W. M. MYERS.

ROTARY EXPLOSION ENGINE.

APPLICATION FILED OCT. 26, 1911.

1,043,454.

Patented Nov. 5, 1912.

2 SHEETS—SHEET 1.

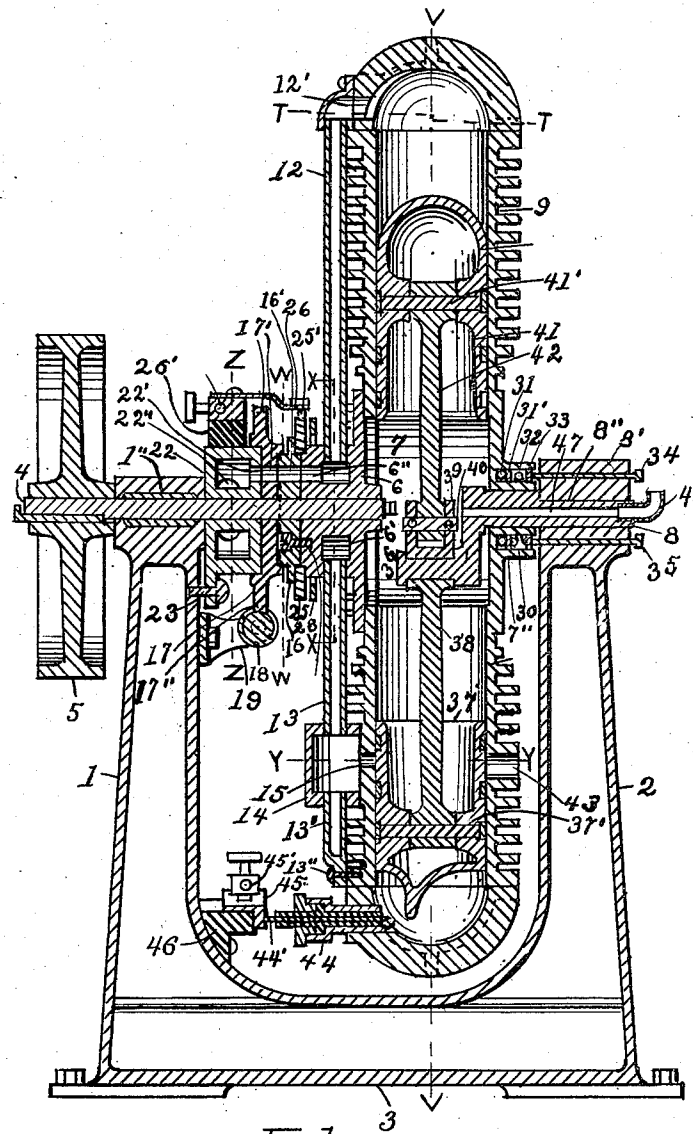


FIG. 1.

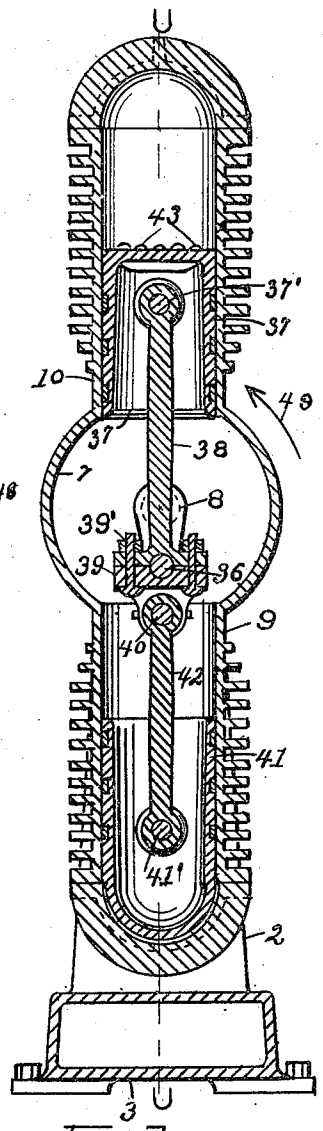


FIG. 2.

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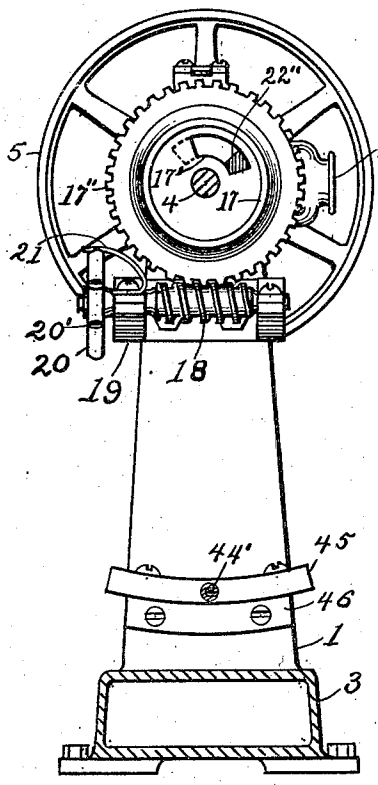


FIG. 3.

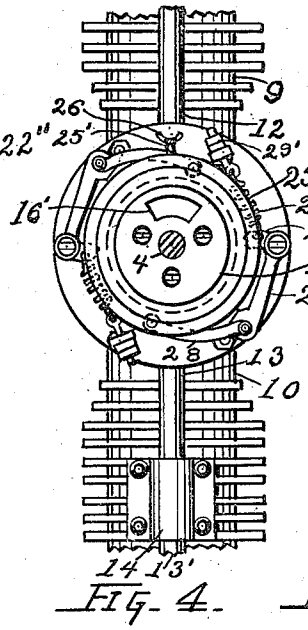


FIG. 4.

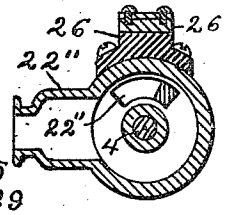


FIG. 5.

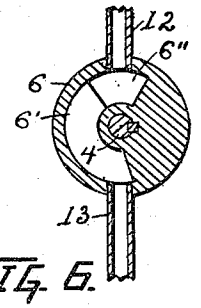


FIG. 6.

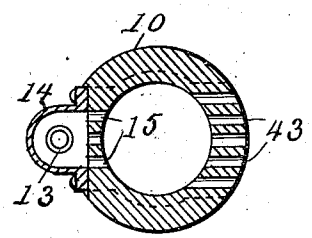


FIG. 7.

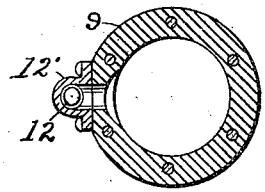


FIG. 8.

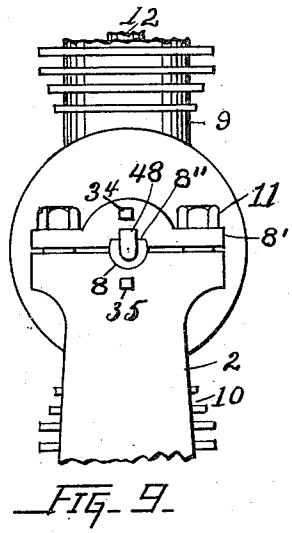


FIG. 9.

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ROTARY EXPLOSION-ENGINE

1,043,454. Specification of Letters Patent. Patented Nov. 5, 1912.

Application filed October 26, 1911. Serial No. 656,947.

To all whom it may concern:

Be it known that I, WILLIAM M. MYERS, a citizen of the United States, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Rotary Explosion-Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in explosion engines the objects of which are, first; to provide an engine of this class which shall be extremely light of weight, durable, and simple in construction, use the minimum amount of fuel and exert the maximum of energy, second; to provide manually operated regulating means, whereby the amount of explosive mixture of fuel and air admitted into said engine is adjusted as desired, and to provide manually adjustable and automatically operated spark advancing means for timing the ignition of said mixture in accordance with such varying speeds of said engine as the operator may desire, thereby providing means whereby the energy thus produced is efficiently applied to the operation of said engine, third; to so construct and arrange the parts of an explosion engine that all 4 valves are eliminated therefrom and ample conduits are provided for the passage of said explosive mixture, of which a full and unexpanded charge may be efficiently used at every revolution of the engine when desired, fourth; to provide splash lubricating means, whereby the working parts of the engine are efficiently lubricated without exposing the lubricant to the action of fire, fifth; to provide ample air cooling means, for cooling the cylinders and crank case of the engine. I attain these objects by the mechanism illustrated in the accompanying drawing, in which:—

Figure 1 is a longitudinal section on the line U U, seen in Fig. 2, looking toward the left showing the parts in position for igniting a charge of mixture. Fig. 2 is a transverse section on the line V V, seen in Fig. 1, looking toward the right showing the parts in position for exhausting an exploded charge of mixture. Fig. 3 is a transverse section on the line W W, seen in Fig. 1, looking toward the left. Fig. 4 is a transverse section on the line W W, looking toward the right, certain parts being broken away, to avoid useless extension of the drawing. Fig. 5 is a transverse section of the inlet chamber, on the line Z Z, seen in Fig. 1, looking toward the right. Fig. 6 is a transverse section of the hub chamber, on the line X X, seen in Fig. 1, looking toward the left. Fig. 7 is a horizontal section of the powder cylinder on the line Y Y, seen in Fig. 1, looking upward. Fig. 8 is a horizontal section of the pump cylinder on the line T T, seen in Fig. 1, looking downward. Fig. 9 is an end view of a portion of the engine and of the spring adjusting means.

Referring to Fig. 1, the uprights 1 and 2 are formed with base 3 and form the supports for the engine. On upright 1 is formed the bearing 1′, in which drive shaft 4 is rotatably mounted. Said bearing is provided with cap 1″. Drive pulley 5 is secured on the outer end of said drive shaft, and hub 6 is secured on the inner end thereof. Drive hub 6 has hub chamber 6′ formed therein and opening 6″ formed through the outer end thereof, leading into said chamber. Said hub is secured on the open end of crank case 7 and forms one end thereof. The right end 7′ of said crank case has hub 7″ formed therewith, which latter is rotatably mounted on fixed crank shaft 8. Said crank case has the pump cylinder 9 and power cylinder 10, formed therewith and opening into said case. Crank shaft 8 is secured on upright 3 by cap 8′ pressed firmly on the flat face 8″ of said shaft, by cap screws 11, (see Fig. 9) screwed into upright 3.

Referring to Fig. 1, hub chamber 6′ is communicatively connected with the outer end of pump cylinder 9 by pipe 12 and elbow 12′ secured to said cylinder. Said hub chamber is similarly connected by pipe 13 with compression chamber 14 secured on power cylinder 10 and communicatively connected with said cylinder by cylinder inlet ports 15, formed through the wall of said power cylinder, seen also in Fig 7. Pipe 13′ is extended from said compression chamber and has its outer end closed and secured to cylinder 10 at 13″. Port plate 16 is secured on the end of hub 6 and has port 16′ formed therethrough, seen best in Fig. 4. Rotatably mounted on drive shaft 4, and against said port plate is the port gate 17. Said gate has gate port 17′ formed therethrough and worm gear 17″ formed on the periphery thereof. Said gear is engaged with worm 18, rotatably mount-

ed in bracket bearings 19, secured on upright 1, seen best in Fig. 3. Said worm is provided with hand wheel 20, having retaining notches 20′ formed in the periphery thereof. Said notches are engaged by the free end of retaining spring 21 for detachably holding said hand wheel. The other end of said spring is secured on one of the brackets 19.

Referring to Figs. 1 and 5, mixture inlet chamber 22 is rotatably mounted on shaft 4, and has chamber port 22′ formed through one end thereof, said chamber being adapted to be adjustably opened and closed by the rotation of the previously described port gate. Said inlet chamber has a connection formed therewith, said connection being adapted to have an ordinary carbureter, not shown, connected therewith, for mixing and admitting an explosive mixture of fuel and air through said connection into said mixture inlet chamber. Said chamber is held against rotation by screw 23, passed through the lower flanged edge of said chamber and screwed into upright 1. The outer end of drive hub 6 and the adjacent surface of port plate 16 are so shaped as to form an annular channel 24 in which the electrode ring 25, carrying electrode 25′ is rotatably mounted. Said electrode is adapted to be rotated into and from contact with fixed electrode 26, secured on insulation 26′, secured on inlet chamber 22.

Referring to Fig. 4, the electrode ring 25 is connected with the free ends of the centrifugal governor arms 27, by connecting rods 28. The other ends of said arms are pivotally secured to hub 6, and are provided with projections 27′ to which the free ends of springs 29 are secured. Said springs are each provided with tensioning nuts 29′ and are thereby properly tensioned to resist outward movement of arms 27. The inward movement of said arms is limited by contact of the free ends of same with hub 6.

Referring to Fig. 1, hub 7″ has annular spring chamber 30 formed therein, in the inner end of which are the bearing balls 31, against which washer 31′ is pressed by spiral spring 32, compressed by washer 33, adjusted in said pressure by screw 34 screwed through cap 8′, and by screw 35 screwed through the upper end portion of upright 3; thus providing elastic pressing means, whereby the face of port plate 16 is firmly pressed against the face of port gate 18, for automatically taking up such space between said plate and gate as may be caused by wear of same, and at all times firmly keeping said faces in contact.

Referring to Fig. 1, fixed crank shaft 8 has crank wrist 36 formed therewith, said wrist being connected with power piston 37, by connecting rod 38. On the wrist connected end of said rod is secured the wrist pin block 39, having wrist pin 40 secured therein. Said wrist pin is connected with pump piston 41 by connecting rod 42. In operation, the described connecting rods are rotated on fixed crank wrist 36, from the position seen in Fig. 1, to the position seen in Fig. 2. This rotation of said rods is caused by the hereinafter described rotation of cylinders 9 and 10, which are further rotated until all of the rotating parts are moved from the positions seen in Fig. 2, to the positions seen in Fig. 1, thereby reciprocatively moving said pistons in their respective cylinders.

A plurality of exhaust ports 43 are formed through the wall of power cylinder 10, opposite to the previously described cylinder inlet ports 15, seen best in Fig. 7. An ordinary electric spark plug 44 is secured in the outer end portion of said power cylinder in the usual well known manner. Said plug carries the plug electrode 44′, into and from contact with fixed secondary electrode 45. Said electrode 45 is secured to insulation 46, secured to upright 1.

Crank shaft 8 has oil duct 47 formed longitudinally therethrough and elbow 48, connected with the outer end of said duct.

In operation, cylinders 9 and 10 are manually rotated in the direction indicated by arrow 49, for starting the engine. During said rotation, pump piston 41 draws a charge of the previously described explosive mixture through the carbureter, not shown, into inlet chamber 22, thence through chamber port 22′, gate port 17′, plate port 16′ and hub opening 6″, into hub chamber 6′, thence through pipe 12 and elbow 12′, into cylinder 9. At this point in said rotation, port 16′ is rotated past register with gate port 17′, and the thus confined charge is compressed through said elbow, and pipe 12 into hub chamber 6′, thence through pipe 13 into compression chamber 14, from whence said charge passes through ports 15, into power cylinder 10, while power piston 37 is passing through the inward portion of its rotation, as seen in Fig. 2. Continued manual rotation of said cylinders brings the parts to the position seen in Fig. 1, causing power piston 37 to compress said charge in cylinder 10. At this juncture electrode 25′ is moved from contact with electrode 26, (see also Fig. 4,) thus closing and opening a primary electric circuit, (not shown,) in the usual well known manner; thereby causing a secondary electric impulse to pass through secondary electrode 45 and spark plug electrode 44′, the metallic portions of said engine and a secondary electric circuit, not shown; thereby producing an electric spark at the inner end of electrode 44′, thereby igniting said charge. The ignition of said charge provides energy by which said cylinders are caused to rotate and the described operations are repeated. As the

speed of the described rotation increases, the governor arms 27, (see Fig. 4,) by their respective connecting rods 28, rotate electrode ring 25 in the same direction, thus advancing the relative position of electrode 25, and the resistance of springs 29 are so adjusted as to cause said electrode to be properly timed for igniting the successive charges at such points in said rotation as will cause the thus generated energy to be efficiently applied to the rotation of the described rotating parts.

Referring to Fig. 4, when it is desired to reduce or increase the amount of mixture used, the free end of spring 21 is manually lifted from notch 20′, wheel 20 is manually rotated in either direction, gate 17 is rotated by the described worm gear and worm, until the opening through inlet chamber port 22″ is reduced or increased by the rotation of said gate as desired.

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

1. In an explosion engine, a rotatably mounted drive shaft; a fixed crank shaft securely mounted in alinement with said drive shaft; a crank case having a closed and open end; a hub formed on said closed end, said hub being rotatably mounted on said crank shaft and slightly slidable thereon; a pump cylinder; a power cylinder; said cylinders being secured on said crank case diametrically opposite to each other; a drive hub for said crank case; said hub having a hub chamber formed therein and an opening therethrough leading into said chamber the outer edge of said hub being secured on the open end of said crank case and closing the same; mixture inlet means loosely mounted on said drive shaft and adapted to admit an explosive mixture of fuel and air into said hub chamber; connecting means whereby said hub chamber is communicatively connected with said pump cylinder and said power cylinder and opening and closing means on said drive hub whereby said mixture inlet means is opened and closed by rotation of said hub.

2. In an explosion engine, a rotatably mounted drive shaft; a crank case for said engine; a drive hub having its edge portion secured on said case and its central portion secured on one end of said drive shaft, said drive hub having a hub chamber formed therein and an opening therethrough leading into said chamber; a port plate having a plate port formed therethrough said plate being secured on said drive hub with its port in register with said hub opening; a mixture inlet chamber loosely mounted on said drive shaft; securing means whereby said inlet chamber is held against rotation; a chamber port through the end of said inlet chamber; a port gate rotatably mounted on said drive shaft said gate having a gate port formed therethrough and gate rotating means for rotating said gate and for adjustably holding the same against rotation.

3. In an explosion engine, a rotatably mounted drive shaft; a mixture inlet chamber mounted on said shaft and secured against rotation thereon, said chamber having a connection formed therewith adapted to have an ordinary carbureter secured thereon, said chamber also having a chamber port formed therethrough and leading therefrom; a port gate rotatably mounted on said drive shaft said gate having a gate port therethrough adapted to be moved into and out of register with said chamber port by rotation of said gate; gate rotating means whereby said gate is rotated; detachable holding means for detachably holding said gate rotating means and mixture conducting means adapted to conduct a mixture of fuel and air, therethrough, the same being secured on said drive shaft and rotated into and out of register with said gate port.

4. In an explosion engine, a rotatably mounted drive shaft; a crank case for said engine said case having an open end and a closed end the latter being formed with said case and having a hub formed therewith; a fixed crank shaft on which said hub is rotatably mounted; a drive hub the outer edge of which is secured on the open end of said crank case and the central portion thereof secured on one end of said drive shaft; a port plate secured on the outer end of said drive hub, said drive hub and port plate being of such shape as to form an annular channel on the outer end of said drive hub and between the same and said port plate; an electrode ring rotatably mounted in said annular channel; an electrode secured on said ring and centrifugally operated rotating means mounted on said hub for rotating said ring.

5. In an explosion engine, a rotatably mounted drive shaft; a crank case; a drive hub for said case, said hub being secured on one end of said drive shaft; a hub chamber in said drive hub provided with a hub opening; a pump cylinder and a power cylinder said cylinders being formed with said crank case diametrically opposite to each other with said crank case between their inner ends which latter open into said crank case; a power piston in said power cylinder; a pump piston in said pump cylinder; reciprocating means in said crank case whereby said pistons are reciprocated; communicating means whereby said hub chamber and the outer end of said pump cylinder are connected; a compression chamber on said power cylinder; other communicating means whereby said hub chamber and said compression chamber are connected; a

plurality of cylinder inlet ports whereby said compression chamber and said power cylinder are connected while said power piston is passing through the inner end portion of its reciprocative movement; a plurality of exhaust ports through the wall of said power cylinder opposite said inlet ports; mixture inlet means adapted to admit an explosive mixture of fuel and air therethrough into said hub chamber and opening and closing means on said hub whereby said inlet means is opened and closed by the rotation of said hub.

6. In an explosion engine, a rotatably mounted drive shaft; a fixed crank shaft; a crank case provided with a drive hub secured on one end of said drive shaft; said hub having a hub chamber therein and an opening therethrough opening into said chamber; a port plate secured on said hub said plate having a plate port in register with said hub opening; mixture inlet means loosely mounted on said drive shaft and held against rotation thereon; a hub formed on the opposite end of said crank case; said hub being rotatably mounted on said fixed crank shaft, and adjustable spring actuated sliding means whereby said crank case is slidably moved on said crank shaft for pressing said port plate against said mixture inlet means.

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

WILLIAM M. MYERS.

Witnesses:
GEO. REES, Jr.,
WM. C. CHESBRO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."