

No. 879,512.

PATENTED FEB. 18, 1908.

J. BRAUNWALDER.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED MAY 16, 1906.

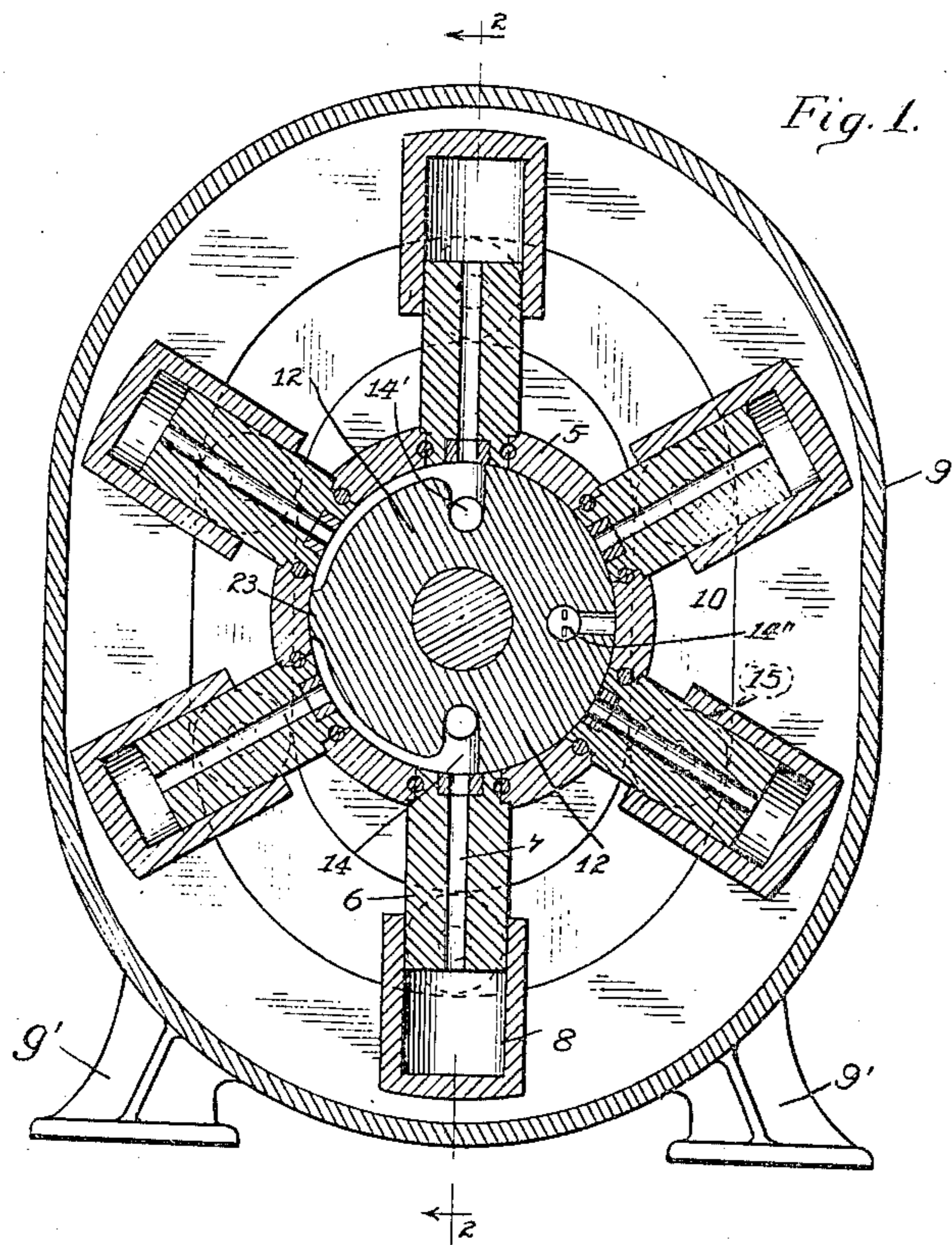


Fig. 1.

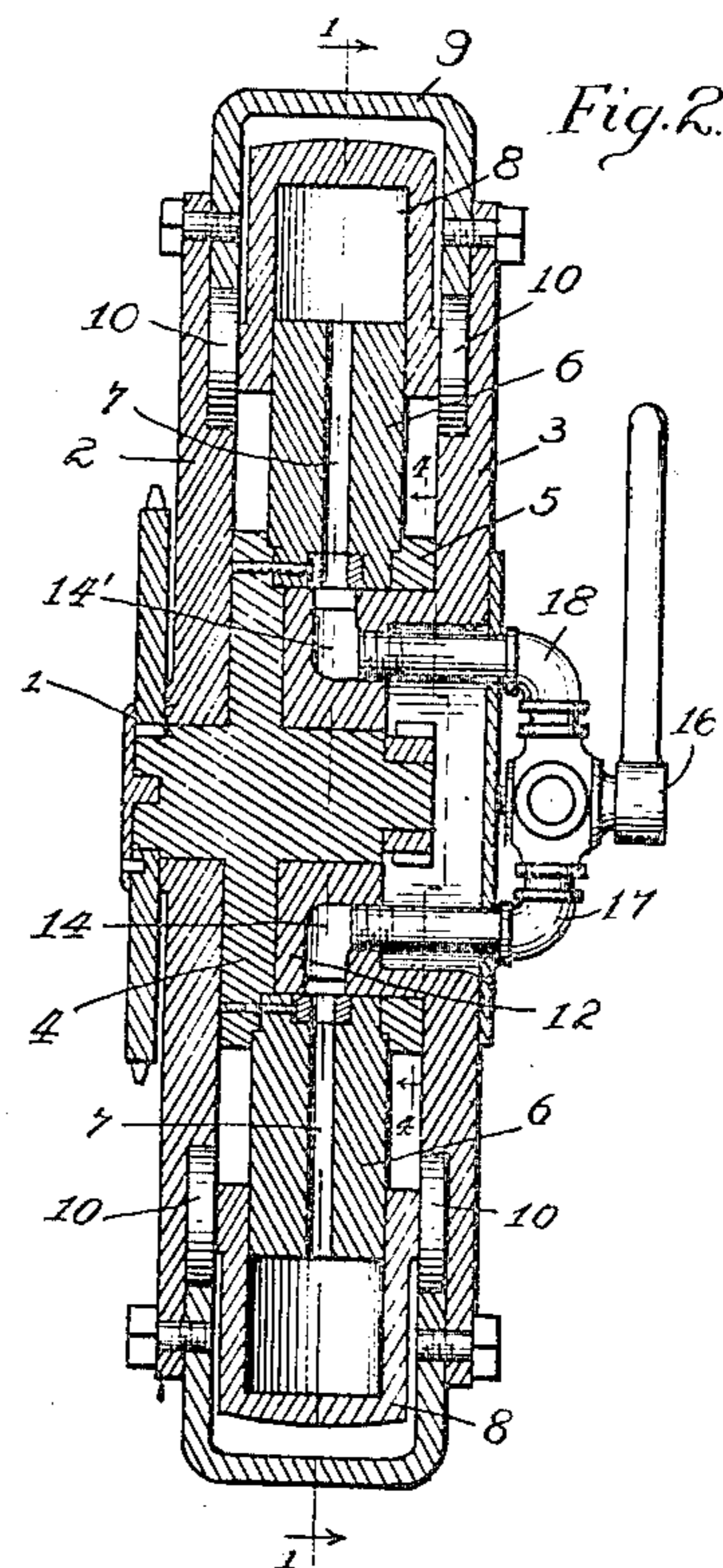


Fig. 2.

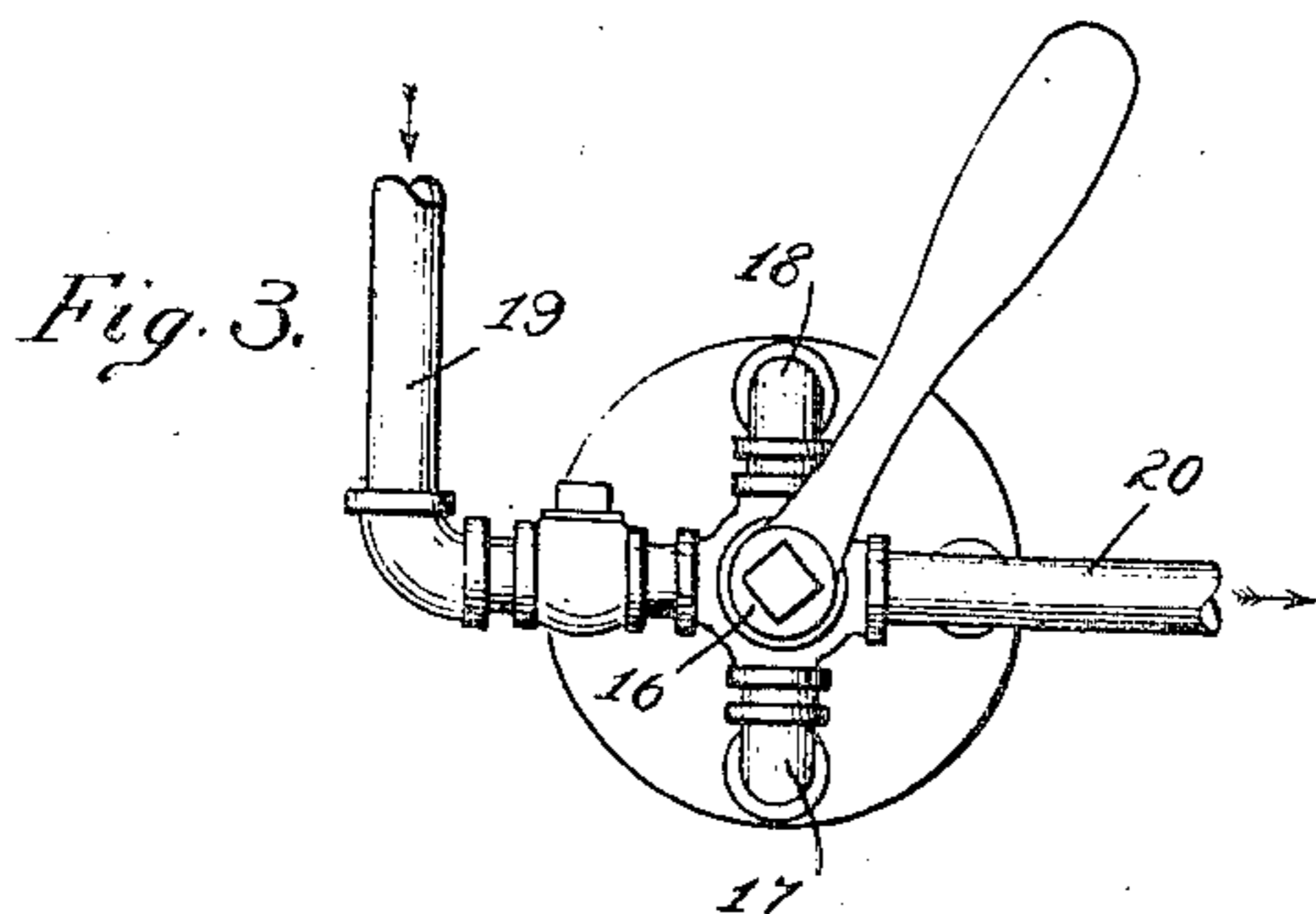


Fig. 3.

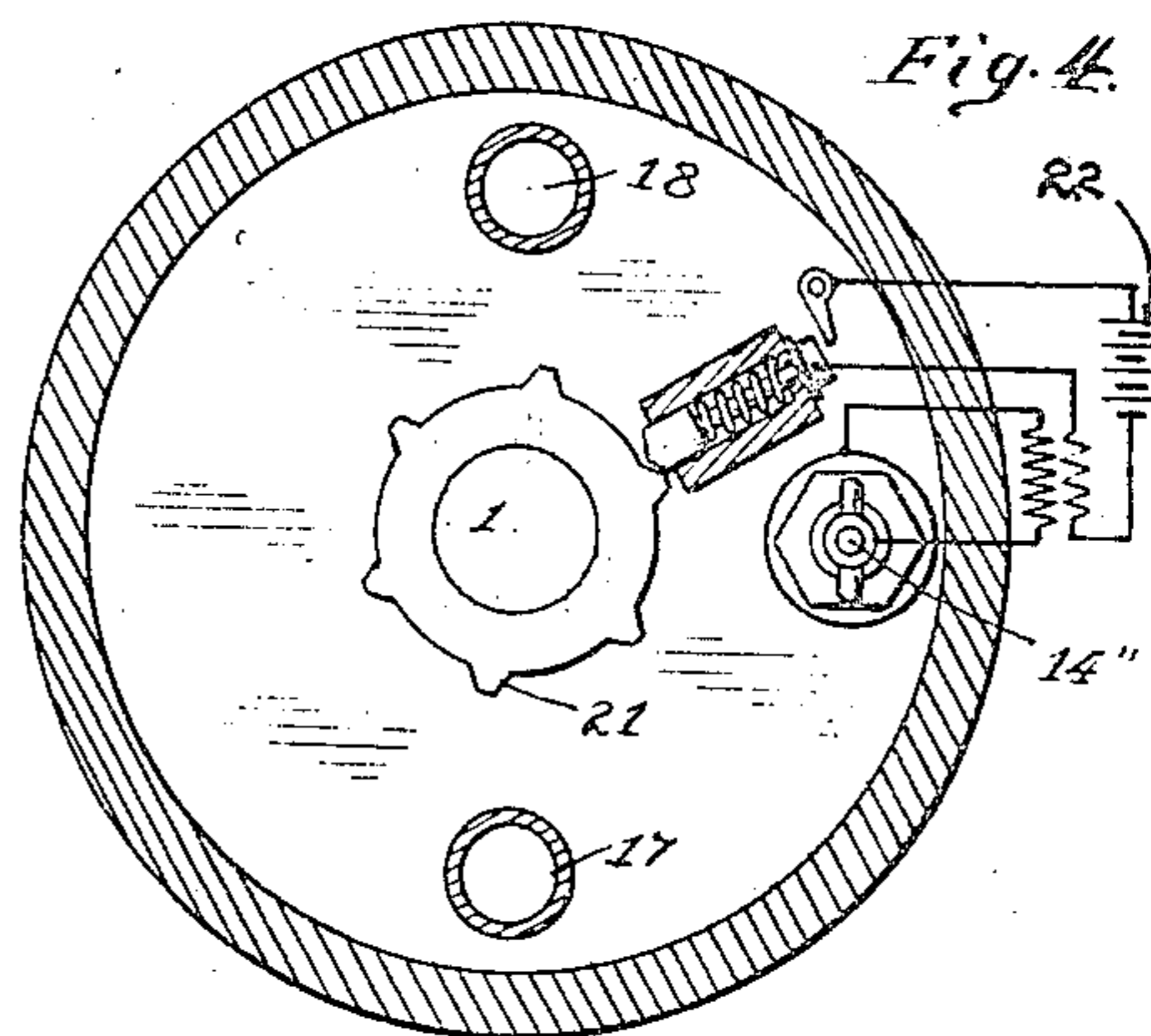


Fig. 4.

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INTERNAL-COMBUSTION ENGINE.

No. 879,512.

Specification of Letters Patent.

Patented Feb. 18, 1908.

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To all whom it may concern:

Be it known that I, JOHN BRAUNWALDER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in an Internal-Combustion Engine, of which the following is a description.

My invention relates to that class of devices known as heat motors employed for driving various kinds of machinery, and in which the power is derived ordinarily from the expansion of heated gases.

The object of my invention is to produce a simple, convenient, economical, and compact device of the kind described and one which may if desired be made to run in either direction.

To this end my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings wherein like or similar reference characters indicate like or corresponding parts; Figure 1 is a section taken substantially on line 1—1 of Fig. 2. Fig. 2 is a section taken substantially on line 2—2 of Fig. 1. Fig. 3 is a detail of a simple arrangement of inlet and exhaust pipes with valves for controlling the direction; and Fig. 4 is a partial section taken substantially on line 4—4 of Fig. 2.

In the preferred form of my device shown in the drawings, a shaft 1 is rotatably mounted in bearings in the heads 2 and 3 and provided near its central portion with a projecting flange 4 rigidly attached to the shaft and carrying a concentric ring 5 at its periphery.

A plurality of pistons or plungers 6 are rigidly mounted upon the ring 5 each projecting radially from its exterior and provided with a central longitudinal opening 7 extending entirely through the plunger to the interior surface of the ring 5 which is preferably accurately finished to provide a smooth continuous bearing surface especially immediately adjacent the ends of the openings 7.

A plain cup shaped cylinder 8 is provided for each plunger 6 each cylinder being adapted to inclose the end of a plunger and slide longitudinally thereon. Any suitable means may be provided to prevent leakage between the walls of the plungers and the

cylinders. In the form shown the exterior of each plunger is accurately finished, and fitted to the finished interior of the cylinders 6, depending merely upon the accuracy of the fit to prevent leakage. When so fitted each plunger also serves as a convenient radial guide and driver to control the position and movement of a cylinder.

Any suitable means may be provided to control the position of the piston 8 upon the plungers 6.

In the form shown the heads or side plates 2 and 3 are rigidly connected and spaced from each by a shell 9 which serves merely as a distance piece to control the relative positions of the heads, and also in the forms shown is provided with a suitable base or feet 9' for mounting my motor upon a foundation.

As shown the head 2 is merely a substantially flat elliptical plate provided with a suitable bearing for the shaft 1 at its central portion, and upon its inner face near its periphery having a suitably formed track or groove 10 the radial distance between said track and the shaft at various points corresponding to the desired positions of the cylinders 8 upon the plungers.

The head 3 is preferably formed of the same general outline as the head 2 and provided in the same manner with a bearing for the shaft 1 and the groove 10 near its periphery; both heads being preferably formed exactly alike except that the head 3 is provided with a cylindrical projection 12 accurately fitted to the interior of the ring 5, and also provided with any desired number of recesses or depressions 14 positioned to periodically communicate with the openings 7 in the plungers 6 as the shaft 1 is rotated.

Any suitable means may be provided upon the cylinders 8 to engage the grooves 10 upon the heads 4. As shown a pair of suitable wheels or rollers 15 are provided upon each cylinder at its opposite sides each wheel adapted to snugly fit a groove 10 in the heads 2 and 3 respectively. The heads 2 and 3 thus serving as portions of the main frame of my device and also as stationary cams in which the groove 10 may be formed of any desired shape to produce the desired movements of the cylinders.

In the form shown in Figs. 1 and 2 the grooves are substantially elliptical thus causing each cylinder to make two complete strokes upon its plunger in each revolution,

this form being especially desirable in explosive engines as in this manner if desired an Otto or four cycle engine may be had in which an explosion occurs in each cylinder at
5 each revolution.

The recesses 14 may be employed for controlling the admission and discharge of the motive fluid to and from the cylinders or for any other purpose desired.

10 In Figs. 1 and 3 in which a reversible explosive engine is shown, the recesses 14 and 14' are employed either for admission or exhaust ports depending upon the direction of motion of the engine and the recess 14'' is
15 employed as an ignition port.

Any suitable means may be employed to connect the depressions 14 and 14' with a suitable supply or motive fluid or with the atmosphere as desired. As shown a suitable
20 valve 16 is provided connected by means of suitable pipes 17 and 18 to the depressions 14 and 14' respectively.

A pipe 19 connects the valve 16 to a suitable supply of fluid for driving the motor and
25 a pipe 20 is provided to conduct away the exhaust. The valve 16 is merely a common four way cock or other suitable device whereby the pipe 19 may be connected either to the pipe 17 or 18 as desired while the pipe 20 is
30 simultaneously connected to the other.

In Fig. 4 a simple form of igniter is shown which may be employed with my device if desired in which a cam 21 is rigidly attached to the shaft 1 and a spring actuated circuit
35 breaker is so positioned that as the shaft 1 rotates an electric circuit from a battery 22 or other source of electric energy is successively completed and broken, each break occurring while an opening 7 is in communication with the recess 14'' thus successively
40 igniting the explosive charge in each cylinder.

In the form shown in Figs. 1 and 2, suppose the shaft is rotating to the left, as each opening 7 passes the recess 14'' the charge
45 in the cylinder 8 is ignited and expands while the cylinder travels outward until it arrives at its extreme outward position and commences upon its inward movement at this point the opening 7 arrives at the exhaust recess 14' permitting the burned gases in the cylinder to escape until the cylinder arrives at the limit of its movement in the opposite direction and the opening 7 after
50 passing the comparatively narrow bridge or partition 23 arrives at the recess 14 just as the cylinder starts upon its second outward stroke thus permitting the cylinder to be filled with the explosive mixture until it reaches the limit of its movement in this direction when the opening 7 reaches the edge
60 of the recess 14 and is closed by the broad bridge 24 while the cylinder travels inward compressing the charge until the cylinder again arrives at the inner limit of its movement when the opening 7 arrives at the re-

cess 14'' and the compressed charge is exploded.

Having thus described my improvement, it is obvious that various immaterial modifications may be made in my device without
70 departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form or construction shown.

What I claim as new, and desire to secure
75 by Letters Patent is:—

1. In a rotary gas engine, a plurality of rigidly connected pistons, adapted to rotate concentrically about a common axis, in combination with a cylinder mounted upon each
80 piston and means for controlling the radial positions of said cylinders.

2. In a rotary gas engine, a plurality of pistons rotating about and rigidly connected to a central shaft, and a cylinder reciprocating radially upon each piston, in combination
85 with means for controlling the radial position of said cylinders, and means for controlling the admission and discharge of fluid to and from said cylinders.

3. In a rotary engine, a plurality of pistons rotating about and rigidly connected to a central shaft, and a cylinder adapted to reciprocate radially upon each piston, in combination with means for controlling the radial
90 position of each cylinder, a port extending radially entirely through each of said pistons and means for directing a fluid into or out of said ports, controlling the flow of fluid therein, and means for successively igniting
95 an inflammable mixture in said ports.

4. In a rotary engine, a shaft, an annular flange concentrically mounted upon said shaft, a plurality of pistons rigidly mounted upon said flange each piston having a longitudinal port extending therethrough, a cylinder fitted upon each piston and adapted to reciprocate radially thereon, and means for controlling the radial movements of said cylinders, in combination with a cylindrical projection positioned within said flange and snugly fitting the interior thereof, a plurality of depressions formed in the periphery of said projection each adapted to successively communicate with the inner end of said ports
105 and means for directing a fluid into or out of a portion of said ports.

5. A rotary engine, comprising a shaft, an annular flange concentrically mounted upon said shaft, a plurality of pistons rigidly
110 mounted upon said flange, each piston having a port extending longitudinally therethrough, a cylinder fitted upon each piston and adapted to reciprocate radially thereon, and means for controlling the radial movements of said cylinders, in combination with a cylindrical projection positioned within said flange and snugly fitting the interior thereof, a plurality of depressions formed in the periphery of said projection and adapted
115 120 125 130

to successively communicate with the inner ends of said ports comprising an admission, an ignition, and an exhaust chamber, fluid conducting means connected to said admission and exhaust chambers and means for producing a spark provided for said ignition chamber.

5 6. In a rotary gas engine, a plurality of radially extended pistons, having formed
0 therein compression and combustion cham-

bers, in combination with radially reciprocating cylinders.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN BRAUNWALDER.

Witnesses:

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