F. W. FERGUSON.

ROTARY ENGINE.

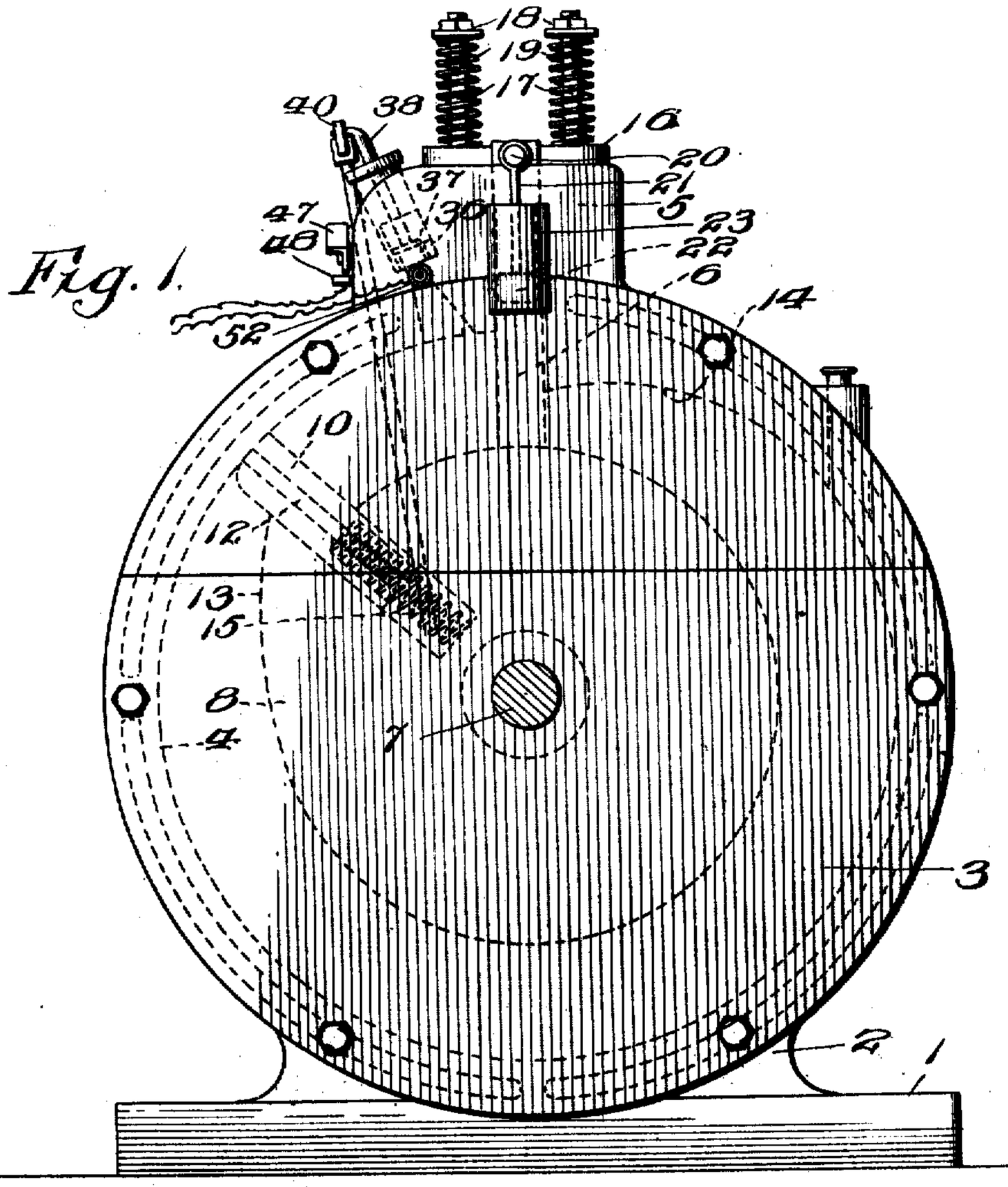
APPLICATION FILED JULY 22, 1910.

995,855.

Patented June 20, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



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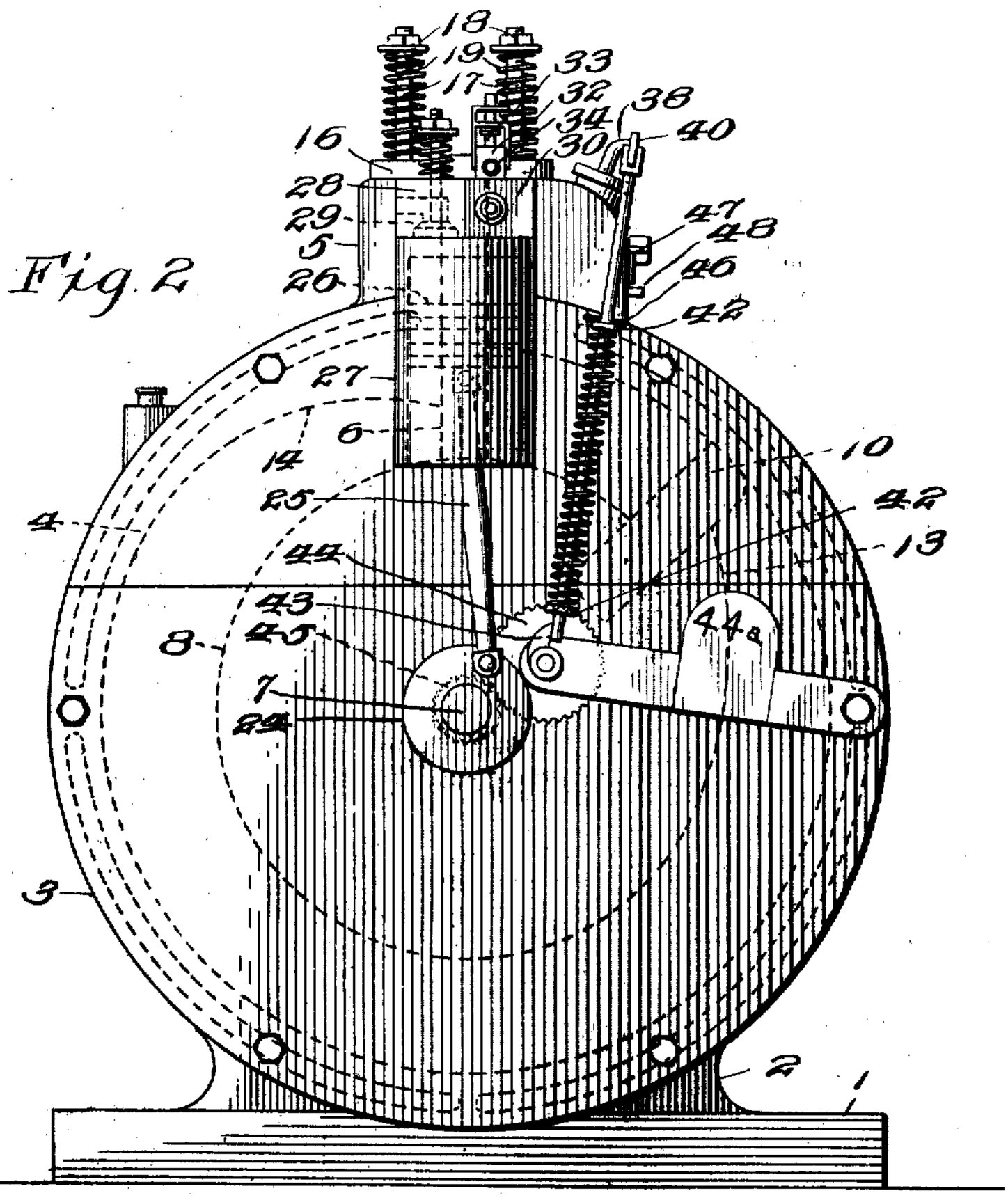
4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

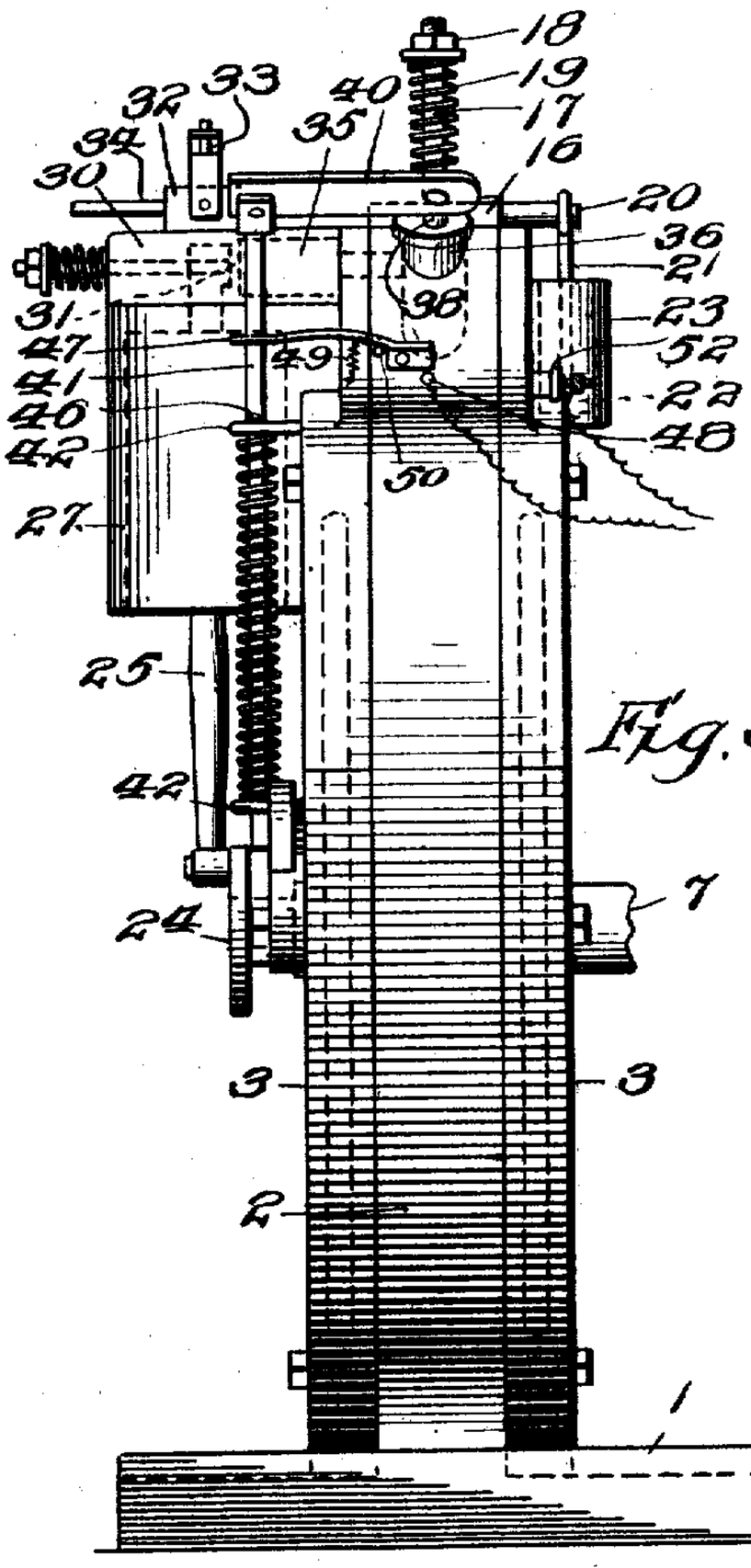

Fig. 3.

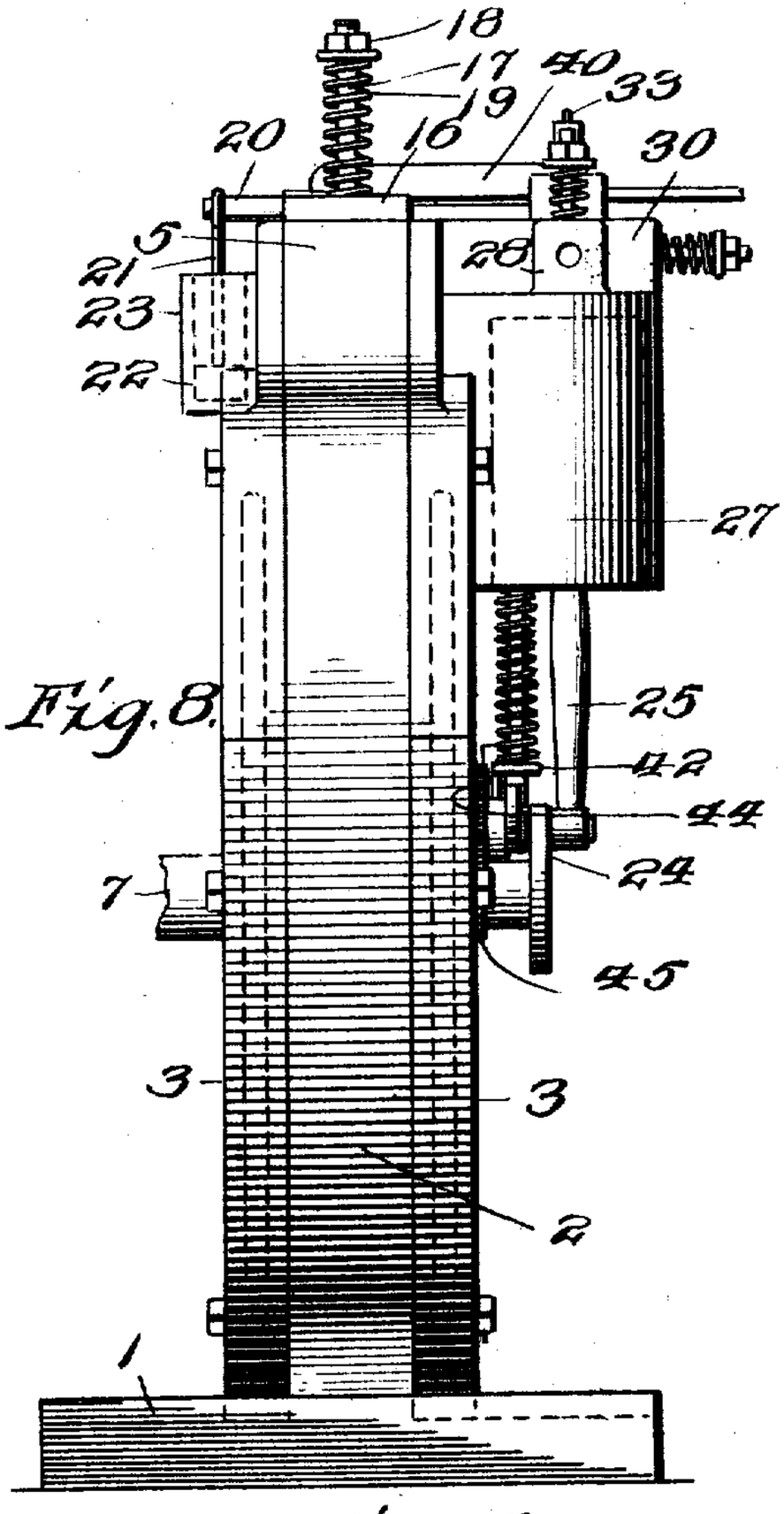

Fig. 8.

Fig. 5.

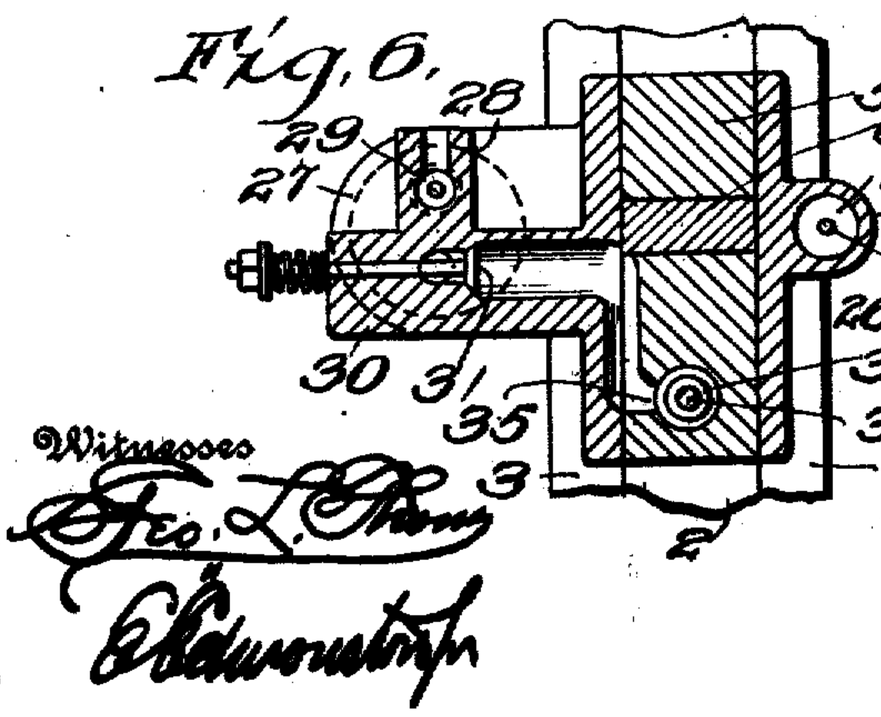

Fig. 6.

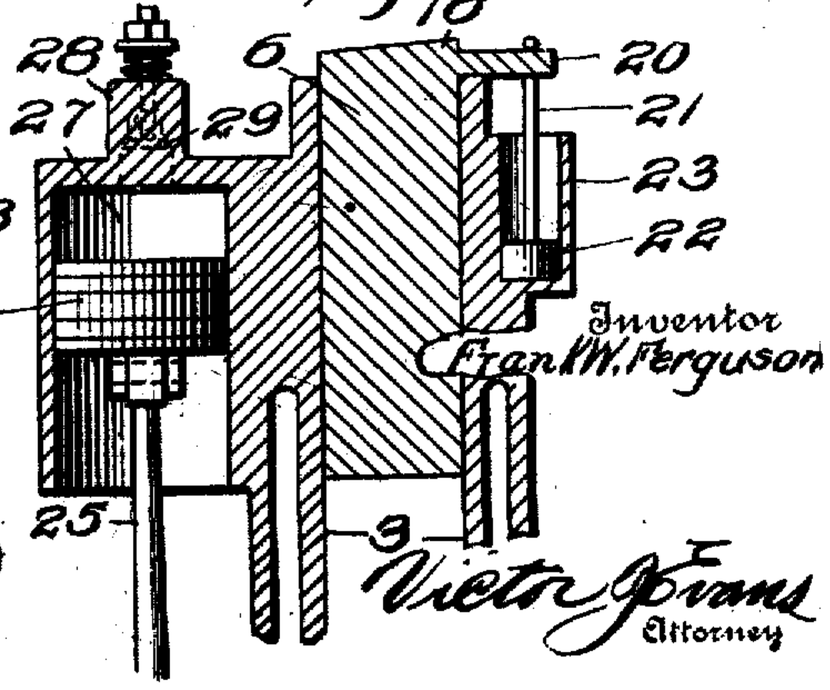

Fig. 10.

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4 SHEETS—SHEET 4.

Fig. 4.

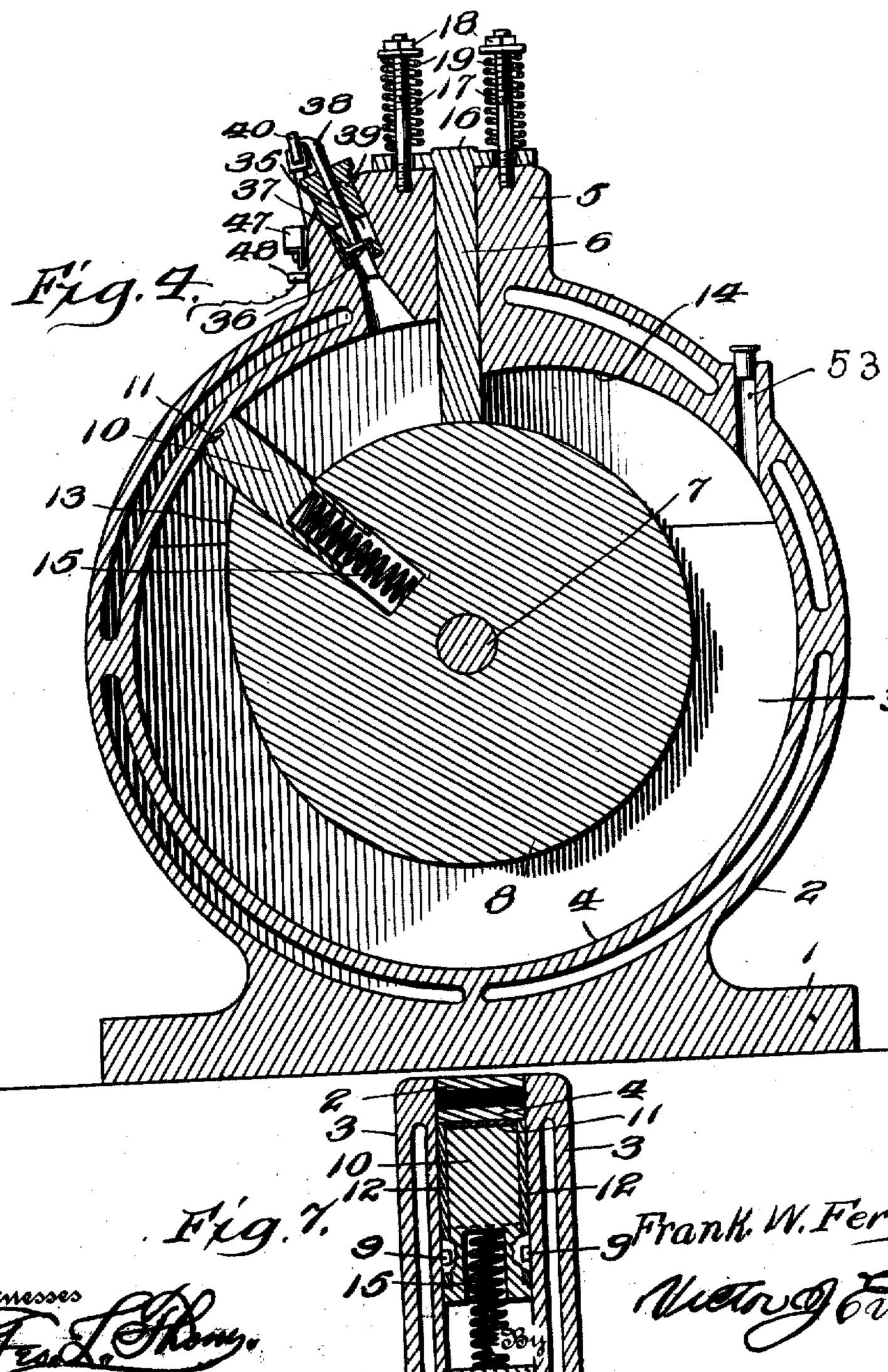

Fig. 7.

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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

995,855. Specification of Letters Patent. Patented June 20, 1911.

Application filed July 22, 1910. Serial No. 573,307.

To all whom it may concern:

Be it known that I, FRANK W. FERGUSON, a citizen of the United States, residing at Kingman, in the county of Mohave and Territory of Arizona, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to rotary engines and the object of the invention is to provide means in an engine of this type for controlling the inlet of fuel and exhaust of spent gases in such a manner as to obtain a maximum efficiency.

A still further object of the invention is the provision in a device of this character of a unitary control for the admission of fuel under pressure and of the spark for igniting said fuel.

Further objects of the invention will appear as the following specific description is read in connection with the accompanying drawings which form a part of this application and in which:

Figure 1 is a front elevation. Fig. 2 is a rear elevation. Fig. 3 is a side elevation. Fig. 4 is a vertical sectional view taken longitudinally through the casing. Fig. 5 is a detail vertical transverse section. Fig. 6 is a detail horizontal section through the valve mechanism. Fig. 7 is a detail section through the piston valve. Fig. 8 is a detail side elevation taken on the side opposite that shown in Fig. 3.

Referring more particularly to the drawings 1 represents the base of the engine on which is mounted the engine casing 2 comprising water jacketed sides 3 and the piston cylinder 4. The upper portion of the cylinder 4 has integrally cast therewith the valve head 5 in which is slidably mounted the valve 6 and the upper half of each side member 3 is preferably formed separately from the lower half so as to permit access to said valve and to the other parts of the valve mechanism which will hereinafter be described.

Journaled centrally in the side members 3 is a shaft 7 upon which is mounted the piston 8 which is concentric with the inner periphery of the cylinder 4 and has positioned in its side faces the concentric packing means 9, spring pressed into engagement with the sides 3 as shown. Slidably mounted within the piston 8 and normally pressed into engagement with the inner periphery of the cylinder 4 is a single piston wing 10 which has suitable packing 11 on its outer end and similar packing 12 on its sides to engage the cylinder and side members 3 of the casing. Immediately adjacent the wing 10 and forming an additional thrust bearing therefor, is a valve operating cam 13 which, as the piston rotates, raises the valve 6 from its seat. A similar cam 14 is secured to the inner side of the cylinder and forms an additional thrust bearing for the valve 6 and as the piston rotates causes the depression of the wing 10 against its operating spring 15.

The valve 6 is normally held down against the periphery of the piston 8 and is provided at its upper end with a head 16 through which suitable guiding rods 17 pass and are secured to the valve head 5. The outer ends of the rods 17 have adjusting nuts 18 applied thereto and spiral springs 19 surround the rods between the head and the adjusting nuts so as to keep the valve normally seated against the piston. The head has a projecting stud 20 which is connected to the piston rod 21 of a dash pot plunger 22. This plunger operates in a dash pot 23 and as the valve rises, the plunger forms a vacuum in the pot and as it falls a pressure which retards the action of the springs 19 and prevents fluttering of the valve.

On the rear side of the engine immediately adjacent the casing there is secured to the shaft 7 a crank wheel 24 which has eccentrically connected to it a piston rod 25 whose upper end is pivoted to a piston 26 traveling in the combustion cylinder 27 bolted to the rear side member 3 of the casing, and removable as a unit with its upper portion. The upper portion of the casing is apertured in two places and seated over one of the apertures is a valve casing 28 having a spring-controlled inlet valve 29 therein which governs the ingress of air to the cylinder 27. The other aperture is covered by a valve casing 30 in which a spring-pressed valve 31 is mounted and upon the top of the valve casing 30 is mounted a check valve casing 32 having a check valve 33 therein which controls the inlet of the fuel from the pipe 34. The valve casing 30 has a port leading into the cylinder 27 and a port leading into a mixing chamber 35 formed in the head 5 on one side of the valve 6. This mixing chamber has communication with the interior of the engine casing through a valved port 36 which is controlled by a valve 37 connected to a

valve rod 38. The valve rod 38 passes through a bushing 39 in the upper portion of the valve head and is connected to a cross head 40 carried on the outer end of the sparking rod 41 which is reciprocally mounted in bearings 42 and has its lower end sheared off and arranged in the path of a cam 43 which is operated by the gear 44 in mesh with the pinion 45 keyed to the shaft 7. The cam 43 and the gear 44 are mounted in the free end of a weighted arm 44^a which is pivoted at its opposite end to one side of the casing.

Secured to the sparking rod 41 above the upper bearing 42 is a laterally projecting pin 46 which lies in the path of the spark lever 47 pivoted upon the casing and having its opposite end lying in the path of an insulating pin 48. The arm 47 is normally prevented from engaging the pin 48 by means of a spiral spring 49 and is limited in its downward movement by a pin 50. When the pin on the rod 41 strikes the arm 47 it raises the same against the tension of the spring and causes the opposite end to engage the pin 48 to which one of the circuit wires is connected. The opposite wire is connected to the spark plug 52 which is let into the front of the casing immediately below the inlet valve 37.

The exhaust port is shown at 53 and is so positioned in the casing that the piston will have completed the greater part of its cycle before the expanded gases are permitted to exhaust, thus securing the maximum amount of energy. When the wings are in the position indicated in Fig. 4, with the live gases between them ready for ignition, the remaining space in the engine casing is partially filled with the highly expanded inactive gases which readily pass out of the exhaust port as the piston wing 10 moves around in the casing.

It will be understood that by removing the sparking mechanism and the fuel mixing and injecting pump, the port in the engine may be connected with a source of steam supply or other fluid under pressure and the engine used as a rotary fluid pressure engine instead of an internal combustion engine.

Having thus described the invention, what is claimed is—

1. A rotary engine comprising a cylinder, a piston rotating therein, means carried by the piston and casing and coacting with the latter to form a combustion chamber, fuel supplying means operated by the piston for supplying fuel to the combustion chamber, a valve mechanism for controlling the admission of fuel to the combustion chamber, and including a valve rod, a sparker lever and means carried by the valve rod for operating the sparker lever.

2. A rotary engine comprising a cylinder, a piston rotating therein, means carried by the piston and casing and coacting with the latter to form a combustion chamber, fuel supplying means, a valve mechanism for controlling the admission of fuel to the combustion chamber, and including a valve rod, a sparker lever, means to normally hold the sparker lever inoperative, and means carried by the valve rod for operating the sparker lever.

3. A rotary engine comprising a cylinder, a piston rotating therein, means carried by the piston and casing and coacting with the latter to form a combustion chamber, fuel supplying means, a valve mechanism for controlling the admission of fuel to the combustion chamber, and including a valve rod, a sparker lever, a spring to normally hold the sparker lever in inoperative position, and a pin carried by the valve rod for engaging the sparker lever to operate the same against the tension of the spring.

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

FRANK W. FERGUSON.

Witnesses:
M. A. Sawyer,
Philip Smith.