July 14, 1942. E. W. BRAGA 2,289,900

EXPLOSION TURBINE

Filed June 20, 1940

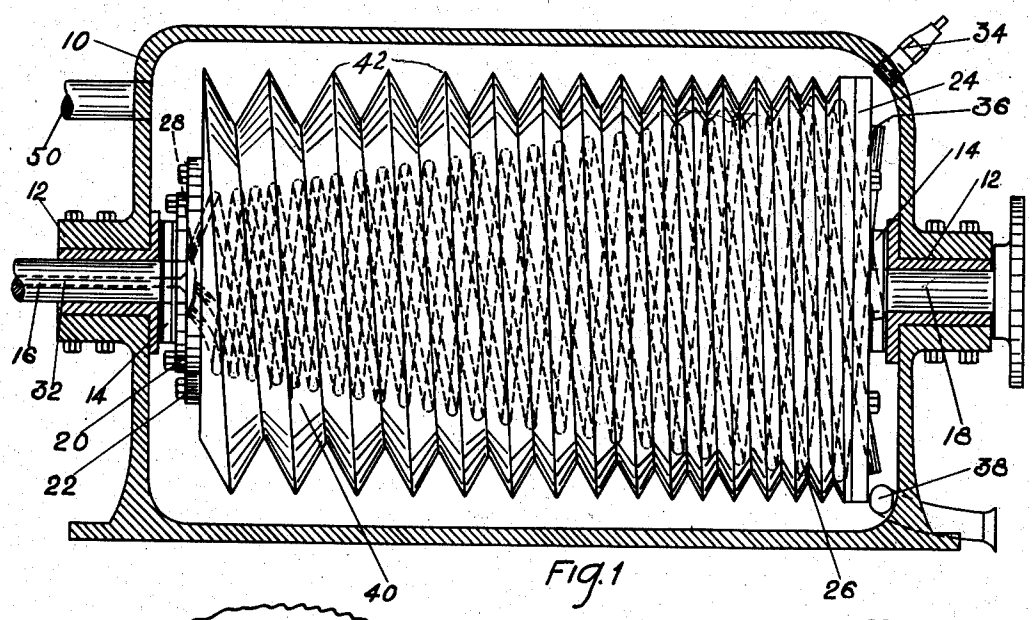


Fig. 1

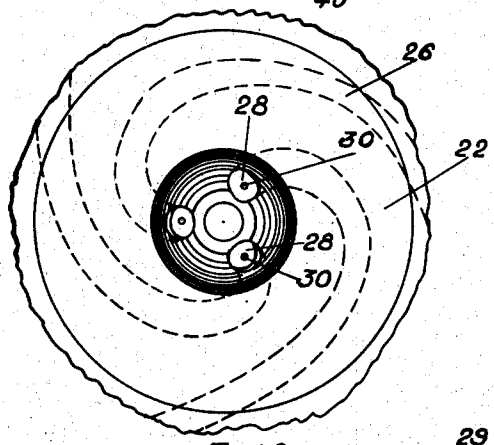


Fig. 2

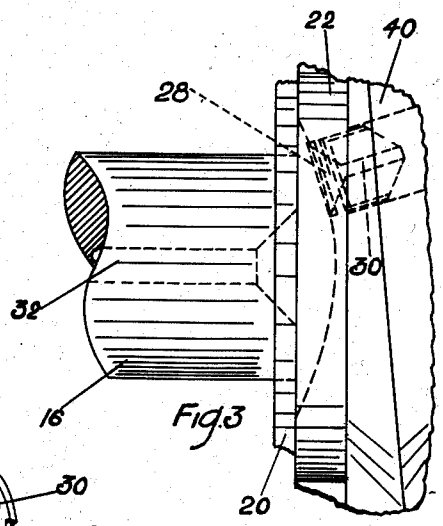


Fig. 3

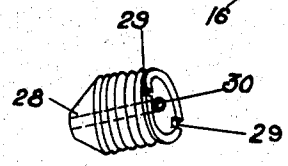


Fig. 5

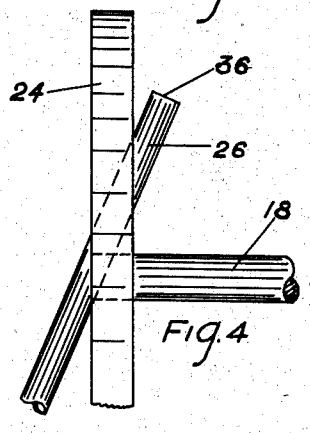


Fig. 4

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UNITED STATES PATENT OFFICE

2,289,900

EXPLOSION TURBINE

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Application June 20, 1940, Serial No. 341,523

3 Claims. (Cl. 60—41)

This invention relates to a new and improved engine or turbine and has, for one of its principal objects, the provision of an internal combustion engine which provides power without the aid of pistons, valves, cam shafts, timing devices or any of the conventional parts ordinarily used in internal combustion engines.

An important object of this invention is the provision of an engine which will develop motive power by the explosion or combustion of fuel within parallel-walled chambers or tubes spiraling from one axial face to the other axial face of a contained rotor, the force and velocity of such explosion, combustion or expansion in seeking release to atmosphere and its natural expression in attempting to forcefully straighten out its path consequently causes the movable rotor to yield and accordingly rotate.

Other and further important objects of the invention will be apparent from the disclosure in the accompanying drawing and following specification.

The invention, in a preferred form, is shown in the drawing and hereinafter more fully described.

In the drawing:

Figure 1 is a side elevation of the rotor and a sectional view of the housing of the turbine of this invention.

Figure 2 is an enlarged end view of the rotor with portions broken away.

Figure 3 is a detailed view illustrating the manner in which the tube and nozzle cooperate, showing a cross-section of the hollow axle shaft at its junction with the fuel admission point of the explosion tubes and method of admitting fuel into the explosion tubes.

Figure 4 portrays a fragmentary area of the rear axial face plate of the rotor, indicating the manner in which the explosion tubes transit same and emerge therefrom.

Figure 5 is a view of a drilled and threaded fuel nozzle.

As shown in the drawing:

Reference numeral 10 indicates generally an encasement or housing, preferably air or water cooled in any desired fashion. Journalled in proper bearings 12 and protected against rotor thrust by ball or roller bearings 14 are two shafts 16 and 18 axially aligned with the center of each end of the rotor to which said shafts are bolted as by the flange 20 or otherwise firmly affixed, preferably through convenient rotor endplates 22 and 24.

The combustion chambers or explosion tubes 26, I construct as tubes or tubing, of constant diameter from beginning to end without pressure-diminishing flare whatsoever.

The explosion tubes 26 which may be one or more in number, desirably three for balance, begin at axial face plate 22 of the rotor and proceed spirally through the rotor to the opposite end, emerging at their exhaust end through the face of axial face plate 24, preferably in an oblique manner. Said explosion tubes 26 terminate before reaching the periphery of the face plate 24.

I realize that optionally the explosion tubes 26 may be made to spiral in helical coil fashion, but have shown them as preferably spiraling in screw fashion, each convolution in ever increasing distance from the axial center of the rotor.

Through the face plate 22 preferably in threaded openings at the beginning of the explosion tubes 26, and preferably extending into the explosion tubes 26, are inserted nozzles 28, through each of which runs a restricted opening or channel 30 permitting fuel mixed with air and under pressure which has arrived at such point in the rotor through channel 32 in shaft 16 from an outside source, to be admitted into the explosion tubes 26. This restricted orifice 30 of a nozzle 28 increases the velocity coefficient of the injected fuel, also is of a size relatively small enough to prevent flashback from the explosion tubes 26 into the fuel supply channel 32. The nozzles 28 being removable permit selection as to proper orifice diameter adaptable to each particular type of fuel. Removal of any nozzle is facilitated by the notches 29.

Ignition of the fuel and air mixture is primarily accomplished by use of a common spark plug 34, preferably threaded through the housing at a point opposite the travel of the open exhaust ends 36 of the explosion tubes 26. By means external to the turbine, operation of the ignition may be instigated to begin upon opening of the fuel throttle permitting admission of fuel through hollow shaft 16, fuel channel 32 and nozzles 28 to the explosion tubes 26. Such fuel continues on through the explosion tubes 26 to their exhaust openings 36 where the spark of the plug 34 engages same. The flame produced from the ignition of the fuel propagates itself back through the explosion tubes 26 to the nozzles 28 at which point its further progress is arrested by the constricted openings 30 in the nozzles 28. Thereafter, the fuel therefrom continues in continuous explosion out through the explosion tubes

26 until such time as the fuel supply is stopped.

An exhaust outlet 38 is provided in the housing 10 desirably at a point convenient to the discharge travel of the explosion tubes 26.

Contact cooling of the rotor 40 is preferably secured by a spirally constructed fin or flange 42 on its peripheral face.

I have in mind advantageously constructing the explosion tubes 26 of suitable steel tubing, around which, in constructing the rotor 40 may be cast aluminum or other suitable material. The spiral fin or flange 42 may be cast with the rotor 40 as an integral part thereof.

The rotation of the rotor causes consequent worm or screw action of the spiral cooling flange on its peripheral surface, the outer edges of which may be in close proximity to the housing 10, and through which spiraling action comparatively cooler air is drawn within the housing 10 through an opening 50 and thereby circulated over the rotor in cooling action toward the exhaust opening 38 at the rear.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the spirit of this invention.

I claim as my invention:

1. In an explosion turbine, a rotor, explosion tubes proceeding in curved lines receding continually from the center about which they revolve, said explosion tubes having parallel walls of constant diameter from beginning to exhaust end of tube, said exhaust end of tube being through an axial face of said rotor, said explosion tubes being surrounded by and embedded in an en-bloc casting of said rotor, the peripheral face of said rotor being in the nature of a helical cooling-flange.

2. In an explosion turbine, a rotor, explosion tubes proceeding in curved lines receding continually from the center about which they revolve, said tubes having parallel walls of constant diameter from beginning to exhaust end thereof, said exhaust end of tube being through an axial face of said rotor, said tubes being surrounded by and embedded in an en-bloc casting of said rotor, the peripheral face of said rotor being in the nature of a helical cooling-flange, a housing for the turbine with apertures therein for admitting cool air and exhausting burned gases and hot air.

3. In an explosion turbine, a rotor, explosion tubes in the rotor, metering nozzles at the inlets of the tubes, means for feeding fuel through said nozzles, said explosion tubes proceeding in curved lines receding continually from the center about which they revolve from one axial face of said rotor to the other axial face of same, said tubes having parallel walls of constant diameter from beginning to end, said tubes terminating through an axial face of said rotor, and surrounded by and embedded in an en-bloc casting of said rotor, the peripheral face of said rotor being in the nature of a helical cooling-flange, and a housing for the turbine with apertures therein for admitting cool air and exhausting burned gases and hot air.

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