E. FISHER, JR.

ENGINE.

APPLICATION FILED SEPT. 24, 1910.

1,041,764.

Patented Oct. 22, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

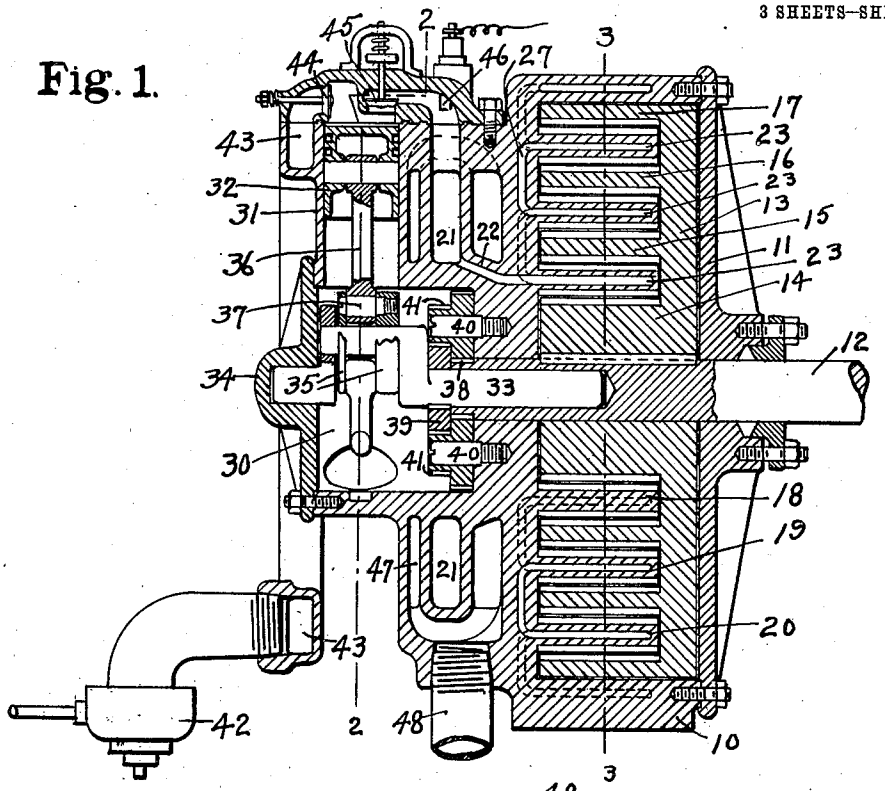
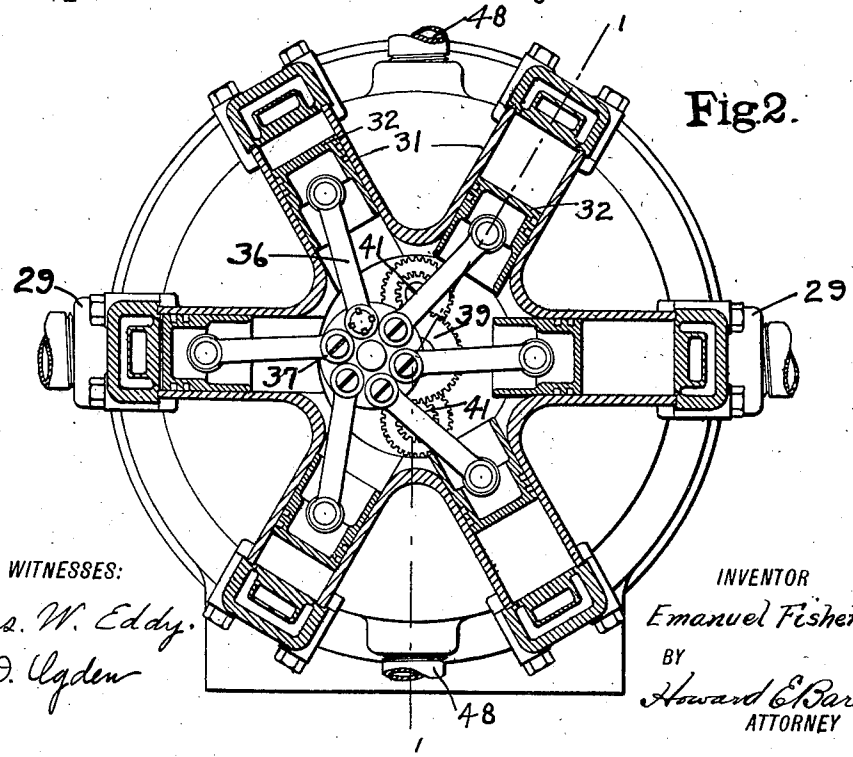


Fig. 2.



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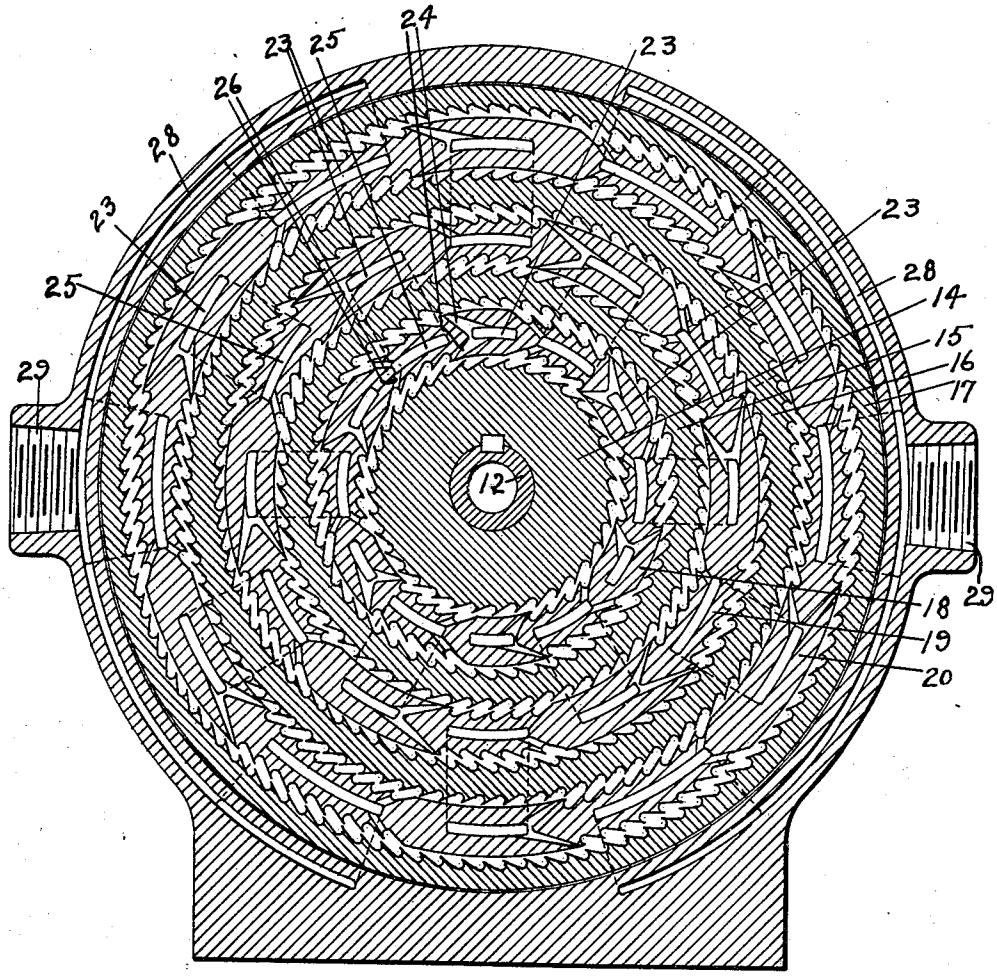
3 SHEETS—SHEET 2.

Fig. 3.



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3 SHEETS—SHEET 3.

Fig.4.

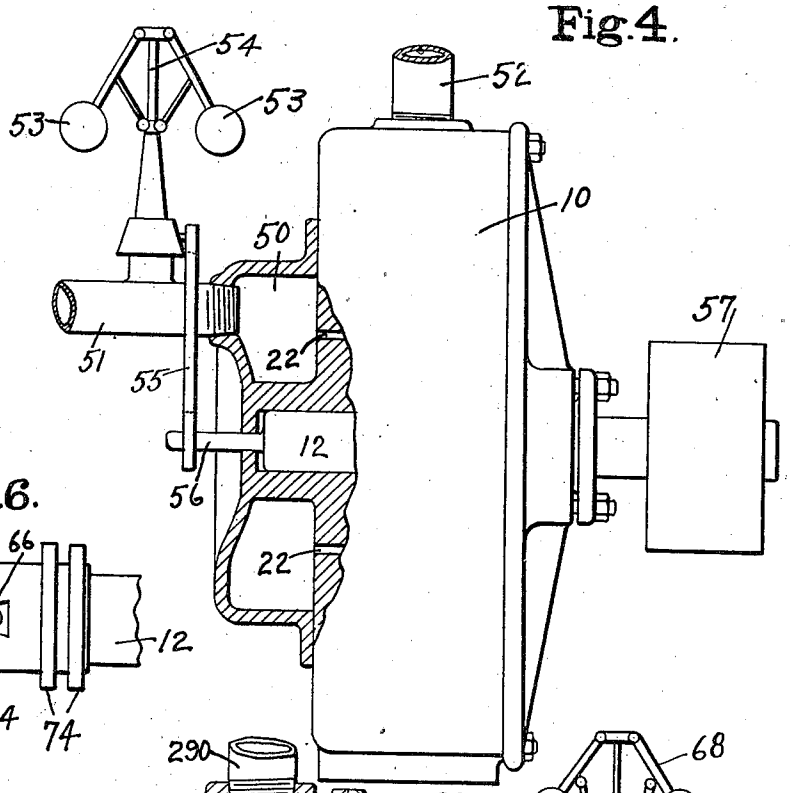

Fig.6.

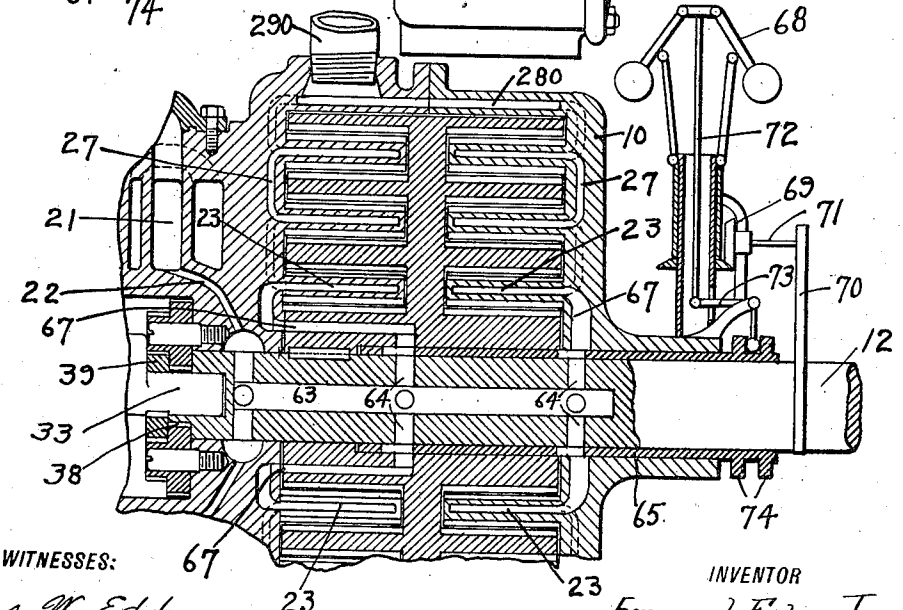

Fig.5.

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ENGINE.

1,041,764. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed September 24, 1910. Serial No. 583,587.

To all whom it may concern:

Be it known that I, EMANUEL FISHER, Jr., a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to engines particularly of the rotary type known as turbine engines, and a special object of the invention is to provide an engine of this character which is adapted to be driven or actuated by any suitable fluid under pressure whether steam or other gases produced by volatilization or by the explosion of a combustible mixture.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1—represents a substantially vertical section through an engine constructed according to my invention. Fig. 2—represents a section on line 2—2 of Fig. 1. Fig. 3—represents a section on line 3—3 of Fig. 1 but on a larger scale, the crank shaft which is mounted in one end of the main shaft being omitted. Fig. 4—is a side elevation of so much of the engine as is necessary to illustrate its use with steam as the motive fluid. Fig. 5—is a section representing a doubled construction of the wheel and showing a structure whereby the fluid is controlled in its passage to the wheel. In fact Fig. 5 illustrates a preferred structure, Fig. 1 illustrating simply more of the details of the structure embraced in Fig. 5. Fig. 6—is a detail view of a part of the valve controlling mechanism.

Similar reference characters indicate the same or similar parts in all of the views.

Referring first to Figs. 1, 2 and 3, the body 10 of the casing is provided with a removable side plate 11 for the purpose of assembling the casing and the wheel presently described. The shaft 12 passes through a suitable stuffing box carried by the side plate 11 and at its inner end is mounted in the body of the casing. Keyed on the shaft 12 is a wheel 13 having a series of concentric portions, which, for convenience of description but without intention of being limited thereby will be hereinafter referred to as concentric rings.

The inner or first ring 14 might be considered as the hub of the wheel which is keyed on the shaft. The second ring is indicated at 15, the third ring at 16, and a fourth or outer ring is indicated at 17. There may be a greater or lesser number of these rings. Concentric ring shaped portions of the casing, or ring shaped members rigidly secured to the casing, enter the spaces between the ring members of the wheel. These ring members of the casing are indicated at 18, 19 and 20.

As best shown in Fig. 3, the outer surface of the ring 14, the inner surface of the ring 17, and both the inner and outer surfaces of all of the intermediate concentric rings or members, are formed with suitable pockets as by corrugating said surfaces. By corrugated surfaces I mean to include any surface provided with teeth or blades or ridges and grooves against which the motive fluid may impinge for the purpose of actuating the rotating member.

A chamber 21 for motive fluid under pressure is connected by ports 22 with a plurality of chambers 23 in the ring 18. Similar chambers 23 are formed in the other ring members of the casing, and each of said chambers 23 is connected with the annular spaces or crevices between the coöperating rings by jet openings 24 so that motive fluid issuing from the chamber 23 through said jet opening 24 will act against the walls of the pockets or corrugations formed in the ring members of the wheel to rotate the latter. Alternating with the chambers 23 are exhaust chambers 25 into which the motive fluid may escape, after acting as described, suitable openings for such escape being indicated at 26. Each exhaust chamber 25 is connected by ports 27 in the casing with the next pressure chamber 23 in the succeeding outer ring member of the casing. The peripheral portion of the casing is shown as provided with long exhaust chambers 28 which connect through suitable ports with the exhaust chambers 25 in the ring member of the casing, and said chambers 28 communicate with openings 29 in the casing, in which openings suitable exhaust pipes may be secured.

The casing as shown in Fig. 1 is formed

with a crank and gear chamber 30, and with cylinders 31 surrounding, and radial to, said chamber 30. Pistons 32 are mounted in said cylinders.

A crank shaft 33 is rotatively mounted in a suitable ball bearing therefor in the end portion of the shaft 12, the outer end of said crank shaft being supported by a bearing in a cap plate 34 which covers the chamber 30. Mounted on the opposite or crank portion of the crank 33 are disks 35, said disks being connected by pins 37. A pitman 36 connects each pin 37 with a piston 32. The end of shaft 12 is toothed or provided with a rigid pinion 38, and adjacent thereto, and keyed on the crank shaft 33, is a gear 39. One or more compound gears and pinions 41 mounted on studs 40 projecting into the chamber 30 from the body of the casing, mesh with the pinion and gear 38—39 in such manner that, as the shaft 12 rotates, the crank shaft 33 will be rotated at a considerable reduced speed, which speed may be in the ratio of six to one. Such rotation causes the pistons to be actuated in succession, for the purpose presently described.

A carbureter of any suitable or preferable construction is indicated conventionally at 42, the combustible mixture therefrom leading to an annular chamber 43, said chamber having an opening controlled by an inwardly opening valve 44 for each cylinder behind the piston. An outlet from each cylinder, controlled by a spring regulated valve 45, connects with the chamber 21, in which chamber sparker points 46 may be located, so that any suitable igniting device may be employed to periodically explode the mixture which is compressed into the chamber 21 by the action of the series of pistons described.

The casing may be formed with suitable chambers 47 for water cooling purposes, the circulation of water being provided for by means of suitable pipes 48 and connections.

It will now be understood that, with the structure illustrated in Figs. 1, 2 and 3, an explosive mixture is first compressed into an explosion chamber and there ignited, the pressure resulting from the continuous series of explosions being transmitted successively through the ports 22 and into the chambers 23 and from thence through jet openings 24 and thence successively through similar chambers and through ports and through exhaust chambers so as to successively act upon the concentric rings of the impact wheel. In the structure so far described, no valves have been referred to excepting those which co-act with the pistons for drawing in and compressing the explosive mixture. But I prefer however to employ a valve structure which will be hereinafter described in connection with Fig. 5. Before referring to that structure however, reference will first be made to Fig. 4 which is intended to indicate the same general form of alternately fixed and rotating members to secure power from the impact of the motive fluid, but in which the motive fluid would be steam instead of the pressures resulting from consecutive explosions. A steam chamber 50, receiving a supply of steam from a boiler through a pipe 51, enters steam to the ports 22, from which ports the steam would pass so as to act upon the successive rings of the engine in the manner hereinbefore described, said steam finally exhausting through a pipe 52. To control the supply of the steam as the motive fluid, I may employ an ordinary governor the weight 53 of which will act upon the stem 54 of the usual type of governor valve for controlling the supply of steam through pipe 51. The governor may be actuated by a belt 55 driven by a pulley on a reduced portion 56 of the shaft 12. In said Fig. 4 I have indicated a pulley 57 by means of which power may be conveyed to the machinery to be driven by the engine. Of course a similar pulley, or other power transmitting device or devices would be employed in every case.

Referring to Figs. 5 and 6, the casing 10 is shown as having ring members projecting from two opposite inner walls. That is, it doubles the structure shown in Fig. 1. The wheel is shown as provided with ring members projecting in opposite directions from a central web and coöperating with the ring members of the casing in the same manner as has been already described, the same reference characters being employed in Fig. 5 as in Fig. 1, where the structures are the same or substantially the same. In this double structure the outer exhaust chamber 280 connects with an exhaust pipe 290. The port 22 communicates with an annular chamber 61 formed in the casing, said chamber communicating by means of ports 62 with a longitudinal passage 63 in the shaft 12. Extending radially from the passage 63 are ports 64, there being two sets of these ports, one for each side of the doubled structure. Exit from the ports 64 is controlled by a sleeve 65 which is splined in the casing so that it may be shifted longitudinally thereof. Said sleeve is formed with apertures 66 (see Fig. 6) preferably tapered so that longitudinal shifting of the sleeve 65 will gradually control the escape of the motive fluid from ports 65, so as to permit more or less of said fluid to pass on through ports 67 and to the chambers 23. This valve sleeve 65 may be controlled as to its position by means of a governor 68 rotatively actuated by means of bevel gearing 69 and a belt 70 running from the shaft 12 over a pulley on the shaft 71 of said bevel gearing. The vertical moving member 72 of the governor is con-

nected to a bell crank lever 73, the latter engaging between collars 74 of sleeve 65. It will now be understood that, when the engine is running, the governor 68 will control the supply of motive fluid by means of the valve sleeve 65.

I claim:

1. An engine of the character described, comprising a casing having a chamber for motive fluid under pressure and having a ring member, a wheel having a recess for said ring member the walls of said recess being corrugated, the ring member having jet orifices for directing the fluid inwardly and outwardly against the walls of the wheel recess, and ports connecting said chamber with said jet orifices.

2. An engine comprising a plurality of concentric alternate rotatable and fixed ring-shaped members each being provided with corrugated fluid contacting surfaces forming a plurality of impact receiving walls, and means whereby the fluid is caused to act upon each set of corrugations successively before finally exhausting.

3. An engine comprising a plurality of concentric alternate rotatable and fixed ring-shaped members each being provided with corrugated fluid conducting surfaces forming a plurality of impact receiving walls, means whereby the fluid is caused to act upon each set of corrugations successively before finally exhausting, and means for automatically controlling the flow of fluid to said fluid-contacting surfaces.

4. An engine of the character described comprising a casing and a wheel having concentric ring-shaped members which alternate with each other the casing being provided with ports leading from one ring to the next whereby the fluid is conducted to act successively upon the different members, and means for automatically controlling the supply of motive fluid to said fluid contacting surfaces.

5. A rotary engine comprising a casing, a shaft mounted therein, a wheel in the casing and connected to said shaft to rotate it, the wheel and casing having coacting members to drive the wheel by the impact of a motive fluid, a crank shaft mounted in alinement with said wheel shaft, reducing gearing for driving the crank shaft from said wheel shaft, a cylinder and a piston for compressing an explosive mixture, a pitman connecting the piston with the crank shaft, and means for igniting the explosive mixture.

6. A rotary engine comprising a casing, a shaft mounted therein, a wheel in the casing and connected to said shaft to rotate it, the wheel and casing having coacting members to drive the wheel by the impact of a motive fluid, a crank shaft mounted in alinement with said wheel shaft, reducing gearing for driving the crank shaft from said wheel shaft, a series of radially arranged cylinders, pistons in said cylinders, connections for actuating all of said pistons from said crank shaft, means for conducting an explosive mixture to the cylinders to be compressed therein, and means for igniting the mixture after compression.

7. In an engine, a shaft having a wheel provided with a recess concentric with the axis of the shaft, said recess having corrugated walls, a stationary ring in said recess and having jet orifices to direct motive fluid inwardly and outwardly against said corrugated surfaces, means for supplying motive fluid to said jet orifices, and exhaust ports in the same stationary ring as that having the supply jet orifices.

8. In an engine, a shaft having a wheel provided with a plurality of concentric recesses, said recesses having corrugated walls, a casing having a plurality of concentric ring members one in each wheel recess, chambers having jet orifices in the said ring members for the supply of motive fluid to act on said corrugated walls, and exhaust chambers also in said ring members and having ports to admit the exhaust thereto, the exhaust chambers of one ring member being in communication with the supply chambers of another ring member.

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

EMANUEL FISHER, JR.

Witnesses:
HOWARD E. BARLOW,
F. I. OGDEN.