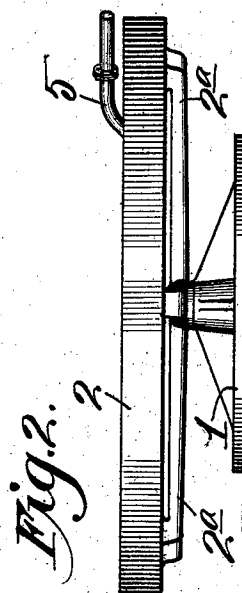
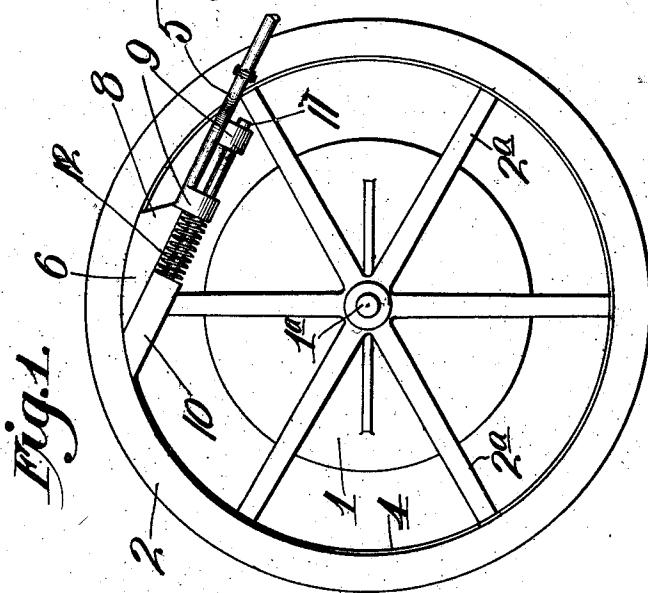
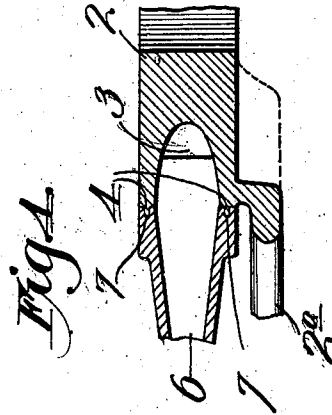
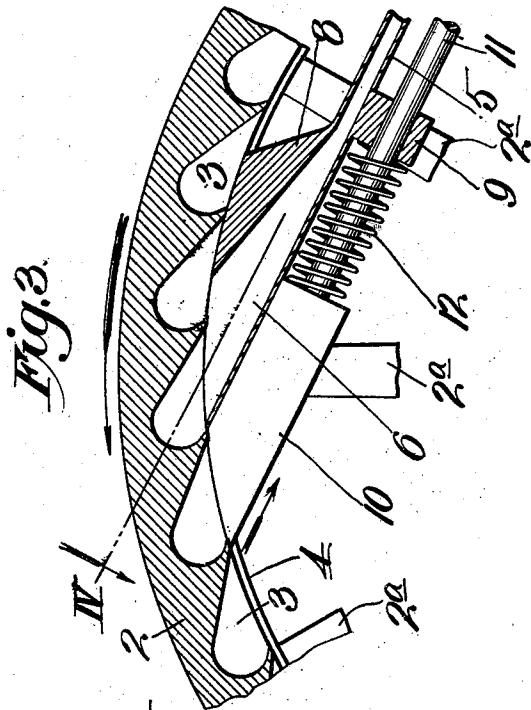


G. W. GILLELAND.
STEAM TURBINE.
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1,001,134.

Patented Aug. 22, 1911.



Witnesses
Frank R. Horn
H. C. Rodgers

Inventor
G. W. Gilleland
By George Y. Thorpe Atty.

UNITED STATES PATENT OFFICE.

GROVER W. GILLELAND, OF STEAMBOAT SPRINGS, COLORADO.

STEAM-TURBINE.

1,001,134.

Specification of Letters Patent.

Patented Aug. 22, 1911.

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To all whom it may concern:

Be it known that I, GROVER W. GILLELAND, a citizen of the United States, residing at Steamboat Springs, in the county of Routt and State of Colorado, have invented certain new and useful Improvements in Steam-Turbines, of which the following is a specification.

This invention relates to steam turbines and has for its object to produce a device of this character whereby the steam is given the maximum leverage for operating the turbine at high velocity.

A further object is to produce means for automatically regulating the speed of the turbine.

More specifically my object is to produce a turbine provided internally with cups and a nozzle for discharging steam into successively presented cups, the nozzle being equipped with stationary means to prevent the steam escaping from the cups rearward of the nozzle and with a yieldingly-advanced guard to prevent the steam escaping from the cups until the latter have passed beyond the front end of the nozzle and adapted, in the event of a substantial diminution in the speed of the engine to be repressed by the expanding steam in the cup next forward of the nozzle to permit the velocity of the turbine to be increased by providing for the escape of the steam from the cup at that time in communication with the nozzle.

With these objects in view, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawing, in which:—

Figure 1, is a plan view of a steam turbine embodying my invention, Fig. 2, is a side view of the same. Fig. 3, is an enlarged horizontal section of a part of the turbine. Fig. 4, is a vertical section as indicated by the dotted line IV of Fig. 3.

In the said drawing, 1 indicates a base or support and 1^a a vertical stub shaft carried thereby on which is journaled the wheel or rotary part 2 of the turbine, 2^a indicating the spokes, which for convenience are shown below the plane of the rim. The rim is provided at its inner side with the cups 3, and with circular tongues 4 at opposite sides of the cups.

5 is a stationary nozzle adapted to be suitably supported and receiving steam under pressure, from any suitable source of supply, and said nozzle is arranged within the space inclosed by the rim of the wheel and extends at an angle corresponding approximately to that of each cup, as the latter passes into communication with the nozzle, the nozzle being so proportioned by preference that it will communicate with the following cup, before the preceding one has begun to pass the front extremity of the nozzle. The nozzle is also provided by preference, with grooves 7, receiving the tongues 4, so that it will be impossible for steam to escape between the side walls of the nozzle and the side walls of the cup. At its rear side the nozzle is provided with an extension or guard 8 of sufficient area to prevent steam escaping rearwardly from the rearmost cup in communication with the nozzle and said extension like the nozzle proper is adapted to bear a tongue and groove relation with the rim. The nozzle is preferably provided with a pair of guide lugs 9, for the stem 11 of a repressible guard 10, fitting against the front side of the nozzle and of sufficient area at its front end to completely close each cup as it passes forward of the nozzle, and this guard like the nozzle and the rear guard or extension 8, is adapted to bear a tongue and groove relation with the rim, and to hold the front guard 10 pressing against the rim with a yielding pressure, I preferably employ a coiled spring 12 which bears against the said guard at one end and one of the bearing lugs 9 at its opposite end.

Assuming that the parts bear the relation shown most clearly in Fig. 3 and that the wheel is being driven by the impact and pressure of the steam on the successively presented cups, it will be apparent that a diminution in the speed from any cause, such as an increase in the load, will result in the confinement of the steam in the cup at that time closed by the front guard, for a longer period of time than occurs when the speed is normal. Because of this, an opportunity is given for the steam to expand and thus repress the guard 10 against the resistance of spring 12, in the direction indicated by the arrow adjacent to the guard. The instant this repression of the guard occurs steam is permitted to escape from the fol-

lowing cup as it clears the front extremity of the nozzle and the velocity of the wheel or turbine is instantly accelerated, as it, at such instant, is driven mainly by the impact rather than under the expansion of the steam from the nozzle. As the speed is restored to normal, the spring 12 returns the guard to its original position and holds it in such position until the speed again falls, it being noted in this connection that but little steam is wasted owing to the fact that the increase of the speed and the readvance of the guard 10 are practically instantaneous.

It will be obvious that a plurality of the nozzles may be employed which will cooperate together in revolving the wheel or turbine and that the maximum speed is obtained because the steam is applied on the outer part of the wheel or turbine and thus obtains the greatest possible leverage.

From the above description it will be apparent that there being no dead point, the operation of the turbine instantly follows the supply of steam to the rim and that the device embodies the desirable features of simplicity, strength, durability and cheapness of construction, and I wish it to be understood that while I have illustrated and described the preferred embodiment of the invention I do not desire to be restricted to the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

I claim:—

1. A steam turbine, comprising a wheel provided with rim cups facing inwardly, a stationary nozzle engaging the rim and adapted to direct steam into the successively presented cups, means for preventing steam from escaping from the cups back of the nozzle, and means to prevent steam escaping forward of the nozzle until each charged cup

has completely cleared the front extremity of the nozzle.

2. A steam turbine, comprising a wheel provided with rim cups facing inwardly, a stationary nozzle engaging the rim and adapted to direct steam into the successively presented cups, means for preventing steam from escaping from the cups back of the nozzle, and a guard to prevent steam escaping forward of the nozzle until the front wall of each charged cup has cleared the front extremity of such guard.

3. A steam turbine, comprising a wheel provided with rim cups facing inwardly, a stationary nozzle engaging the rim and adapted to direct steam into the successively presented cups, means for preventing steam from escaping from the cups back of the nozzle, and a guard yieldingly engaging the rim forward of the nozzle and preventing the escape of steam until the front wall of each charged cup has either cleared the front wall of said guard or the steam in said cup has repressed the guard from the rim.

4. A steam turbine, comprising a wheel provided with rim cups facing inwardly, a stationary nozzle engaging the inner face of the rim and adapted to direct steam into the successively presented cups, a guard preventing steam supplied to the cups from escaping therefrom back of the nozzle, a slidable guard fitting against the front side of the nozzle and suitably guided for endwise reciprocation, and a spring holding said guard pressed against the inner side of the rim forward of the nozzle.

In testimony whereof I affix my signature, in the presence of two witnesses.

GROVER W. GILLELAND.

Witnesses:

J. EARL MILNER,

ALBERT A. MANN.