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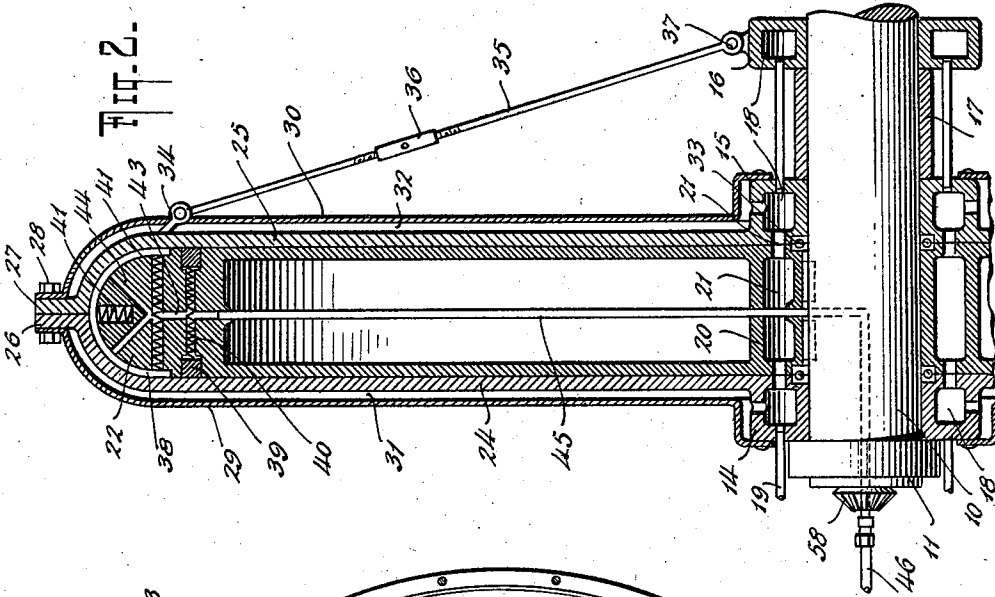
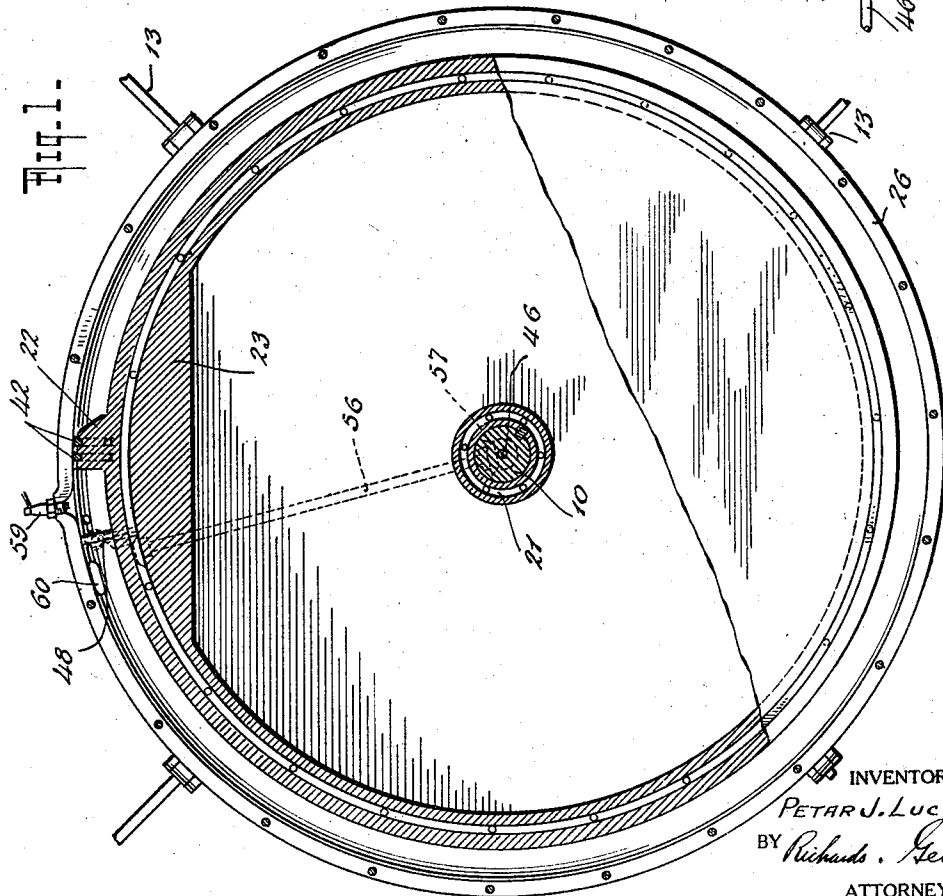
1,611,213

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ROTARY INTERNAL COMBUSTION MOTOR

Filed April 26, 1924

2 Sheets-Sheet 1



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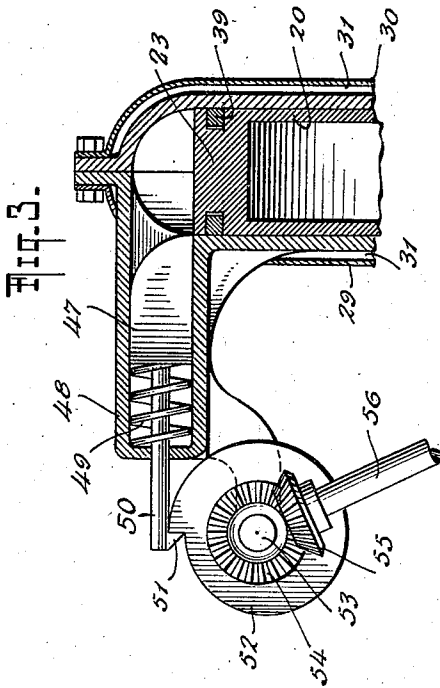
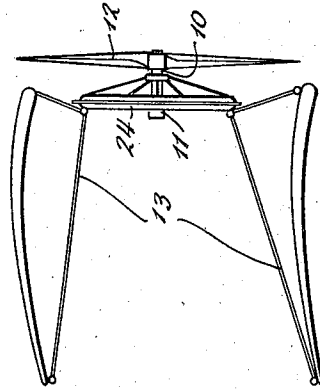
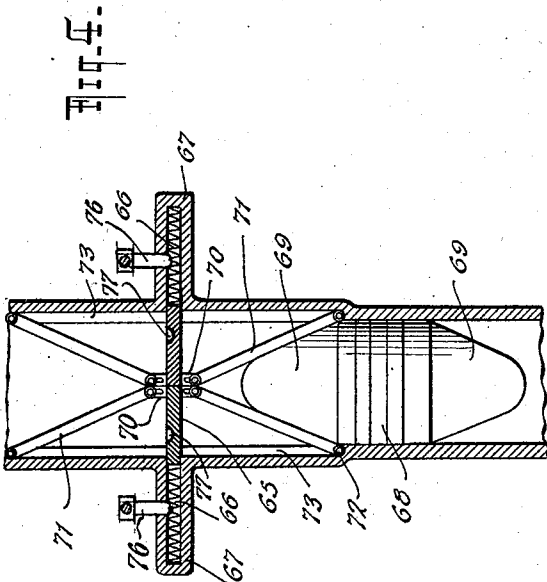
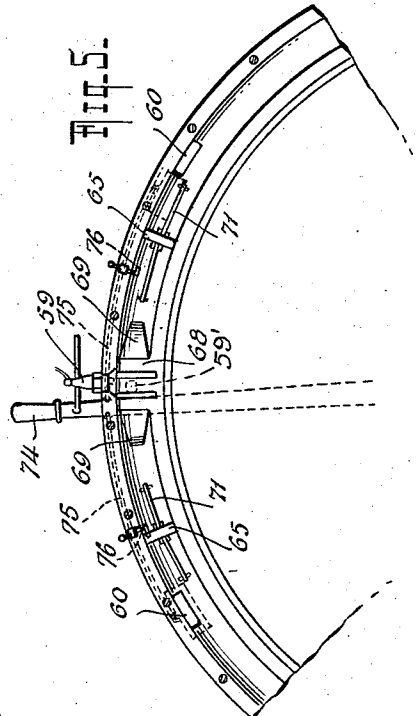


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ROTARY INTERNAL-COMBUSTION MOTOR.

Application filed April 26, 1924. Serial No. 709,313.

This invention relates to improvements in explosion motors of the rotary type and has as its object to provide a simple, compact and efficient motor, easy to construct, control and operate.

Another purpose is to produce a motor of the type mentioned in which the rotor is entirely enclosed in a water jacketed casing and which receives a single impulse at each complete revolution.

A further aim is in the provision of a motor which may be reversed so as to rotate in either direction.

These objects are attained by the novel construction, combination and arrangement of parts hereafter described and shown in the annexed drawings, forming part hereof, and in which:—

Figure 1 is a partial side elevational, partial sectional view of a motor made in accordance with the invention, parts being broken away to disclose the construction.

Figure 2 is an enlarged fragmentary transverse sectional view of the same.

Figure 3 is a fragmentary sectional view showing the sliding abutment and its actuating means.

Figure 4 is a similar view illustrating a modified form of abutment and means carried on the rotor for accomplishing its recedence.

Figure 5 is a fragmentary side elevational view showing the reversing device.

Figure 6 is a general plan view illustrating the application of the motor to a flying machine.

Referring to the drawings more in detail, the numeral 10 designates a rotatable shaft having an enlargement or fixed collar 11 near one end, the other end of the shaft being extended to drive whatever structure that may be required, as for instance the aerial propeller 12 of the flying machine 13 as shown in Figure 6.

The shaft is rotatably housed in a series of fixed bearings, as 14, 15 and 16, the latter having between them a spacing sleeve 17.

All these bearings contain interconnected annular chambers 18 supplied by the pipes 19 with water or like liquid cooling medium,

maintained in constant circulation by common means not shown.

Keyed to the shaft 10, between the bearings 14 and 15 is a rotor 20 containing an inner annular chamber 21 having perforate end walls communicating with the water chambers in the adjacent bearings and having a semi-circular periphery 22, constituting a piston the rotor being hollow except for a single segmental solid portion 23.

Said rotor operates closely between circular webbed walls 24 and 25 formed on the bearings 14 and 15, the outer portions of these walls being curved in conformity to the rotor and having matched extending flanges 26 and 27 secured in juxtaposition by bolts 28.

These bolts also are utilized in securing casings 29 and 30, disposed in spaced relation to the webs 24 and 25, presenting a water jacket enclosing spaces 31 and 32 connected with the circulatory system, the hubbed inner portions of the casings being secured to the bearings 14 and 15.

The rotor is mounted to operate on annular bearings 33 set in the main shaft bearings 14 and 15 and partially resting on the shaft 10, for the purpose of reducing the friction, both axially and laterally.

In addition to the bolts 28, the webs 24 and 25 are provided with a plurality of fixed eyes 34 in which are engaged guy rods 35, having in their lengths, adjustable elements, as the turn-buckles 36, the opposite ends of the guy rods being secured to the bearings 16, as shown at 37 in Fig. 2.

The semi-circular periphery 22 of the rotor piston is reduced to present a curved annular space 38 between it and the inner surface of the circumjacent curved elements of the walls 24 and 25 and is further provided with packing rings 39 on both sides, pressed outward by springs 40 disposed in the body of the rotor at uniform spaced intervals.

Another series of springs 41 is set in the rotor for pressing packings 42 outwardly into engagement with the walls of the surrounding body.

Midway in the piston portion 22 of the

rotor is a radial opening 43, having divergent branches 44, and a pipe 45, passing through the open space in the center of the rotor, enters the shaft 10 to its axial center and then outward at its end as at 46 to connect with the supply of lubricating oil.

A movable abutment 47 is housed in a projection 48 on one of the body elements, the same being normally pressed into the path of the piston 22 by a spring 49; the abutment has a stem 50 extending through the end of the projection and provided with a hook lug 51.

A cam 52, fixed on a spindle 53 is adapted to engage the lug 51, withdrawing the abutment 47 at proper intervals, said spindle being rotated by a pair of bevel gears 54 and 55, the latter being actuated by a shaft 56, driven by another pair of like gears 57 and 58, the latter being fixed on the end of the main shaft 10.

A spark plug 59 is properly timed in sequence with the operation of the piston, to ignite a charge of compressed gaseous fuel which enters through an opening 59' from a suitable source (not shown), at which time the piston will be slightly in advance of the abutment 47, so that when an explosion takes place the rotor will receive an impulse, exhaust taking place through the port opening 60. The feed of the compressed fuel to the opening 59' is controlled by any suitable valve mechanism (not shown) of a known type in order to prevent the back flow of the mixture at the time of explosion, or its inflow into the chamber after the explosion.

In the modification shown in Figure 4, a pair of opposed sliding abutments 65 are pressed by springs 66 operable in lateral extensions 67, on the body sides, to normally close the passage in which the piston 68 operates, said piston being provided with end extensions 69 of conical profile and having rounded ends as shown.

At the inner adjacent ends of the abutments are connected opposed pairs of slotted lugs 70 with which are engaged links 71 pivoted at 72 in recesses 73 in the body sides, the arrangement being such that when the wedge shaped ends of the piston make contact with the links 71 as to press the abutments apart, into the elements 66, and pass between them.

The device may be arranged as shown in Fig. 5 in which a lever handle 74, pivoted on the axis of the shaft 10 is used as a switch to control the moment of firing and hence the directional movement of the rotor, the same being dependent upon which side of the abutment or abutments the explosion takes place. Thus as shown in Figure 5, when the rotor is moving in a counterclockwise direction the abutments 65 at the right of said figure are maintained in open posi-

tion by means presently to be described, while the exhaust port 60 at the left is kept closed and that at the right remains open. The mechanism for controlling said abutments and exhaust ports is operated by means of the handle 74 and consists of two pairs of rods 75 extending in opposite directions from said lever and connected at their ends to the valves for controlling the exhaust ports so that when said lever is moved in opposite directions said ports will be alternately opened and closed. The rods of each pair extend on opposite sides of the body and each of said rods carries intermediate its ends an angular pin 76 adapted to extend through a suitable opening formed in the adjacent lateral extension 67 so that when the abutments 65 are moved to open position in passing therebetween, said pins may be caused, by an operation of the lever 74, to engage in recesses 77 formed in said abutments and thereby retain the abutments in their open position. Thus when it is desired to maintain the abutments 65 at the left of Figure 5 in open position, the lever 74 may be shifted to the left in order to project the pins 76 at the left into the extension 67 so that the same will engage in the recesses 77 upon the next opening of said abutments. Then with the exhaust port 60 at the left closed and that at the right opened, after the piston has passed through the abutments 65 at the right, the latter will again close. The explosion chamber is then formed between these abutments and piston 68 and when the spark plug 59 is fired the rotor will be impelled in a counterclockwise direction. As the piston 68 revolves and approaches the completion of its revolution the same will force the exhaust gases of the charge ignited during the previous revolution through the exhaust port 60 at the right. From this description it will be apparent that when the lever is shifted in an opposite direction to reverse the engine the port 60 at the right will be closed, that at the left opened, and the abutments at the right maintained in open position by engagement of the pins 76 at the right with said abutments.

Thus the motor may be operated in either direction, it being necessary only to momentarily stop the same at the instant of reversing.

Although I have described my improvements with considerable detail and with respect to certain particular forms of my invention, I do not desire to be limited to such details since many changes and modifications may well be made without departing from the spirit and scope of my invention in its broadest aspect.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

In an internal combustion rotary motor, 130

the combination with a fixed casing, a shaft journalled therein and a rotor fixed on said shaft movable in said casing, of a single piston on said rotor, said piston having 5 wedge shaped ends, pairs of opposed abutments movable transversely into the path of said piston, resilient means for normally maintaining said abutments in closed relation and links engaged at one end with said abutments and at their opposite ends in said 10 body, said links being contactable by the ends of said piston whereby the abutments are retracted to admit passage of the piston.

In testimony whereof I have affixed my signature.

PETAR JOHN LUCICH.