

Feb. 22, 1966

S. KOFINK

3,236,500

TURBINE

Filed Nov. 20, 1962

2 Sheets-Sheet 1

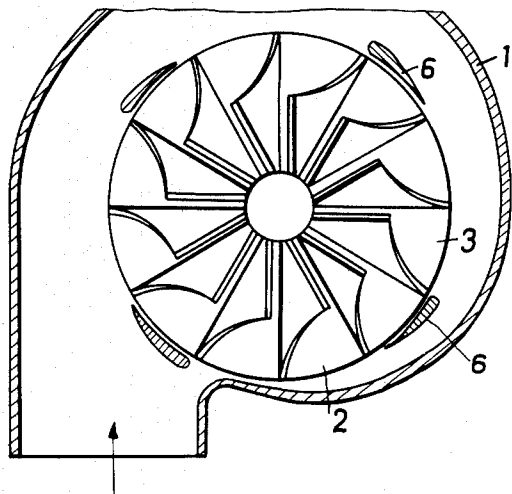


Fig. 2

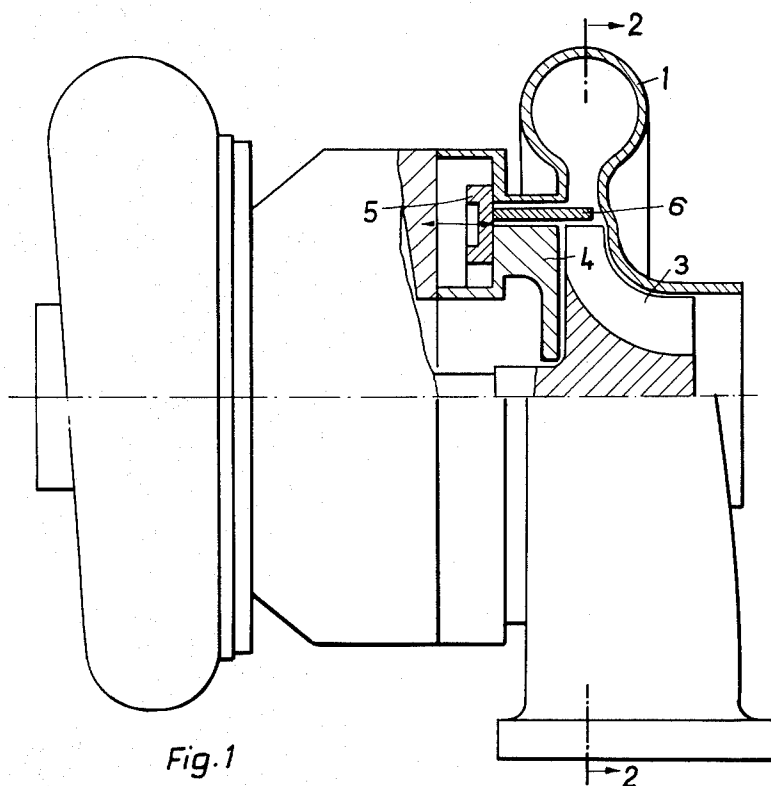


Fig. 1

Inventor:
Siegfried Kofink
McGraw and Toren
Attorneys

Feb. 22, 1966

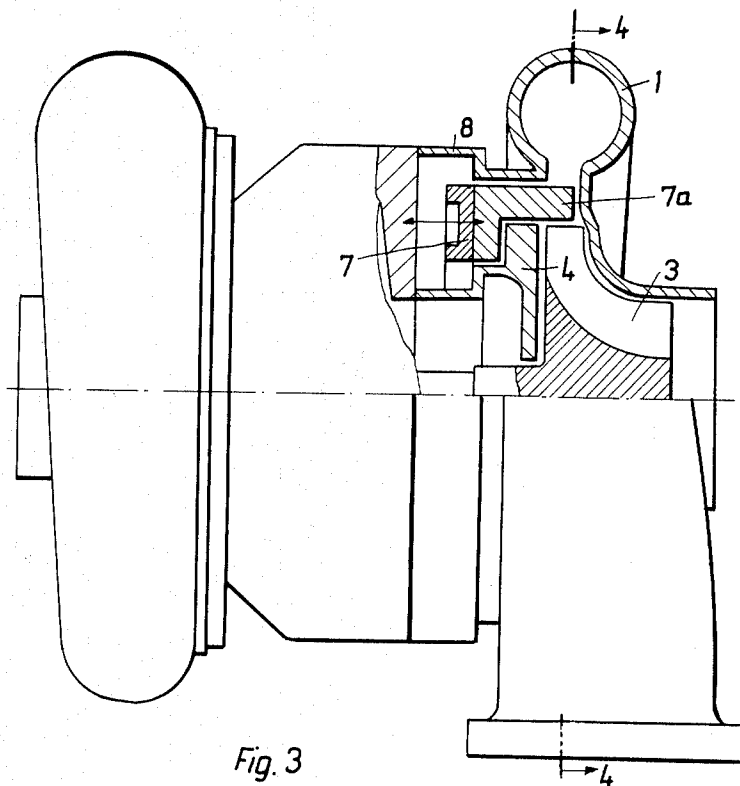
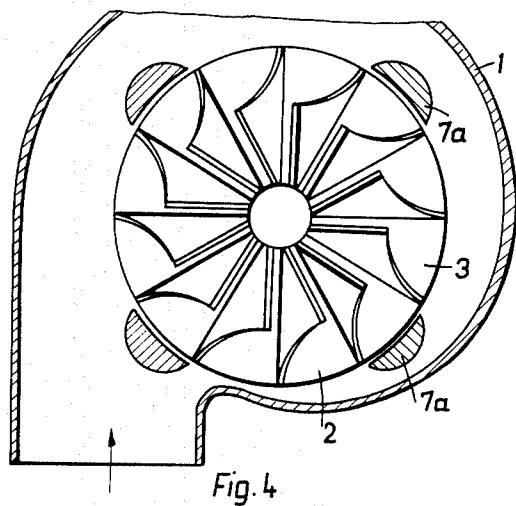
S. KOFINK

3,236,500

TURBINE

Filed Nov. 20, 1962

2 Sheets-Sheet 2



Inventor:
Siegfried Kofink
McGlew and Toren
Attorneys

1

3,236,500
TURBINESiegfried Kofink, Zell (Neckar), Germany, assignor to
Gerätebau Eberspächer OHG, Esslingen (Neckar),
Germany

Filed Nov. 20, 1962, Ser. No. 239,035

Claims priority, application Germany, Dec. 9, 1961,
G 33,788

4 Claims. (Cl. 253—121)

This invention relates in general to turbine construction, and in particular to a new and useful gas turbine construction of a radial design having a casing wall with slots adjacent the periphery of rotor blades to permit insertion of covering plates for the blades for varying the amount of flow through the various blades.

The present invention is related to applicant's copending application Serial No. 147,356, filed October 24, 1961, now patent No. 3,137,477. In that application, certain means have been disclosed for adapting the impeller channels of fluid turbines to a regulation of fluid admission by employing coverings in a nozzle ring which are coordinated in a manner to provide constant speed operation regardless of the flow of the fluid to the turbine.

In accordance with the present invention, there is provided a turbine having a housing defined as a spiral for the admission of the operating fluid and which includes a side wall for the housing having openings at a location adjacent the periphery of a rotor blade rotatable within the housing. The openings are provided for receiving one or more covering elements which extend through the wall of the turbine and may be positioned to align with the periphery of the blades for the purpose of limiting the amount of flow through the blades. In accordance with the invention, the coverings are advantageously mounted on a control element such as a ring which may be moved in accordance with the operating characteristics of the turbine in order to provide the desired speed thereof. With the invention, it is a simple matter to either insert or remove the covering so that the operation of the turbine is affected thereby. The covers are such that they substantially fill the opening of a slot defined in the wall of a casing, and when they are moved to an inoperative position they cover said opening.

Accordingly, it is an object of this invention to provide an improved turbine construction.

A further object of the invention is to provide a turbine construction including a housing having a wall with at least one opening therein at a location adjacent the periphery of the rotor blade operating within the housing and including a covering element for the blades which is insertable in the opening.

A further object of the invention is to provide a turbine having a housing or casing constructed to provide spiral inflow of the driving fluid, and which includes a rotatable turbine wheel therein, the housing having a plurality of openings at locations spaced around the periphery of the rotatable blade, and including a control element having a plurality of covering members which are insertable in respective openings for the purpose of regulating fluid flow through the blades.

A further object of the invention is to provide a turbine which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings

2

and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

In the drawings:

FIG. 1 is a partial elevational and partial fragmentary sectional view of a gas turbine constructed in accordance with the invention;

FIG. 2 is a section taken on the line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 1 of another embodiment of the invention; and

FIG. 4 is a section taken along the line 4—4 of FIG. 3.

Referring to the drawings in particular, the invention embodied therein includes in FIGS. 1 and 2 a turbine generally designated 10 which includes a housing 1 which is of generally spiral configuration to provide for the spiral inflow of driving fluid such as exhaust gases from an internal combustion engine. A central radial impeller 2 having blades 3 is rotatably mounted within the housing 1 on an axis or shaft 12.

In accordance with the invention, the turbine casing 1 includes a wall or bulkhead 4 having a plurality of circumferentially spaced openings 14 located adjacent the periphery of the blades 3. A control element or holding ring 5 is provided with a similar number of covering elements 6 which are of a size to be inserted within the openings 14. The slots or openings 14 correspond in size and configuration to the size of the covering element 6.

The holding ring 5 is connected by an element 16 to means sensing the quantity of gas which is admitted through an opening 18 in the turbine casing. The means which are located to sense the fluid admitted at the opening 18 actuate the member 16 to cause the holding ring 5 to move inwardly and insert the covering 6 within the casing 1 in a position to cover the blade elements 3, as indicated in the drawings. In this manner, they reduce the total passage cross section to the blade channels of the impeller 2. In the embodiment illustrated in FIGS. 1 and 2, the coverings 6 are advantageously shaped in the form of an airplane wing with the forward end rounded and the trailing end pointed, so that the flow in the direction of the arrows 20 will be aerodynamically stable and not inhibited.

As indicated in FIGS. 3 and 4, a gas turbine 10' is provided with a casing 1' of a configuration similar to that indicated in the other embodiment. In this embodiment, however, a cylindrical formation 8 is provided at the periphery of the casing on the bulkhead or wall 4'. A control member 7 is movable within the cylinder 8 in accordance with the flow conditions of the operating gas which enters in an opening 18' of the turbine. The control member 7 is provided with finger elements or covers 7a which slide in a slot or opening 14' defined in the wall 4' adjacent the periphery of the blades 3'. In this embodiment, the covering elements are made in the form of segments of a cylinder. They are advantageously made slightly smaller than the spacing between the blades for the purpose of control of fluid flow therethrough.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A gas turbine comprising a casing having a side wall and wall means for directing gas in a spiral, a rotor rotatably mounted within said casing with the periphery thereof defining a spiral with the outer wall of said casing, said rotor having a plurality of radially extending blades spaced angularly to define entrance openings at their peripheries, a plurality of openings defined in said side wall of said casing adjacent the periphery of said

3

rotor at circumferentially spaced locations, and a control ring, a plurality of circumferentially spaced covering elements corresponding in number to the number of said openings and forming a unitary structure with said ring, said covering elements being located at circumferentially spaced locations around the periphery of said rotor and being circumferentially elongated sufficiently to cover the entrance openings between adjacent ones of said rotor blades and having an inner surface concentric to the axis of rotation of said rotor blades and having a leading and trailing edge, the outer surface between said edges being defined by an unbroken, smooth, continuously changing curved surface, said control means being axially movable in one direction to position said coverings within said casing adjacent the periphery of said blades for covering a portion of the periphery of said rotor between a plurality of blades for regulating the operating characteristics of said turbine and axially movable in an opposite direction to uncover the periphery of said rotor.

2. A device according to claim 1, wherein said covering element is substantially wing-shaped in profile.

3. A device according to claim 1, wherein said covering element is in the form of a segment of a circle in profile.

4. A gas turbine according to claim 1, wherein said control means includes a piston member, said casing having a plurality of cylinders defined at locations surround-

4

ing each of said openings, said control element including a plurality of piston portions slidable in said cylinders.

References Cited by the Examiner

UNITED STATES PATENTS

5	268,287	11/1882	Risdon et al. -----	253—104
	1,353,915	9/1920	Kime -----	103—97
	1,659,410	2/1928	Schmidt -----	103—103
	2,285,976	6/1942	Huitson -----	253—52
10	2,465,527	3/1949	Goddard -----	103—103
	2,519,151	8/1950	Overweg -----	230—114
	2,770,943	11/1956	Beale -----	253—55

FOREIGN PATENTS

15	875,086	6/1942	France.
	848,330	9/1952	Germany.
	305,214	1/1929	Great Britain.
	738,987	10/1955	Great Britain.
20	750,635	6/1956	Great Britain.
	753,316	7/1956	Great Britain.
	133,892	6/1929	Switzerland.

DONLEY J. STOCKING, *Primary Examiner.*

25 LAURENCE V. EFNER, JOSEPH H. BRANSON, JR.,
KARL J. ALBRECHT, *Examiners.*