

May 24, 1927.

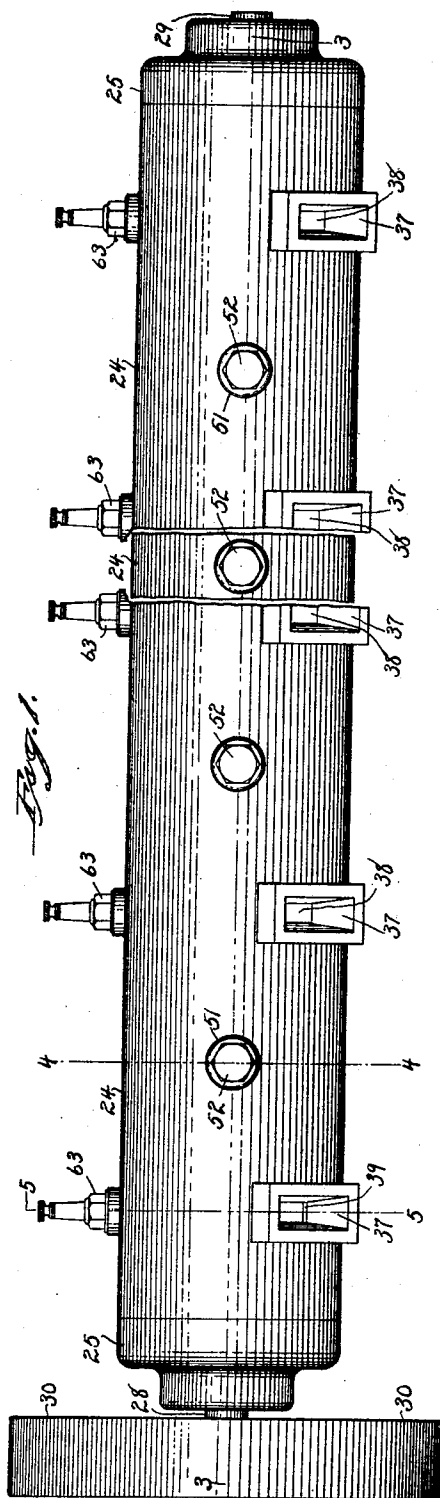
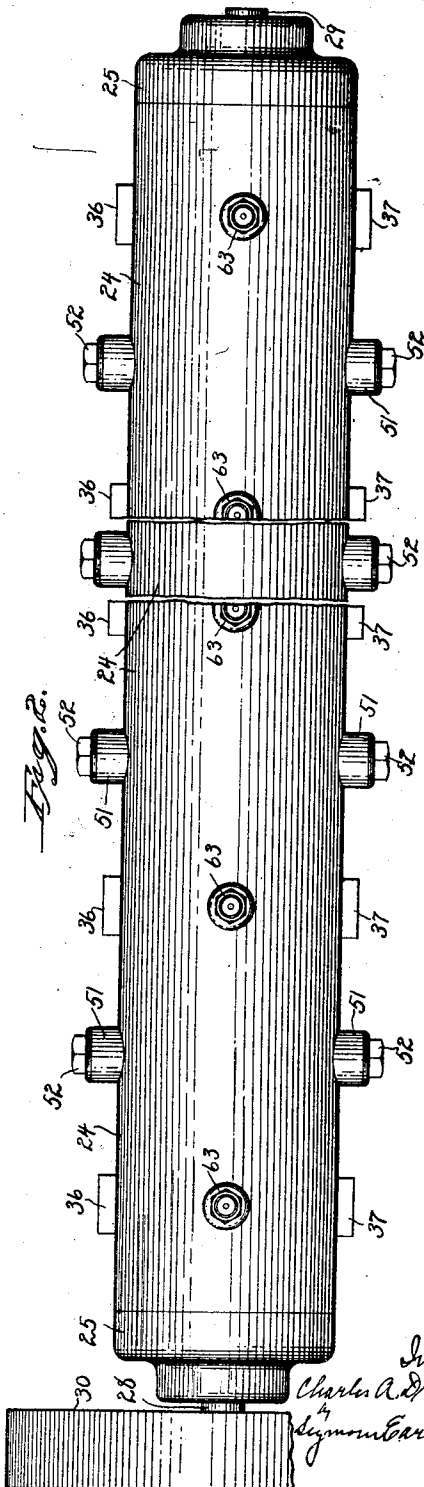
C. A. DREISBACH

1,629,686

ENGINE

Filed Aug. 12, 1926

5 Sheets-Sheet 1



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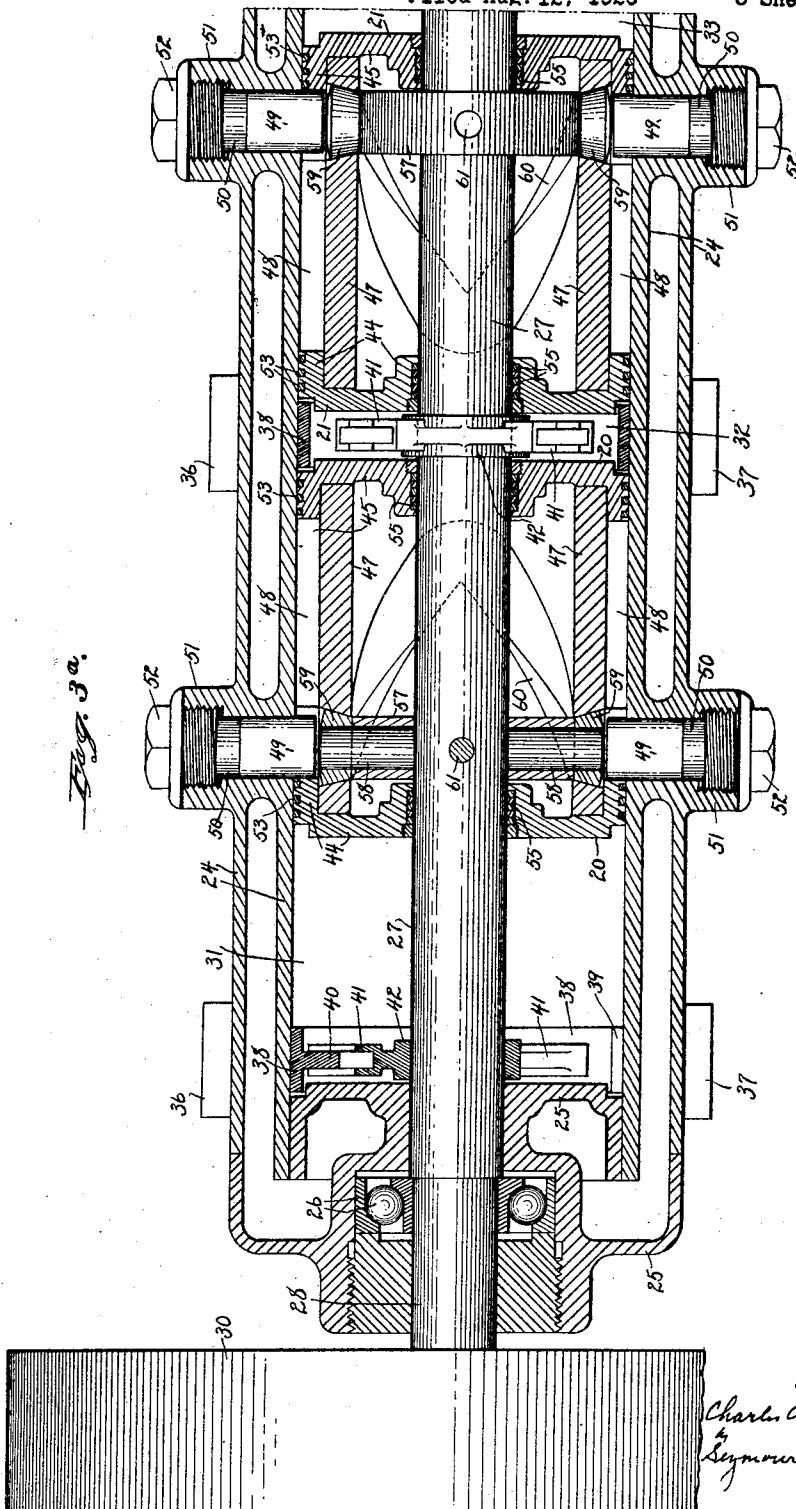
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ENGINE

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5 Sheets-Sheet 2



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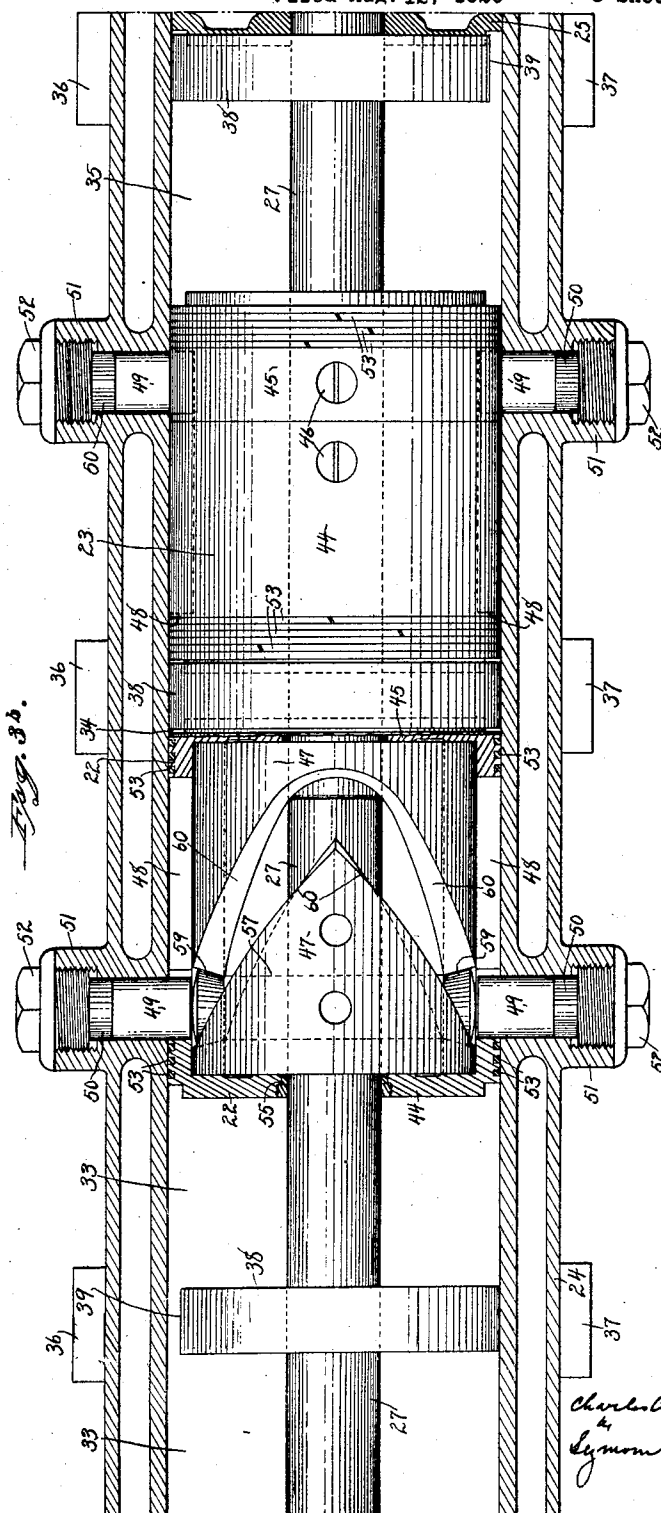
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ENGINE

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5 Sheets-Sheet 3



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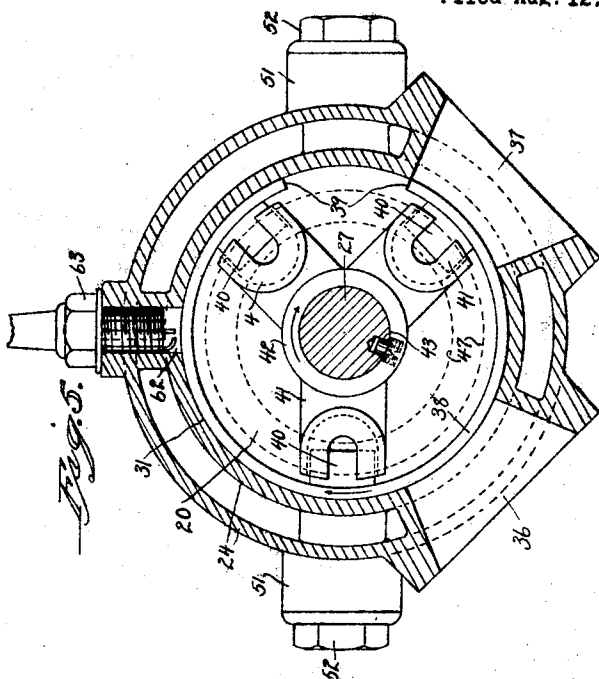
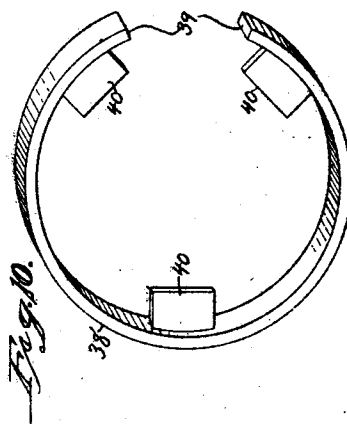
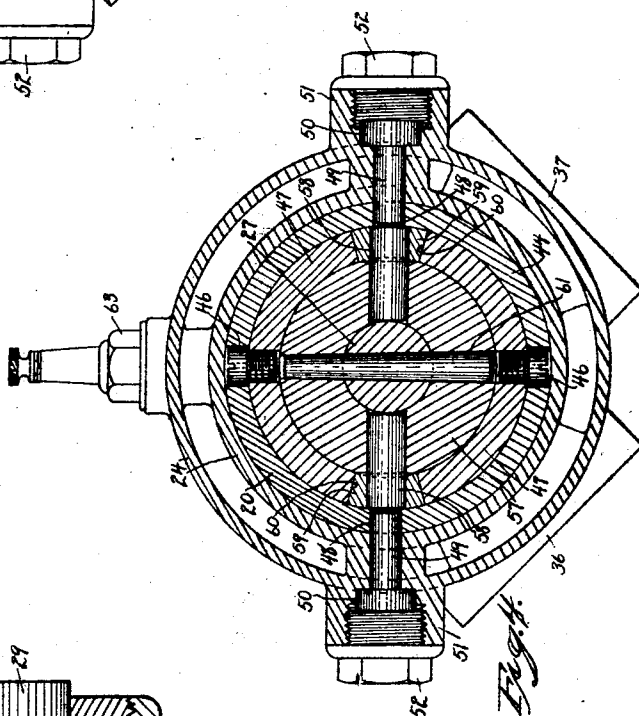
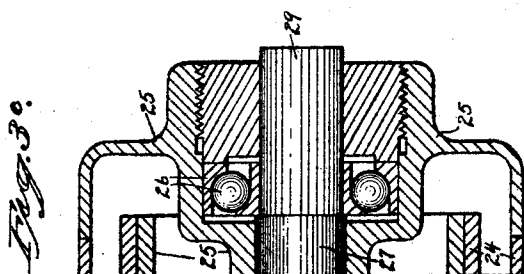
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ENGINE

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5 Sheets-Sheet 4



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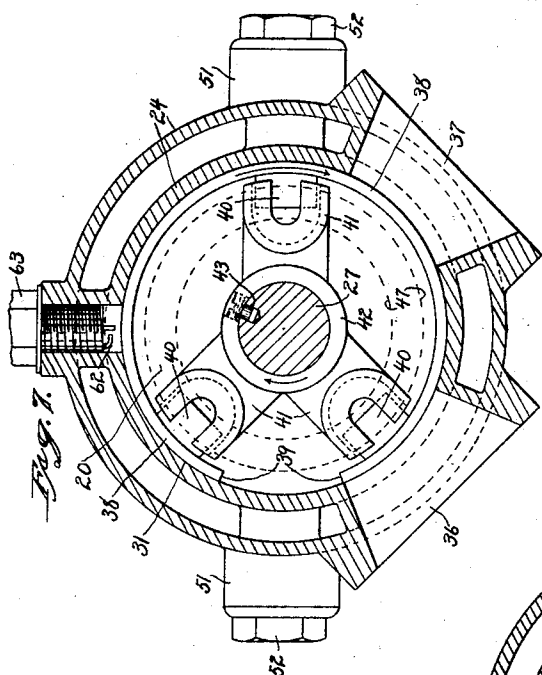
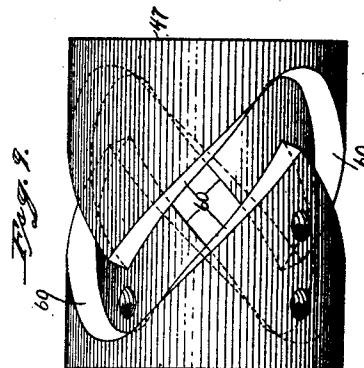
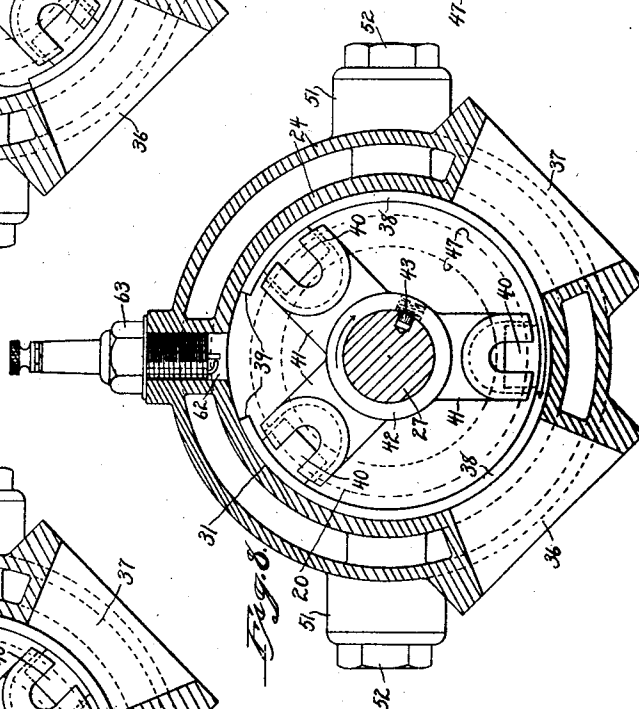
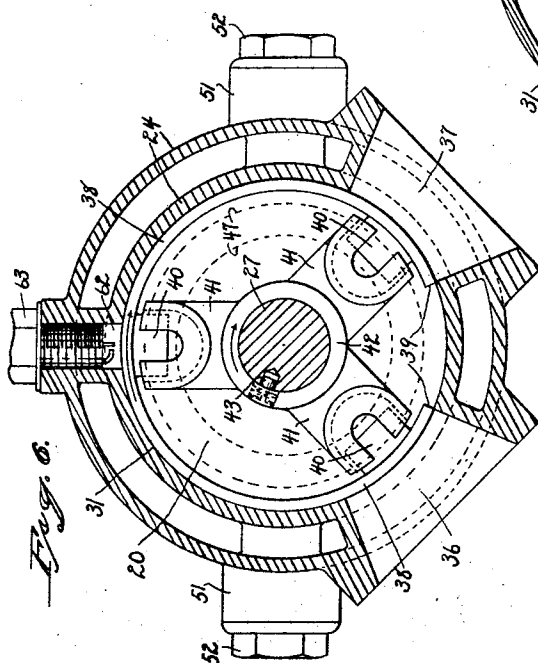
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1,629,686

ENGINE

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5 Sheets-Sheet 5



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Patented May 24, 1927.

1,629,686

UNITED STATES PATENT OFFICE.

CHARLES A. DREISBACH, NEW HAVEN, CONNECTICUT, ASSIGNOR TO DREISBACH MOTORS INC., A CORPORATION OF NEW YORK.

ENGINE.

Application filed August 12, 1926. Serial No. 128,752.

Fig. 1 is a view in side elevation of an internal-combustion engine constructed in accordance with my invention.

Fig. 2 is a top plan thereof;

Fig. 3^a is a longitudinal sectional view on a larger scale, taken on the line 3—3 of Fig. 1, and showing the left hand portion of my improved engine;

Fig. 3^b is a corresponding view of another portion of my improved engine, which lies immediately to the right of the portion shown in Fig. 3^a;

Fig. 3^c is a corresponding view of the remaining or right hand portion of my improved engine;

Fig. 4 is a vertical transverse sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a vertical transverse sectional view on the line 5—5 of Fig. 1 and showing the rotary valve in the position which it would occupy at the conclusion of an "explosion" phase of its cycle, and when it is about to move into its "exhaust" position;

Fig. 6 is a corresponding view but showing the rotary valve in the position which it would occupy at the conclusion of an "exhaust" phase of its cycle, and when it is about to move into its "intake" position;

Fig. 7 is a corresponding view, but showing the rotary valve in the position which it would occupy at the conclusion of an "intake" phase of its cycle and when it is about to move into its "compression" position;

Fig. 8 is a corresponding view, but showing the rotary valve in the position which it would occupy at the conclusion of a "compression" phase of its cycle and when it is about to move into its "explosion" position;

Fig. 9 is a detached view in side elevation of one of the cam-members;

Fig. 10 is a detached perspective view of one of the rotary valves.

This invention relates to an improvement in engines and particularly to engines of the internal-combustion type, though not so limited.

The object of this invention is to produce a simple and reliable engine constructed with particular reference to superior efficiency in use.

With this object in view, my invention consists in an engine characterized by its provision with a plurality of co-axial reciprocating pistons adapted to drive a rotary

shaft which passes through them and to which they are coupled by means secured to the said shaft and co-acting with cam grooves carried by the said pistons.

My invention further consists in an engine characterized as above and having certain other details of construction and combinations of parts as will be hereinafter described and particularly recited in the claims.

In carrying out my invention as herein shown, I employ four corresponding co-axial pistons, 20, 21, 22, 23, reciprocating in a long water-jacketed cylinder 24, provided at each end with cylinder heads 25. Each of the cylinder heads 25 described is provided with an anti-friction bearing 26, of the type commonly known as a combined radial-and-thrust bearing.

Extending centrally through the cylinder 24, as well as through each of the several pistons, is a shaft 27, having slightly reduced ends 28 and 29, which project outward through the bearing 26 and through the cylinder heads 25, as clearly shown in the drawings. The end 28, of the shaft 27 is provided with a fly-wheel 30, designed to function in the same capacity as the similar part of a standard engine.

The positions of the pistons, 20, 21, 22, 23 within the cylinder 24, virtually divides the bore thereof into five combustion chambers, 31, 32, 33, 34, and 35, each of which is provided with an inlet port 36 and an exhaust port 37, alternately open and closed by a rotary ring-like valve 38, which is cut away to form a segmental passage 39, adapted to successively register with the ports 36 and 37.

Each of the said rotary valves is provided with three inward projecting lugs 40, respectively adapted to enter the recessed outer ends of a corresponding number of radial spider-arms 41, projecting outward from a ring 42, secured to the shaft 27, by means of a set-screw 43.

Each of the pistons, 20, 21, 22, 23, previously mentioned, consists of two oppositely facing cup-shaped members 44, 45, secured together to form a unitary structure by means of screws 46, extending inwardly through them into tubular cam-members 47, over which the said cup-shaped members are sleeved.

To prevent the rotation of the pistons and hence limit them to a reciprocating movement, each is formed with two oppositely

located longitudinal slots 48, receiving the flattened inner end 49, of guide pins 50, seated in sockets 51 formed in the cylinder 24, at opposite points thereon and held in place therein by screw plugs 52.

At its opposite ends respectively, each piston is provided on its outer periphery, with a group of piston rings 53, engaging the interior surface of the cylinder 24 and with groups 55 of interior piston rings embracing the shaft 27.

For the purpose of causing the reciprocating movement of the pistons to effect the rotation of the shaft 27, I rigidly mount on the latter, and within each piston, a drive disc 57, provided with two oppositely projecting pins 58, each carrying at its outer end a taper roller 59, fitting snugly in the reversely inclined cam groove 60, in the cam members 47 aforesaid. Each drive disc 57 as shown, is secured to the shaft 27, by means of a taper-pin 61.

As will be seen from Fig. 9 of the drawings, the cam grooves 60, is shaped to insure two complete reciprocations of any given piston, for each complete revolution of the shaft 27.

For the purpose of igniting the explosive mixture, when drawn into and compressed in the combustion chambers, 31, 32, 33, 34 and 35, each of these chambers is provided with a radial passage 62 receiving a spark plug 63 and is located in line with its complementary valve 38, midway between the complementary ports, 36 and 37 as clearly shown in Figs. 5 to 8 inclusive.

For the purpose of describing the operation of my improved engine, it may be assumed that the explosive mixture in the end combustion chambers 31 and 35 have been ignited and the piston 20 has been forced from left to right and the piston 23 forced from right to left with the effect of causing the cam members 47 of the said piston to act through the appropriate rollers 59 and drive discs 57 to impart a rotating movement to the shaft 27. While the action just described is taking place, the mixture previously drawn into the combustion chamber 32 will be compressed between the pistons 20 and 21 preparatory to ignition while a vacuum will be created in the combustion chamber 33 by the separation of the pistons 21 and 22. Meanwhile also, the previously exploded mixture in the chamber 34, will be forced outward through its exhaust port 37 by the approach of pistons 22 and 23, toward each other.

From the foregoing it will be seen that each combustion chamber in turn has drawn into it a charge of combustible mixture, where it is in turn compressed, exploded and exhausted. It will also be noted that each piston completes one cycle of four phases namely, in-take, compression, explo-

sion and exhaust, once for each revolution of the shaft 27.

I claim—

1. An engine comprising a cylinder, a plurality of co-axial reciprocating pistons located therein, means of limiting the said pistons to movement in a rectilinear path, a rotary shaft extending centrally through said pistons, helical cam grooves having reversely inclined reaches located within the said pistons, and transmission members secured to the said rotary shaft and engaging the said cam grooves whereby the rectilinear movement of the pistons acts to rotate the shaft.

2. An engine comprising a cylinder, a plurality of co-axial reciprocating pistons located therein, means for limiting the said pistons to movement in a rectilinear path, a rotary shaft extending centrally through said pistons, cam members carried by said pistons within the same and formed with helical cam grooves having reversely inclined reaches and transmission members secured to the said rotary shaft and engaging the said cam grooves whereby the rectilinear movement of the pistons acts to rotate the shaft.

3. An engine, comprising a cylinder, a plurality of co-axial reciprocating pistons located therein, means for limiting the said pistons to movement in a rectilinear path, a rotary shaft extending centrally through said piston, seals between the said pistons and rotary shaft and between said pistons and cylinder wall, helical cam-grooves having reversely inclined reaches located within said pistons and transmission members secured to the said rotary shaft and engaging the said cam-grooves whereby the rectilinear movement of the pistons acts to rotate the shaft.

4. An engine comprising a cylinder with a plurality of intake and exhaust ports, a plurality of co-axial reciprocating pistons located therein, means for limiting the said pistons to movement in a rectilinear path, a plurality of rotary valves also located in the said cylinder for covering and uncovering the said intake and exhaust ports, a rotary shaft extending centrally through said pistons, cam members carried by said pistons within the same and formed with helical cam grooves having reversely inclined reaches, and transmission members secured to the said rotary shaft and engaging the said cam grooves whereby the rectilinear movement of the pistons acts to rotate the shaft.

5. An engine comprising a cylinder, a plurality of co-axial reciprocating pistons located therein in such a manner as to virtually divide the same into a series of combustion chambers, intake and exhaust ports for the said chambers, means for limiting

the said pistons to movement in a rectilinear path, a rotary shaft extending centrally through said pistons, cam members carried by said pistons within the same and formed with helical cam grooves having reversely inclined reaches, and transmission members secured to the said rotary shaft and engaging the said cam grooves whereby the rectilinear movement of the pistons acts to rotate the shaft.

6. An engine comprising a cylinder, a plurality of co-axial reciprocating pistons

located therein in such a manner as to virtually divide the same into a series of combustion chambers, intake and exhaust ports for the said chambers, means for limiting the said pistons to movement in a rectilinear path, a rotary shaft extending centrally through said pistons, rotary valves located in said combustion chambers for covering and uncovering the said ports.

In testimony whereof, I have signed this specification.

CHARLES A. DREISBACH.