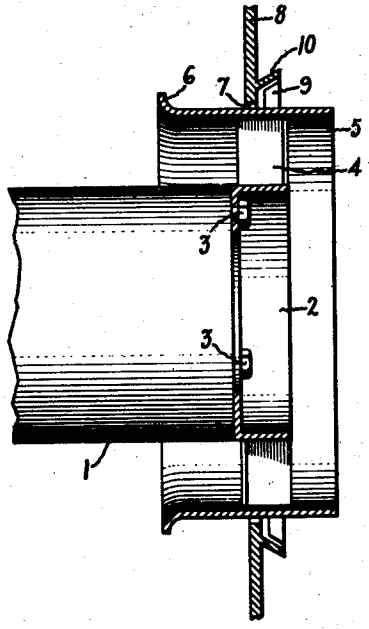
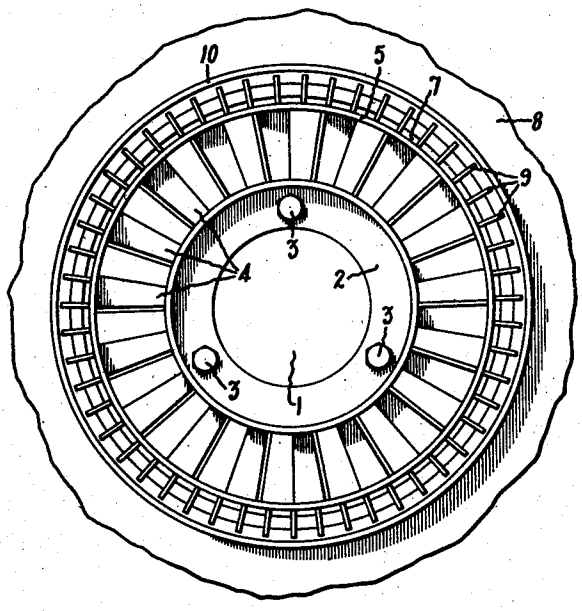


Fig. 2.



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AXIAL FLOW IMPELLER

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5 Claims. (Cl. 230—120)

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My invention relates to axial flow impellers.

An object of my invention is to provide an improved axial flow impeller.

Further objects and advantages of my invention will become apparent and my invention will be better understood from the following description referring to the accompanying drawing, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

In the drawing, Fig. 1 is a sectional side elevational view illustrating an axial flow impeller provided with an embodiment of my invention; and Fig. 2 is an end view of the impeller shown in Fig. 1.

Referring to the drawing, I have shown an embodiment of my invention in which an axial flow impeller is adapted to be driven by a rotatable shaft 1 on which an inner driving and mounting member 2 is secured by a plurality of circumferentially spaced apart bolts 3. Fluid, such as air, is adapted to be blown axially by a plurality of outwardly extending axial flow impeller blades 4 which are secured to the mounting member 2 and at their outer edges to an axially extending impeller shroud 5 arranged coaxially with the mounting member 2 and formed with an outwardly flared inlet edge 6 to facilitate the intake of the fluid into the impeller with a minimum of turbulence. This provides an impeller in which the blade and the shroud are adapted to rotate as a unit, thereby avoiding the necessity of any clearance between the impeller blades and the surrounding shroud and increasing the efficiency of the impeller. In the illustrated arrangement, this impeller is mounted to extend through an opening 7 in a wall 8 with a free running clearance around the impeller shroud 5. In order to provide a fluid seal around the shroud 5 for preventing the reverse flow of fluid around the impeller shroud through the opening 7, a plurality of radially outwardly extending vanes 9 are mounted on the outer surface of the impeller unit shroud adjacent the wall 8 on the impeller discharge side of the wall with a running clearance between the vanes and the wall. The outer edges of these vanes 9 are tapered outwardly towards the discharge side of the impeller and are adapted to cooperate with a conical stationary shroud 10 which is mounted on the wall 8 in any suitable manner and may be formed as an integral part thereof. This stationary shroud is flared outwardly towards the discharge side of the impeller and is arranged with a running clearance around the

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outer tapered edges of the vanes 9, such that as these vanes 9 rotate, fluid will be drawn from both directions and discharged substantially radially against the conical shroud providing a slight flow of fluid towards the discharge side of the impeller, thus preventing reverse flow of the fluid around the impeller shroud through the opening 7. The power required for producing this slight flow of fluid by the vanes 9 will be materially less than the losses due to the running clearances required between the conventional axial flow impeller blades and a stationary impeller shroud, and the above construction provides an arrangement in which the running clearances need not be made as accurately as in the conventional design in order to provide the same conditions, thereby providing a much cheaper construction for the same efficiency of the impeller unit.

While I have illustrated and described a particular embodiment of my invention, modifications thereof will occur to those skilled in the art. I desire it to be understood, therefore, that my invention is not to be limited to the particular arrangement disclosed, and I intend in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An axial flow impeller comprising an inner mounting member, an axially extending shroud, a plurality of axial flow impeller blades extending between said mounting member and said shroud secured thereto for rotation as an impeller unit, a stationary wall with an opening therethrough, said impeller unit extending through said wall opening with a free running clearance therearound, and means including a plurality of outwardly extending vanes mounted on the outer periphery of said impeller unit shroud on the impeller discharge side of said wall and extending outwardly beyond said impeller discharge end of the clearance between said wall and said shroud and along the impeller discharge side of said wall with a running clearance between said vanes and said wall, said vanes being shaped to draw fluid from both sides of said vanes and to discharge the fluid radially outward, and a stationary shroud mounted on the discharge side of said wall spaced from said wall opening and surrounding said vanes whereby a slight flow of fluid, is provided towards the discharge side of said impeller and reverse flow of fluid around said impeller shroud is prevented.

2. An axial flow impeller comprising an inner

mounting member, an axially extending shroud, a plurality of axial flow impeller blades extending between said mounting member and said shroud secured thereto for rotation as an impeller unit, a stationary wall with an opening therethrough, said impeller unit extending through said wall opening with a free running clearance therearound, a plurality of vanes mounted on said impeller unit shroud on the impeller discharge side of said wall and extending outwardly beyond the impeller discharge end of the clearance between said wall and said shroud and along the impeller discharge side of said wall with a running clearance between said vanes and said wall, said vanes being shaped to draw fluid from both sides of said vanes and to discharge the fluid radially outward, and a smooth conical shroud mounted on said wall and flared outwardly toward the discharge side of the impeller and surrounding said vanes.

3. An axial flow impeller comprising an inner mounting member, an axially extending shroud having an outwardly flared inlet edge, a plurality of axial flow impeller blades extending between said mounting member and said shroud secured thereto for rotation as an impeller unit, a stationary wall with an opening therethrough, said impeller unit extending through said wall opening with a free running clearance therearound, a plurality of vanes mounted on said impeller unit shroud on the impeller discharge side of said wall and extending outwardly beyond the impeller discharge end of the clearance between said wall and said shroud and along the impeller discharge side of said wall with a running clearance between said vanes and said wall, said vanes having a radial length from two to three times the clearance between said wall and said impeller shroud, and a smooth conical shroud mounted on said wall and flared outwardly toward the discharge side of the impeller and surrounding said vanes.

4. An axial flow impeller comprising an inner driving and mounting member, an axially extending shroud coaxial with said mounting member and having an outwardly flared inlet edge, a plurality of axial flow impeller blades extending between said mounting member and said shroud secured thereto for rotation as an impeller unit, a stationary wall with an opening therethrough, said impeller unit extending

through said wall opening with a free running clearance therearound, a plurality of radial vanes mounted on the outer surface of said impeller unit shroud adjacent said wall on the impeller discharge side of said wall with a running clearance between said vanes and said wall, said vanes having a radial length from two to three times the clearance between said wall and said impeller shroud, and means including a conical stationary shroud on said wall flared outwardly toward the discharge side of said impeller and arranged around said radial vanes for cooperation therewith in drawing fluid from both directions and discharging the fluid radially against said conical shroud to provide a slight flow of fluid towards the discharging side of said impeller and to provide a fluid seal preventing reverse flow of fluid around said impeller shroud.

5. An axial flow impeller comprising an inner mounting member, an axially extending shroud, a plurality of axial flow impeller blades extending between said mounting member and said shroud secured thereto for rotation as an impeller unit, a stationary wall with an opening therethrough, said impeller unit extending through said wall opening, the outer surface of said shroud being adjacent the inner surface of said wall opening defining a free running clearance, and a plurality of outwardly extending vanes mounted on the outer periphery of said impeller unit shroud on the impeller discharge side of said wall, said vanes extending outwardly beyond the impeller discharge end of the clearance between said wall and said shroud and adjacent the impeller discharge side of said wall with a running clearance between said vanes and said wall, said means providing a slight flow of fluid towards the discharge side of said impeller and providing a fluid seal preventing reverse flow of fluid around said impeller shroud.

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