

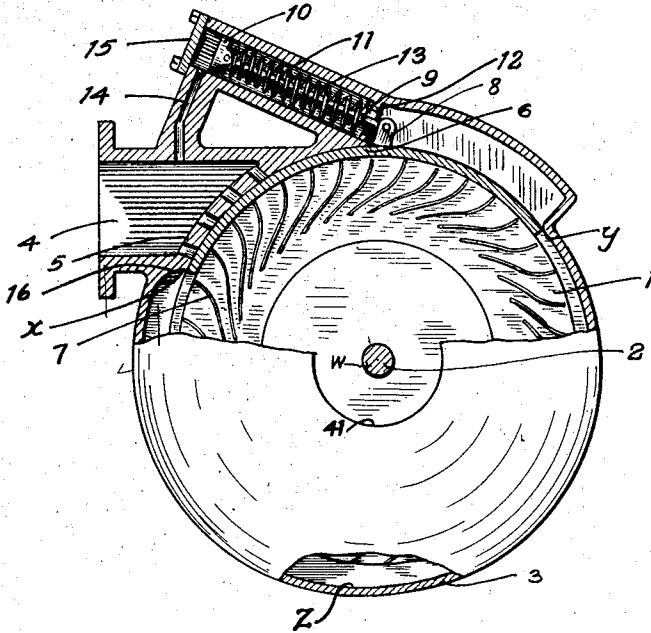
Aug. 25, 1925.

1,551,337

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TURBINE

Filed May 20, 1924



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Patented Aug. 25, 1925.

1,551,337

UNITED STATES PATENT OFFICE.

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TURBINE.

Application filed May 20, 1924. Serial No. 714,670.

To all whom it may concern:

Be it known that I, ARTHUR ROBERT SIEGLER, a citizen of the United States, residing at Denver, in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Turbines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in turbines and has reference more particularly to improvements in the casing.

It is the object of this invention to produce a turbine that shall be of simple and substantial construction, and which can readily be equipped with automatic means for controlling the power or the speed or both when employed either in connection with a constant or a variable head. Turbines are, as a general rule, employed solely in connection with constant head supply. It is my intention, however, to employ my turbine in connection with a variable head or supply such as that produced by my liquid engine, which forms the subject matter of my co-pending application, Serial No. 644,902, filed June 12, 1923.

It is evident that any turbine that is to be driven from the liquid compressed by means of my engine, must be adapted to run on widely variable pressures, as these are varied between wide limits.

In order better and more clearly to describe my invention, I shall have reference to the accompanying drawings in which the same is illustrated, and in which the single figure is a horizontal section of a runner casing showing the runner in place therein.

N numeral 1 represents a runner which may be of any suitable construction and mounted to rotate about the shaft 2. The runner is enclosed in a casing which I have designated broadly by the numeral 3. The casing has a water inlet 4 that may be connected to the supply and an exhaust port 41 that may be connected to a suitable waste pipe. The inner end of the inlet is closed by a perforated transverse wall 5, the openings of which all make the same angle with the tangent to the runner at that point. The portion of the inner wall of the casing lo-

cated between point x and y is curved on the arc of a circle whose center coincides with the center of the runner. An arcuate slide valve 6 lies between the inner arcuate wall surface of the casing 3 and the outer surface of the runner. This valve is so constructed that it can be slid in the space between the runner and the casing. When the left-hand end of the valve is at the point marked x , it is evident that no liquid can flow from the inlet chamber through the openings in the wall 5 and into the buckets 7 of the runner. As the slide is moved towards the right, it will gradually uncover openings in the wall 5, whereupon liquid will flow and the runner will start to rotate. It is evident that with a given hydrostatic head, the power developed by the runner can be regulated by means of the slide 6. Where the hydrostatic head of the supply is variable, the power developed by the runner can likewise be controlled by the slide. In Fig. 1 I have shown the slide 6 as provided with a radially extending lug 8 which is connected by means of a connecting rod 9 with a piston 10 which is located within the cylinder 11. The inner surface of the cylinder has lugs 12 projecting inwardly from the sides thereof. These lugs serve as an abutment for one end of the compression spring 13 whose other end abuts the under side of the piston 10. The spring 13 exerts a force tending to move the slide to closing position. A channel 14 connects the intake inlet with the cylinder space between the top of the piston and the cylinder head 15. It is now evident that when the pressure within the inlet is low, the spring 13, which will be compressed only the amount required to balance the pressure of the liquid, will hold the slide 6 in a position where only a small amount of liquid can flow into the runner. As the pressure of the supply increases, the slide 6 moves farther towards the right and permits more liquid to flow into the runner. It is therefore apparent that by varying the pressure of the supply, the power generated by the runner is varied in accordance therewith.

Having now described my invention, what I claim as new is:

1. A turbine comprising, in combination, a casing having a runner chamber, a runner in said chamber, said casing having an inlet, a perforated wall in the bottom of said inlet, an arcuate slide between the runner

and said perforated wall, a liquid supply, and means for automatically moving said slide in accordance with the pressure of supply.

5 2. A turbine comprising, in combination, a casing having a runner chamber, a runner in said chamber, said casing having an inlet, a perforated wall in the bottom of said inlet, an arcuate slide between the runner
10 and said perforated wall, said casing having a cylindrical chamber, a piston in said cylinder, a connecting rod from the piston to the slide, spring means operatively connected to the piston for normally retaining it in a
15 predetermined position, a rod connecting said piston to said slide, and means for permitting liquid from the inlet to come into contact with the piston and for moving it against the pressure of the spring.

20 3. A turbine comprising, in combination, a casing having a runner chamber, a runner in said chamber, said casing having also an inlet opening and a cylinder, a piston in the cylinder, an arcuate transverse wall between the inlet opening and the runner, a
25 slide between the runner and the arcuate

wall, means for connecting the piston to the slide, a spring operatively connected to the piston, and a tubular member connecting the inlet opening with the cylinder, where-
30 by the piston will be subjected to the same pressure as that prevailing within the inlet opening.

4. A runner casing for turbines having a runner chamber whose side is formed by two
35 arcuate sections of different radius and eccentric with respect to each other, an arcuate slide movably associated with one of said arcuate sections and means for moving said slide, said means comprising a piston
40 operatively associated therewith.

5. A runner casing for turbines having a runner chamber whose side is formed by two arcuate sections of different radius and eccentric with respect to each other, an arcuate
45 slide movably associated with one of said arcuate sections means for moving said slide, and means comprising a spring for normally maintaining the piston in a predetermined position.
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In testimony whereof I affix my signature.
ARTHUR ROBERT SIEGLER.