No. 859,848. PATENTED JULY 9, 1907.

A. W. SHEPHERD.

ROTARY ENGINE.

APPLICATION FILED SEPT. 26, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

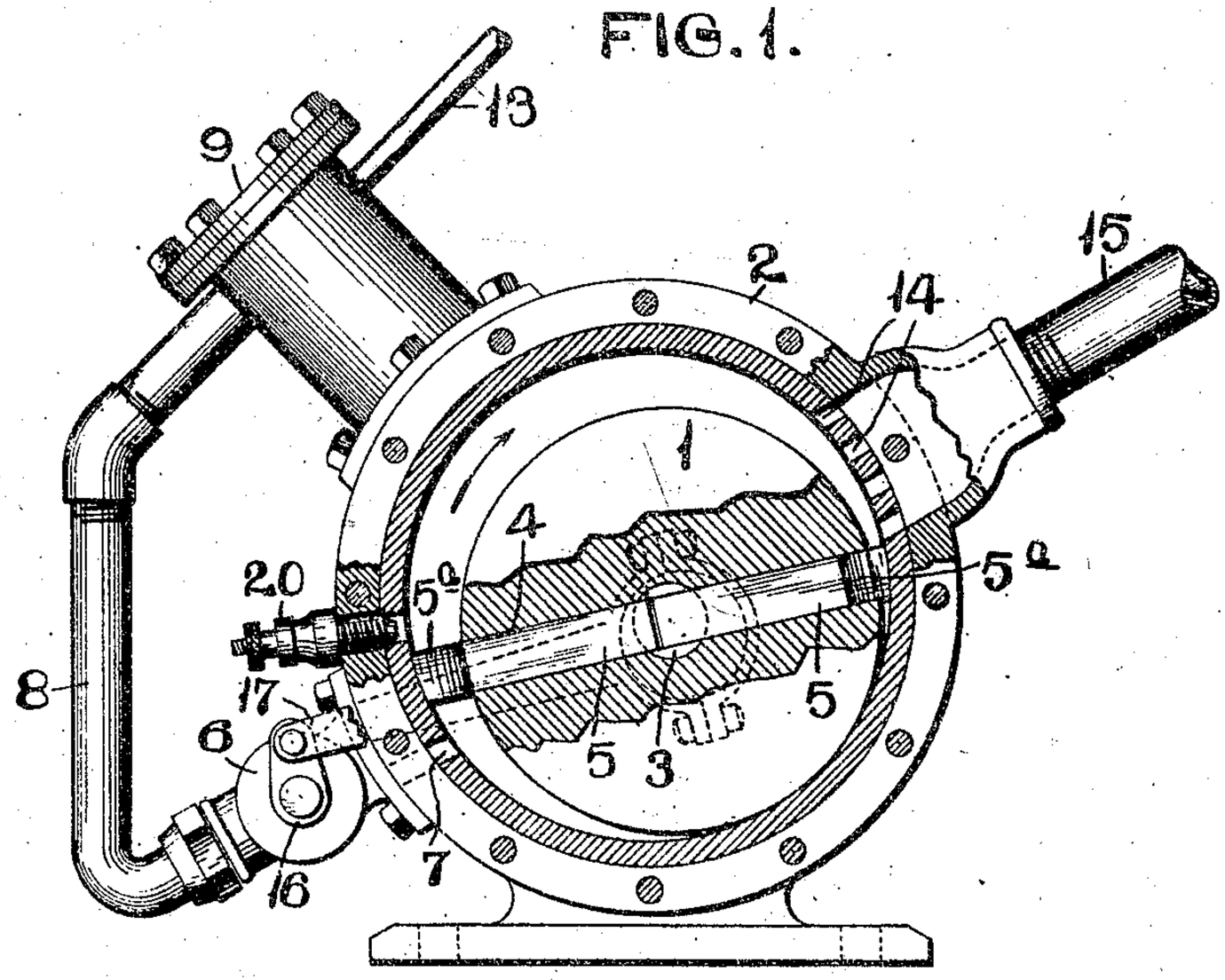
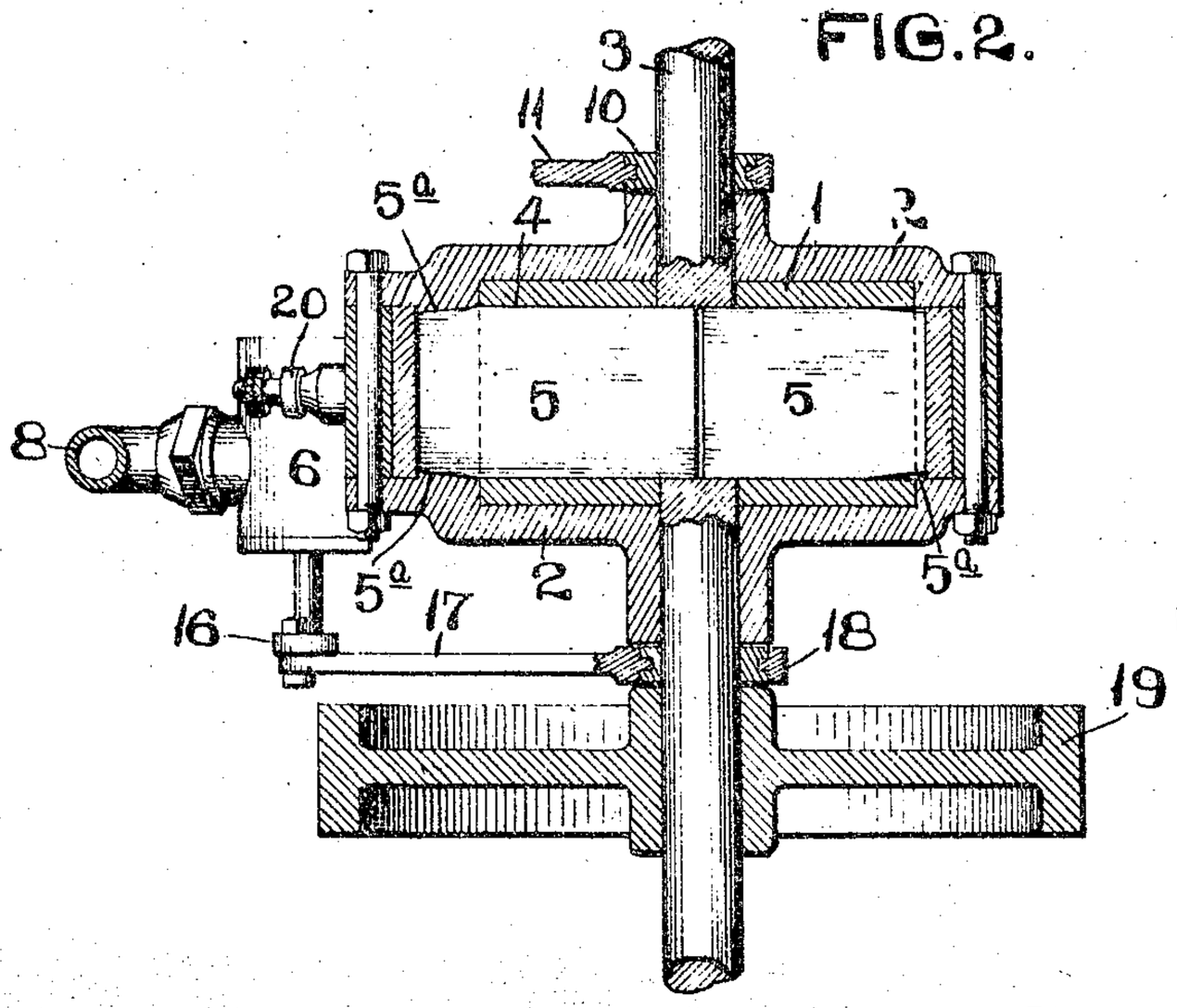


FIG. 2.



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2 SHEETS—SHEET 2

FIG. 3.

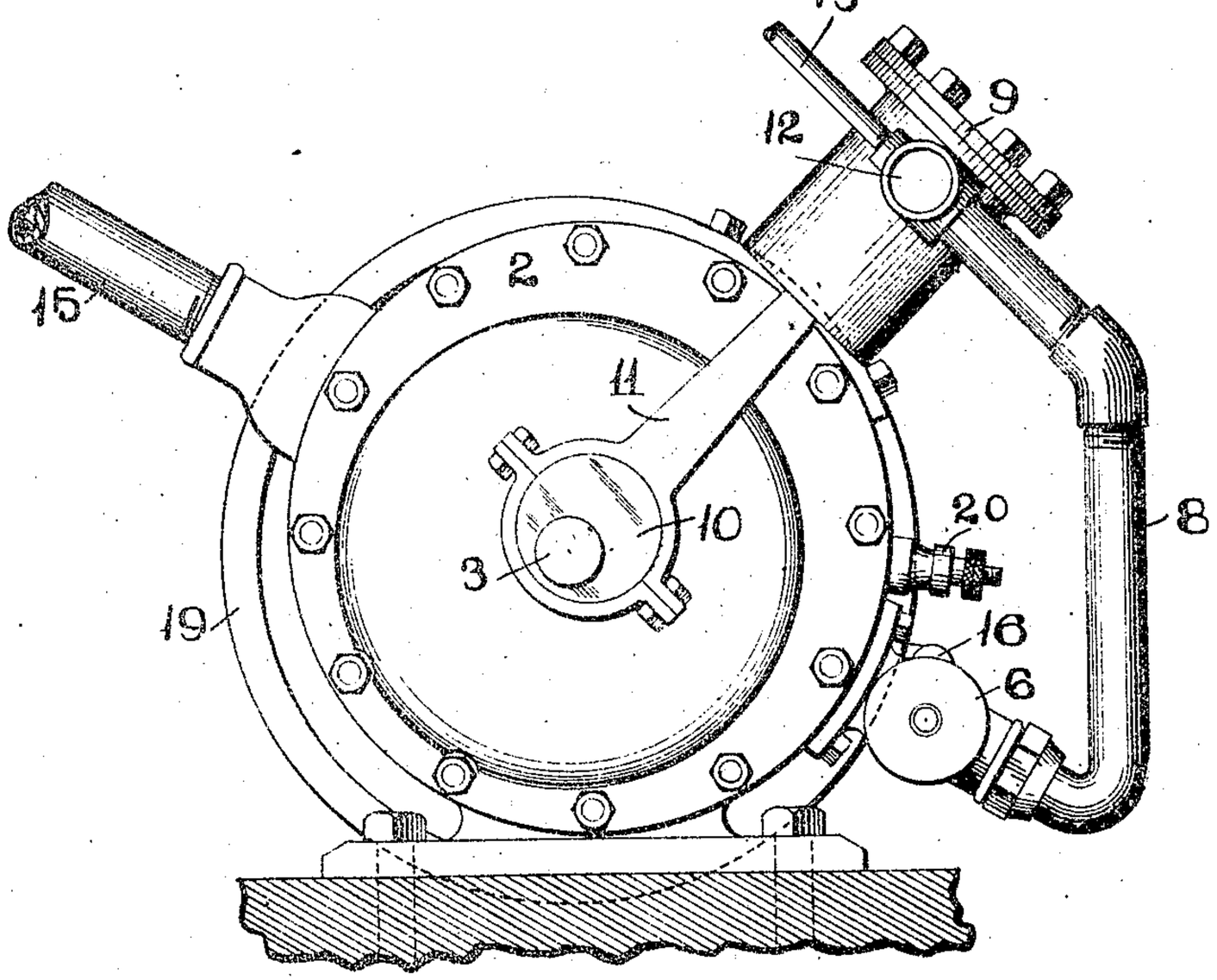
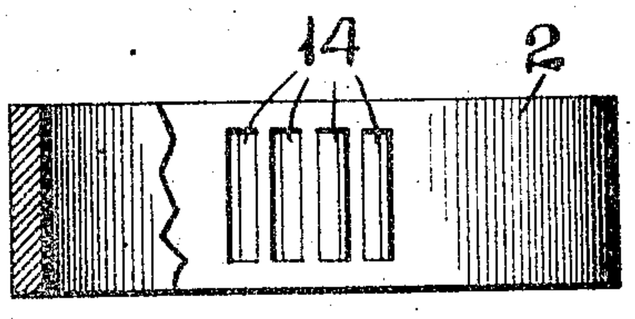


FIG. 4.



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ROTARY ENGINE.

No. 859,848. Specification of Letters Patent. Patented July 9, 1907.

Application filed September 26, 1905. Serial No. 280,187.

To all whom it may concern:

Be it known that I, ARTHUR W. SHEPHERD, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved rotary engine of that class wherein a drum is mounted eccentrically within the cylinder and carries a double-ended piston which slides diametrically through said drum, and the ends of which engage the walls of the cylinder.

My invention consists in the novel construction hereinafter shown, described and claimed.

The object of my invention is to provide an improved rotary engine of the class above mentioned, which shall possess certain points of superiority and simplicity, and which shall be adapted for use as a steam engine, a gas engine, a pump, or as a muffler for steam engines or gas engines.

In the drawings—Figure 1 is a sectional side elevation of an engine embodying my invention. Fig. 2 is a sectional plan view thereof. Fig. 3 is a side elevation of same. Fig. 4 is a detail view of the inner periphery of the cylinder, illustrating the exhaust-ports.

The drum 1 is mounted eccentrically within the cylinder 2, upon the stub-shafts 3, which latter have suitable bearings in the opposite heads of the said cylinder. Said drum 1 has formed in it a guide-slot 4 which extends diametrically across the same, and within said guide-slot are two equal sized plates that form a double-ended piston 5 which slides back and forth so that the outer ends will engage the walls of said cylinder and form a comparatively tight joint therewith.

The double-ended piston is made in two parts in order that during its rotation the centrifugal motion will throw the two parts of said piston outwardly, and thus automatically form a tight joint with the entire periphery of the cylinder. The inner side walls of the cylinder that are not covered by the sides of the drum 1 are slightly inclined, as indicated by 5^a, and the sides of the outer ends of the piston 5 are correspondingly beveled, in order to form a comparatively tight joint against the inclined faces 5^a.

6 indicates a common rocking-valve, the casing of which is fixed upon the cylinder 2 and communicates with the interior of the cylinder by means of an induction-port 7. In case my engine is to be used as a steam engine, the pipe 8 should extend from said valve 6 to a suitable steam-boiler. In case the device is to be used as a gas engine or gasolene engine, said pipe 8 is extended, as shown, to a common piston-pump 9 within which reciprocates the usual piston, which is operated by an eccentric 10 fixed upon one of the stub-shafts 3 at one side of the cylinder, and said eccentric is connected to the piston of said pump by means of the usual eccentric-rod 11. Said pump 9 is adapted to compress the explosive charge previous to its entrance to the cylinder 2, which takes place through the said pipe 8, valve 6 and port 7. The mixture of gas and air, or of gasolene and air, or other hydro-carbon explosive mixture, is supplied to the said pump 9 by means of any common mixing-valve 12, with which is connected a supply-pipe 13.

Diametrically opposite the induction port 7 is formed, in the cylinder wall, a series of exhaust-ports 14 which discharge into an exhaust-pipe 15. Motion is communicated to the valve 6 by means of the rocker-arm 16 and an eccentric-rod 17 which is connected to an eccentric 18 fixed upon the stub-shaft on the opposite side of the cylinder from that on which the eccentric 10 is located.

19 indicates a common fly-wheel fixed upon the stub-shaft exterior of the eccentric 18.

20 indicates the usual spark-plug for igniting the charge in the customary manner.

The operation is as follows: I will first describe the operation of the device as a steam engine. Steam entering the port 7, passes into the cylinder and fills the space inclosed by the drum 1, the projecting end of the piston 5 and the adjacent cylinder wall, and forces the piston in the direction indicated by the arrow in Fig. 1, and said piston of course carries with it the drum 1, the stub-shafts 3 and all parts carried thereby Movement of the piston continues until it reaches the exhaust-ports 14, when the contents of the cylinder are discharged through the said ports and pass off by way of the exhaust-pipe 15. Immediately after the termination of this action, the opposite end of said piston passes the induction-port 7 and receives the force of the incoming steam, and so on. When my device is operated as a gas engine or gasolene engine, the explosive mixture is first compressed within the pump 9, and then admitted to the pipe 8, the valve 6 and port 7, and to the space behind the projecting end of the piston 5, and is then fired by the spark formed between the points of the spark-plug 20, and the piston will thus be caused to rotate in the manner previously described. In case of small gas engines, where earlier ignition is required, I locate the spark-plug 20 at a point below the induction-port 7. When my device is to be used as a pump, the pump 9 and valve 6 will of course be dispensed with, and it will only be necessary to impart motion to the stub-shafts 3, when the fluid to be pumped will be drawn into the cylinder by way of the port 7, and discharged through the ports 14. When my device is to be used as a muffler for gas engines, especially upon automobiles, the exhaust gases from the automobile engines are discharged into the cylinder 2 through the pipe 8 and port 7, and

they will act as steam and move the piston in the manner previously described, and thereby generate power by the action of said exhaust gases; and the noise usually produced by the discharge of said exhaust gases will also be muffled by its discharge into the cylinder 2.

I claim:

A rotary engine, comprising a cylinder in which is formed a circular opening, a drum eccentrically arranged for rotation in the cylinder, the exposed inner faces of the side walls of the cylinder being inclined, there being a diametrically arranged opening formed through the drum, a piston formed in two parts arranged to slide through said opening, the side faces of the outer ends of said piston being inclined to engage the inclined faces on the sides of the cylinder, there being induction and exhaust ports formed through the body of the cylinder on opposite sides thereof, a compression pump mounted on the cylinder, means whereby said compression pump is operated when the engine is in operation, a tubular connection from the compression pump to the induction port, a valve arranged in said tubular connection, and means operated by the engine whereby said valve is opened to allow fluid under pressure to pass into the cylinder.

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

ARTHUR W. SHEPHERD.

Witnesses:

M. P. SMITH,

E. L. WALLACE.