July 17, 1928. 1,677,198

E. W. NAILEIGH

INTERNAL COMBUSTION TURBINE

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Fig. 1.

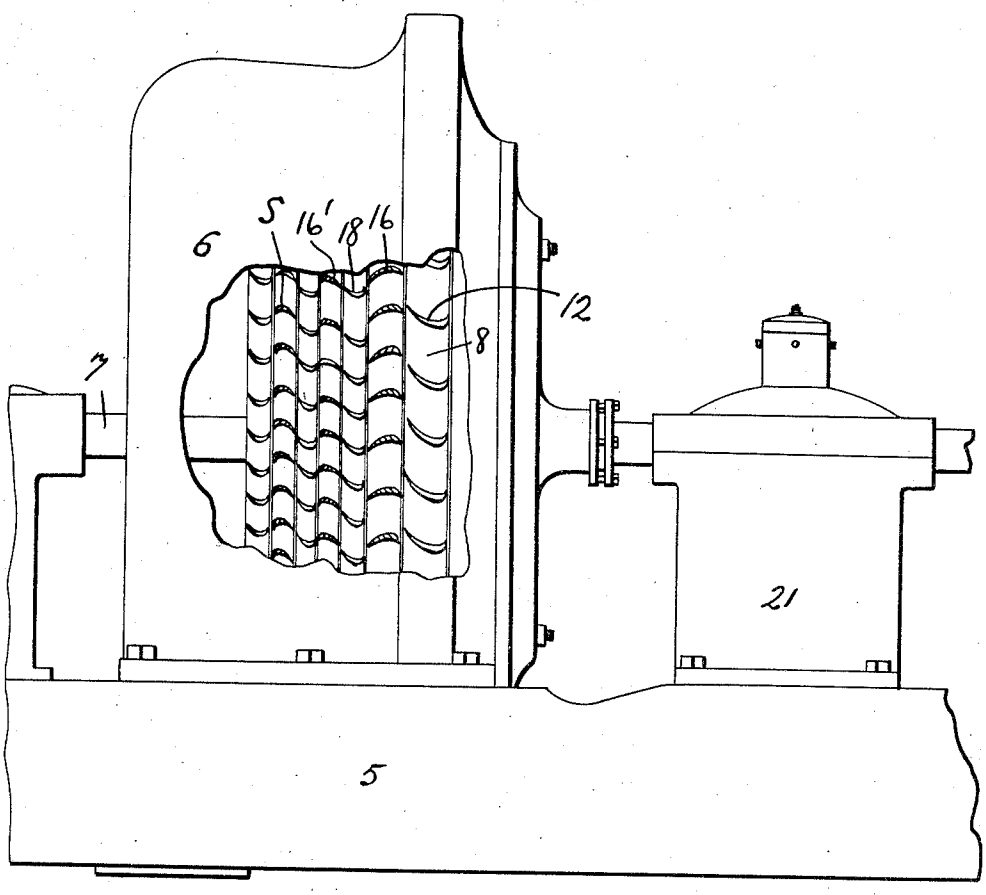

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Fig. 2.

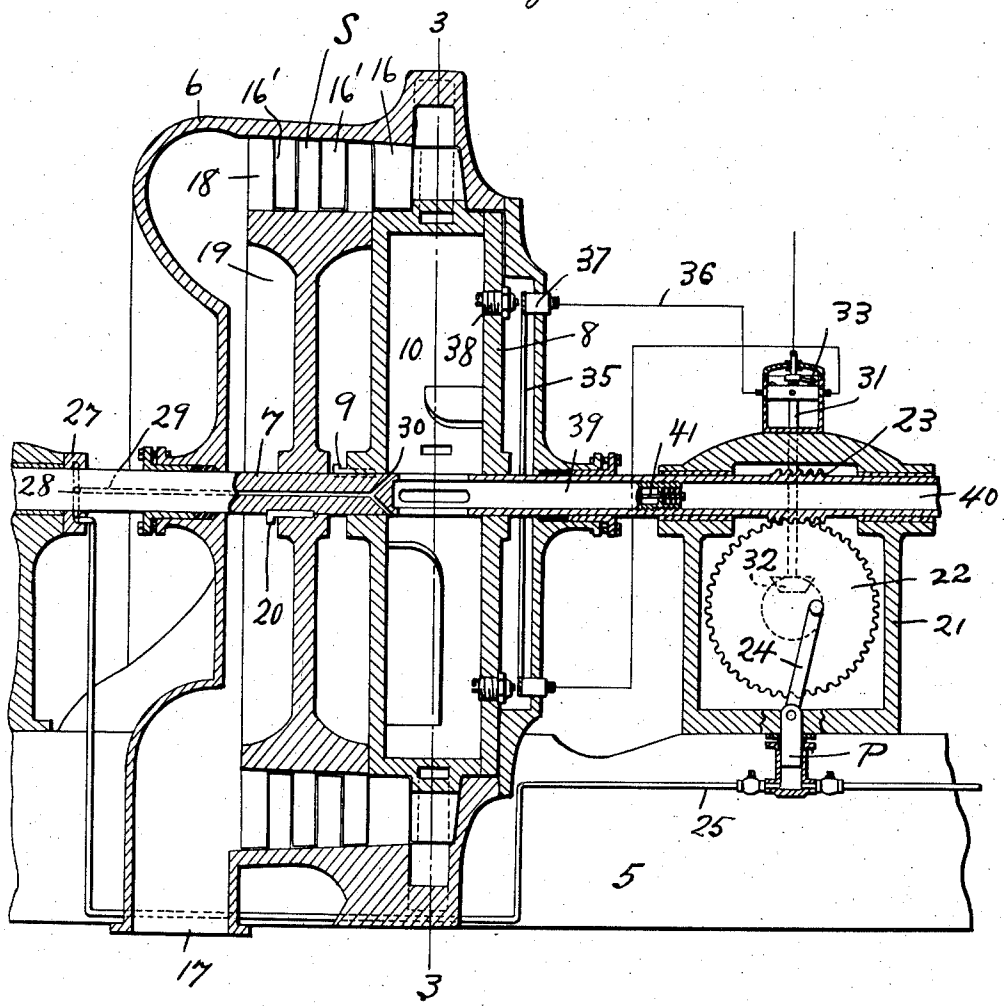

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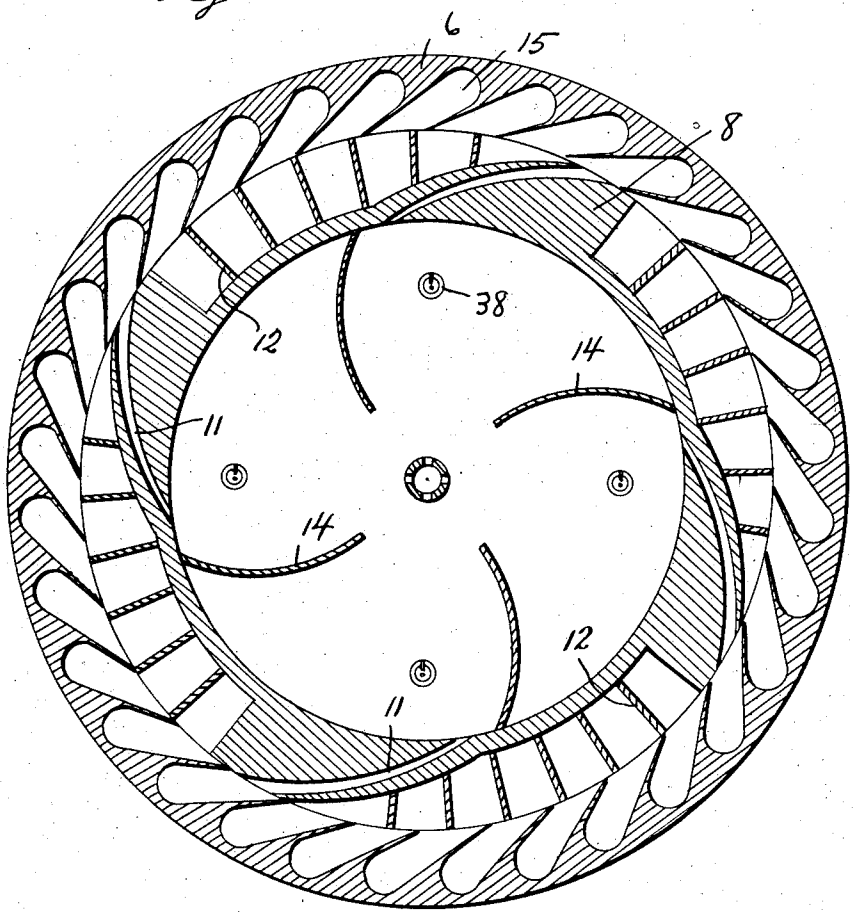
Fig. 3.



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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION TURBINE.

Application filed September 27, 1926. Serial No. 137,951.

The present invention relates to an internal combustion turbine and has for one of its important objects to provide a rotary combustion chamber and a turbine chamber in axial alinement therewith, together with means for supplying fuel and air in correct proportions to the rotary combustion chamber whereby there will be produced a proper combustion, this chamber being also associated with a water inlet construction for supplying water which is utilized in absorbing most of the unit for producing steam pressure, whereby the turbine is further actuated.

Another object of this invention is to provide means whereby the explosive power of the combustible fluids may be produced and applied in combination with the expansion power of steam with maximum effect to useful work; and effect this in the simplest, most direct and convenient manner, and to minimize wear and the destructive action.

Another very important object of the invention lies in the improvement in the simplification and construction and operation of prime movers of this character, so as to be inexpensive to manufacture, reliable and efficient in use, and composed of comparatively few parts.

With these objects in view, and others, as will appear as the description proceeds, the invention comprises the various novel features of construction and arrangement of parts which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention:—

Figure 1 is a side elevation of the internal combustion turbine embodying the features of my invention, showing a portion thereof broken away,

Fig. 2 is a vertical longitudinal section therethrough, and

Fig. 3 is a vertical transverse section therethrough, taken substantially on the line 3—3 of Fig. 2.

Referring to the drawing in detail, it will be seen that the numeral 5 denotes a base on which is mounted a casing 6, having a shaft 7 journaled therethrough. A hollow rotor 8 is keyed to the shaft as at 9 and the interior thereof forms the explosive chamber 10. Nozzle passages 11 extend substantially tangentially through the rim portion of the rotor 8. Between each pair of the nozzle passages 11 there are formed on the rim exteriorly thereof, a plurality of transversely curved vanes 12. A plurality of fins 14 are provided inside the rotary combustion chamber for accumulating all the heat possible from explosions.

The portion of the casing 6 about the rotor 8 is provided with stationary vanes 15 which reverse the flow from the jets 11, causing the gas to impinge on movable vanes 12 imparting more rotary power to the rotor 8. These movable vanes 12 again reverse the flow and direct the gas into the stationary vanes 16 of any steam turbine denoted generally by the letter S. The steam and burnt gases exhaust at 17.

The stationary vanes 16′ of the steam turbine shown, are mounted on the casing 6 while the movable vanes 18 are mounted on the wheel 19 keyed to the shaft 7 as at 20.

A casing 21 is formed on the base and has rotatably mounted therein a worm gear 22 which meshes with a worm 23 formed on the shaft 7, which is extended through the packing of the casing 21. A pitman 24 is eccentrically associated with the worm gear 22 and operates a pump P which has communicated therewith a pipe 25 leading to an internally channeled member 27 which delivers water through inlets 28 of the longitudinally extending passage 29 formed in the shaft 7. The exits are indicated at 30 within the combustion chamber 10 for delivering water into the combustion chamber to be turned by heat into steam.

A shaft 31 is geared as at 32 with the worm gear 22 and operates a distributing mechanism 33 for distributing high tension current to a metallic ring 35, the wires 36 passing through porcelain insulators 37. Spark plugs 38 extend through suitable openings in the rotor and the current jumps from the ring 35 to these spark plugs. These spark plugs, of course, ignite the combustible fuel which is led into the combustion chamber through the hollow portion 39 of the shaft 7 from the end 40, it being noted that a suitable check valve 41 is provided in the hollow portion of the shaft so that when the explosions take place, said check valve will be closed.

It is thought that the construction of my improved internal combustion turbine has been disclosed in detail with sufficient particularity to enable those skilled in the art to

now fully understand the same. An explosive mixture is forced through the hollow shaft into the rotary combustion chamber.

It is then ignited by the electric sparks from the plugs 38. The force of the explosion seats the check valve 41 which prevents any of the exploded gas from going back through the hollow shaft, and consequently it has to escape through nozzles 11, thereby causing rotor 8 to revolve by reaction of the escaping gas. The escaping gas impinges on stationary vanes 15 which reverse the flow, causing the gas to impinge on movable vanes 12 imparting more power to the revolving rotor. The movable vanes 12 again reverse the flow and direct the gas into the stationary vanes 16 of any steam turbine type. The action from there is the same as in any turbine driven by steam. The number of explosions relative to the number of revolutions is governed by the timing gear and distributor is driven as heretofore indicated.

The pump, of course, in the meanwhile is in operation, and furnishes water for cooling the hot surfaces inside the rotor which are heated by the explosions. The fins 14 inside the rotary combustion chamber are provided for accumulating all the heat possible from explosions. A quantity of water is forced by the pump P through the pipe 25 to the shaft 7, then through the passage 29 to the spray exits 30 which spray the water on the hot surfaces inside the rotor. This water is instantly turned into steam which raises the pressure inside the rotor which then acts to feed the nozzles and vanes, the same as the explosive, imparting more power to the revolving rotor, also acting as a cooling agent.

The present embodiment of the invention has been disclosed in detail merely by way of example since in actual practice it attains the features of advantage enumerated as desirable in the statement of the invention and the above description. It will be apparent that the changes in the details of construction, and in the combination and arrangement of parts may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed, or sacrificing any of its advantages.

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

An internal combustion and steam turbine of the class described including, in combination, a stator casing, a hollow shaft journaled through the casing, a hollow rotor fixed to the shaft, the interior of the hollow rotor forming a combustion chamber, said hollow shaft being provided with openings leading into the combustion chamber, a check valve in the hollow shaft, so that combustible fuel may move in one direction to the shaft toward said opening, said stator casing being provided with pockets curved to reverse the gases impinged thereagainst, the rim of said rotor being provided with nozzles for impinging exploded gases against the pockets, means for igniting the explosive mixture in the combustion chamber, the rim of said rotor being provided between the nozzles with vanes curved transversely for reversing gases impinged thereagainst, a plurality of stationary vanes in the stator casing, a wheel fixed to the shaft and having transversely curved vanes to receive gases from the vanes of the rotor and to be directed against the second mentioned vanes of the casing, fins in the combustion chamber for agitating the explosive mixture and to be heated thereby when ignited, and means for injecting water into the combustion chamber to be generated into steam by the fins therein and agitated and mixed with the explosive mixture.

In testimony whereof I affix my signature.

ELLIS WOOD NAILEIGH.