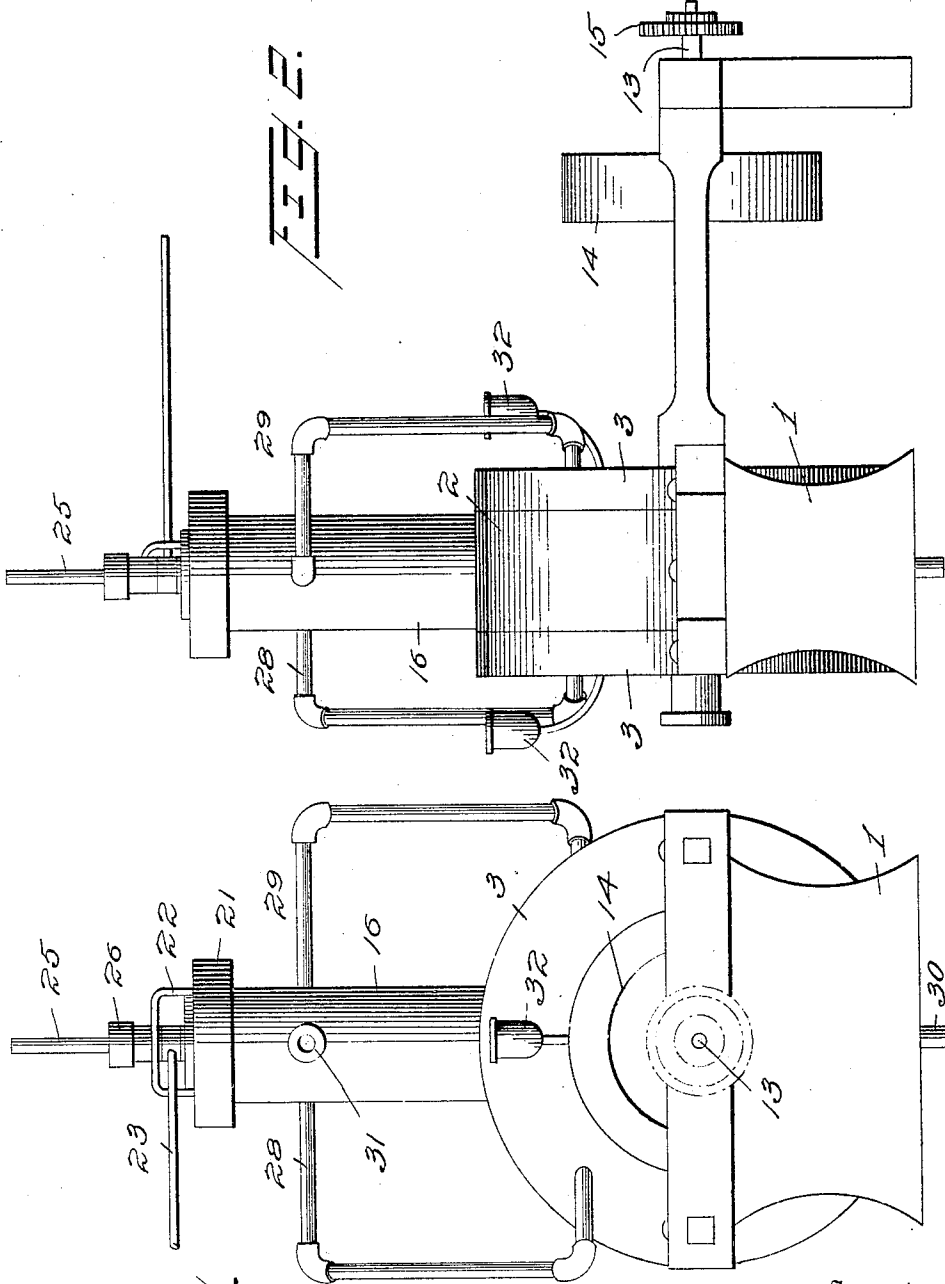


J. S. LIVENGOOD.
 ROTARY ENGINE.
 APPLICATION FILED SEPT. 11, 1912.

1,056,286.

Patented Mar. 18, 1913.

3 SHEETS-SHEET 1.



Witnesses

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Inventor

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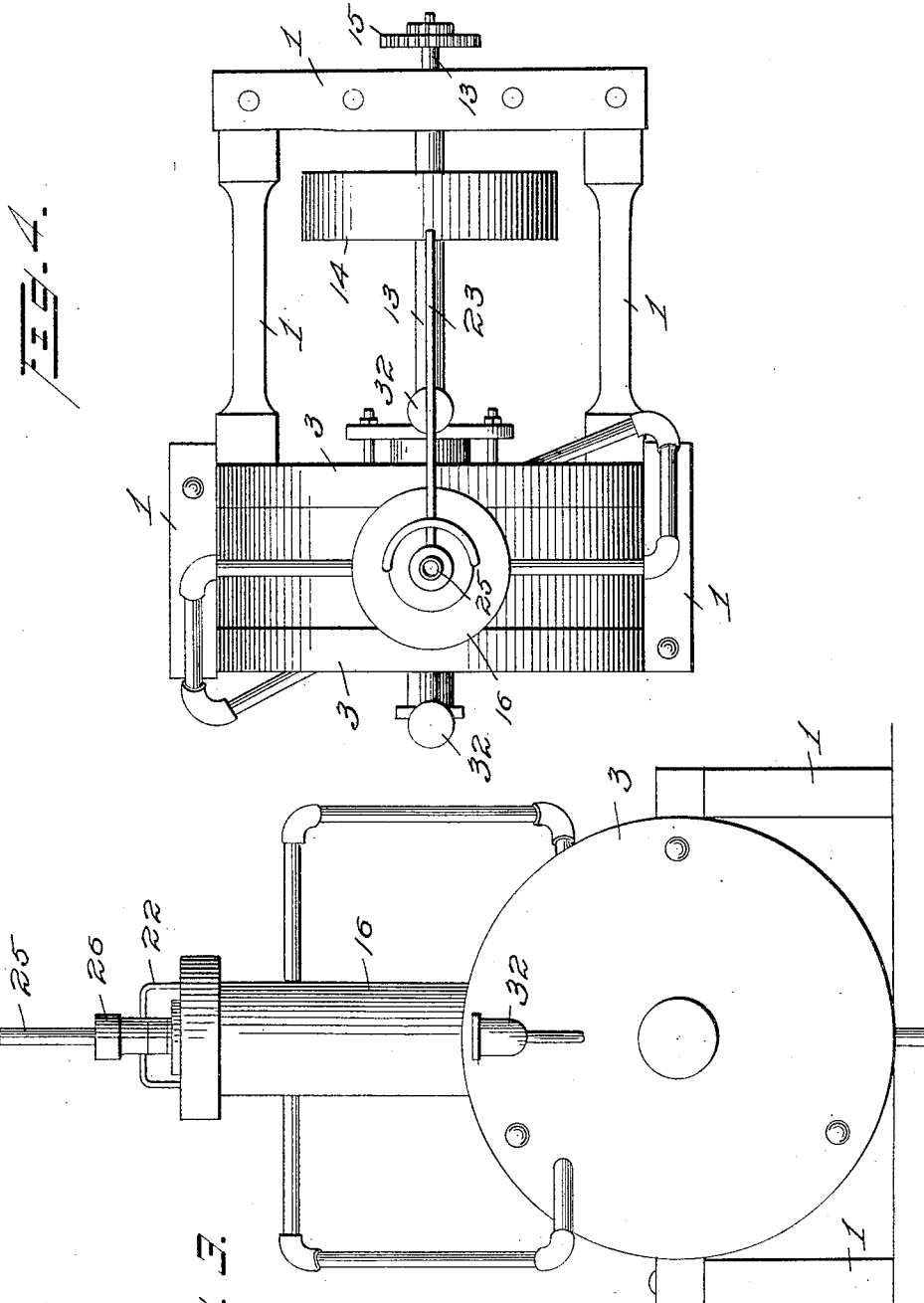
Attorney

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WITNESSES

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3 SHEETS-SHEET 3.

FIG. 6.

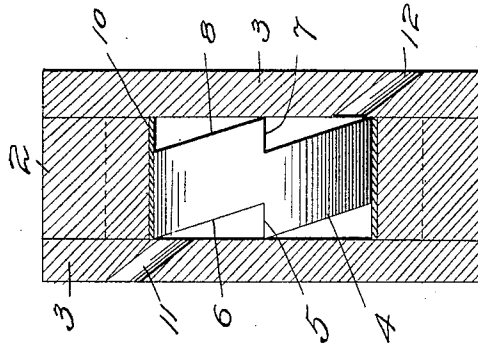
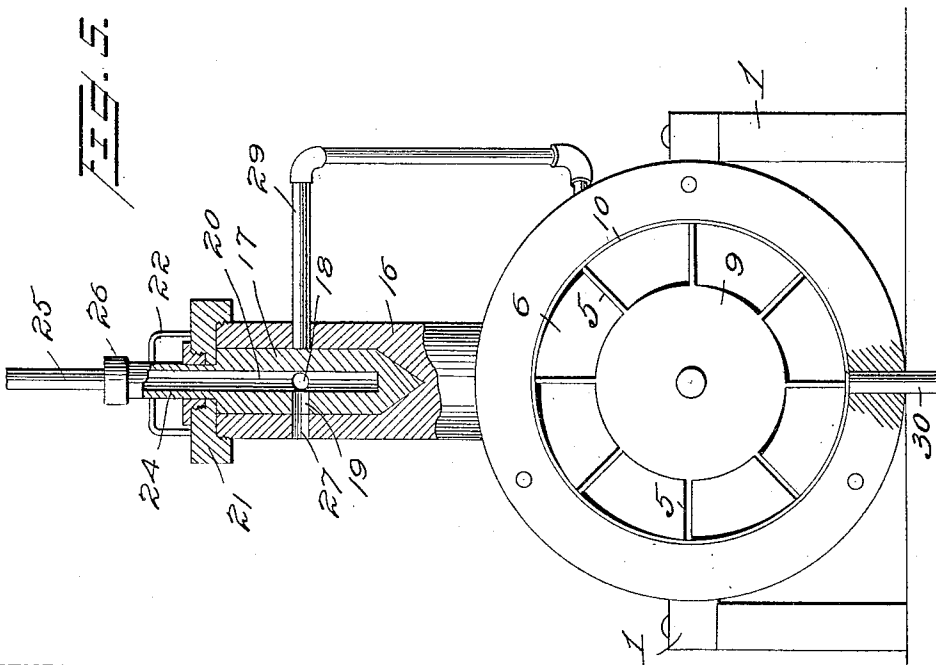


FIG. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

JACOB S. LIVENGOOD, OF HEIDLEBURG, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD
TO WILLIAM S. FOOSE, OF YORK, PENNSYLVANIA.

ROTARY ENGINE.

1,056,286.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed September 11, 1912. Serial No. 719,719.

To all whom it may concern:

Be it known that I, JACOB S. LIVENGOOD, a citizen of the United States, residing at Heidlersburg, in the county of Adams and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to rotary steam or compressed air engines, designed more particularly for use in driving automobiles, but capable of many other uses, and one of the principal objects of the invention is to simplify the construction, reduce the number of parts and to improve the general efficiency of engines of this character.

Another object of the invention is to provide a double acting turbine wheel and means whereby this wheel may be rotated in either direction, thus providing a reversible engine of simple construction and high efficiency.

These and other objects may be attained by means of the construction illustrated in the accompanying drawings, in which:

Figure 1 is an end elevation of a rotary engine made in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation taken from the opposite end to that shown in Fig. 1. Fig. 4 is a top plan view of the same. Fig. 5 is a view in partial elevation showing the inlet ports and valve mechanism in section and showing one of the cylinder heads removed. Fig. 6 is a vertical sectional view of the cylinder with the turbine wheel shown in elevation.

Referring to the drawings the numeral 1 designates the frame work of the engine, and mounted on said frame work is a cylinder or casing 2 provided with removable cylinder heads 3; fitted within the cylinder 2 is a double turbine wheel 4 provided with abrupt shoulders 5, and inclined portions 6 upon one side of the wheel and oppositely disposed shoulders 7 upon the other side of the wheel, and inclined surfaces 8 connecting the shoulders. This turbine has a central hub 9 and a peripheral rim 10, and is mounted to rotate in the cylinder 2. Extending through the cylinder heads 3 are inlet ports 11 and 12, said inlet ports being oppositely disposed and properly inclined

to permit the compressed air or steam to fill the pockets formed by the shoulders and the inclined surfaces in the wheel and by impact against the shoulders rotate said wheel in the cylinder. A shaft 13 extends through the cylinder heads and wheel and said shaft may be provided with a flywheel 14, and a double cog gearing 15, for connecting the same up to the axles of an auto vehicle.

Supported upon the cylinder 2 is a valve casing 16, and mounted in this casing is a rotary valve 17 provided with ports 18 and 19 arranged at right angles one to the other and said valve having a central bore 20; a cap 21 is fitted to the valve casing and connected to the cap is a lever guide 22; a lever 23 extends into the tubular extension 24 of the valve. The inlet steam or compressed air pipe 25 is connected up to the valve by a stuffing box or fitting 26. Connected to the valve casing 16 through openings 27 are intake pipes 28 and 29 leading to the inlet ports 11 and 12 at the opposite sides of the cylinder, and an exhaust port 30 extends through the cylinder at the bottom and communicates with the pockets in the turbine wheel. A separate inlet port 31 may be used where it is desired to make a convenient connection with a compressed air tank or steam boiler. Oil cups 32 are conveniently arranged for lubricating the parts.

The operation of my invention may be briefly described as follows: By shifting the lever 23 the steam or compressed air may be admitted through the pipe connections 28 and 29 and through the inlet ports 11 and 12 to either side of the turbine wheel, depending upon the direction in which it is desired to rotate the wheel. By shifting the lever 23 slightly the motive power may be cut off, as will be understood.

From the foregoing it will be obvious that my invention is of simple construction, provides a reversible engine of very few parts which is direct in action and which is highly efficient in both power and speed.

I claim:

A rotary engine comprising a cylinder, a shaft journaled in said cylinder, a double and reversible turbine wheel mounted on said shaft in said cylinder, said turbine wheel being solid and provided with op-

positely disposed abrupt shoulders upon the
opposite sides of said wheel, and oppositely
inclined surfaces leading from said shoul-
ders to the sides of the wheel, oppositely in-
5 clined inlet ports in the sides of said cyl-
inder, a valve supported upon said cylinder,
and means for operating said valve to ad-
mit motive force upon either side of the

turbine wheel for reversing the rotation
thereof.

In testimony whereof I have affixed my
signature in presence of two witnesses.

JACOB S. LIVENGOOD.

Witnesses:

WILLIS S. HERMAN,

JACOB A. DENTLER, Jr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."