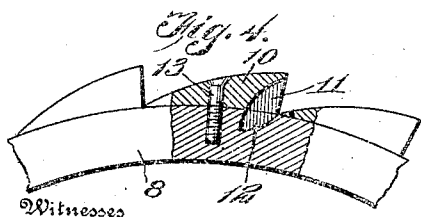
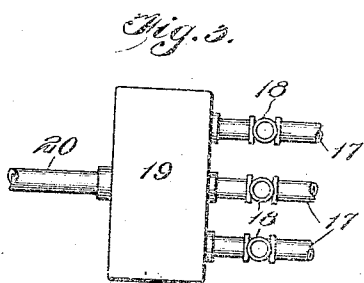
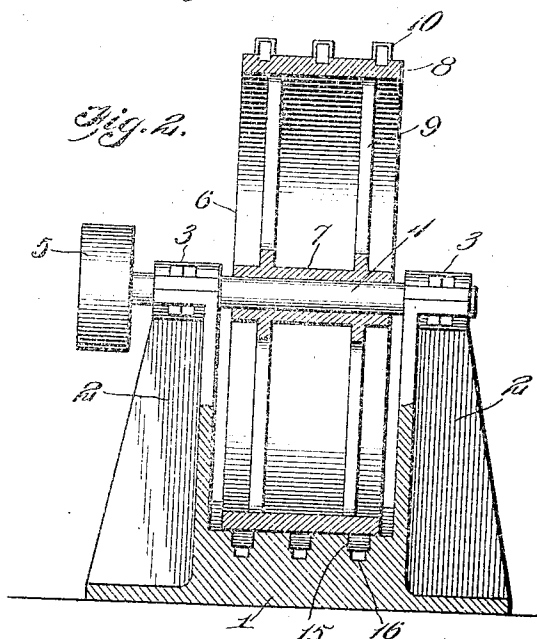
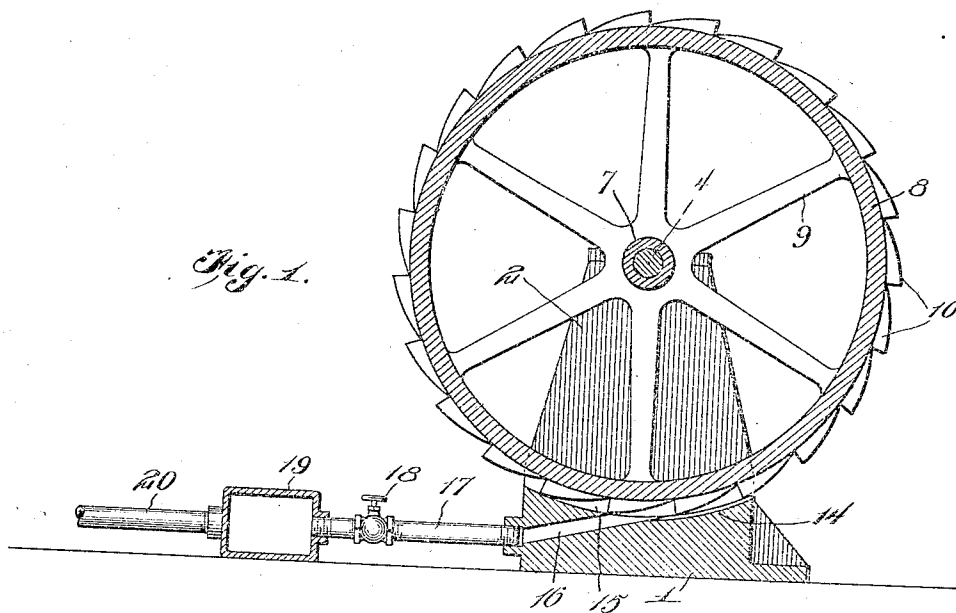


941,322.

M. KELLER.
STEAM TURBINE.
APPLICATION FILED JUNE 15, 1909.

Patented Nov. 23, 1909.



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MICHAEL KELLER, OF EUREKA, UTAH.

STEAM-TURBINE.

941,322.

Specification of Letters Patent Patented Nov. 23, 1909.

Application filed June 15, 1909. Serial No. 302,322.

To all whom it may concern:

Be it known that I, MICHAEL KELLER, a citizen of the United States, residing at Eureka, in the county of Juab and State of Utah, have invented new and useful Improvements in Steam-Turbines, of which the following is a specification.

This invention relates to steam turbines, the object of the invention being to provide a novel construction of turbine wheel and means for supplying steam to the vanes thereof by which the wheel may be rotated at a desired rate of speed and to transmit a greater or less amount of driving power to its driving shaft, the construction being such as to enable the wheel to be driven with a minimum amount of waste or expenditure of steam.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a vertical longitudinal section of a steam turbine embodying my invention. Fig. 2 is a vertical transverse section through the turbine wheel and its supporting base. Fig. 3 is a top plan view of the steam chest. Fig. 4 is a side view, partially in section, of a portion of the rim of the wheel.

Referring to the drawings, 1 designates a base from which rise spaced supporting standards 2 carrying at their upper ends bearings 3 for the engine shaft 4, on one end of which is mounted a pulley 5 for transmitting power therefrom to the machine or element to be driven.

Keyed or otherwise fixed to the shaft between the standards is a turbine wheel 6, comprising a hub 7, rim 8 and a series of spokes or radial arms 9 connecting the rim with the hub. This construction of the wheel is preferred in order to secure lightness of weight, but any other preferred construction may be employed.

The periphery of the rim 8 is provided with a plurality of annular series of vanes 10, each of which preferably comprises a substantially wedge-shaped block having a concaved inner face to bear against the rim and a convex outer face merging at its rear end into the concaved face, thus producing a point or reduced end at the rear of the block. The front or thickened base of the block is formed with a cavity 11 communicat-

ing with a pocket or cavity 12 in the rim of the wheel, such cavities forming a chamber for the reception of a jet of steam designed to impinge against the walls thereof to propel the wheel. Each vane is secured by a screw or other fastening device 13 to the rim of the wheel and has its chambered end facing the convex outer face of the succeeding blade. The vanes of each annular row are preferably arranged in transverse alignment, to provide transverse rows which are successively acted upon by the jets of steam from the motive fluid supplying agents, to enable a maximum amount of power to be applied at a time to the periphery of the wheel.

The upper surface of the base 1 is concaved or curved on an arc concentric with the axis and rim of the wheel, the outer surface of which rim is adapted to travel in close contact therewith. In said surface of the base in the direction of rotation of the wheel are formed channels 14 equal in number to the rows of vanes on the wheel. These channels are enlarged at their upper portions to provide passages 15 through which the vanes travel and during their period of travel therethrough are subjected to the action of the steam.

Inclined steam supply ducts 16 are formed in the base 1 and extend from the rear surface thereof and intersect the central portions of the channels 14 at a tangent. Communicating with the outer ends of these ducts are steam supply pipes 17 each having a controlling valve 18 therein and leading from a steam chest 19 receiving steam through a primary feed pipe 20 leading from a boiler or other source of steam generation. The parts of the motor may be mounted upon a suitable foundation and arranged in any desired relation to the steam generator and machine or element to be driven.

Assuming that the wheel is inactive and that it is desired to operate the same for generating power, the valves 18 of all the steam pipes are opened and the steam from the chest 19 allowed to pass through the pipes to the ducts 16, from which it is discharged in the form of jets into the channels 14. The jets of steam thus discharged into the channels enter the cavities in and associated with the immediate adjacent transverse rows of vanes of the portion of the wheel passing over the concaved sur-

face of the base and by impact start the turbine wheel into operation. Successive jets of steam are thus supplied to the transverse rows of vanes in the rotation of the wheel until the latter is driven at the required rate of speed, at which time a momentum will have been acquired and the weight of the vanes will act to impart a fly wheel effect to insure a uniformity of motion. At this time all but one of the valves 18 may be closed, the steam supply from a single pipe 17 being sufficient to rotate the wheel at the required speed and to furnish the requisite amount of power unless the load on the engine is comparatively heavy, under which conditions the valve or valves of one or both the other steam supply pipes may be opened or the injection of steam against the vanes of two or all the annular rows. The jet of steam striking each vane enters the cavity 11 at an angle and tends to exert an upward as well as a forward forcing effect on the periphery of the wheel, by which the wheel is lifted as it were and at the same time given a driving effect to overcome the tendency to inertia from its weight and propel the same forward in its direction of revolution. By this means the impact pressure of the steam is effectually utilized for a driving action and any tendency to back pressure prevented. The pockets 12 in the wheels increase the extent of impact surface and are inclined correspondingly to the pockets in the vanes to increase the lifting and propelling effect described. As each transverse row of vanes passes beyond the front of the base the steam exhausts from the cavities thereof, as will be readily understood.

40 A turbine constructed as above described

embodies a minimum number of parts and may therefore, be manufactured at a comparatively low cost. It is economical in the consumption of steam and generates a high degree of power proportionate to the amount consumed.

I claim:—

1. A turbine embodying a fixed surface having a curved face provided with steam channels and communicating passages, the latter opening through said curved face, and also provided with tangential steam ducts intersecting said channels, valved conductors communicating with the ducts, and a rotor provided with vanes adapted to travel through said passages and to receive the impact from the jets of steam issuing from the ducts.

2. A turbine embodying a fixed surface having a curved face provided with steam channels and communicating passages, the latter opening through said curved face, and also provided with tangential steam ducts intersecting said channels, valved conductors communicating with the ducts, a rotor provided in its periphery with pockets inclined in its direction of rotation, and vanes secured to the periphery of the rotor to travel through said passages and receive the impact from the jets of steam issuing from the ducts, said vanes being formed with cavities inclined correspondingly to and communicating with said pockets.

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

MICHAEL KELLER.

Witnesses:

CHARLES SCHAEFFER,
JAMES EUSTICE.