No. 827,511. PATENTED JULY 31, 1906.

S. DENTON & E. S. VEEN.

ROTARY EXPLOSIVE MOTOR.

APPLICATION FILED FEB. 15, 1905.

2 SHEETS—SHEET 1

FIG. 1.

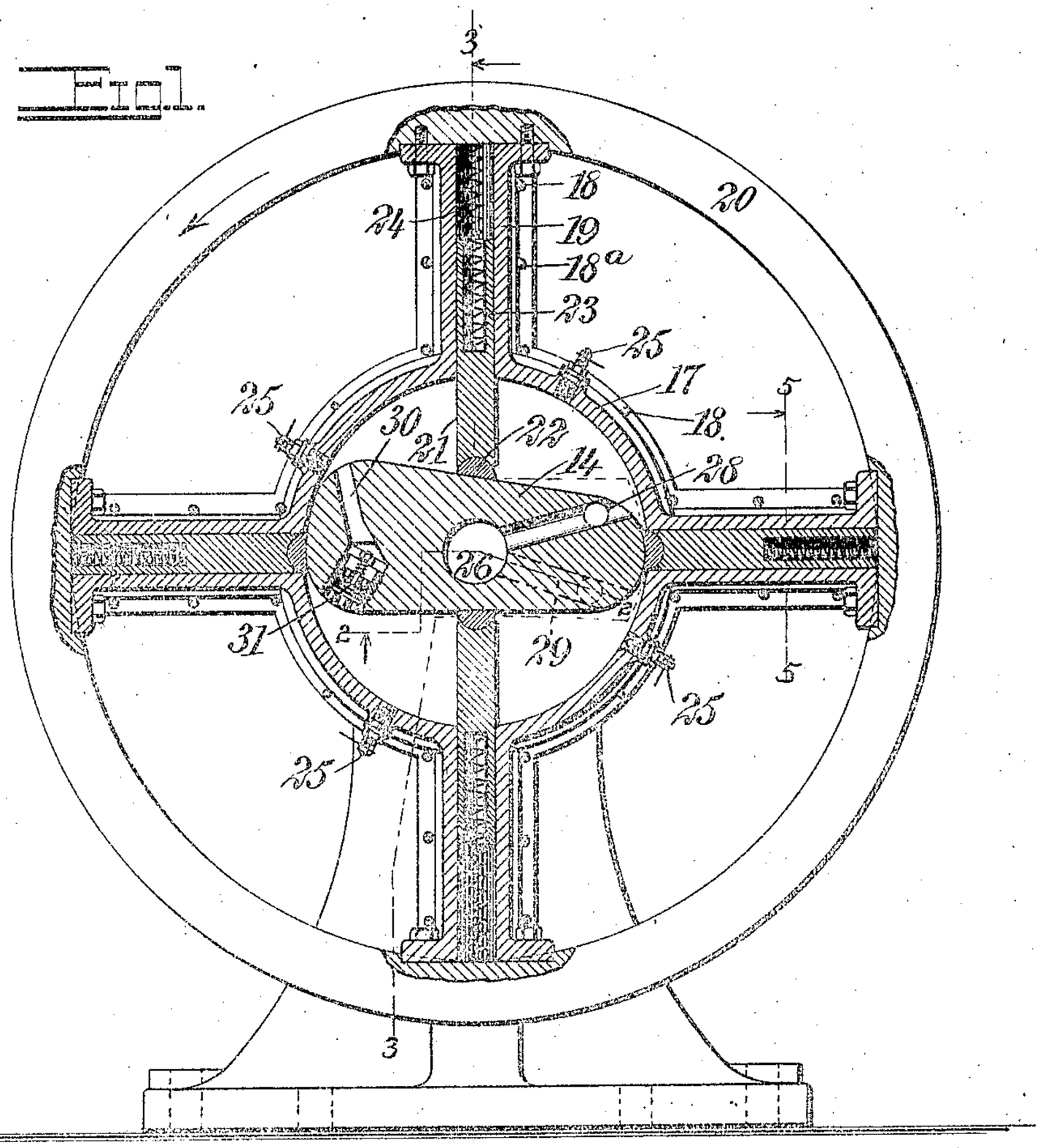


FIG. 2.

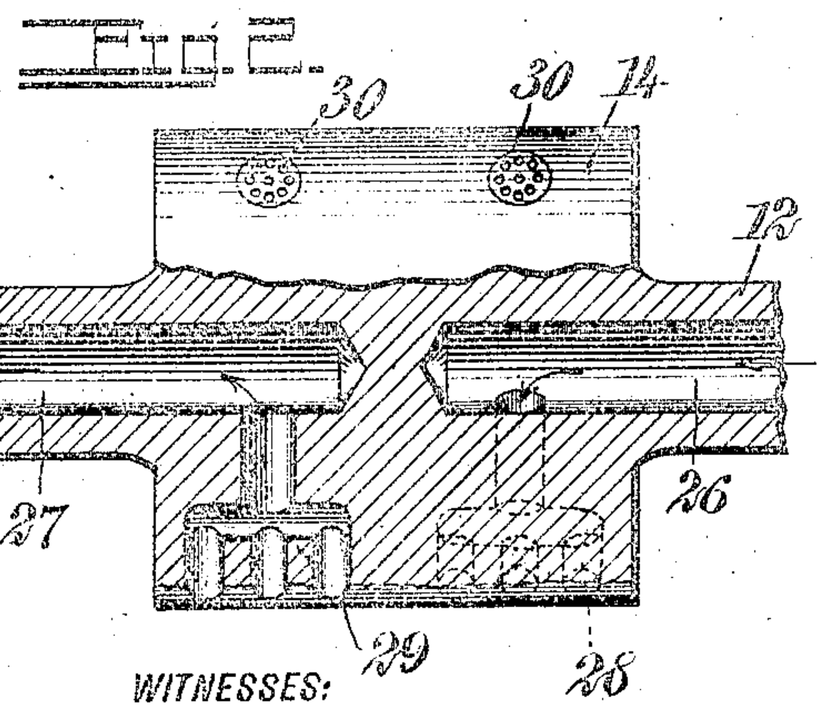
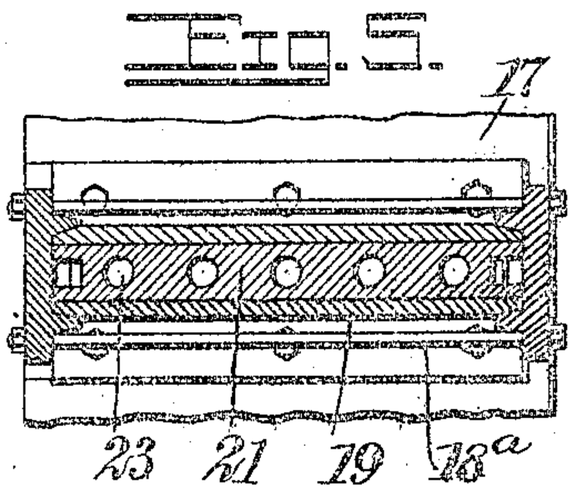


FIG. 3.



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2 SHEETS—SHEET 2.

Fig. 3.

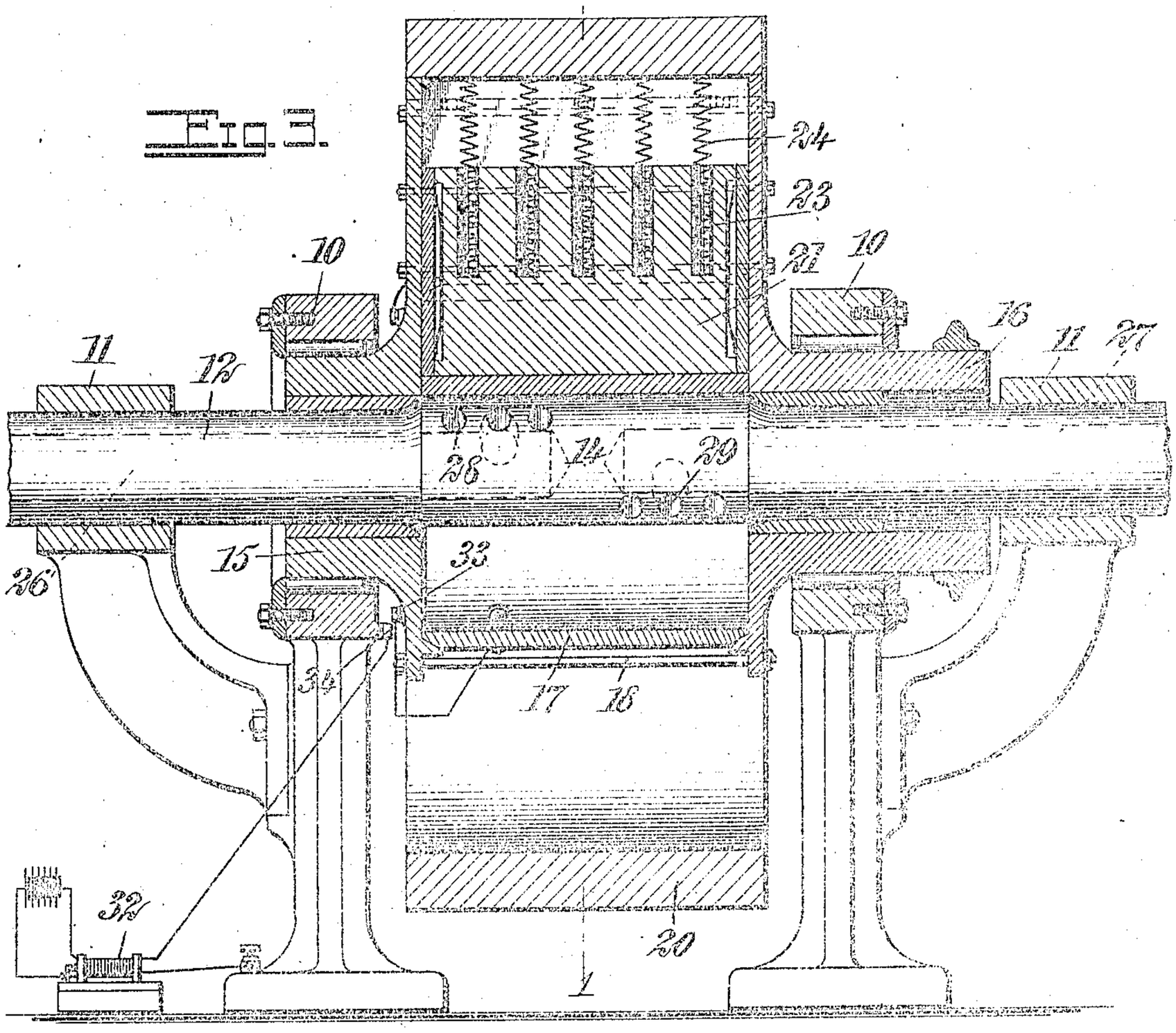
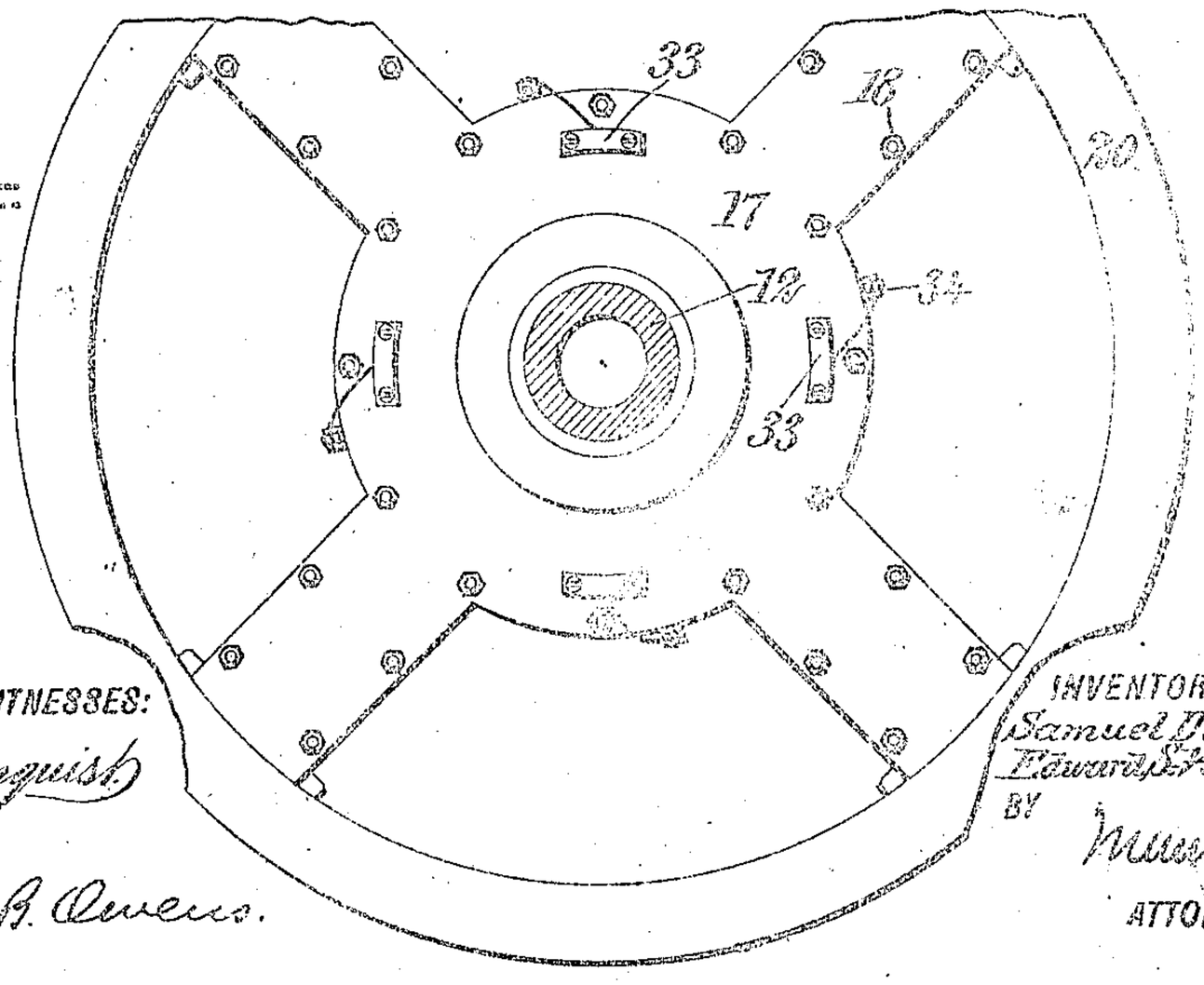


Fig. 4.



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UNITED STATES PATENT OFFICE.

SAMUEL DENTON AND EDWARD S. VEEN, OF GREAT FALLS, MONTANA, ASSIGNORS TO ROBERT P. RECKARDS, OF GREAT FALLS, MONTANA.

ROTARY EXPLOSIVE-MOTOR.

No. 827,511. Specification of Letters Patent. Patented July 31, 1906.

Application filed February 15, 1905. Serial No. 245,733.

To all whom it may concern:

Be it known that we, SAMUEL DENTON and EDWARD S. VEEN, citizens of the United States, and residents of Great Falls, in the county of Cascade and State of Montana, have invented a new and Improved Rotary Explosive-Motor, of which the following is a full, clear, and exact description.

The invention relates to a rotary explosive motor, according to the preferred embodiment of which a circular cylinder is connected with a rim by means of radial pockets, the whole constituting a fly-wheel, and said pockets carrying radially-movable abutments which coact with a stationary piston carried by a stationary shaft, on which the cylinder is mounted to turn, and the shaft and piston being provided with ports for the inlet and exhaust of the motor fluid.

The invention resides in certain novel features of construction and organization, which will be fully set forth hereinafter and pointed out in the claims.

Reference is to be had to the accompanying drawings, which illustrate as an example the preferred embodiment of our invention, in which drawings like characters of reference indicate like parts in the several views, and in which—

Figure 1 is a vertical section of the invention, taken across the piston and the shaft on essentially the line 1 1 of Fig. 3. Fig. 2 is a sectional view illustrating the piston, taken on the line 2 2 of Fig. 1. Fig. 3 is a longitudinal section taken on the line 3 3 of Fig. 1. Fig. 4 is a side elevation of the rotating part of the engine; and Fig. 5 is a section on the line 5 5 of Fig. 1, showing one of the abutment-pockets and the abutment sliding therein.

As shown best in Fig. 3, a frame is provided, which comprises two bearings 10 and two boxes 11 outward of the bearings 10. The boxes 11 securely carry a shaft 12, which, as shown in Figs. 1 and 2, has a flattened enlargement 14 integral therewith and constituting the piston of the engine. Turning freely around the shaft 12, at each side of the enlargement or piston 14, are hollow trunnions 15 and 16, these trunnions also turning in the bearings 10. The trunnions 15 and 16 are formed integral with or suitably connected to the rotating cylinder 17. This cylinder is circular in form and may be constructed in any manner. As here shown, it is formed with side walls connected by tie-rods 18 and clamping between them the outer or peripheral walls of the cylinder. The cylinder is provided with radially-extending pockets 19, preferably formed, as shown best in Figs. 1 and 5, of parallel side plates integral with the peripheral wall of the cylinder and end plates integral with the end walls of the cylinder and clamped in place by tie-rods 18ª. A weighted rim 20 incloses the cylinder and abutment-pockets and is attached to the outer ends of the pockets to form, with the pockets and with the cylinder, what is essentially the fly-wheel of the engine.

21 indicates the abutments which slide in the abutment-pockets and are provided with packing-strips 22 at their inner ends, said strips being adapted to run around the piston, as shown, and effect a tight connection therewith. The abutments 21 are provided with openings 23, in which are arranged springs 24, these springs pressing the abutments inward against the piston, but yielding to force the abutments completely into their pockets, as shown with respect to the horizontal abutments in Fig. 1. 25 indicates sparking plugs or other igniting devices, which are arranged one between each pair of abutments and are operated to ignite the explosive mixture, as will be fully set forth hereinafter.

As shown in Fig. 1, the piston 14 is formed by horizontally widening the shaft 12, the widened or enlarged portion having rounding corners and being slightly thicker at one side than at the other. The shaft 12 is formed at one end with an inlet-port 26 and at the other end with an exhaust-port 27. These ports do not communicate with each other, but they lead into the piston, and the inlet-port 26 communicates with the other side of the piston by means of transverse ports 28, while the exhaust-port 27 communicates with the lower side of the piston by means of transverse ports 29. These ports 28 and 29 extend toward the thin edge of the piston, and the thickened edge of the piston is provided with a transfer-port 30, leading from the top of the piston to the bottom thereof and provided with a valve 31, which seats against the return of fluid from the bottom of the piston to the top.

In the operation of the engine, assuming

the parts to be in the position shown in Fig. 1 and the rotating elements to be moving in the direction of the arrow applied to the rim 20 in said view, the top abutment 22, moving leftward from the inlet-port 28, will draw into the cylinder a quantity of the explosive mixture. When the top abutment moves around to the horizontal, the abutment following will compress this mixture and force it through the transfer-port 30 into the space at the lower left-hand side of the piston, and, the movement of the parts continuing, when said top abutment assumes a position below the piston the mixture should be ignited. At the period of ignition the compressed mixture lies at the lower left-hand side of the piston and an impulse is given to the rotating parts. The burned gases are exhausted by the following piston pressing the gases out through the ports 29. The mixture therefore is drawn into the cylinder at the upper side of the piston, and as the parts rotate the mixture is compressed and forced through to the lower side of the piston, it being ignited at the lower left-hand side and exhausted at the lower right-hand side. The rotating parts, therefore, receive four impulses for each revolution, causing the engine to operate evenly and effectually. The spark-plugs may be operated by any desired devices. In Fig. 3, 32 indicates a sparking coil and appurtenances, and in Figs. 3 and 4, 33 indicates contact devices in connection with the spark-plug and operating with a contact 34 on the frame of the engine, the arrangement being such as to cause the spark to pass at each plug when the plug reaches a position below the left-hand side of the piston.

Various changes in the form, proportions, and minor details of our invention may be resorted to at will without departing from the spirit and scope thereof. Hence we consider ourselves entitled to all such variations as may lie within the terms of our claims.

Having thus described the preferred form of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a flat stationary piston, having inlet and exhaust passages entering the same and transverse branches leading to the opposite sides of the piston near one edge thereof, and the piston having a transfer-port extending from one to the other side thereof near the edge opposite the inlet and exhaust ports, a valve commanding the transfer-port, a rotating cylinder inclosing the piston, an abutment operating in the cylinder, and means for igniting the explosive charge.

2. The combination of a flat stationary piston, having inlet and exhaust passages entering the same and transverse branches leading to the opposite sides of the piston near one edge thereof, and the piston having a transfer-port extending from one to the other side thereof near the edge opposite the inlet and exhaust ports, a valve commanding the transfer-port, a rotating cylinder inclosing the piston, an abutment operating in the cylinder, and means for igniting the explosive charge, said means including a sparking device carried by the cylinder.

3. A rotary explosive-engine, having a stationary piston with means for admitting and exhausting the working fluid, the piston also having a transfer-port extending from one side to the other, a valve commanding the transfer-port, a rotary cylinder inclosing the piston, a sliding abutment carried by the cylinder and engaging the piston, and means for igniting the charge.

4. A rotary explosive-engine, having a stationary piston with means for admitting and exhausting the working fluid, the piston also having a transfer-port extending from one side to the other, a valve commanding the transfer-port, a rotary cylinder inclosing the piston, a sliding abutment carried by the cylinder and engaging the piston, and means for igniting the charge; the igniting means comprising a sparker carried by the cylinder.

5. The combination of a piston, a cylinder inclosing the same, one of said parts being rotatable, the cylinder engaging the piston at two points forming two chambers and the piston having a transfer-port from one of said chambers to the other, abutments movably mounted on the cylinder and engaging the piston, and means for admitting and exhausting the motive agent.

6. The combination of a piston, a cylinder inclosing the same, one of said parts being rotatable, the cylinder engaging the piston at two points forming two chambers and the piston having a transfer-port from one of said chambers to the other, abutments movably mounted on the cylinder and engaging the piston, means for admitting and exhausting the motive agent, and a valve commanding the transfer-port.

7. The combination of a piston, a cylinder inclosing the same, one of said parts being rotatable, the cylinder engaging the piston at two points forming two chambers and the piston having a transfer-port from one of said chambers to the other, abutments movably mounted on the cylinder and engaging the piston, means for admitting and exhausting the motive agent, and a check-valve preventing movement of the working fluid through the transfer-port in one direction.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

SAMUEL DENTON.
EDWARD S. VEEN.

Witnesses:
HERMAN G. LESCHER,
JOHN T. COTTUR.