J. H. FITCH.

EXPLOSIVE ENGINE.

APPLICATION FILED OCT. 28, 1909.

972,071.

Patented Oct. 4, 1910.

4 SHEETS—SHEET 1.

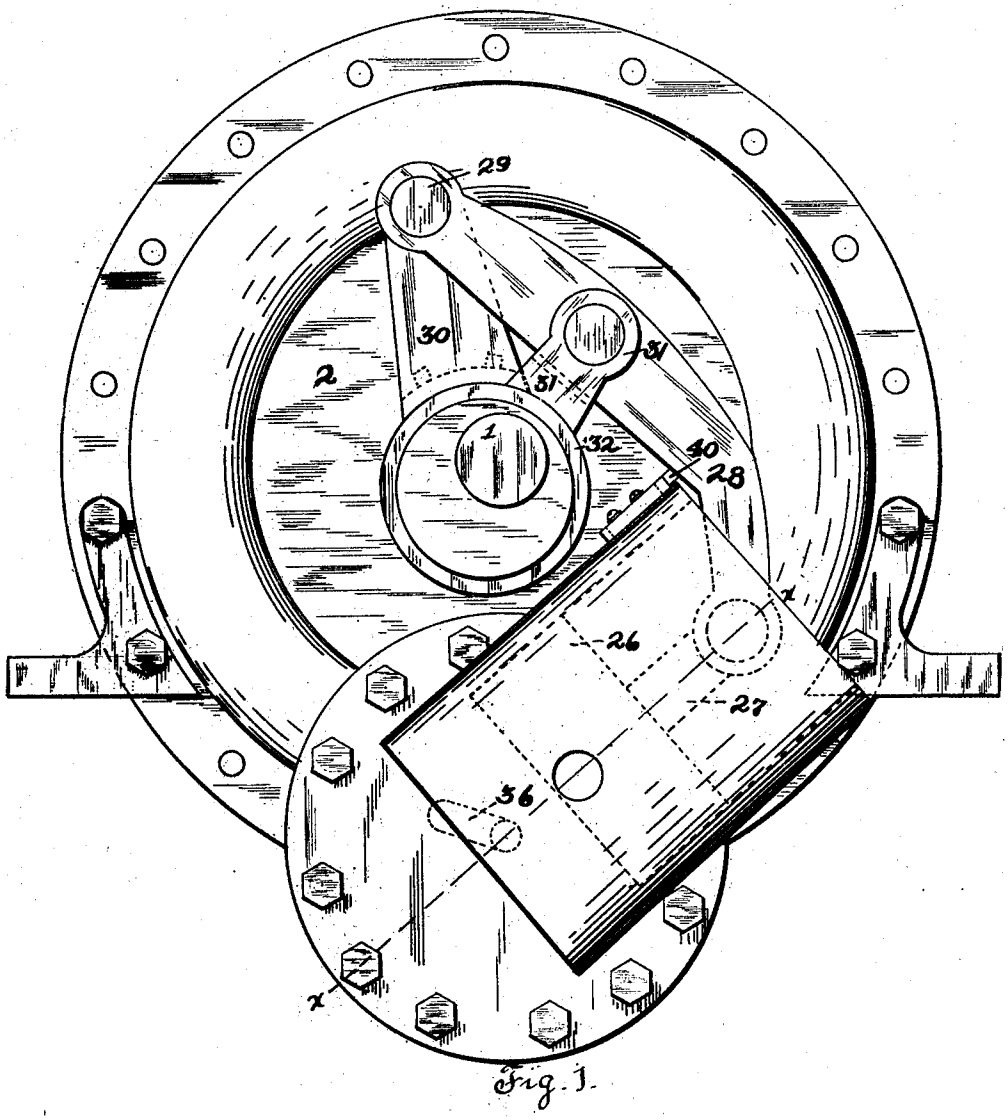

Fig. 1.

Witnesses

W. C. Smith

B. G. Richards

Inventor

John H. Fitch

By Joshua R. H. Peters

his Attorney.

J. H. FITCH.

EXPLOSIVE ENGINE.

APPLICATION FILED OCT. 28, 1909.

972,071. **Patented Oct. 4, 1910.**

4 SHEETS—SHEET 2.

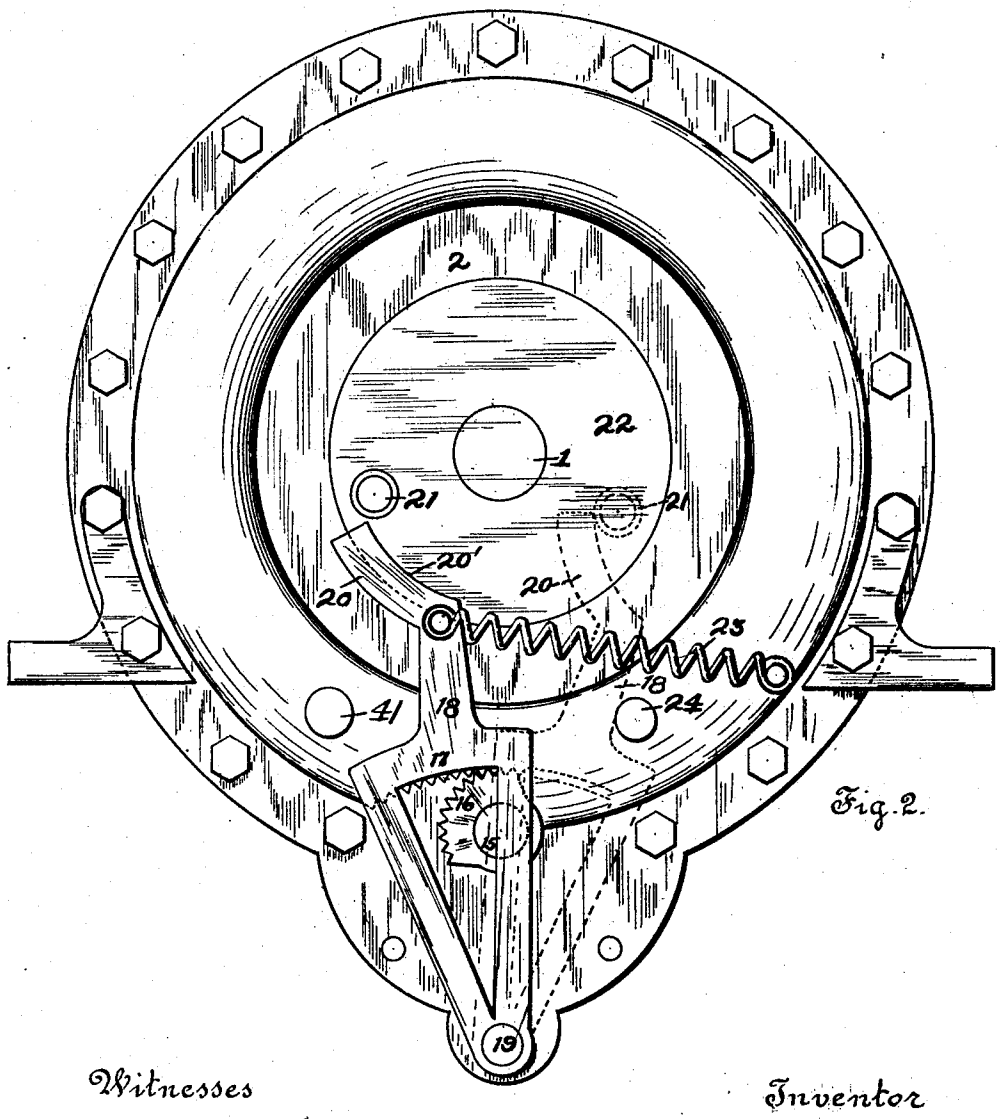

Fig. 2.

Witnesses

W. C. Smith

B. G. Richards

Inventor

John H. Fitch

By Joshua R. H. Potts

his Attorney

J. H. FITCH.

EXPLOSIVE ENGINE.

APPLICATION FILED OCT. 28, 1909.

972,071.

Patented Oct. 4, 1910.

4 SHEETS—SHEET 3.

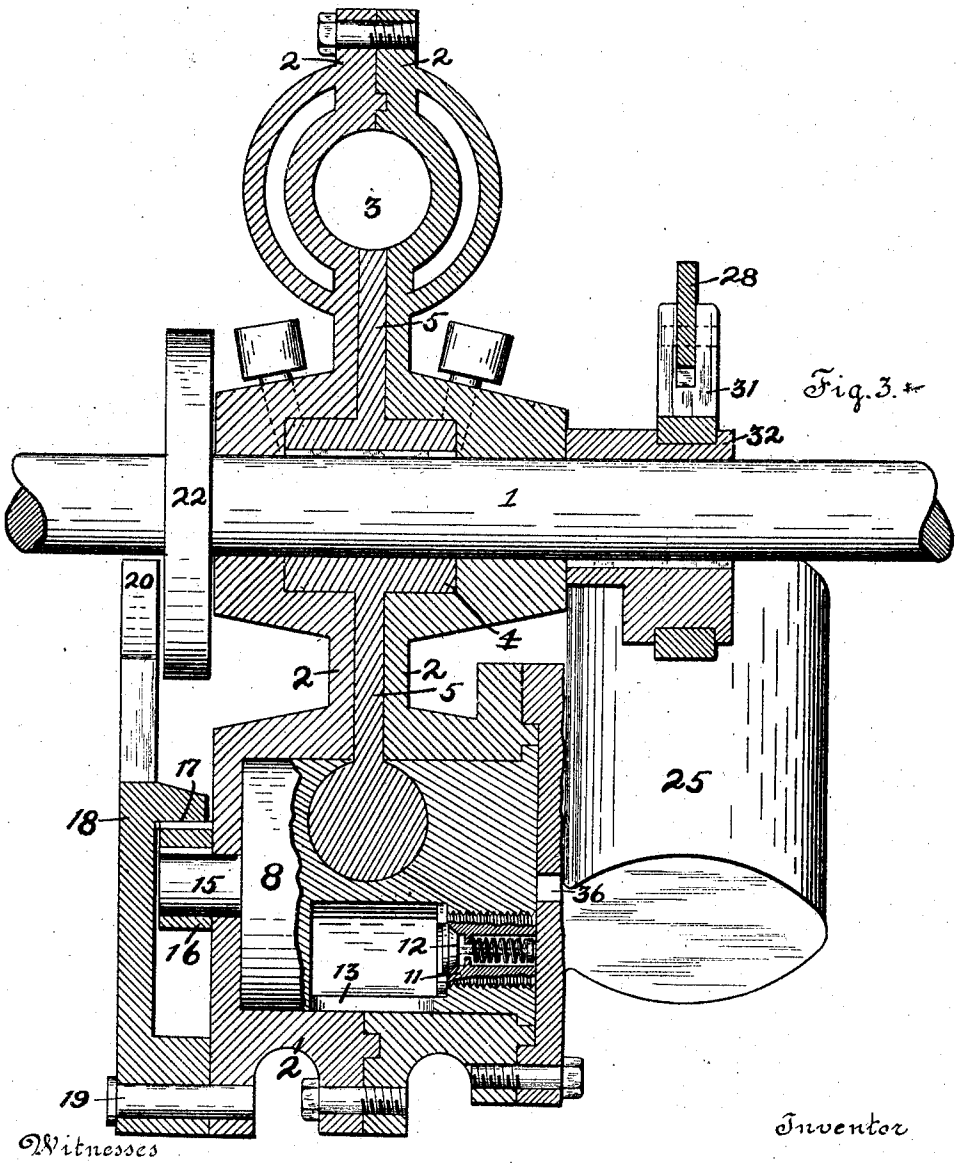

Fig. 3.

Witnesses

W. C. Smith

B. G. Richards

Inventor

John H. Fitch.

By Joshua R. H. Potts

his Attorney.

J. H. FITCH.

EXPLOSIVE ENGINE.

APPLICATION FILED OCT. 28, 1909.

972,071. Patented Oct. 4, 1910.

4 SHEETS—SHEET 4.

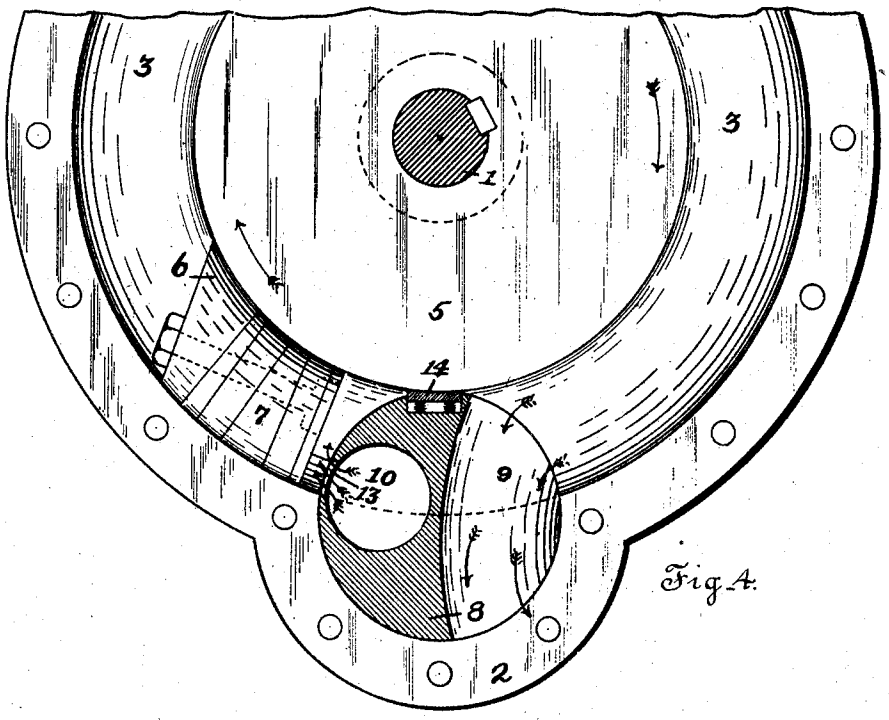

Fig. 4.

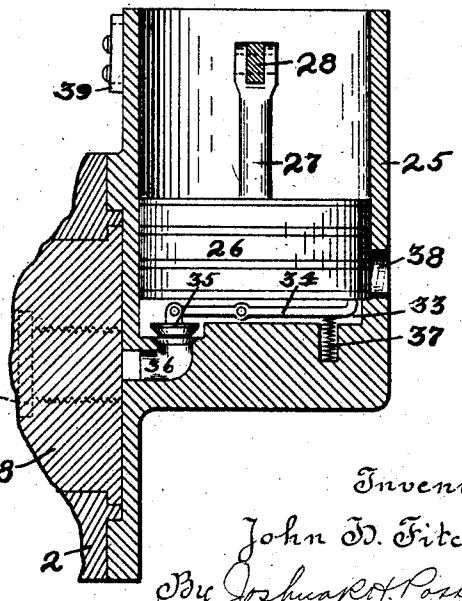

Fig. 5.

Witnesses

W. E. Smith

B. G. Richards

Inventor

John H. Fitch

By Joshua R. H. Potts

his Attorney.

UNITED STATES PATENT OFFICE.

JOHN H. FITCH, OF LUDINGTON, MICHIGAN.

EXPLOSIVE-ENGINE.

972,071. Specification of Letters Patent. Patented Oct. 4, 1910.

Application filed October 28, 1909. Serial No. 525,032.

To all whom it may concern:

Be it known that I, JOHN H. FITCH, a citizen of the United States, residing at Ludington, county of Mason, and State of Michigan, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification.

My invention relates to improvements in an explosive engine and has for its object the production of an explosive engine of improved construction and operation.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

My invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a side elevation of an engine embodying my invention, Fig. 2, an elevation of the opposite side of said engine, Fig. 3, a vertical transverse section of said engine, Fig. 4, a vertical section, partially in elevation, showing the valve employed in the engine, and Fig. 5, a partial section on line x—x of Fig. 1.

In the preferred form of construction as illustrated in the drawings the engine shaft 1 is rotatably mounted in a suitable casing 2. Casing 2 is formed in two parts bolted together to inclose an annular cylinder 3. Within casing 2 a hub 4 is keyed to shaft 1 and carries a circular disk 5 operating between the parts of said casing. At one point on its periphery plate 5 is provided with a cylindrical lug or projection 6 to which a cylindrical piston 7, adapted to operate in cylinder 3, is secured. Intersecting cylinder 3, and mounted in casing 2, is a rotary valve 8 provided with an opening 9 adapted to register with and form a smooth continuation of the bore of the cylinder 3. By this arrangement it will be seen that the valve 8 will be so set as to permit the passage of piston 7 through it, as indicated in Fig. 3 or to have the opening 9 serve as an exhaust for cylinder 3, as indicated in Fig. 4. The valve 8 is also provided with an admission chamber 10 having a threaded plug 11 carrying a check valve 12 at one end and a port 13 at one side. By this arrangement when valve 8 is in position to exhaust cylinder 3 the port 13 is in position to admit to the other side of cylinder 3 from chamber 10. A spring-held plate 14 is also provided in valve 8 to prevent leakage past the edge of plate 5.

At one end the valve 8 is provided with a stud shaft 15 projecting through the wall of casing 2 and carrying a segmental gear 16 keyed to its outer end. Segmental gear 16 meshes with another segmental gear 17 carried by the arm 18 which is pivoted at its outer end on a stud 19 secured in casing 2. At its inner end arm 18 carries a segmental arm 20 adapted to contact with a pin 21 carried by a plate 22 fixed to shaft 1. A spring 23 attached at one end to arm 18 and at its other end to casing 2 is adapted to yieldingly hold said arm in contact with a pin 24 on casing 2. When arm 18 contacts with pin 24 valve 8 is in position illustrated in Fig. 4 and cylinder 3 is exhausting. As shaft 1 and plate 22 rotate pin 21 contacts with the inner end of arm 20 and rocks valve 8 to bring opening 9 to register with cylinder 3 so as to permit the passage of lug 6 and piston 7 therethrough, the said valve being held in proper position while pin 21 travels along the inner circular face 20′ of arm 20. During this action the lug 6 and piston 7 pass through the opening 9 whereupon the pin 21 running from under arm 20 permits the return of the valve to original or exhausting position.

At the opposite side of casing 2 is secured a compression cylinder 25 in which operates a compression piston 26 carried by a connecting rod 27 pivoted to the end of a lever 28. The lever 28 is fulcrumed on a stud 29 carried by a standard 30 secured to casing 2. At its middle, lever 28 is connected with a link 31 operated by eccentric 32 on shaft 1. In a slot 33 in the end of cylinder 25 is pivoted a lever 34 having one end adapted to contact with the end of piston 26 at the compression end of its stroke. At its other end lever 34 carries a valve 35 adapted to close a port 36 leading from cylinder 25. A spring 37 serves to yieldingly hold valve 35 to its seat and to place the end of lever 34 in the path of the end of piston 26, all as illustrated in Fig. 5. A threaded opening 38 is provided in the wall of cylinder 25 and in which a suitable pipe containing a check valve may be secured to connect said cylinder with a carbureter. By this construction it will be seen that as shaft 1 rotates a charge will be drawn into cylinder 25 and compressed therein until the end of piston 26 contacting

with lever 34 raises valve 35 and permits the escape of said charge through port 36. Port 36 communicates with the end of valve 8 in such position as to register with plug 11 when valve 8 is in position shown in Fig. 4. Thus the charge escaping from cylinder 25 is permitted to enter chamber 10 and thence pass into cylinder 3 immediately behind piston 7. Cylinder 25 carries an adjustable contact point 39 adapted to coöperate with a similar point 40 on lever 28 to close an electric circuit through spark plug 41 when the piston 26 reaches the end of its compressive stroke and a full charge has been forced into cylinder 3 behind piston 7. This explodes the charge behind piston 7 thus causing the operation of said piston to continue the rotations of shaft 1.

By this construction it will be seen that a simple and effective means are provided for operating the engine and supplying it with explosive charge.

While I have illustrated and described the preferred form of construction, this is capable of variations or modifications without departing from the spirit of my invention. I therefore do not wish to be limited to the exact details of construction set forth but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. In an explosive engine, the combination of a casing provided with an annular cylinder therein; a revolving piston in said cylinder and mounted upon the engine shaft; a rotary valve intersecting said cylinder and provided with an opening adapted to permit the passage of said piston and to serve as an exhaust port, and an admission port; an inwardly projecting arm connected with said valve, the said arm being provided at its inner end with a segmental arm; a spring for yieldingly holding said valve in exhausting position; and a pin mounted upon said engine shaft and adapted to engage said arm to rotate said valve to a position to permit the passage of said piston, and said segmental arm to momentarily hold said valve in this position to permit the passage of said piston, substantially as described.

2. In an explosive engine, the combination of a casing provided with an annular engine cylinder therein; an engine shaft; a revolving piston in said cylinder and mounted upon said engine shaft; a rotary valve intersecting said cylinder and provided with an opening adapted to permit the passage of said piston and to serve as an exhaust port and an admission port; means for operating said valve, a compression piston and cylinder adjacent said engine cylinder and provided with a port adapted to connect with said admission port; a pressure seated valve closing said compression cylinder port; a spring-held lever for operating said valve and arranged to be operated by the piston at the compression end of its stroke, a segmental gear carried by said rotary valve; a spring-held arm pivoted to said casing and carrying a segmental gear meshing with said first mentioned segmental gear; and a pin carried by said engine shaft and adapted to engage said arm to operate said valve, substantially as described.

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

JOHN H. FITCH.

Witnesses:
R. R. Wheeler,
Joseph W. Stull.