No. 864,273.

PATENTED AUG. 27, 1907.

W. H. THOMPSON, JR.

COMBINATION ENGINE.

APPLICATION FILED FEB. 11, 1907.

3 SHEETS—SHEET 1.

FIG. 1

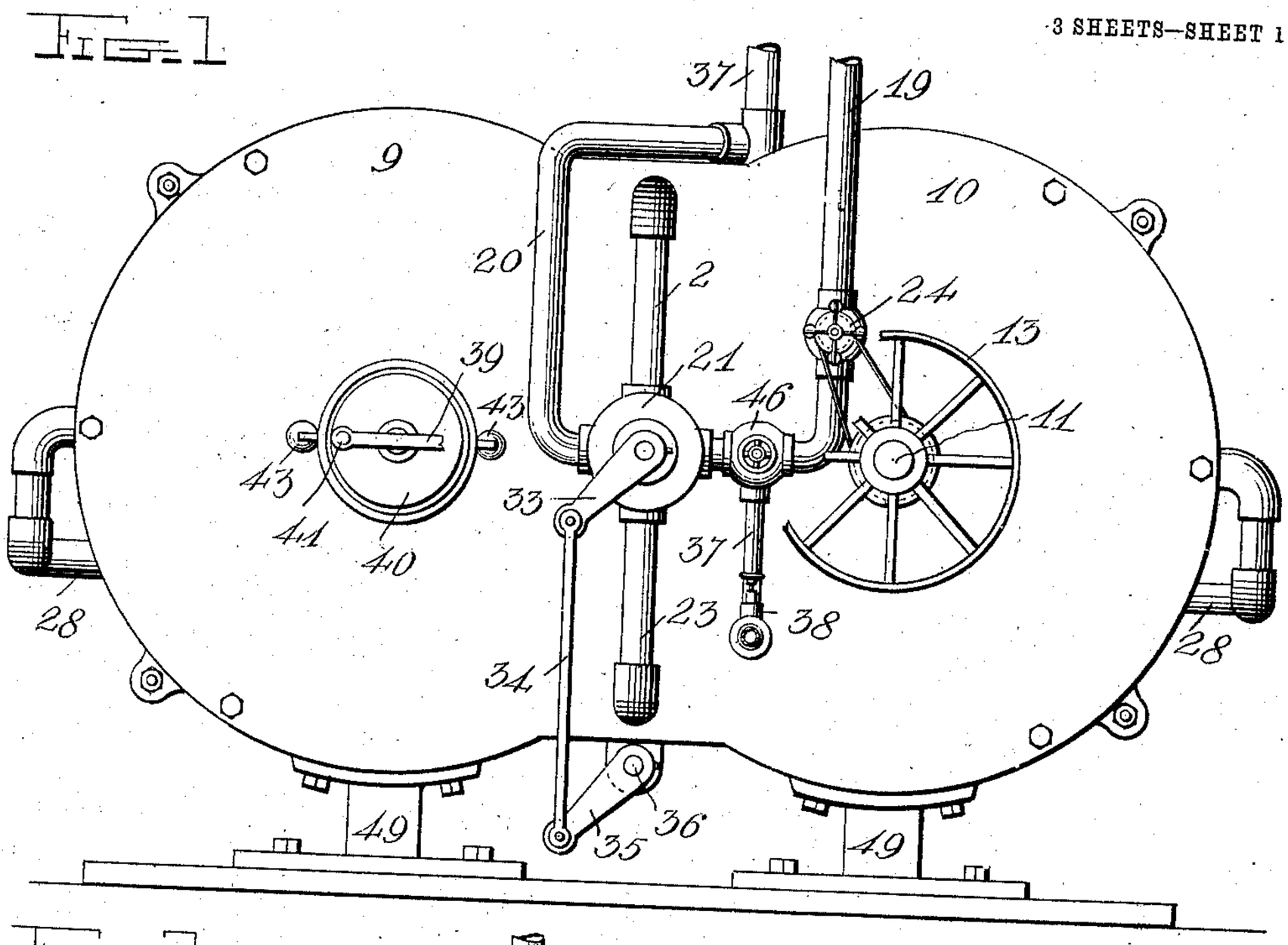
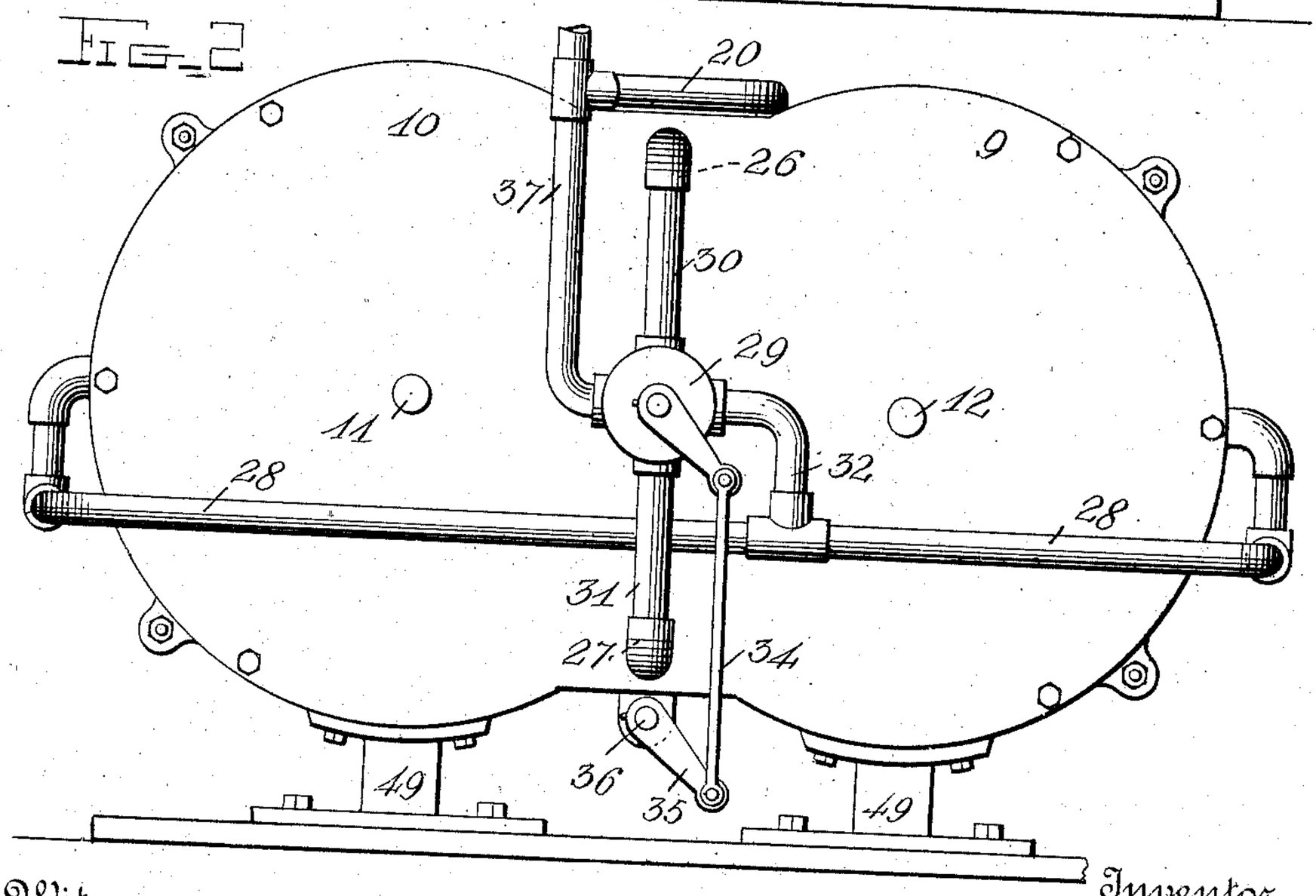


FIG. 2



Witnesses

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3 SHEETS—SHEET 2.

FIG. 4

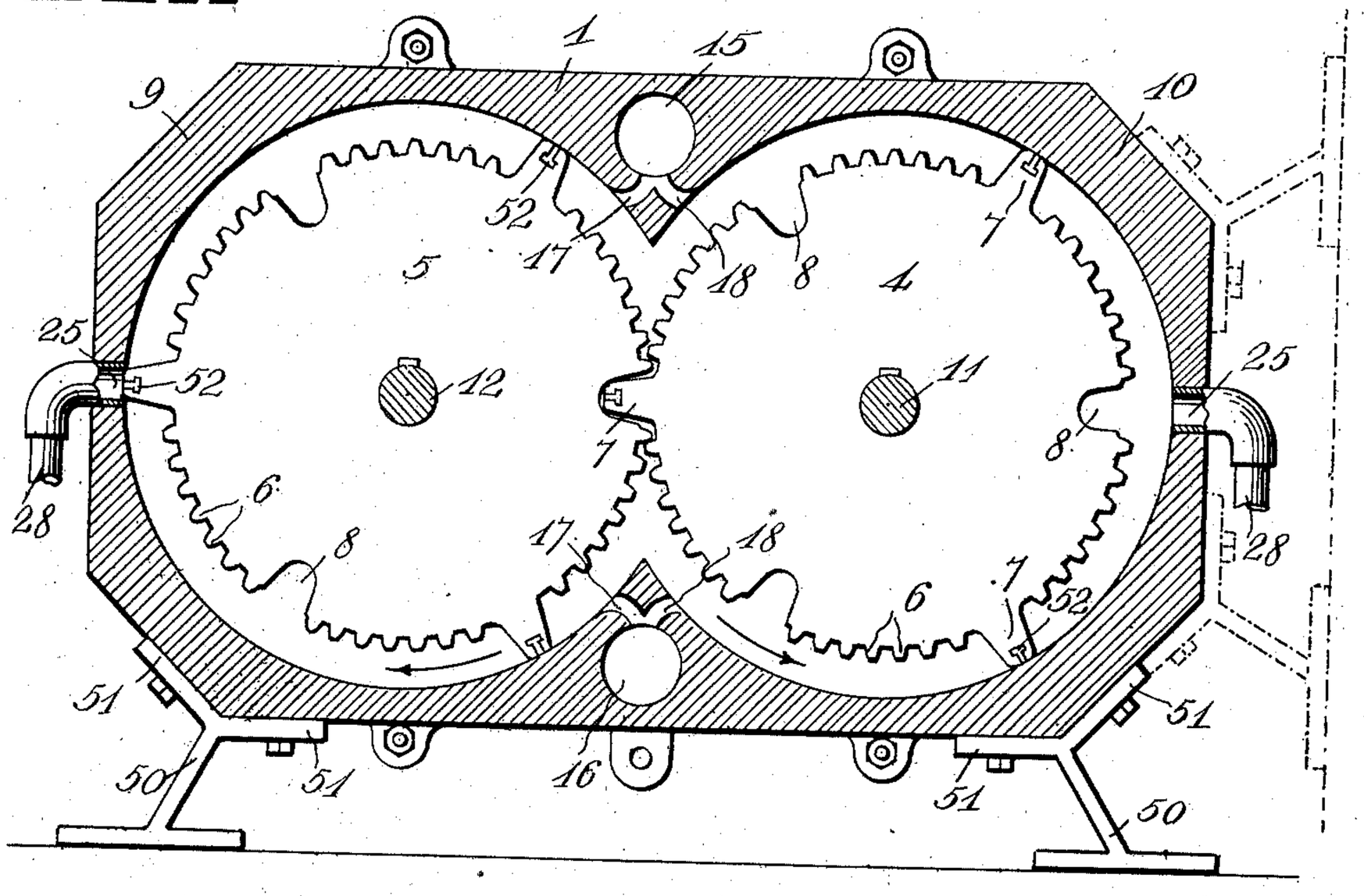
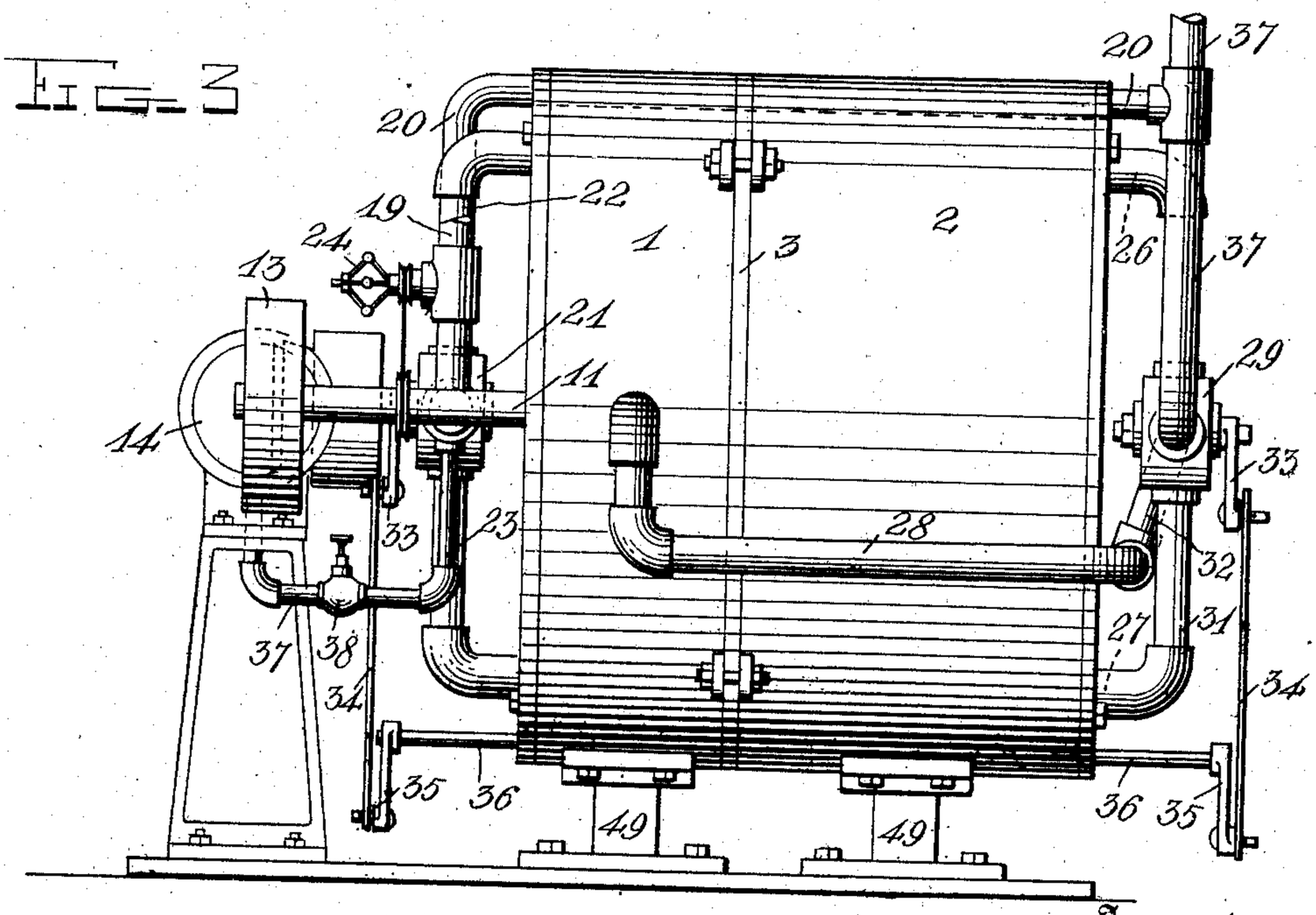


FIG. 3



Witnesses

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3 SHEETS—SHEET 3.

FIG. 5

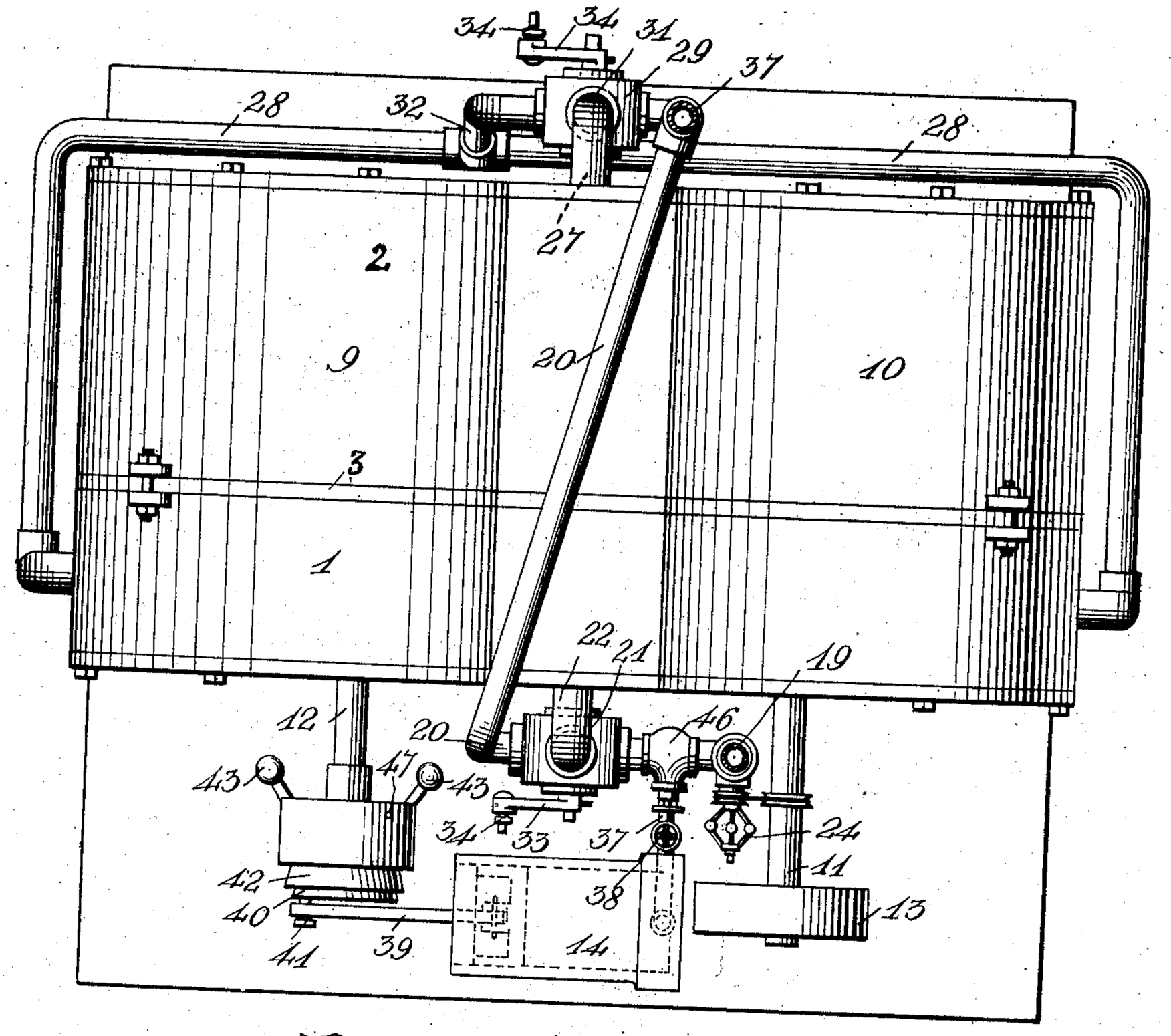


FIG. 6

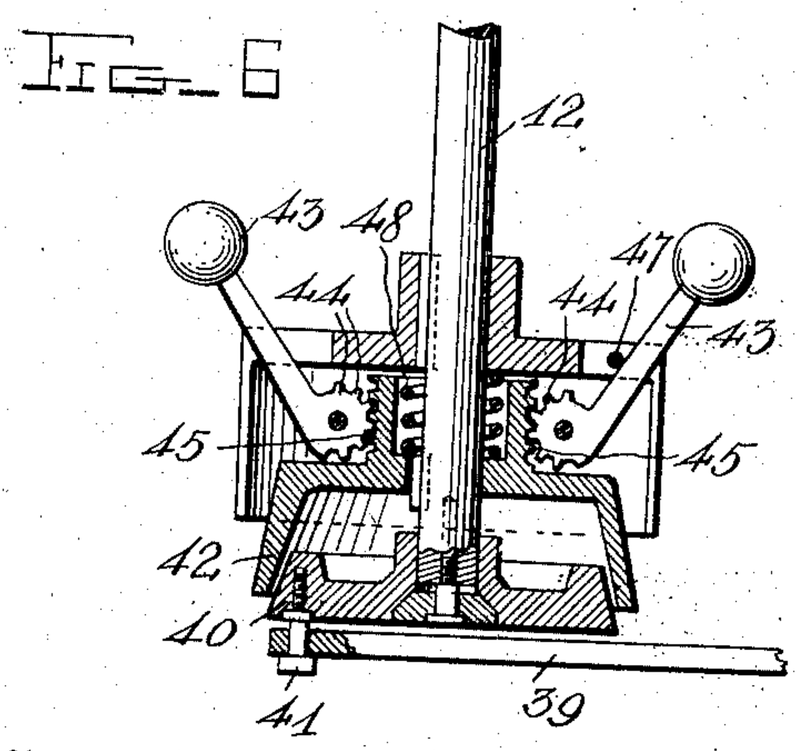
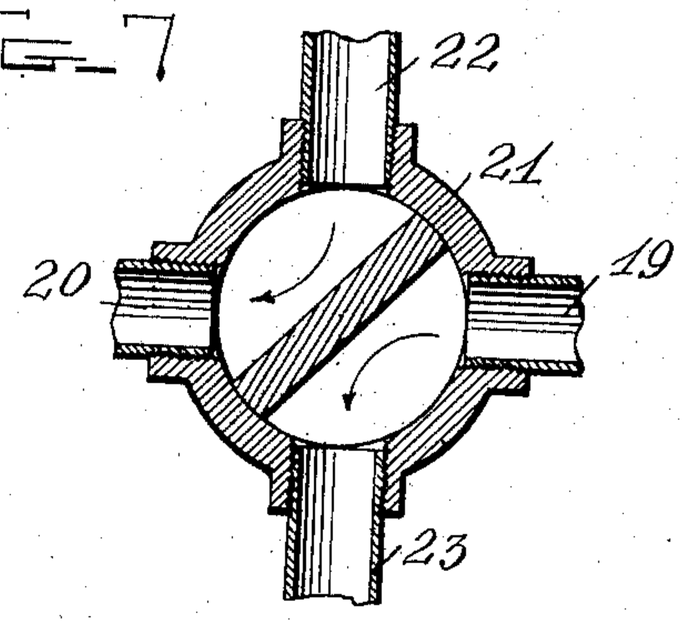


FIG. 7



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. THOMPSON, JR., OF BONNERS FERRY, IDAHO.

COMBINATION-ENGINE.

No. 864,273. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed February 11, 1907. Serial No. 356,919.

To all whom it may concern:

Be it known that I, WILLIAM H. THOMPSON, Jr., a citizen of the United States, residing at Bonners Ferry, in the county of Kootenai and State of Idaho, have invented certain new and useful Improvements in Combination-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to engines, and more particularly to that class of such devices which are known as "rotary engines", and are adapted to be run by steam, compressed air, or liquids, as water; but in addition to actuating the engine in this manner, I also provide means whereby the rotary members may be actuated by means of an explosive engine, as one using gasolene, etc., thereby permitting of the use of gasolene in case of accident to the steam boiler or other power producing mechanism.

With these ends in view, the invention consists in the improved construction and novel arrangement of parts of the same, as will be hereinafter more particularly set forth.

In the accompanying drawings which illustrate the invention,—Figure 1 is a front elevation of the engine, some of the parts being omitted to avoid confusion; Fig. 2 is a rear view of the same; Fig. 3 is a side or edge view of Fig. 1; Fig. 4 is a longitudinal sectional view through the rotary mechanism; Fig. 5 is a top plan view showing a gasolene engine in outline and the means of connecting it with the rotary mechanism of the engine proper; Fig. 6 is a detail view of the clutch mechanism for connecting the gasolene engine with the rotary mechanism; Fig. 7 is a detail view of the reversing mechanism for the steam engine.

Referring more particularly to the drawings,— 1 and 2 indicate the casings, respectively, of a rotary engine, which are preferably secured directly together, side by side, with a suitable partition 3 between them.

Rotatably mounted within each casing is a pair of rotary members 4 and 5, only one pair of which is shown, as in Fig. 4, the other members being exact duplicates except where the engine is used as a compound engine, when the pair of members in the second or exhaust casing 2 are longer than those in the first or primary casing 1, to compensate for the expanded condition of the steam after its having passed through the primary casing.

The members of each pair are preferably toothed or corrugated upon their peripheries, as shown at 6, so as to rotate in unison, and each of them is provided with alternately arranged projections 7 and depressions 8, which are adapted to coincide as the members are rotated, with the projections of one member entering the depressions or recesses, of the other members. The members are mounted axially within the respective portions 9 and 10 of the casings by means of shafts 11 and 12 which project beyond one side of the casing in position to transmit power, as by means of the fly wheel 13 on the shaft 11, or receive the power, as from the gasolene engine 14, which is adapted to be detachably connected with the shaft 12.

The chambers or compartments 9 and 10 of the casings communicate with each other at a point coincident with the contacting portions of the members, and the casings are preferably contracted or bent inward at those points so as to cause the casing to lie as close as possible to the peripheries of the members, whereby the projections 7 will engage therewith, and prevent the escape of steam as it enters from the ports or inlets 15 and 16, respectively. The inner ends of said ports or inlets are preferably bifurcated or divided, as shown at 17 and 18, so as to facilitate the entrance or exit of the steam, as the case may be.

The ports 15 and 16 communicate respectively with the supply pipe 19 and the exhaust 20 through a four-way valve 21, which is mounted substantially between said ports and connected therewith by means of pipes 22 and 23. The supply pipe 19 is provided with an ordinary throttle, preferably controlled by any suitable governor 24, whereby the engine is run at a regular rate of speed in either direction according to the position that the valve 21 occupies in relation to the ports 15 and 16.

In the drawings the engine is shown as receiving steam through the port 16, which communicates with the supply pipe 19, and when used as a single acting or non-compound engine exhausting through the port 15, which communicates with the exhaust 20. This will cause the members to rotate in the direction indicated by the arrows in Fig. 4.

When the engine is used as a compound engine, as in the present instance, the casing 1 is provided with two diametrically oppositely located ports or openings 25, which communicate with ports 26 and 27 in the casing 2, through steam pipes 28 and a four-way valve 29, which is similar to the valve 21, and communicates with said ports by means of pipes 30 and 31 and with the pipes 28 by means of a pipe 32. By locating the openings 25 in this manner, the pressure from the steam when entering from either port will be cut off from said inlet port before the other projection passes the opening and thereby all back pressure from the low pressure cylinder to the high pressure pistons will be prevented.

The valve 21 is provided with a handle or lever 33

by means of which it may be rotated to cause the engine to run in either direction, and where the engine is compound, the valve 29 is connected with the valve 21 so as to be rotated synchronously therewith by means of links 34 and arms 35 upon a rock shaft 36, which extends transversely of the casing from one side to the other, and the exhaust pipe 20 is connected with the exhaust pipe 37 leading from the second or compound engine.

As above described, it will be seen that by properly adjusting the four-way valves, the engine can be rotated in either direction and the power generated thereby can be transmitted through the shaft 11 and fly wheel 13. But in case of a desire for any reason to operate the engine by other means than the steam, compressed air, or liquid, as above described, motion can be transmitted to the fly wheel 13 through the members on the shafts 11 and 12, by applying power to the shaft 12, as by means of the gasolene engine 14.

The gasolene engine may be of any desired construction and is adapted to have its inlet connected with the supply pipe 19 in any desired manner, as by means of a pipe 37, which is provided with a suitable check valve 38.

The piston head of the engine is provided with the usual pitman 39, which is connected with a disk or clutch member 40 by means of a wrist pin 41. The disk 40 is loosely secured to the outer end of the shaft 12, and is adapted to be engaged by a clutch member 42, which is loosely mounted on said shaft, and is adapted to be moved back and forth by means of suitable actuating mechanism, as weighted levers 43, which have their inner ends toothed, as shown at 44, so as to engage with corresponding teeth 45 on the stem of the clutch member 42. The stem is non-rotatably secured to the shaft by the ordinary slot and feather.

When it is desired to use the gasolene engine in place of the steam, or other power, as heretofore described, a suitable three-way valve 46 in the supply pipe 19 is turned so as to close communication between the engine and the source of steam supply and to open communication between the engine and a suitable supply of gasolene or other explosive mixture. The clutch members are thrown into engagement, as by removing a pin 47, or other locking device, which will permit the weights on the levers 43 to move inward toward the shaft 12 in case said shaft is located vertically. Or the arms 43 may be moved inward by means of springs, as shown in full lines at 48, in Fig. 6, when the engine is occupying any other position, or even when the shaft is occupying a vertical position.

It will be evident that with the gasolene engine connected in this manner, as soon as it is rotated in either direction, the motion will be transmitted through the clutch mechanism to the shaft 12, and thence through the members 4 and 5 to the shaft 11, and finally to the fly wheel 13, from which power can be transmitted in the same manner as though the members 4 and 5 were actuated or driven by the introduction of the steam or other fluid through the casing, as heretofore described. When the gasolene engine is to be dispensed with, the clutch mechanism is disconnected and locked in that position, which will thereby disconnect the engine from the shaft and the valve 47 is rotated so as to re-establish communication between the engine casing and the source of steam supply and to close the pipe leading to the engine.

Although the casing may be of any desired construction, as circular, in Figs. 1, 2, and 3, and be supported upon legs 49, as shown in Fig. 3, I prefer to form it substantially rectangular, as shown in Fig. 4, with the corners cut off and the legs 50 provided with arms 51, which are adapted to be secured thereto so as to hold the casing horizontal or by reversing one of the legs and securing the other one to the same end of the casing, as shown in dotted lines in Fig. 4, the casing may be supported in a vertical position instead of horizontal, thereby adapting it for use where floor space is small.

By constructing an engine as above described, it is evident that it can be made very compact, and that where steam is used it can be passed through both casings, and thereby secure the fullest efficiency with the least possible waste.

The engine can be run in either direction by simply rotating the four-way valve, and it can be converted from a steam or other fluid engine to a gasolene driven engine by simply turning the valve in the supply pipe to provide the necessary explosive mixture and connecting the gasolene engine with the rotary parts of the steam engine.

The outer edges of the projections of the rotary members are provided with the usual wearing surfaces 52 to compensate for the wear that ordinarily takes place at those points.

Having described my invention, I claim:—

1. In a rotary engine, intermeshing rotary members provided with means for transmitting power, means for actuating said members by a fluid medium, a motor detachably connected with one of said members, and means for supplying said motor with an actuating medium.

2. In a rotary engine, intermeshing rotary members provided with means for transmitting power, means for actuating said members by a fluid medium, clutch mechanism connected with one of said members, and an independent motor connected with said clutch mechanism.

3. In a rotary engine, intermeshing rotary members provided with means for transmitting power, means for actuating said members by a fluid medium, clutch mechanism on the shaft of one of said members, an independent motor connected with said clutch mechanism, means for locking said clutch mechanism in its inoperative position, and means for providing said motor with an actuating medium.

4. In a rotary engine, a casing provided with intermeshing rotary members, a supply pipe, a motor detachably connected with one of said members, a pipe leading from the supply pipe to said motor, and a valve in said pipe adapted to control the communication from the supply pipe to the casing and to the motor, as desired.

5. In a rotary engine, a double compartment casing provided with two pairs of intermeshing rotary members, each compartment being provided with ports, four-way valves for establishing communication with said ports, pipes leading from one casing to the four-way valve of the other casing, and means for rotating said valves in unison.

6. In a rotary engine, a double compartment casing, intermeshing rotary members mounted in each compartment, ports in the casing for each compartment, a four-way valve for the ports of each compartment, a supply pipe for one of the casings, and an exhaust pipe for the other, a pipe leading from diametrically opposite sides of the casing having the inlet and communicating with

the four-way valve of the casing having the outlet, a handle for each valve, and means for moving said handles and valves in unison.

7. In a compound rotary engine, a double compartment casing, one of said casings, being larger than the other, a four-way valve for each casing, pipes leading from diametrically opposite sides of the small casing to the valve of the larger casing, a handle for each valve, a shaft mounted transversely of the casing and provided with an arm at each end, and links for connecting said handles with said arms.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM H. THOMPSON, JR.

Witnesses:
WILLIAM P. MAHONEY,
OSCAR J. BANDELIN.