L. STEMPFER.

ROTARY MOTOR.

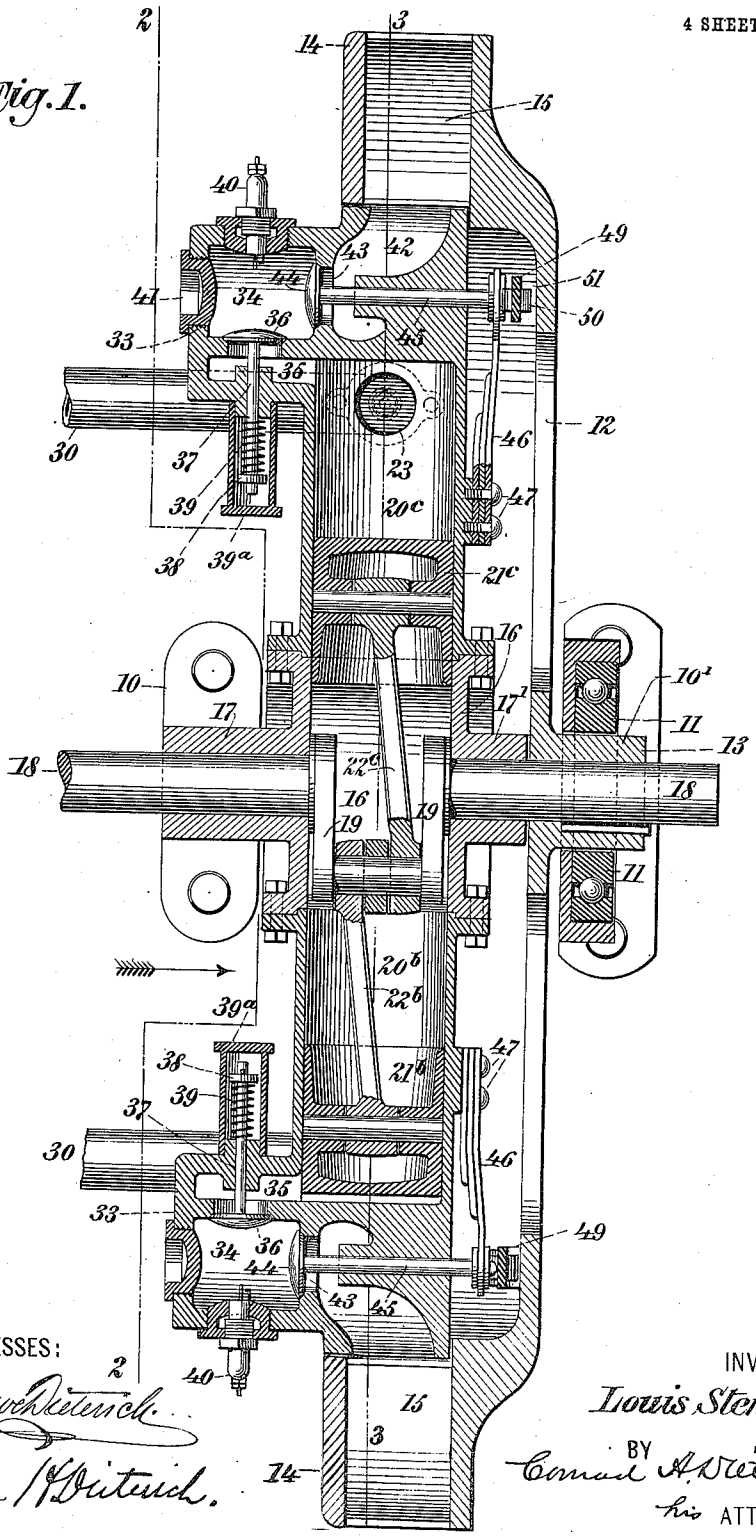
APPLICATION FILED NOV. 11, 1907.

976,006.

Patented Nov. 15, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



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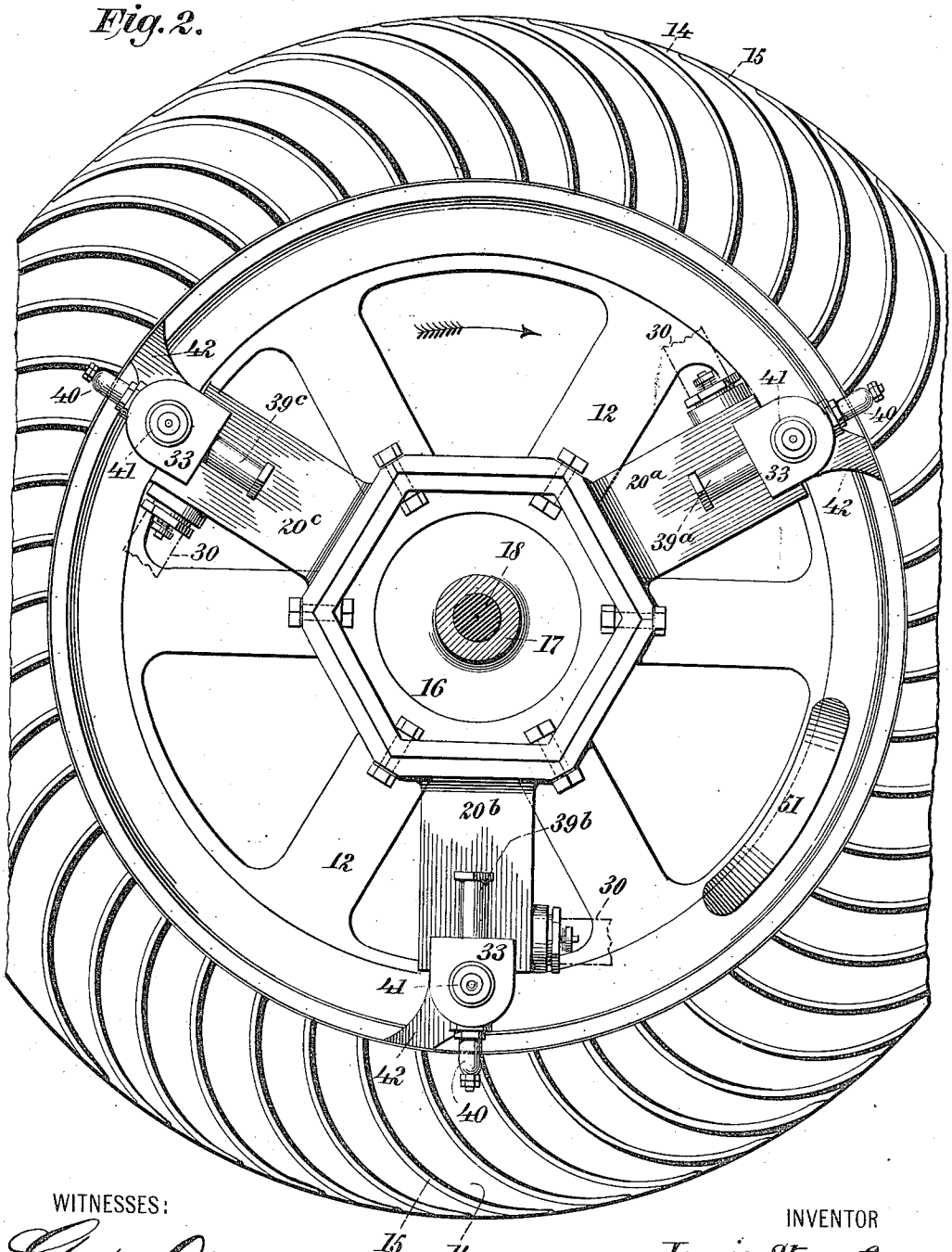
4 SHEETS—SHEET 2.

Fig. 2.



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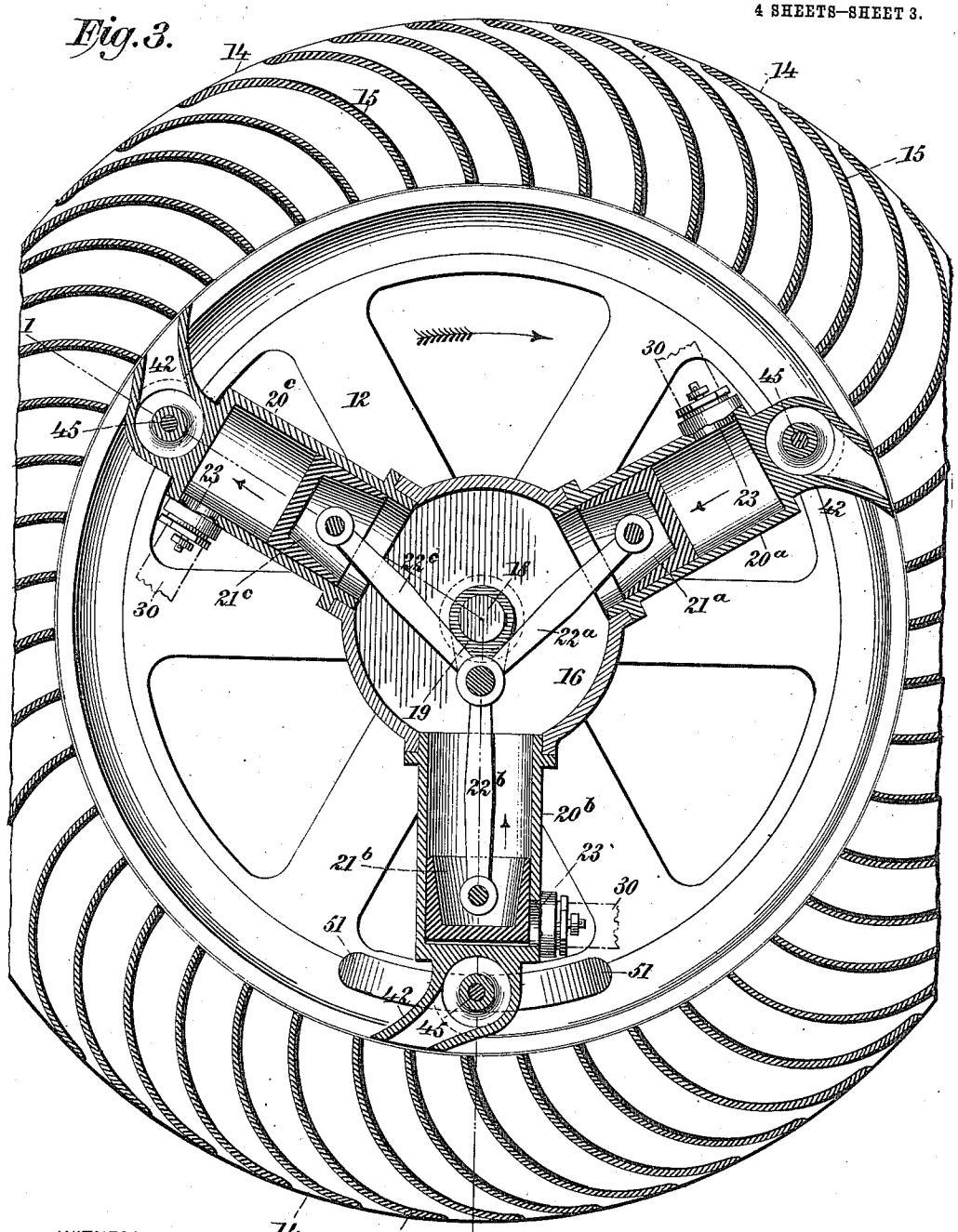
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

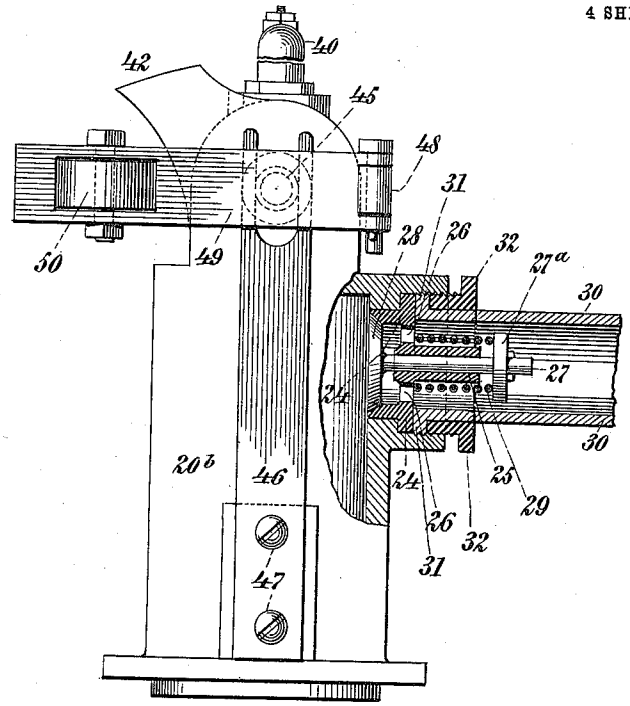
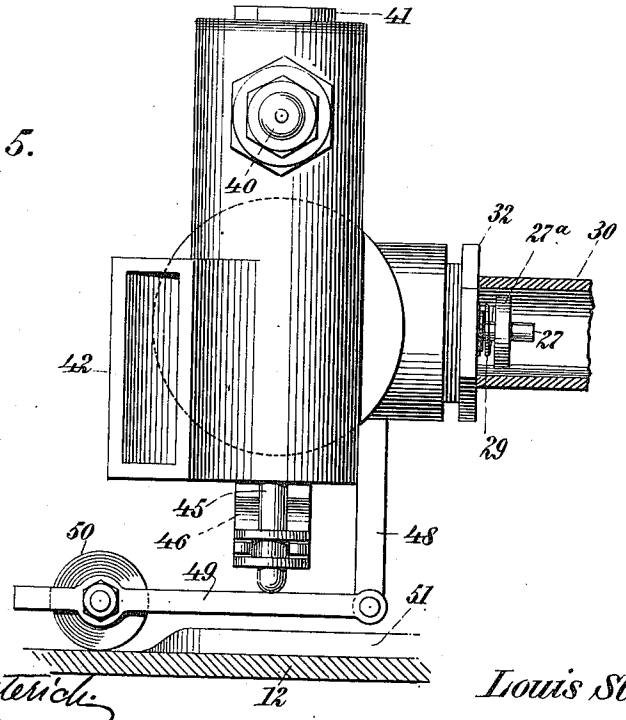


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIS STEMPFER, OF NEW YORK, N. Y.

ROTARY MOTOR.

976,006. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed November 11, 1907. Serial No. 401,535.

To all whom it may concern:

Be it known that I, LOUIS STEMPFER, a citizen of the United States, residing in the city of New York, borough of Manhattan, in the county and State of New York, have invented certain new and useful Improvements in Rotory Motors, of which the following is a full, clear, and exact specification.

My invention relates to improvements in gas and analogous engines, and the same has for its object more particularly to provide a neat, compact and reliable gasolene motor which may be used either as a stationary engine or upon motor vehicles and other structures.

Further, said invention has for its object to provide a motor which may be operated as a unit, or as one of a series of motors connected together, in order to enable the user to increase or diminish the power to suit varying conditions or circumstances.

Further, said invention has for its object to provide a motor for the purposes set forth in which the vibration may be reduced to a minimum and a continuous, even operation of the motor insured.

To the attainment of the aforesaid objects and ends, my invention consists in the novel details of construction, and in the combination, connection and arrangement of parts hereinafter more fully described, and then pointed out in the claims.

In the accompanying drawings forming part of this specification wherein like numerals of reference indicate like parts, Figure 1 is a central, substantially transverse section taken on the line 1—1 of Fig. 3; Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1 showing the main portion of the motor in side elevation; Fig. 3 is a central section taken on the line 3—3 of Fig. 1; Fig. 4 is a detail side view, partly broken away, showing the construction of one of the cylinders and valve actuating means therefor, and Fig. 5 is a top view of the cylinder and parts shown in side view at Fig. 4.

In said drawings 10, 10^1 denote bearings, one of which is provided with a ball-bearing 11.

12 denotes a revoluble bucket wheel having a hollow hub 13 which is supported in the ball bearing 11 of the bearing 10^1 and provided at its edge with a rim 14 having arranged therein a series of radially curved vanes or blades 15.

16 denotes a circular casing or receptacle having hollow hubs 17, 17^1 arranged upon the opposite sides thereof. The outer hub 17 is rigidly secured to the bearing 10, and both the bearings 17, 17^1 arranged in alinement with the hub 13 of the bucket wheel 12.

18 denotes a driving shaft which extends through the hollow hubs 13, 17, 17^1 and is rigidly fixed to the hub 13 of the bucket wheel 12, and 19 denotes a crank formed in the driving shaft 18, and located and working in the circular casing or receptacle 16.

To the outer side of the receptacle 16 are secured a plurality of radial cylinders 20^a, 20^b, 20^c, and within said cylinders 20^a, 20^b, 20^c are respectively arranged pistons 21^a, 21^b, 21^c which are connected to the crank 19^a on the driving shaft 18 by the rods 22^a, 22^b, 22^c. These may be of any desired number but for the purposes of this application the motor is shown as composed of three cylinders.

Each cylinder is provided near its outer end with an intake port 23 in which is disposed a removable seat bushing 24 having a hollow central stem 25 secured at its inner end to said bushing 24, by arms 26, 26, and 27 denotes a valve stem mounted in said hollow stem 25 and provided at its inner end with a valve 28 and at its outer end with a head 27^a intermediate which and the arms 26, 26 is disposed a coil spring 29.

30 denotes a pipe connected at one end to a manifold (not shown) and at its other end said pipe is provided with an annular flange 31 which abuts against the seat bushing 24, and secured in position within said inlet port by a threaded collar 32.

Adjacent to the outer end of each cylinder is provided an integral receptacle 33 constituting an explosion chamber 34 which is connected to the outer end of the cylinder by a passage 35, controlled by a normally seated inwardly opening valve 36, the stem 37 of which extends outwardly through said passage 35 and the side of said receptacle 33, and is provided at its outer end with a head 38, and a coil spring 39 arranged intermediate the outer side of said offset portion and said head 38, and 39^a denotes a housing inclosing the projecting portion of said valve stem 37. 40 denotes a

spark plug which is arranged in said receptacle 33 opposite to the valve 36, and in the outer side of said receptacle 33 is a screw cap 41 to permit of access to the interior of the receptacle.

From the outer end of each cylinder extends an inclined nozzle 42 having its opening arranged parallel with and in close proximity to the inner edges of the vanes or blades 15 of the bucket wheel 12. The nozzle 42 communicates with the interior of the receptacle 33 through an opening 43 controlled by a normally seated, inwardly opening valve 44 mounted upon a stem 45 which extends through said nozzle 42 and has its projecting end connected to one end of a flat spring 46 which is rigidly secured at its inner end to the outer side of the cylinder by screws 47, 47, and which spring serves to hold the valve 44 normally seated. Upon the side of the nozzle 42 adjacent to the upper end cylinder is secured a bracket 48 to the end of which is pivotally-secured an arm 49 provided at its free end with a roller 50. Said arm 49 contacts intermediate its ends with the end of the valve stem 45, and the roller 50 is adapted to engage a cam 51 arranged upon the inner surface of the bucket wheel 12, which successively actuates the arms 49 to open the valves 44 as the bucket wheel 12 revolves.

The operation of the motor is as follows; and will be best understood by reference to Fig. 3 of the drawings: Assuming that the bucket wheel 12 is moving in the direction of the arrow, Fig. 3. The piston 21^a is shown as about completing its inward movement and drawing an explosive charge into the cylinder 20^a through its intake port 23, and the piston 21^b about to complete its inward movement after having delivered and compressed the explosive charge into the explosive chamber 34 of the cylinder 20^b, the inlet valve 36 of which automatically opens under such pressure to admit such charge. At about the same time that the explosive charge is ignited by the spark plug 40, controlled by any suitable timing mechanism outside of the cylinder, the outlet valve 44 communicating with the nozzle 42 will be opened by the action of the cam 51 on the bucket wheel 12 contacting with the roller 50 of the arm 49 and thus cause the expanded gases to issue from the nozzle 42, and be delivered with great force against the vanes or blades of said bucket wheel, and thereby rotate the same. The piston 20^c is shown in the intermediate position in the cylinder 21^c, *i. e.* about to begin its inward movement to deliver a charge of explosive mixture into the explosion chamber 34 of said cylinder 20^c, which is thereupon compressed therein and exploded when the cam 51 engages the arm 49 controlling the valve 44 of said cylinder 20^c. The same operation will be performed in regard to the cylinder 20^a, and continued successively in regard to all of said cylinders, and thus insure the constant and uniform operation of the motor.

It is to be noted particularly that in my improved engine the cylinders merely act as stationary pumps in which the explosive charge is compressed, and that the ignition and expansion of said charge are obtained in the explosion chamber and delivered therefrom through the nozzle to the vanes or blades of the bucket wheel, and that each of said cylinders operates in rotation independently of the remaining ones to effect the revolving of the bucket wheel. Further, that in the operation of the engine the bucket wheel 12 in rotating acts to a certain extent as a fan wheel to keep the operating parts air-cooled. Further, that as the explosive charges are ignited and expanded in a chamber wholly independent of the cylinders in which the same are compressed, the said cylinders are not liable to become overheated, and the lubricating medium therein burned or consumed by contact with such gases.

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

1. A rotary explosive engine comprising a stationary member and a rotating member surrounding the same, receptacles on said stationary member, means for compressing explosive charges therein, a second series of receptacles communicating with said first-named receptacles, valve means for controlling the passage of the compressed explosive charges from said first-named receptacles to said second-named receptacles, valve means for controlling the passage of the expanded explosive charges to said rotating member, and means for actuating said last-named valve means for delivering the expanded explosive charges to said rotating member, substantially as specified.

2. A rotary explosive engine comprising a stationary member and a rotating member supported by and surrounding said stationary member, receptacles on said stationary member adapted to receive explosive charges, valve means for said receptacles, reciprocating pumps arranged on said stationary member for initially compressing said explosive charges and then forcing the same into said receptacles, igniting means arranged in said receptacles, and means for actuating said valve means to release the expanded charges and direct the same against said rotating member, substantially as specified.

3. A rotary explosive engine comprising a stationary member, a driving shaft supported therein, a rotating member fixed upon said shaft and surrounding said stationary member, cylinders arranged upon said stationary

member, pistons in said cylinders connected to said driving shaft for compressing explosive charges within said cylinders, receptacles connected to said cylinders adapted to receive the compressed explosive charges from said cylinders, valve mechanism arranged in said receptacles for controlling the passage of the explosive charges to and from said receptacles, means for igniting said explosive charges in said receptacles, and means for actuating said valve mechanism to release the expanded explosive charges and to direct the same against said rotating member, substantially as specified.

4. A rotary explosive engine comprising a stationary member, having hollow hubs, means for supporting said stationary member, a bucket-wheel having a hollow hub, a bearing for said hollow hub, a crank shaft mounted in said stationary member and fixed to said bucket-wheel, a plurality of cylinders on said stationary member having intake ports communicating therewith, valves in said ports, pistons in said cylinders connected to said crank shaft, receptacles connected to said cylinders having inlet and outlet ports, normally closed valves for said ports, igniting devices arranged in said receptacles, and means arranged upon said bucket wheel for opening the valve in said outlet ports as the explosive charge is ignited, substantially as specified.

5. A rotary explosive engine comprising a stationary member having hollow hubs, means secured to one of said hubs for rigidly supporting said stationary member, a bucket wheel surrounding said stationary member and provided with a hollow hub, a bearing for said hub, a crank shaft revolubly supported in the hollow hubs of said stationary member and fixed to said bucket wheel, a plurality of radial cylinders on said stationary member provided with intake ports, normally closed valves therefor, pistons in said cylinders connected to said crank shaft, receptacles on said cylinders, igniting devices for said receptacles, inlet and outlet ports in said receptacles, nozzles on said inlet ports having their ends arranged adjacent to the blades of said bucket wheels, normally closed valves in said inlet ports, valves in said outlet ports, stems extending therefrom through said nozzles, springs arranged upon the projecting ends of said stems for holding said valves normally seated, and cam means arranged upon said bucket wheel adapted to engage the projecting ends of said valve stems to open the same as the explosive charges in said cylinders are ignited, substantially as specified.

6. A rotary explosive engine comprising a hollow stationary member having hollow hubs at its opposite sides, a bearing rigidly secured to one of said hubs for supporting said hollow stationary member, a bucket wheel surrounding said stationary member and provided with a hollow hub, a bearing for said hub, a crank shaft revolubly mounted in the hollow hubs of said stationary member and having one end keyed to said bucket wheel, a plurality of radial cylinders arranged upon said stationary member and provided at their outer ends with angularly-arranged nozzles terminating adjacent to the inner ends of the blades of said bucket wheel, said cylinders having intake ports, normally closed valves for said intake ports, pistons in said cylinders connected to said crank shaft, receptacles on said cylinders having inlet ports communicating with said cylinders, and outlet ports communicating with said nozzles, normally closed valves in the inlet ports of said receptacles, valves in the outlet ports thereof, stems extending through said nozzles, springs each secured at one end to one of said cylinders and at its other end to one of said valve stems to hold its valve normally seated, brackets secured to said nozzle, arms pivotally secured to said brackets adapted to contact intermediate their ends with said valve stems, rollers at the free ends of said arms, and a cam arranged upon the inner side of said bucket wheel adapted to engage the rollers on said arms to actuate the outlet valves in said receptacles, substantially as specified.

Signed at the city of New York, in the county and State of New York, this 22nd day of October, nineteen hundred and seven.

LOUIS STEMPFER.

Witnesses:
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A. R. ANGUS.