

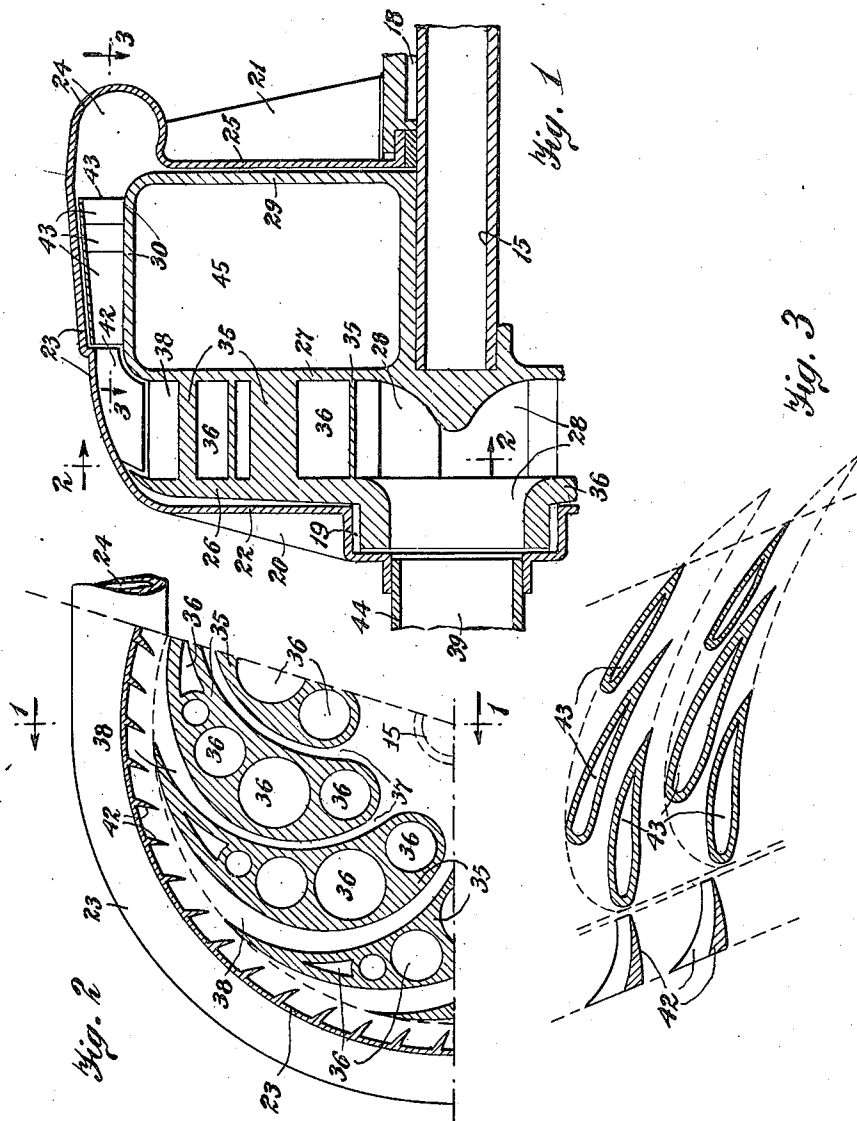
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WING TURBINE UNIT

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WING TURBINE UNIT

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6 Claims. (Cl. 253—91)

This invention relates to improvements in steam and gas turbines and air compressors and more specifically to the blades used therewith.

The wing shaped form of these blades is similar to the shape of the wings used on airplanes, changed to adapt them for this purpose.

In both fields the flow of gaseous substances or elastic fluids is utilized by being transformed into power; the underlying principle is therefore the same and dealt with accordingly.

Practical experience and research in turbine construction, proves beyond doubt that under certain conditions the so called eddy spaces between the blades increases efficiency, contrary to existing theories.

In this case the force of suction is effected similarly to the lifting power of an airplane wing, as the latter consists of the combined forces of substantially two-thirds suction and one third pressure.

With these facts in mind it appears obvious that in utilizing this principle, the efficiency of a turbine can be increased, its construction simplified and its size decreased.

As the lifting force in an airplane wing depends on its area, as well as velocity, as in a turbine, it is logical to assume that large wing shaped blades will be more effective than the usual small blades; no doubts exist as to the foregoing in aeronautics.

Furthermore, in the application of this principle in turbine construction, a far superior advantage is obtained by reducing the complicated method of changing the direction of the gases continuously in multiple sets of stationary buckets.

The many improvements inherent in the adaptation of this principle of aeronautics to turbine construction is the principal object of this invention.

Figure 1 is a fragmentary longitudinal section through the entire device; taken along line 1—1 of Figure 2.

Figure 2 is a fragmentary transverse sectional view taken along line 2—2 of Figure 1.

Figure 3 is a diagrammatic view through a part of the wing arrangement disposed peripherally of the rotor, the view looking on line 3—3 of Figure 1.

The illustrated embodiment of the present invention consists essentially of a compound rotor and of a stationary enclosure, stator or casing. The rotor is fixed to a rotor shaft 15 and rotates with the latter, which is journaled in anti-friction bearings 18 and 19. Struts or braces 20 and

21 extend from the bearing members to the enclosures of the stator or stationary casing composed of elements 22, 23, 24, and 25.

The rotor comprises essentially a plurality of spaced disks defining compartments therebetween. As shown in Figure 1 disks 26 and 27 define a collecting chamber 28.

Disks 27 and 29 are fixed to the shaft 15 and integrally connected by a peripheral wall 30, parallel with the shaft, and enclosing an annular chamber 45.

Disks 26 and 27 are interconnected by a series of hollow wing members 35 having annular openings 36. These wing shaped blades are radially arranged in the turbine chamber 45 around the shaft 15 in mutually overlapping spaced relation, as clearly illustrated in Figures 1 and 2, and define Venturi-shaped funnels or passageways 37 and 38 therebetween open at their outer, wider ends and in communication with the angular space between the walls 23 and 30. The inner arcuate ends of the wing shaped blades 35 are spaced from the centerline, defining the collecting chamber 28.

Extending inwardly from casing wall 23 into the space between the turbine chamber 45 and the stationary wall 22 and partially overlapping into the annular space between rotating wall 30 and stationary wall 23, is a circumferential series of stationary baffles or buckets 42 (see Figures 1 and 2) positioned as illustrated and adapted to change the direction of flow of the gases coming from the turbine.

Another circumferential series of wing blades 43 is provided on the peripheral wall 30 of the rotor and are extended close to the stationary enclosure 23. As best shown in Figure 3, the wing blades 43 are arranged in axially directed sets of three mutually overlapping wing shaped elements, defining in their combined outline, a wing shaped form and elongated Venturi shaped passageways therebetween. Moreover, the trailing wing ends are so shaped and so directed that the tangents to the concave side at such ends are substantially parallel. The gases directed against the concave side of the first wing element will not touch directly the trailing edges of the other elements and will therefore cause a suction on the passages between the elements. The resulting reaction will be a rarefaction of gases on the convex side of the blade elements 43 and with it a highly effective suction action.

In action, the driving medium enters through pipe line 44 through its inlet opening into the collecting chamber 28, then directed into the

openings 37 between the wing shaped blades 35, pressing outward through the narrow necks into a tangential direction in channel 38, enforcing high pressure and suction forces against the blades. After passing baffles 42 the gases are forced to assume an axial direction and flow at high speed between the wing shaped sets 43, then pass into the exhaust ring around the periphery of the stator and into the exhaust outlet 24.

The embodiment of the present invention herein disclosed is purely illustrative in character, and various alterations may be made therein without departing from the spirit of the invention. Accordingly, the present invention is not intended to be limited by the details of the construction disclosed or otherwise than by the terms of the claims hereunto appended.

Having described the invention, what is claimed is:

1. A continuous system of wing-shaped turbine blades, adapted to be applied for steam and gas turbines and compressors, radially arranged and gradually deflected into a final substantially tangential direction, said blades being so spaced as to define Venturi-shaped passageways therebetween, said passageways consisting of wide openings between the arcuate leading edges of said wing-shaped blades, narrow necks and a gradually widening channel toward the periphery of the turbine rotor, whereby the outward flow of the elastic fluid through said passageways results in a rarefaction thereof on one side and a densification thereof on the other side of each

blade, thereby creating a combination force of pressure and suction similar to the airplane wing theory.

2. The system defined in claim 1, said wing-shaped blades defining Venturi-shaped passageways therebetween, in which the narrow neck and the opening at the periphery are in relation to the compression ratio.

3. The system of wing-shaped turbine blades, as described in claim 1, said blades being strengthened through annular walls interconnecting the convex with the concave side of said blades.

4. A system of wing-shaped blades, adapted to be applied to steam and gas turbines, said blades being circumferentially spaced and axially directed, consisting of a series of sets arranged in overlapping spaced relation to annular rows, each blade defining in its outline a wing-shaped form and having Venturi-shaped passages therebetween, whereby passage of the elastic fluid causes a suction effect on the convex side of each wing element.

5. The system of wing-shaped blades defined in claim 4, the blades of each set being so shaped and arranged that tangents thereto at the trailing edges thereof are spaced and substantially parallel.

6. The system of wing-shaped blades defined in claim 4 the blades being fixed to and between the inner mantel of the rotor drum and, throughout their whole length to an outer ring close to the stationary enclosure.

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