J. H. BONSTEEL.

MOTOR.

APPLICATION FILED JAN. 9, 1906.

1,015,663.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.

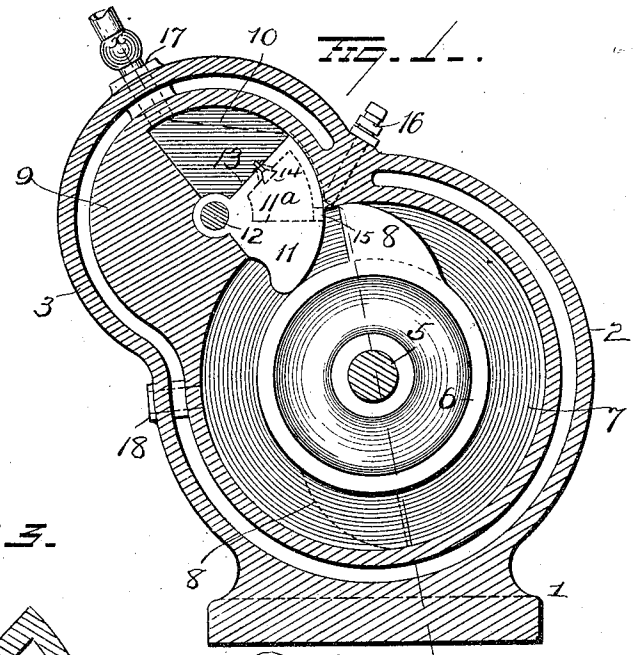


Fig. 1.

Fig. 3.

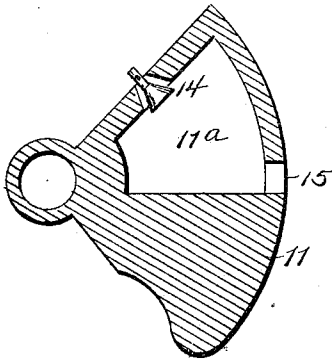
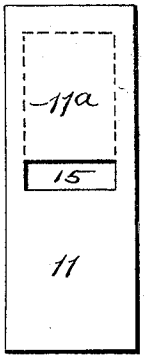


Fig. 4.



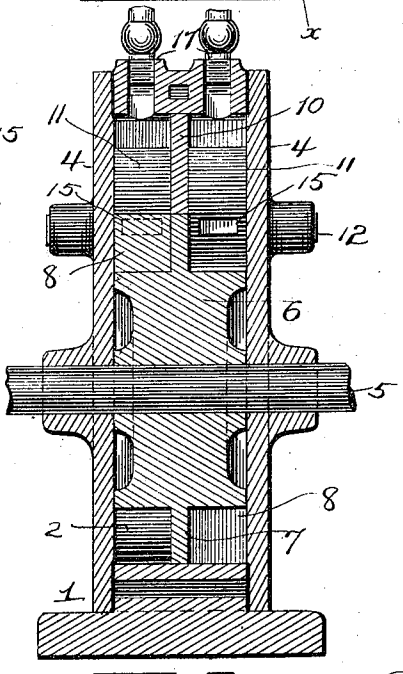


Fig. 2.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

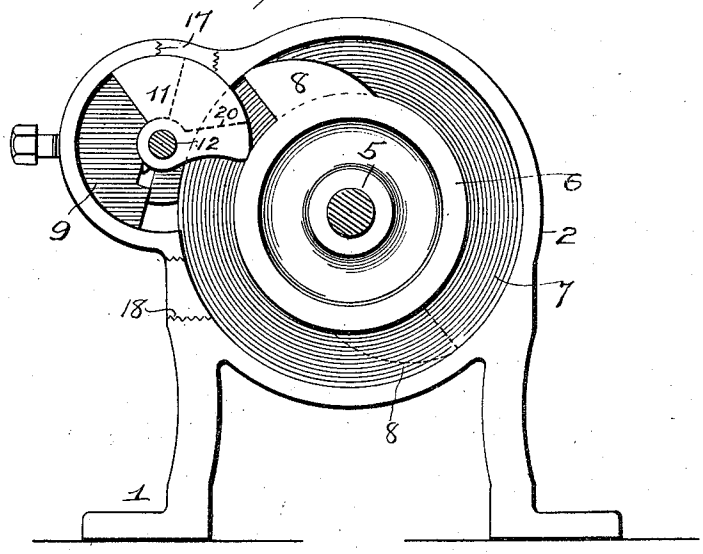
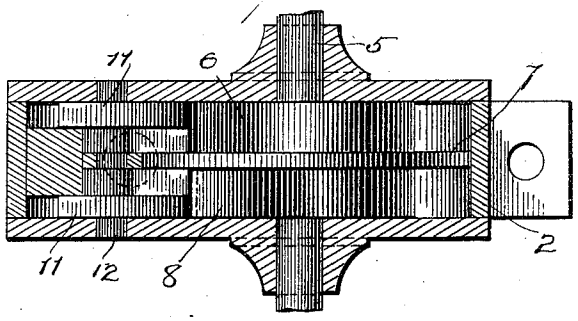


Fig. 6.



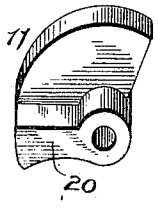


Fig. 7.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN H. BONSTEEL, OF NIAGARA FALLS, NEW YORK, ASSIGNOR OF ONE-HALF TO FRANK J. RICHARDSON, OF NIAGARA FALLS, NEW YORK.

MOTOR.

1,015,663. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed January 9, 1906. Serial No. 295,306.

To all whom it may concern:

Be it known that I, JOHN H. BONSTEEL, a resident of Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in motors, and more particularly to an engine operated by explosive or other fluid, one object of the invention being to provide an improved valve which will operate also as an abutment and be shifted by the rotary element and by the pressure of fluid and to so construct the rotary element that direct driving power of the fluid is always applied thereto.

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

In the accompanying drawings, Figure 1 is a view in vertical section illustrating my improvements. Fig. 2 is a view in cross section on the line *x*—*x* of Fig. 1. Figs. 3 and 4 are detail views of the valve mechanism, and Figs. 5, 6 and 7 are views of a modification.

1 represents a base plate on which a casing 2 is secured or made integral and is in the form of a narrow cylinder constituting the main chamber for the rotary element, and a smaller chamber 3 communicating therewith constituting the valve chamber. Removable side plates 4 are provided closing both chambers and are made with alined bearings for a shaft 5 on which the rotary element 6 is secured. These sides are provided with packing to render them perfectly tight and the casing is made with hollow walls to form water compartments to cool the motor.

The rotary element 6 is made with a central annular web 7 which fits the cylinder 1 and divides the same into two chambers, and secured to the rotary element in both chambers are pistons 8, having cam faces, and said pistons located diametrically opposite to each other.

In valve chamber 3 a block 9 is located and supports a partition plate 10 curved to fit against the edge of web 7 and divide the valve chamber into two compartments in each of which a valve 11 is located and supported to turn upon a short shaft 12 passed through the partition plate 10 and both of the casing sides 4.

The valves 11 (which also serve as abutments as hereinafter explained) are in the form of segments of a circle having one side curved to conform to the curvature of the rotary element and made with shoulders 13 which move toward and away from the block 9. Each valve 11 is made with a small compression chamber, 11^a, the inlet of which is closed by a check valve 14 and the outlet 15 is closed by the wall of the valve casing when the valve is swung inward. Sparking plugs 16 are located at the juncture of valve casing 3 and main casing 1 in front of the port 15 when the latter is in position for the explosion to take place. The explosive mixture is supplied through valved inlets 17 to the valve chambers and the exploded gases exhausted through port 18 in casing 1.

The operation of my improved motor is as follows:—As the rotary element 6 is turned by the exploded charge in one valve 11, the piston 8 at the other side of the rotary element will engage its valve 11 and force it rearward causing the outlet port in the valve to be closed by the wall of valve casing 3 and compelling the check valve 14 to open and admit the explosive mixture into the chamber 11^a wherein it is compressed. When the piston 8 passes the valve 11, the latter, due to the pressure of the gas compressed back of the same, will be moved back to its former position and the charge between the piston 8 and valve 11 (the latter now acting as an abutment) will be exploded by a spark at plug 16 to drive the piston and rotary element and as the pistons 8 are at diametrically opposite points an explosion will take place at every half revolution of the rotary element.

In the modification shown in Figs. 5, 6 and 7, a fluid pressure motor is illustrated in which water or other fluid under pressure

is employed as the motive force. In this modification the valves 11 have no chambers but are provided with webs 20, which when the valve is moved back in its chamber by the piston, will close the chamber and prevent any passage of fluid behind the piston. When the piston passes, the pressure of fluid against the web 20 will swing the valve down against the rotary element and the web 20 will serve to direct the motive fluid against the piston. As the pistons are located at different points on the rotary element the motive fluid is always driving one piston and the pressure against one piston turning the rotary element will cause the other piston to close its valve in passing. The water or other fluid enters the valve chambers through a port 17 and exhausts at 18.

A great many other changes might be made in the general form and arrangement of the parts described and hence I do not restrict myself to the precise details set forth but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a motor, the combination with a casing, of a rotary element in the casing, a central annular web or partition on the rotary element dividing the casing into two chambers, pistons on the rotary element one at each side of the web or partition and at diametrically opposite sides of the rotary element, and pivoted valves actuated positively in one direction by the pistons in passing, to close them, and means for admitting motive fluid behind the valves, said valves constituting, when open, abutments for the fluid discharged behind the pistons.

2. In a motor, the combination with a casing having valve chambers therein, and means for admitting motive fluid to said valve chambers, of a rotary element in the casing, a central annular web or partition on the rotary element dividing the casing into two annular chambers, pistons on the rotary element one in each of said annular chambers and located at diametrically opposite sides of the rotary element, valves pivotally mounted in the valve chambers, projecting into the annular chambers of the casing when open to admit motive fluid from said valve chambers against the pistons and constituting abutments for the fluid which they discharge behind the pistons, and said pistons arranged to strike the valves and momentarily close them.

3. In a motor, the combination with a casing having valve chambers, and means for admitting motive fluid to the valve chambers, of a rotary element in the casing, a central annular web on the rotary element dividing the casing into two annular chambers, pistons on the rotary element one in each of the annular chambers and located at diametrically opposite sides of the rotary element, valves in the valve chambers, said valves provided with ports and adapted to project into the casing to discharge motive fluid through said ports behind the pistons and said valves constituting abutments for said motive fluid, and the pistons arranged to have direct engagement with said valves to move them to momentarily close the supply ports.

4. In a motor, the combination with a main casing and a valve casing, of a rotary element in the main casing, a central annular web on the rotary element dividing the main casing into two annular chambers, pistons on the rotary element one in each of the annular chambers and located at diametrically opposite sides of the rotary element, a partition in the valve casing alining with the web on the rotary element and dividing the valve casing into two valve chambers, a hinged valve in each valve chamber and adapted to rest against the rotary element and constitute an abutment for fluid, each valve having a port to discharge motive fluid behind a piston on the rotary element, the pistons arranged to engage the valves and move them to close the ports therein, a fluid inlet for each valve chamber, and a fluid outlet in the casing.

5. In a motor, the combination with a main casing, a valve casing communicating therewith, and means for admitting motive fluid to said valve casing, of a rotary element in the main casing, a piston thereon, a hinged valve in the valve casing adapted to project into the main casing and constitute an abutment for fluid, a compression chamber in the valve, an inlet port for said compression chamber, said valve adapted to be moved back into the valve casing by direct action of the piston to compress a charge into the chamber in said valve, said compression chamber in the valve having a port to discharge behind the piston on the rotary element, and means for igniting the compressed charge behind the piston.

6. In a motor, the combination with a main casing and a valve casing communicating therewith, of a rotary element in the main casing, a central annular web on the rotary element dividing the casing into two chambers, pistons on the rotary element one at each side of the web and at diametrically opposite sides of the rotary element, a partition in the valve chamber dividing the same and located in alinement with the web on the rotary element, hinged valves actuated in one direction by the pistons and located one at each side of the partition and constituting abutments, compression chambers in the valves, valved inlets for said

compression chambers, said compression chambers having outlet ports to discharge behind the pistons, sparking means located at the juncture of the main and valve casings to explode the charge discharged from the compression chamber in each valve when the outlet port thereof is open to the main casing.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JOHN H. BONSTEEL.

Witnesses:
JOHN C. LAMMERTS,
ROY W. VRADENBURG.