

F. WUNDERLICH & L. KOERBER

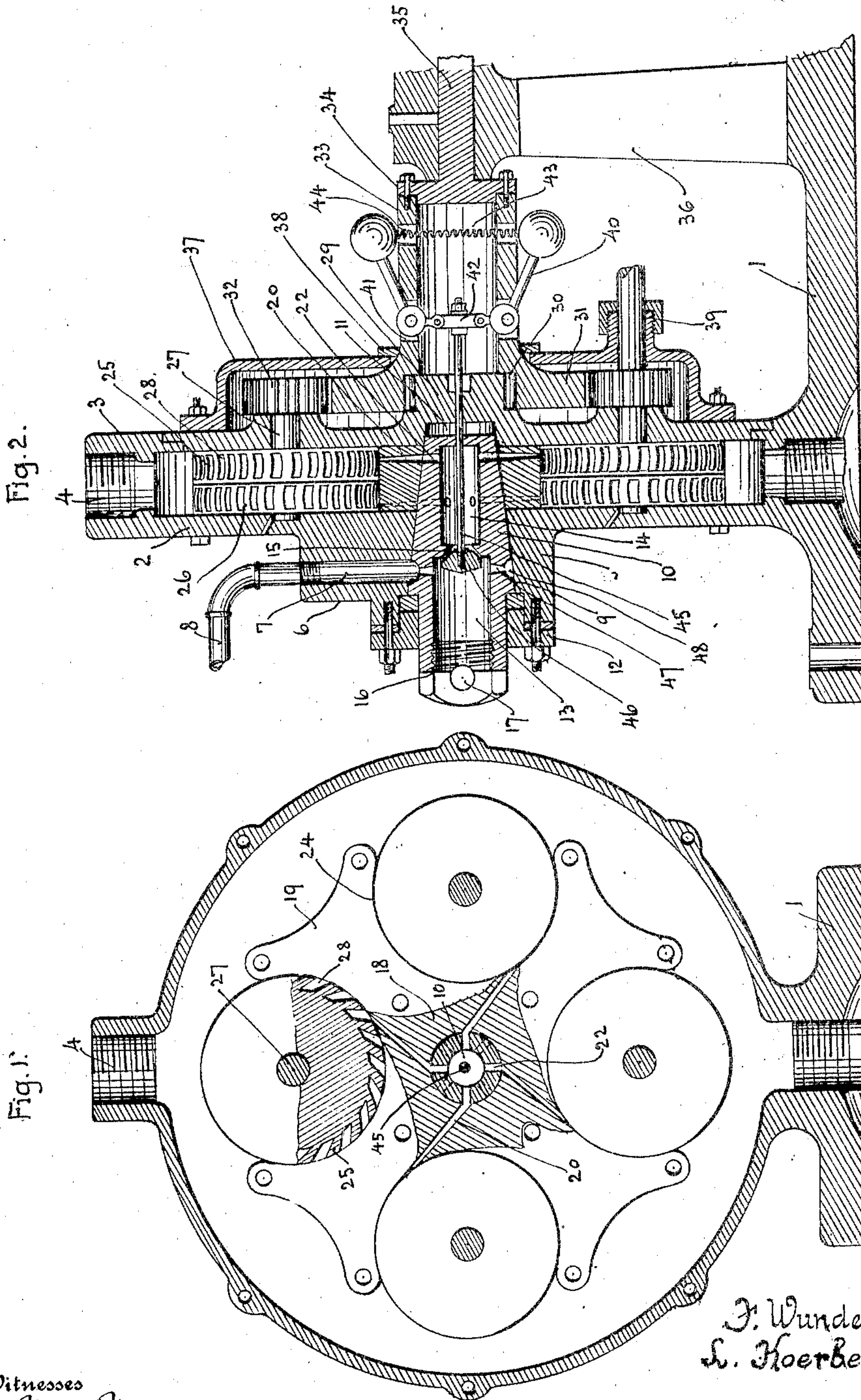
ROTARY ENGINE.

APPLICATION FILED FEB. 27, 1909.

928,094.

Patented July 13, 1909.

2 SHEETS—SHEET 1.



Witnesses

Frank Trimmer

O. H. Butler

Inventors
F. Wunderlich
L. Koerber

By

H. C. Evert

Attorney

F. WUNDERLICH & L. KOERBER.

ROTARY ENGINE.

APPLICATION FILED FEB. 27, 1909.

928,094.

Patented July 13, 1909.

2 SHEETS—SHEET 2.

Fig. 4.

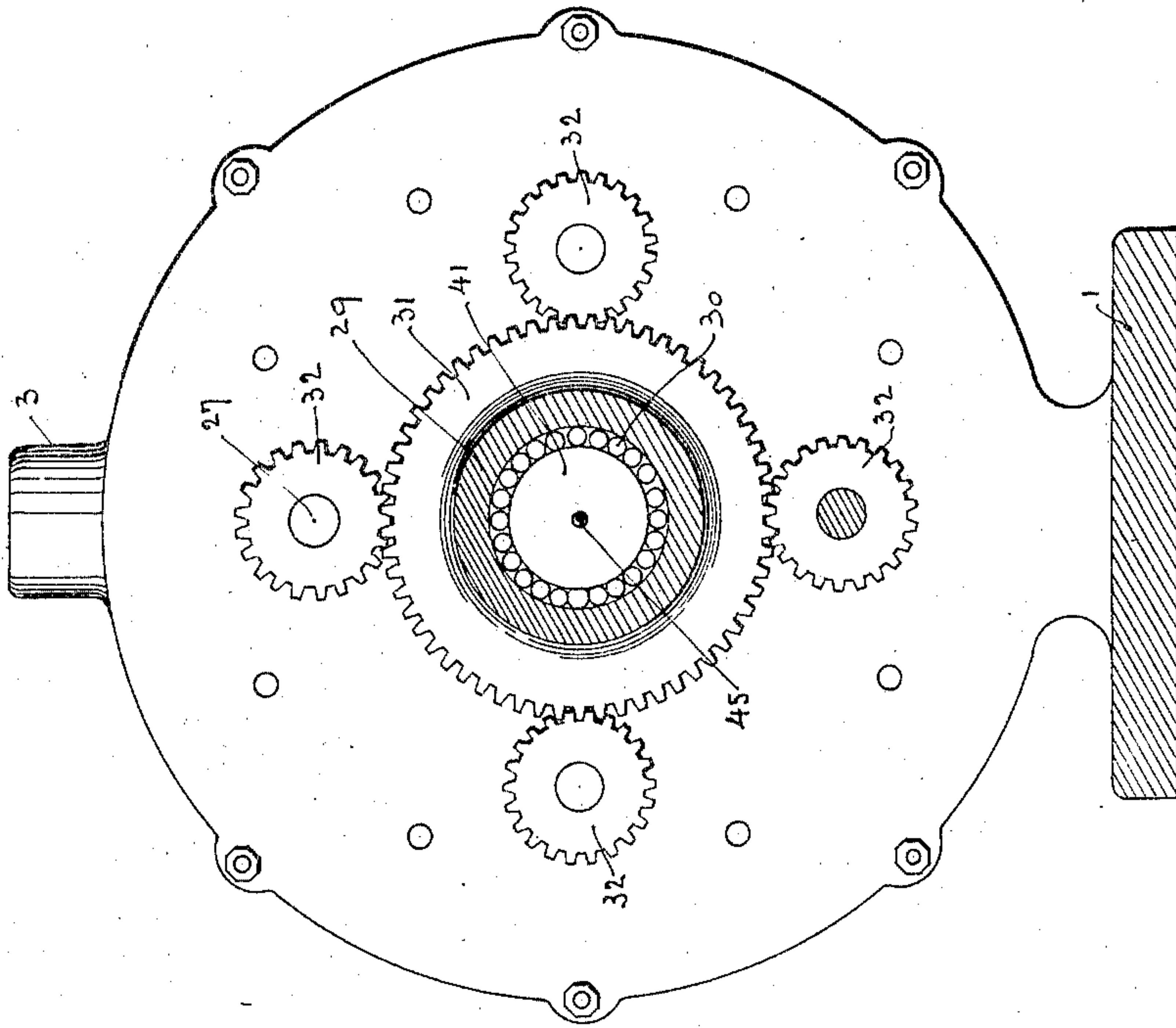
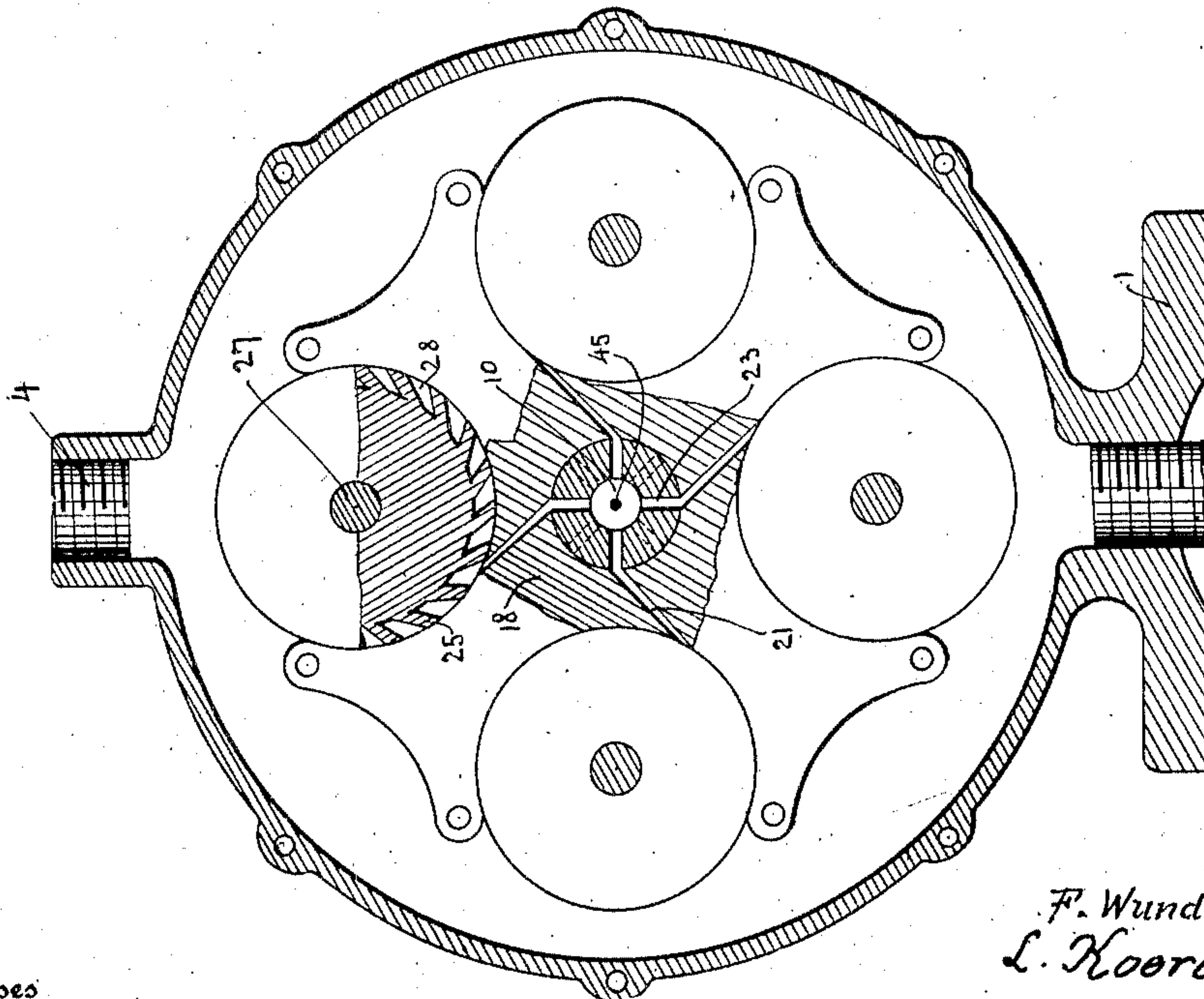


Fig. 3.



Witnesses

Frank J. Trimmer

R. H. Butler

Inventor

F. Wunderlich and
L. Koerber

By

H. C. Evert

Attorneys

UNITED STATES PATENT OFFICE.

FREDRICH WUNDERLICH, OF SWISSVALE, AND LOUIS KOERBER, OF EAST PITTSBURG,
PENNSYLVANIA.

ROTARY ENGINE.

No. 928,094.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed February 27, 1909. Serial No. 480,446.

To all whom it may concern:

Be it known that we, (1) FREDRICH WUNDERLICH and (2) LOUIS KOERBER, citizens of the United States of America, residing at (1) Swissvale, (2) East Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to rotary engines and the invention has for its object to provide a novel engine from which a high degree of efficiency can be obtained with a minimum expenditure of fuel, the engine in its entirety being economically operated to develop power.

Another object of the invention is to provide a reversible rotary engine having a novel governor mechanism for controlling the speed of the engine.

A further object of the invention is to provide a steam turbine wherein the propeller wheels are arranged to develop a high degree of power which through the medium of a train of gears is transmitted to a single power shaft.

With the above and other objects in view which will more readily appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts to be presently described and then claimed.

In the drawings, Figure 1 is a vertical transverse sectional view of the engine, illustrating the valve thereof in position for driving the engine in one direction, Fig. 2 is a vertical longitudinal sectional view of the engine, Fig. 3 is a vertical transverse sectional view of the engine illustrating the valve in position to drive the engine in an opposite direction, from that shown in Fig. 1, and Fig. 4 is a similar view of the engine with the gear casing removed.

In the drawings, 1 designates a base plate supporting a cylindrical casing 2, said casing having a detachable plate 3, and exhaust ports 4 at the top and bottom of said casing. The casing 2 is provided upon the rear side thereof with a central enlargement 5 having an extension 6, provided with a steam inlet port 7 adapted to connect with a suitable steam supply pipe 8. The central enlargement 5 is provided with a tapering seat 9 for

a valve plug 10, said block extending into the casing 2, and into a seat 11 provided therefor upon the inner side of the plate 3. The plug 10 is retained within the seat 9 by a stuffing box 12, and said plug is formed with two longitudinal cylindrical compartments 13 and 14, said compartments being separated by a partition 15 provided with a valve seat establishing communication between said compartments. The outer end of the compartment 13 is closed, by a detachable cap 16 provided with a transverse opening 17 intersecting a portion of the valve plug 10, whereby a suitable instrument or wrench can be used for rotating the valve plug 10.

In the casing 2 is secured a valve frame comprising a central body 18, and radially disposed arms 19. The body 18 of the frame surrounds the valve plug 10, and is provided with two sets of tangentially disposed ports 20 and 21, these ports being designed to communicate with two sets of radially disposed ports 22 and 23 formed in the valve plug 10, and communicating with the compartment 14. The edges of the arms 19 of the valve frame are curved, as at 24, to provide cylinders for four sets of propeller wheels, each set comprising two wheels 25 and 26 mounted upon a shaft 27 journaled in the casing 2 and the detachable end plate 3, said shafts protruding through said end plate. The propeller wheels 25 and 26 have the periphery thereof provided with tangentially disposed pockets 28 adapted to register with the ports 20 and 21.

The outer side of the end plate 3 is provided with a central bearing 29 for a plurality of antifriction rollers 30 supporting a large gear wheel 31 adapted to mesh with small gear wheels 32 mounted upon the outer ends of the shafts 27. The large gear wheel 31 is provided with a tubular hub 33, closed by a detachable slot 34 carried by a shaft 35, journaled in a bearing 36 carried by the base plate 1. The gear wheels 31 and 32 are inclosed by a casing 37 secured to the end plate 3, and by a collar 38 carried by the hub 33. The casing 37 is provided with a stuffing box 39 through which one of the shafts 27 extends and is adapted to be provided with a pulley wheel (not shown) whereby machinery can be driven by the engine.

In connection with the tubular hub 33 the governor mechanism is used for controlling

the speed of the engine. This mechanism comprises two weighted bell-crank arms 40 pivotally mounted in oppositely disposed openings 41 provided therefor in the hub 33, the inner ends of said arms being pivotally connected to a cross-head 42, while the outer weighted ends of said arms are connected by a coil spring 43 extending through oppositely disposed openings 44 provided therefor in the hub 33. The cross head 42 is connected to a valve rod 45 extending through the bearing 29, end plate 3, compartment 14 of the valve plug 10 into the compartment 13 of said plug, where a stem is provided with a valve 46, adapted to engage the valve seat 15 and shut off a supply of steam to the compartment 14, the steam being admitted to the compartment 13 through a plurality of radially disposed ports 47 formed in the valve plug 10 and communicating with the port 7, through the medium of an annular groove 48 formed in the periphery of the valve plug 10.

In operation, the steam admitted to the compartment 13 is adapted to pass through the valve seat 15 into the compartment 14, and through the ports 22 or 23 communicating with the ports 20 or 21. As shown in Figs. 1 and 2, the ports 22 communicate with the ports 20, consequently the four wheels 25 will be driven by steam entering the pockets 28 of said wheels. With the four wheels 25 revolving in the same direction, the large gear wheel 31 will be driven and power can be taken from said wheel, either through the medium of the prolonged shaft 27 or the shaft 35, the former being preferable.

Should either of the shafts revolve with too great a rapidity, the bell-crank arms 40 are swung outwardly by centrifugal force and through the medium of the cross head 42 shift the valve rod 45, and close the valve 46 until the speed of the engine is reduced.

To reverse the engine, the valve plug 10 is rotated, until the ports 23 register with the ports 21, and then steam is admitted to the pockets 28 of the wheels 26, and the prolonged shaft 27 and the shaft 35 are driven in an opposite direction.

It will be observed from the foregoing description that the various parts of the engine are compactly assembled, and that the operation of the engine is easily controlled by a single attendant.

It is thought that the operation and utility will be fully understood without further description, and while in the drawings there is illustrated the preferred embodiments of the invention, we do not care to limit ourselves to the exact manner of assemblage without departing from the spirit or scope of the invention.

Having now described our invention, what we claim as new, is; -

1. A rotary engine comprising a casing having exhaust ports, an end plate detach-

ably mounted upon said casing, a central enlargement carried by said casing and having an inlet port formed therein, a frame arranged within said casing and providing cylinders, four sets of propeller wheels revolubly mounted in the cylinders of said frame, each set comprising two wheels having the periphery thereof provided with tangentially disposed pockets, said frame having two sets of tangentially disposed ports adapted to communicate with the pockets of said wheels, a valve plug adjustably mounted in said enlargement and extending through said frame, said plug having two compartments formed therein, one of said compartments communicating with said inlet port, and the other of said compartments with the tangentially disposed ports of said frame, geared wheels revolved by said propeller wheels, a large gear wheel driven by said gear wheels, said gear wheel having a tubular hub, and a governor mechanism carried by said tubular hub for controlling the passage of steam from one compartment of said valve plug to the other compartment, said mechanism including weighted bell-crank arms, a valve rod extending into said valve plug, and a valve carried by said rod, substantially as described.

2. A rotary engine comprising a casing having exhaust ports, an end plate detachably mounted upon said casing, a central enlargement carried by said casing and having an inlet port formed therein, a frame arranged within said casing and providing cylinders, four sets of propeller wheels revolubly mounted in the cylinders of said frame, each set comprising two wheels having the periphery thereof provided with tangentially disposed pockets, said frame having two sets of tangentially disposed ports adapted to communicate with the pockets of said wheels, a valve plug adjustably mounted in said enlargement and extending through said frame, said plug having two compartments formed therein, one of said compartments communicating with said inlet port, and the other of said compartments with the tangentially disposed ports of said frame, geared wheels revolved by said propeller wheels, a large gear wheel driven by said gear wheels, said gear wheel having a tubular hub, and a governor mechanism carried by said tubular hub for controlling the passage of steam from one compartment of said valve plug to the other compartment.

3. A rotary engine, comprising a casing having exhaust ports, an end plate mounted upon said casing, a frame arranged within said casing and providing cylinders, said frame having tangentially disposed ports formed therein, propeller wheels revolubly mounted in said cylinders and adapted to be driven by steam admitted through said ports, a valve plug extending into said frame and having ports formed therein

adapted to register with the ports of said frame, an enlargement carried by said casing and having a steam inlet port formed therein adapted to supply steam to said cylinders through said block and the ports thereof, a large gear wheel revolubly supported by said end plate and adapted to be driven by said propeller wheels, a tubular hub carried by said gear wheel, a governor mechanism carried by said hub for controlling the passage of steam through said plug, and means for moving said plug to control the operation of said propeller wheels.

4. A rotary engine, comprising a casing having exhaust ports, an end plate mounted upon said casing, a frame arranged within said casing and providing cylinders, said frame having tangentially disposed ports formed therein, propeller wheels revolubly mounted in said cylinders and adapted to be driven by steam admitted through said ports, a valve plug extending into said frame and having ports formed therein adapted to register with the ports of said frame, an enlargement carried by said casing and having a steam inlet port formed therein adapted to supply steam to said cylinders through said plug and the ports thereof, a large gear wheel revolubly supported by said end plate and adapted to be driven by said propeller wheels, a tubular hub carried by said gear wheel, and a governor mechanism carried by said hub for controlling the passage of steam through said plug.

5. A rotary engine, comprising a casing, four sets of propeller wheels revolubly mounted in said casing, each set comprising two wheels having the periphery thereof

provided with pockets, an enlargement carried by said casing and having a steam inlet port formed therein, a valve plug extending through said enlargement into said casing and adapted to communicate with said port and the pockets of said wheels, a large gear wheel revolubly supported by said casing and adapted to be driven by said wheels, and a governor mechanism supported by said large gear wheel for controlling the admission of steam to the pockets of said wheels, said mechanism including weighted bell-crank levers, a valve rod, and a valve in connection with said valve plug.

6. A rotary engine, comprising a casing, four sets of propeller wheels revolubly mounted in said casing, each set comprising two wheels having the periphery thereof provided with pockets, an enlargement carried by said casing and having a steam inlet port formed therein, a valve plug extending through said enlargement into said casing and adapted to communicate with said port and the pockets of said wheels, a large gear wheel revolubly supported by said casing and adapted to be driven by said wheels, and a governor mechanism supported by said large gear wheel for controlling the admission of steam to the pockets of said propeller wheels.

In testimony whereof we affix our signatures in the presence of two witnesses.

FREDRICH WUNDERLICH.
LOUIS KOERBER.

Witnesses:

MAX H. SROLOVITZ,
K. H. BUTLER.