July 6, 1943. V. V. DIBOVSKY 2,323,382

ROTARY BLOWER

Filed May 29, 1942

Fig.1.

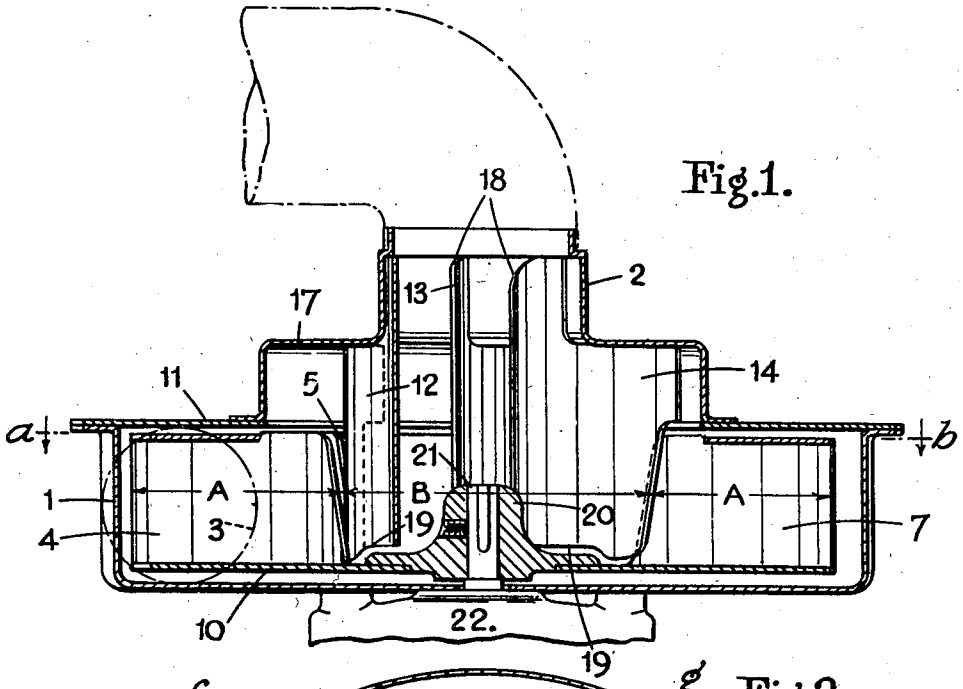
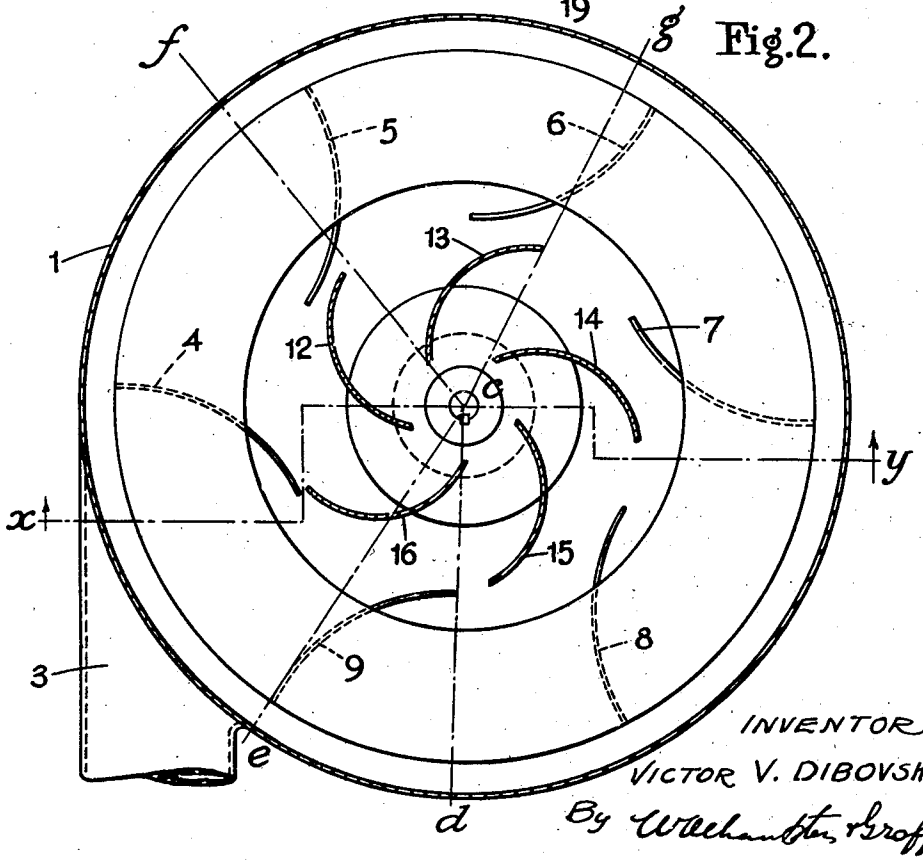


Fig.2.



INVENTOR
VICTOR V. DIBOVSKY
By Wheeler, Wheeler & Groff.

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ROTARY BLOWER

Victor Vladimirovitch Dibovsky, London, England

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1 Claim. (Cl. 230—127)

This invention relates to rotary blowers or exhausters for air or other elastic fluids of the kind having a casing containing a rotor embodying an annulus occupied by a set of blades and a central part into which air is drawn so as to be finally delivered by the bladed annulus through a suitably disposed outlet conduit in the casing.

An object of the invention is to produce an increased flow in relation to the usual degree of flow produced by rotary blowers of approximately similar size driven at or about the same speed. A further object is to direct the streams in such a way as to form a resistance to minimise or balance out centrifugal force exerted on the rotor at high revolutions, a frequent cause of damage.

With these and other objects in view the invention consists broadly in constructing the blower in such a manner that the volume of that part of the casing swept by the annulus (i. e. the section bounded in the axial direction by the top and bottom walls of the rotor and radially by the inner and outer edges of the blades) is at least twice as large as the remaining cubic area in which is located the central part of the rotor. It is preferred to employ in combination a set of fixed curved blades carried by the casing and disposed in said remaining cubic area tangentially to the rotor blades with their curve in contraflow thereto. All blades are advantageously shaped substantially as true arcs of a circle.

In order that the invention may be readily understood reference is directed to the following description of an embodiment given by way of example which is illustrated by the accompanying drawing, wherein:

Figure 1 is a sectional elevation on the combined planes indicated by the line *x*—*y* of Figure 2, and

Figure 2 is a sectional plan on the line *a*—*b* of Figure 1.

The casing 1 is of flat cylindrical formation sufficiently large to house the rotor with requisite clearance, having a central inlet tube or neck 2 at the top and an outlet conduit 3 leading from its circular wall. This outlet may be tangential or otherwise angularly offset from the radial direction according to the general direction of the discharging stream.

In the embodiment the cubic area of that part of the casing swept by the annulus of the rotor represented by A and A is of the order of twice the cubic area at the centre represented by B. In the example the opposed edges of the respective sets of rotor and fixed blades are sloping and the mean radial width of the rotor blades determines the dimension A. The rotor blades 4, 5, 6, 7, 8 and 9, shaped as true circular arcs, are erected between a bottom disc 10 of the rotor and an annular top plate 11 with the inner edges of the blades preferably extending past the inner edge of said annular top plate as seen more clearly in Figure 2. The blades 4 to 9 are angularly set with their outer edges lying on a radius *c*—*e* which is circumferentially spaced away from a radius *c*—*d* containing their respective inner edges with the concavity facing outwards in the angle formed by the two radii.

A series of fixed blades 12, 13, 14, 15 and 16 are secured to the top wall 17 of the casing with the outer edges of the blades brought near to the inner edges of the rotor blades, and the inner edges of said fixed blades brought towards the centre of the blower, but spaced from one another at the centre to leave a hollow air core. Said fixed blades preferably extend up into the central inlet tube 2, the inner edges being rounded off as at 18 so as to curve towards the wall of the tube. These fixed blades extend down towards the base of the rotor, and are curved or otherwise shaped as at 19 to the contour of the rotor and its supporting member 20 at the centre. This supporting member 20 is keyed or otherwise fixed to the spindle 21 of a motor 22.

The fixed blades are also preferably although not necessarily curved as arcs, and whilst they are angularly set in a manner corresponding to the rotor blades, their concavity is reversed, i. e. faces inwards in the angle formed by the two radii *c*—*f* and *c*—*g* on which their inner and outer edges respectively lie. Their curves make a tangent to the curves of the rotor blades when a rotor blade and a fixed blade are lying edge to edge as perhaps most clearly seen where the blades 4 and 16 are in such a position. It is preferred to employ an odd number for one set of blades and even for the other, and in the example six rotor blades and five fixed blades are used.

The fixed blades serve, among other things, to prevent the formation of a vortex within the centre of the rotor, whilst they ensure a smooth flow of the stream by their contraflow curve and tangential disposition into the annulus. By this way any resistance encountered at the rotor blades is on the inner concave surfaces giving a centripetal force component minimising the liability to damage by centrifugal action.

The combination of fixed and rotor blades as herein described has the further advantage of improving the suction at the centre which is par-

ticularly useful when the device is used primarily for suction.

I claim:

A rotary blower or the like, including, a rotor housing, a cupped section provided with a tangential outlet and a ring like side wall, a rotor mounted in said rotor housing and comprising a disc and an annular ring like plate, the outer edges of said disc and plate lying in the same circumferential plane, a series of arcuate vanes arranged transversely between the disc and plate in spaced relation, said vanes having their outer ends terminating substantially in the circumference plane of the plate and disc and having their inner ends terminating in a common circumferential plane defining a fixed blade receiving chamber, a boss on the inner face of the annular ring like having a bore for receiving a motor driven spindle, a cupped stator section fitted to and covering the opening in the ring like side wall of the rotor section and having an inlet neck of reduced diameter, and a plurality of fixed arcuate blades carried by the stator section, said fixed blades having their outer ends formed to provide portions entering the said inlet neck and their outer side portions extending laterally into the chamber of the cupped stator section, said blades also having their inner ends extending into the said fixed blade receiving chamber formed by the rotor blades.

VICTOR V. DIBOVSKY.