

No. 610,783.

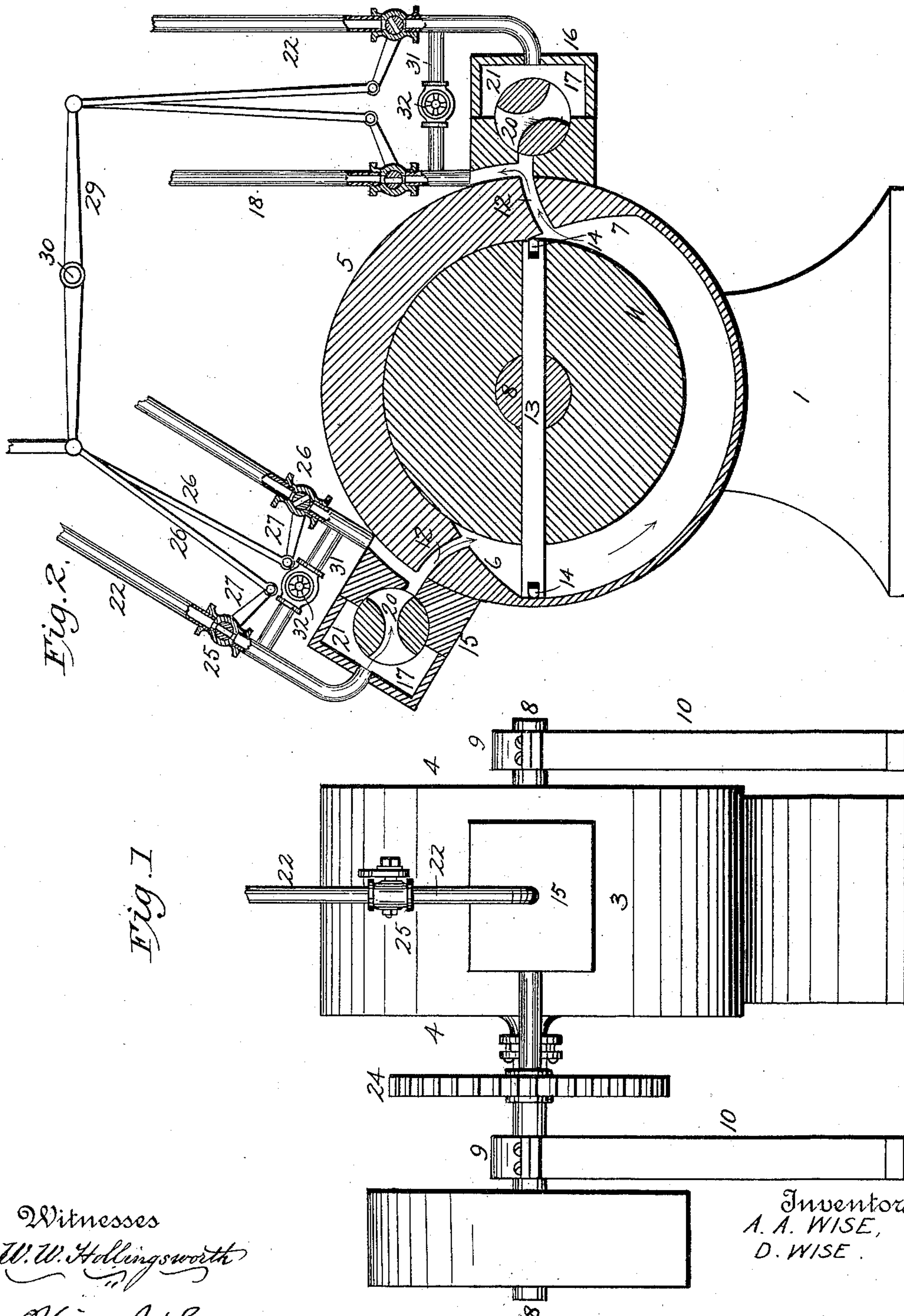
Patented Sept. 13, 1898.

A. A. & D. WISE.
ROTARY ENGINE.

(Application filed May 15, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

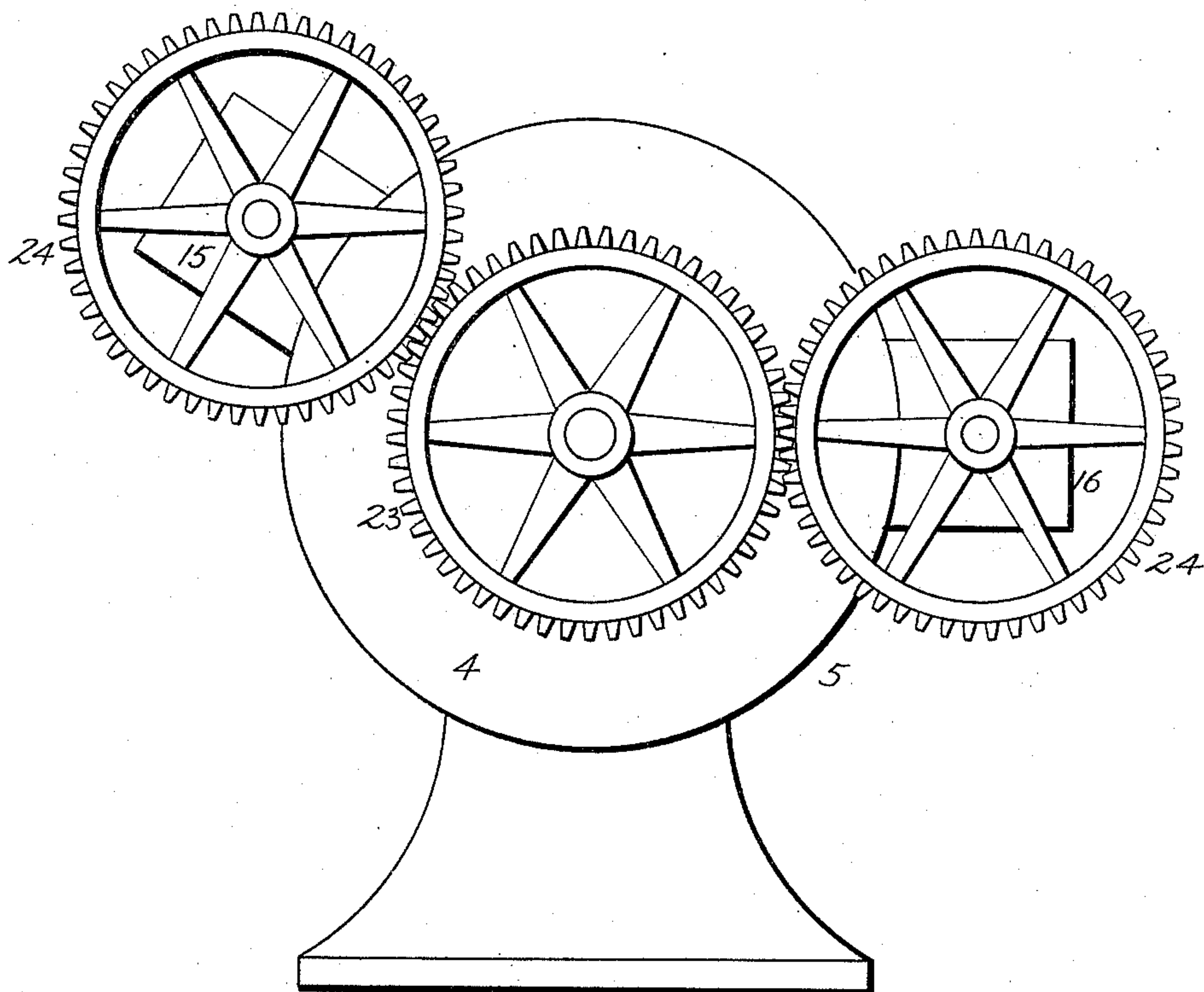
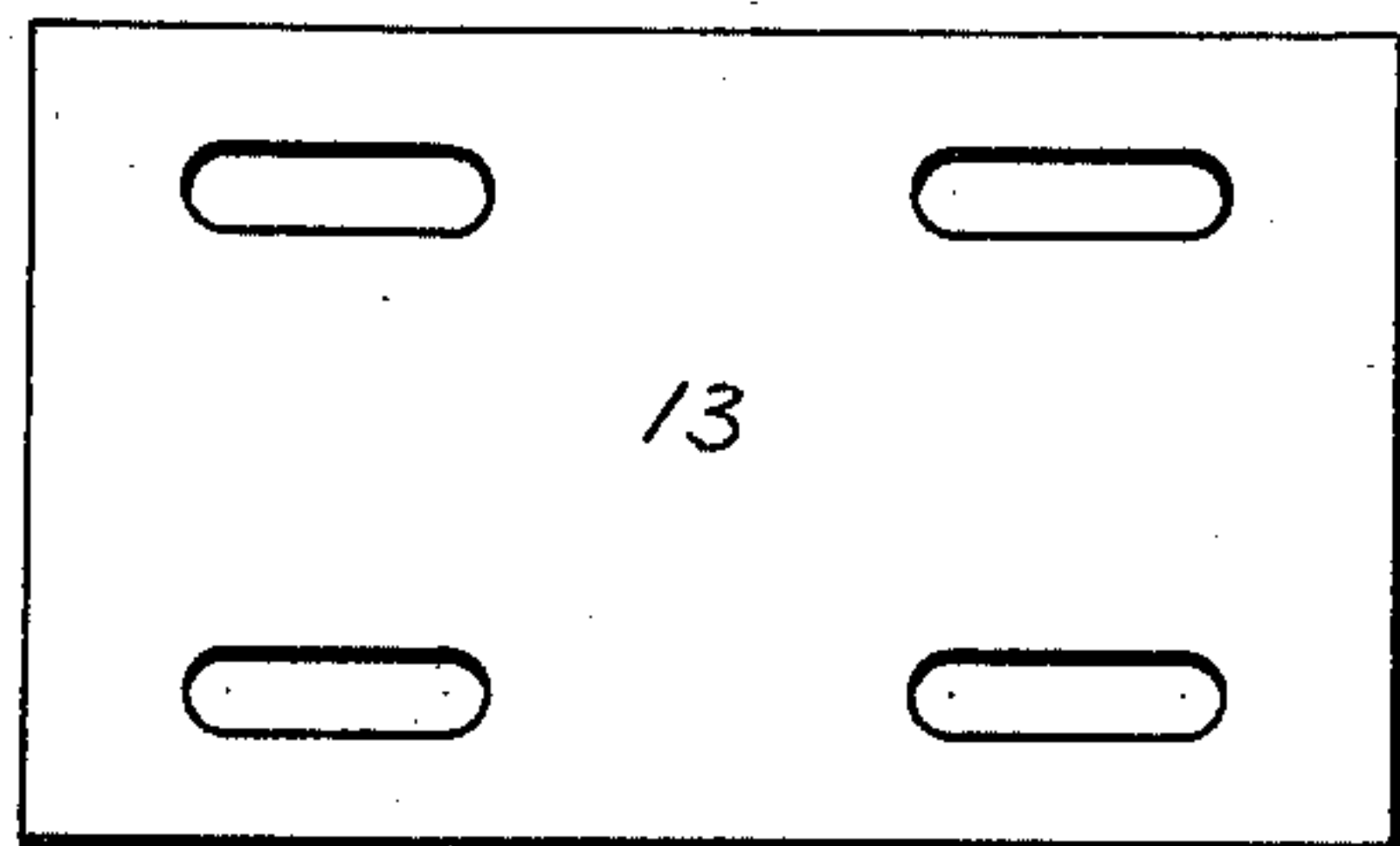


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALVIN A. WISE AND DANIEL WISE, OF PEABODY, KANSAS.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 610,783, dated September 13, 1898.

Application filed May 15, 1897. Serial No. 636,728. (No model.)

To all whom it may concern:

Be it known that we, ALVIN A. WISE and DANIEL WISE, of Peabody, in the county of Marion and State of Kansas, have invented certain new and useful Improvements in Rotary Engines; and we do hereby 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 ap-
10 pertains to make and use the same.

This invention relates to improvements in rotary engines, the object of the same being to provide an engine of this general character in which the particular arrangement of
15 the valve mechanism and manner of gearing the same admits steam to the cylinder at the proper time to act upon the piston, giving a partial rotation to the same, the exhaust being at the opposite side and the valve mechanism duplicated to provide for reversing the
20 engine, further provision being made to allow for a continuous pressure of steam in the cylinder.

With the above objects in view the invention consists in a rotary engine comprising a
25 cylinder with a rotary head therein carrying a sliding piston, inlet and exhaust ports through the cylinder, rotary valves located in steam-chests and controlling the admission
30 of steam, valves in the supply and exhaust pipes which connect with the steam-chests, and means for manipulating the last-mentioned valves to change the supply and exhaust to opposite sides of the cylinder.

In the following specification we have entered into a detailed description of our invention, reference being had to the accompanying drawings and to numerals thereon, which
35 designate the different parts, and what we consider to be the novel features of construction are specifically set forth in the claims.

In the drawings forming part of this specification, Figure 1 is an elevation showing a rotary engine constructed in accordance with
45 our invention. Fig. 2 is a sectional view through the cylinder of the engine and steam-chests located at the opposite sides thereof and including the reversing mechanism. Fig. 3 is an elevation showing the manner of gearing the rotary valves to the main shaft. Fig.
50 4 is a detail view of the sliding piston.

Referring to the drawings by numerals, 1

designates the base of the engine, which is mounted upon a suitable bed 2 and supports the cylinder 3, which is provided with heads
4 4, connected to each other and to the body 55 of the cylinder in the usual manner. The interior of this cylinder is provided at one side with a thick wall 5, which terminates at its ends in the inclined surfaces 6 and 7, extending to the outer wall of the cylinder and preferably curved or slightly concave. This construction of the cylinder provides one in
60 which the interior space is eccentric, presenting circular walls of different arcs connected by the inclined surfaces 6 and 7. Through the cylinder-heads passes the main shaft 8, which is journaled beyond each side of the cylinder in bearings 9, supported by standards 10, which extend from the bed 2, and
70 within the cylinder this shaft is provided with a circular piston-head 11, which fits tightly against the curved surface formed by the enlarged portion 5 of the cylinder and having the usual packing-strips to provide tight
75 joints. Beyond the large wall of the cylinder a space is left between the piston-head and side of the cylinder presenting the steam-chamber, inlet and outlet ports 12 12 passing through the cylinder near the inner end of
80 each inclined or curved surface 6 and 7 thereof. In connection with this construction of cylinder and piston-head located therein the latter is provided with a sliding piston 13, which extends diametrically therethrough
85 and through the main shaft, being provided with packing-strips 14 at its outer ends. This piston is of such a width between the inner walls of the cylinder that it will properly engage therewith, and the inclined surfaces 6 and
90 7 are correspondingly disposed, so that when one end of the piston is riding upon one the other end will be descending the other. The piston-head is preferably made in two parts, which are bolted to each other in any suitable
95 manner, the bolts passing through slots in the piston, so as not to interfere with the movement thereof. By this arrangement it will be seen that when steam is admitted through one of the ports it will act upon the end of
100 the piston which is projected beyond the piston-head and will carry the latter around until the other end of said piston is brought in front of the port, the steam on the opposite

side being then discharged through the port at the other side of the cylinder, and in connection with this operation we have provided a valve mechanism by which the admission of steam is controlled so as to act upon the piston during but a partial rotation of the same, and thereby allow the expansive pressure to carry the piston around until the opposite end is brought in position to be acted upon by the steam.

Upon opposite sides of the cylinder are secured steam-chests 15 and 16, each having a passage 17 communicating with the ports through the cylinder and with the exhaust-pipe 18, the said chests also containing a rotary valve which has a through-way 20 to establish communication between the port 12 and steam-chamber 21 in the chests, the latter receiving steam from the supply-pipe 22. Each chest is provided with solid walls between the steam-chamber and passage leading to the port, which will provide for cutting off the passage through the rotary valve during the rotation of the same. These rotary valves are turned from the main shaft of the engine through the intervention of a large gear-wheel 23, mounted upon said main shaft and in mesh with corresponding gear-wheels 24 24, keyed to the shafts or stems of the rotary valves, the gearing being such that the valves and piston revolve at the same rate of speed; but the way through the valve admits the steam to the cylinder twice during each revolution. The supply and exhaust pipes of the steam-chests are provided with turning valves or cut-offs 25 and 26, respectively, the stems of said valves having projecting arms 27, which are connected by rods 28 to a reversing-lever 29, centrally fulcrumed on a bearing-pin 30, supported upon the standard or upright, as shown. The valves 25 and 26 are so disposed that when the valve in the supply leading to one of the steam-chests is open the valve in the other supply will be closed, while the exhaust leading from the first-mentioned steam-chest is closed and the exhaust of the other chest open. By this arrangement when steam is admitted to one of the steam-chests the port 12 thereof becomes the inlet-port, while the port at the opposite side of the cylinder forms the outlet-port, and by shifting the reversing-lever the relative positions of the valves are changed so that the steam will be admitted into the opposite side of the cylinder. This provides for reversing the rotation of the piston by simply manipulating the lever 29. The main shaft of the engine is provided with a balance-wheel to assist in the regular rotations of the main shaft carrying the piston-head.

From the foregoing description, in connection with the accompanying drawings, the construction and operation of our improved rotary engine will be readily apparent, for when the valves are arranged as shown in the drawings the steam will be admitted into the

steam-chest 15, and passing through the valve 20 will enter the cylinder by way of the port 12 and act upon each end of the sliding piston as it comes in position in front of said port, sufficient steam being admitted to carry the piston-head a quarter of a revolution, while expansion of the steam will serve to carry it the other quarter, which will bring the opposite end of the piston in position to be acted upon by the steam, which is again admitted by the half-rotation of the rotary valve 20, the exhaust being through the open passage in the other steam-chest. The operation of the reversing-lever will cut off the supply of steam to the chest 15 and open the exhaust leading therefrom, while the other chest is connected with the steam-supply pipe leading thereto and the exhaust closed. This will admit steam into the cylinder to act upon the opposite side of the sliding piston and reverse the rotation of the piston-head.

As heretofore stated, the rotary valves admit steam into the cylinder during but a quarter of a revolution of the piston-head, depending upon the expansion of the steam to carry the piston around, and in order to provide for a continuous steam-pressure in case the engine is used in connection with heavy machinery the exhaust and supply pipes are connected by a pipe 31, having a valve or cut-off 32 therein, and when the valve is open it will present a straight or uninterrupted passage for steam to the port, the valve in the exhaust being located above the connection of the pipe 31 with the exhaust-pipe and is closed when the valve in the steam-supply is open. When the valve 32 is open, the steam will be continuously admitted through the port to the cylinder and will carry the piston-head around, exhausting the steam when the opposite end of the piston is in position to receive the live steam. This arrangement of the parts provides an engine which is extremely strong and powerful.

It will be understood, of course, that mechanism could be provided for throwing one of the rotary valves out of operation when steam is admitted into the chest which carries the other and said mechanism connected to the reversing-lever so as to be operated thereby. It is also obvious that other modifications or changes could be made in the construction and arrangement without sacrificing any of the advantages of our invention, and we therefore reserve the right to change or modify the parts within the spirit and scope of our claims.

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

1. In a rotary engine, a casing-cylinder provided on one side with a wall forming a seat for the piston-head or drum and upon the opposite side with a wall removed from the drum to leave an intermediate steam-chamber, said walls being connected by inclines provided with steam and exhaust ports,

in combination with a piston-head or drum fast upon a through-shaft, a diametrically-sliding piston extending through said drum and shaft and operated upon by the opposing inclines, steam-chests mounted upon the periphery of the casing-cylinder, upon opposite sides thereof, communicating with the steam and exhaust ports in said cylinder, said steam-chests being provided with steam and exhaust ports, rotary valves mounted within said steam-chests provided with through-ports and geared to the piston-shaft to be operated thereby to permit the passage of the steam through the valve twice in each revolution thereof, and valves for controlling the admission and exhaust of the steam, whereby when the steam is admitted to one of the steam-chests, the exhaust-port thereof will be closed, while the exhaust-port in the chest upon the opposite side will be opened and the steam-supply thereto cut off, substantially as described.

2. In a rotary engine, a casing-cylinder provided on one side with a wall forming a seat for the piston-head or drum and upon the opposite side with a wall removed from the drum to leave an intermediate steam-chamber, said walls being connected by inclines provided with steam and exhaust ports, in combination with a piston-head or drum fast upon a through-shaft, a diametrically-sliding piston extending through said drum and shaft and operated upon by the opposing

inclines, steam-chests mounted upon the periphery of the casing-cylinder, upon opposite sides thereof, communicating with the steam and exhaust ports in said cylinder, said steam-chests being provided with steam and exhaust ports, rotary valves mounted within said steam-chests provided with through-ports and geared to the piston-shaft to be operated thereby to permit the passage of the steam through the valve twice in each revolution thereof, valves for controlling the admission and exhaust of the steam, whereby when the steam is admitted to one of the steam-chests, the exhaust-port thereof will be closed, while the exhaust-port in the chest upon the opposite side will be opened and the steam-supply thereto cut off, and connected levers for controlling the steam and exhaust pipes whereby when the steam-supply upon one side is opened and the exhaust-pipe on the same side is closed, the steam-supply upon the opposite side will be cut off and the exhaust opened by a single movement of the connected levers, substantially as described.

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

ALVIN A. WISE.
DANIEL WISE.

Witnesses:

S. S. FINDLEY,
W. H. ELLETT.