

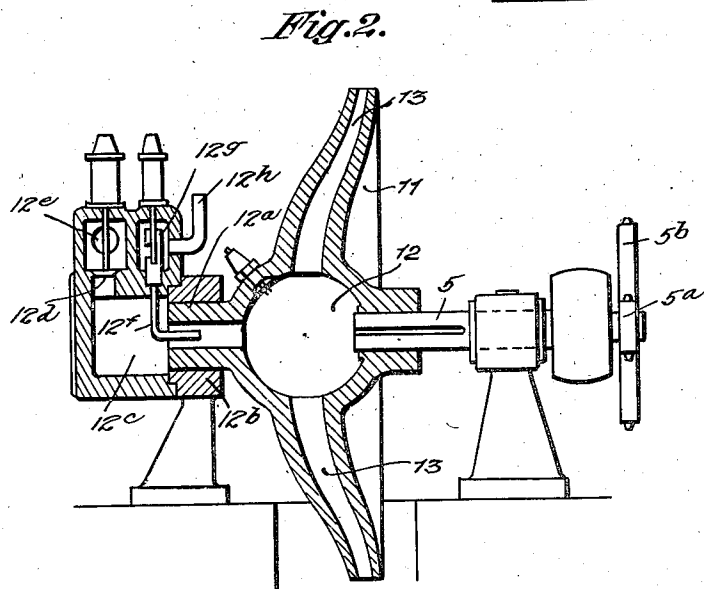
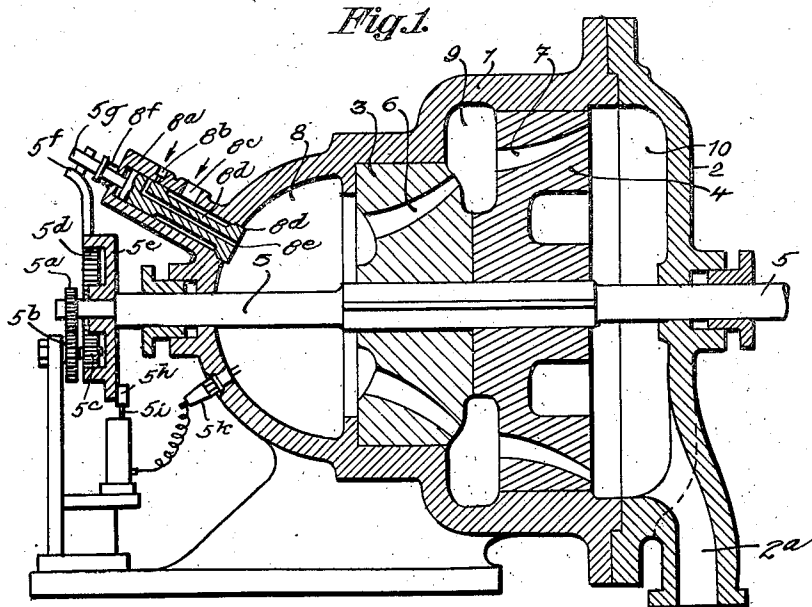
April 16, 1935.

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1,998,255

ROTARY POWER ENGINE

Original Filed Nov. 19, 1929 2 Sheets-Sheet 1



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Fig. 4.

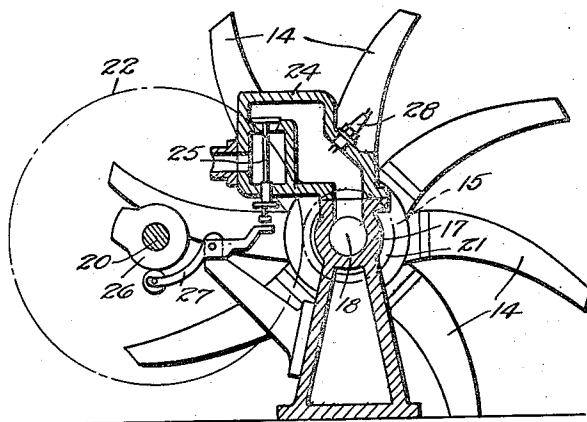
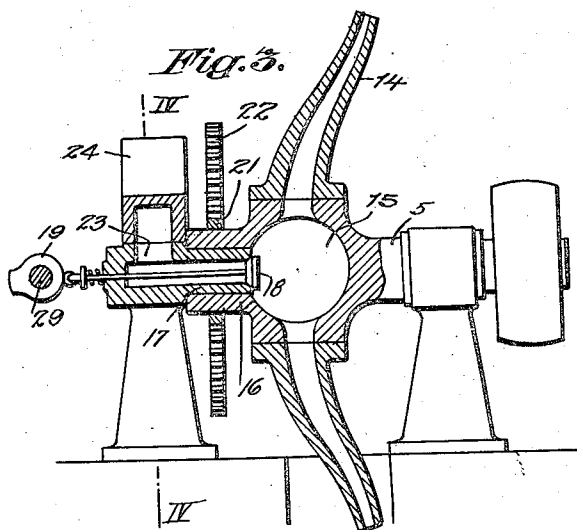


Fig. 5.



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UNITED STATES PATENT OFFICE

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ROTARY POWER ENGINE

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Continuation of application Serial No. 408,199, November 19, 1929. This application November 8, 1930, Serial No. 494,405. In Austria November 28, 1928

2 Claims. (Cl. 253—79)

This invention relates to an improved rotary power engine or turbine of the type in which the rotor is provided with channels or ducts for the passage of the motive fluid, the object of the invention being to provide a rotary engine which is simple in construction and combines the advantages of direct rotary drive with comparatively high output, and very light weight.

Several forms of the invention are shown, by way of example and diagrammatically, in the accompanying drawings, in which

Fig. 1 shows a rotary engine in accordance with the present invention, in longitudinal section;

Fig. 2 shows a further constructional form, likewise in longitudinal section;

Fig. 3 shows a third form of construction in longitudinal section; and

Fig. 4 is a transverse sectional view taken approximately on the line IV—IV of Fig. 3.

Referring to Fig. 1 a two-part casing 1, 2 encloses rotors 3, 4 which are attached to a common shaft 5. The cover portion 2 of the casing is provided with an outlet opening 2^a. It will be understood that the engine may be equipped with only one rotor or with more than two rotors. The rotors are provided with ducts or channels 6, 7 which traverse the rotors from one lateral surface to the other. These channels are shown developed in the plane of the drawings, for the sake of simplicity, although they are in fact spatially curved (three-dimensional curves). By the arrangement of the channels according to this configuration it becomes possible to make the channels themselves of any desired shape for adaptation to the conditions of working or to the motive fluid employed. Channels which are curved in the direction of rotation and also in the direction of the shaft of the turbine enable a very compact arrangement of the channels to be achieved with channels of comparatively great length. In front of the rotor 3 there is provided within the casing a hollow space 8 which serves as combustion chamber. For this purpose the casing is provided with a cylindrical extension 8a which possesses lateral apertures 8b, 8c for the connection of the fuel pipe and of the compressed air pipe. In the cylindrical extension 8a a valve member 8d is longitudinally slidable, this valve being provided with an angular bore 8e. This valve is retained in the closing position by a spring 8f.

To the shaft 5 there is keyed a toothed wheel 5a which meshes with a toothed wheel 5b. This latter is connected to a pinion 5c which engages in the internal toothing 5d of a disc 5e which runs

idly on the shaft 5. This disc carries by means of an arm 5f a roller 5g which actuates the valve 8d.

The disc 5e is further provided with a roller 5h which actuates a contact device 5i for the sparking plug 5k.

The explosion gases generated in the chamber 8 first perform work in the channels of the rotor 3 by direct impulse, pass through the chamber 9 into the channels of the rotor 4 where they expand, collect in the chamber 10, and finally escape through the pipe connection 2a.

In other words, the gases generated in the chamber 8 on passing through the channels exert pressure on the walls thereof the direction of which, in the case of all the channels, crosses the axis in the same sense of rotation, so that the rotor is revolved. Under these circumstances the engine works without a guide wheel or vanes. The motive fluid acts from the explosion chamber simultaneously upon all the channels, since the same enters those channels simultaneously and acts radiatingly from the centre in all directions. Guide wheels can be dispensed with, since the portioning is effected by the regulation of the explosions, and of the number of explosions occurring per unit of time. The gases, after having worked in the rotor 3, pass through the annular space 9 into the channels of the rotor 4 in which they supply further energy through expansion, after which they are withdrawn from the collecting chamber 10, if desired by means of suction.

Referring to Fig. 2, the rotor consists of a disc 11. The combustion chamber 12 is arranged in this disc itself, this latter also containing the channels 13. Adjoining the chamber 12 there is a hollow journal 12a which is mounted in a bearing 12b. Adjoining the bearing there is a casing 12c which is connected through a valve 12d with the compressed air pipe 12e. There is further arranged in the casing 12c a tube 12f into which the fuel supplied through the pipe line 12h is forced by means of a pump plunger 12g. The valve 12d and the pump 12g are actuated by a control shaft which is not shown in the drawings, and which is driven through the intermediary of sprocket wheels 5a, 5b and chain from the shaft 5.

The chamber 8 or 12 can also serve merely as a feed or collecting chamber. A form of construction embodying this principle is shown in Figs. 3 and 4, in which the rotor is composed of individual tubes 14 which are arranged in star-formation adjoining a hollow chamber 15 in the

shaft 5. The hollow body is provided with a cylindrical extension 16 into which there fits a hollow journal 17. This hollow journal is provided with a valve 18 which is actuated by a cam disc 19 the shaft 29 of which is driven from the control shaft 20 through the intermediary of gearing which is not shown in the drawings. The control shaft is driven by the tube through the intermediary of gear wheels 21, 22.

10 The bearing trunnion or journal is provided on its upper side with an aperture 23 to which the casing 24 of the combustion or explosion chamber adjoins. The compressed air supply is controlled by a valve 25 which is actuated by a cam disc 26 keyed to the shaft 20, through the intermediary of a two-armed lever 27. The regulation of the fuel supply is effected in the same manner. The ignition of the sparking plug 28 is likewise controlled from the shaft 20.

20 The first essential feature of the invention consists in the fact that the channels proceed from a hollow chamber disposed in the axis, in the manner of the arms of a medusoid star. This definition is to be understood to mean that the channels lie upon a surface of rotation the generatrices of which have a point of inflexion. In this manner it becomes possible to utilize the potential energy of the driving medium to a very great extent. The driving medium, on entering 30 the channels, exerts a direct impulse by impact on the channel wall in the vicinity of the point of inflexion, and acts during its subsequent flow both by expansion and also, on flowing out, by reaction.

35 In the form of construction shown in Fig. 1 the channels lying on a surface of rotation of the described order are subdivided by the chamber 9; the portions of the thus subdivided channels being designated 6 and 7 respectively.

40 The second essential feature of the invention consists in the fact that the channels are formed of individual tubes adjoining the middle chamber. This feature enables the machine to be operated without any separate cooling means, since 45 the tubes themselves set up movement of the air which eliminates sufficient heat.

The third essential feature of the invention consists in the fact that the rotor is mounted by means of a hollow journal or trunnion which fits into the bore of the chamber and serves for the admission of the driving medium. This arrangement is more advantageous, since in this manner the feed channel for the driving medium is smooth and free of shouldering on its inner surface throughout its entire length, so that eddy-formation is eliminated.

The described turbine is particularly suited for use as an internal combustion turbine, but it is also adapted for use with other motive fluids (compressed gas, liquid and solid explosive substances, steam, liquids). It is not only adapted for use as a stationary and vehicular engine, but also more particularly as an aeroplane engine, and for the driving of air torpedoes, projectiles and the like.

What I claim is:—

1. A rotor for rotary power engines with intermittent admission of the driving fluid comprising a rotatable body provided with a chamber for admission of the driving fluid disposed at the axis of the rotor, channels proceeding from said chamber outward and curved both in the direction of rotation and in the direction of the shaft and having a point of inflexion by which the channels are divided into a foremost or front part acting by impulse and an end part acting by reaction of the driving fluid.

2. A rotor for rotary power engines with intermittent admission of the driving fluid comprising a rotatable body provided with a chamber for admission of the driving fluid disposed at the axis of the rotor, channels proceeding from said chamber outward and curved both in the direction of rotation and in the direction of the shaft and having a point of inflexion by which the channels are divided into a foremost or front part acting by impulse and an end part acting by reaction of the driving fluid, the channels being formed by tubes connected to said chamber.

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