J. A. WALTMAN.

ROTARY MULTIPLE CYLINDER STEAM ENGINE.

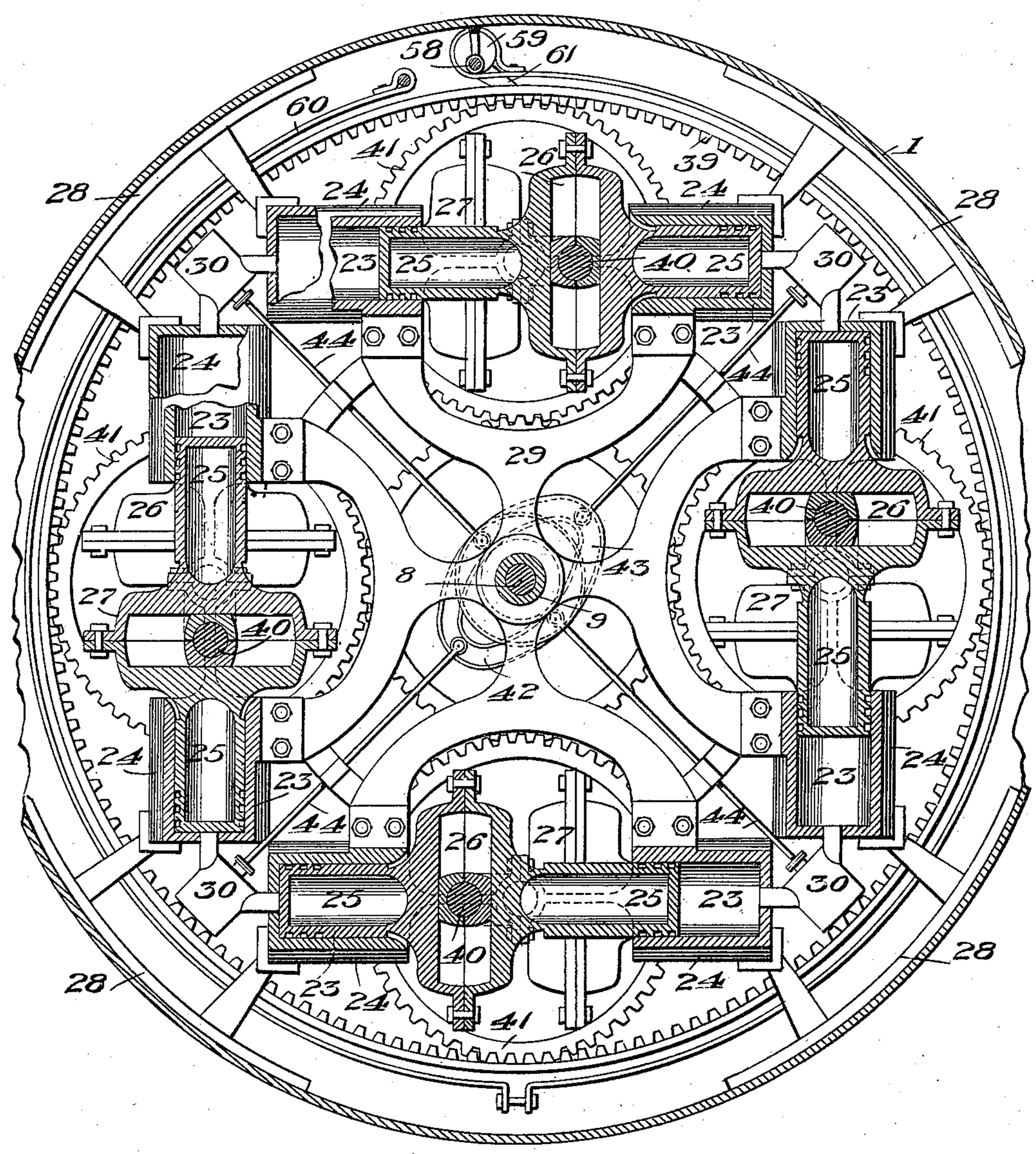
APPLICATION FILED JAN. 26, 1910.

975,486.

Patented Nov. 15, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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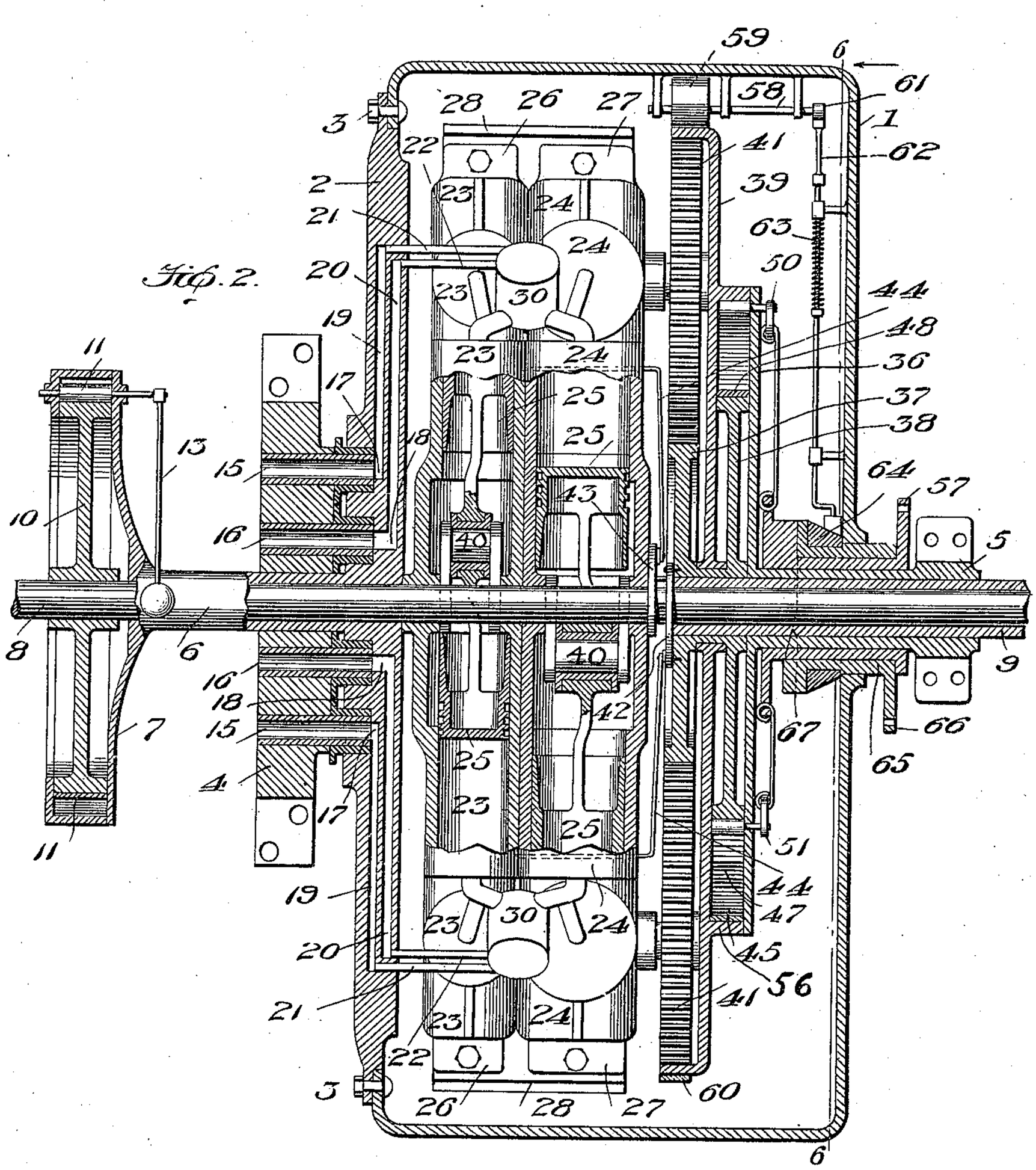
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

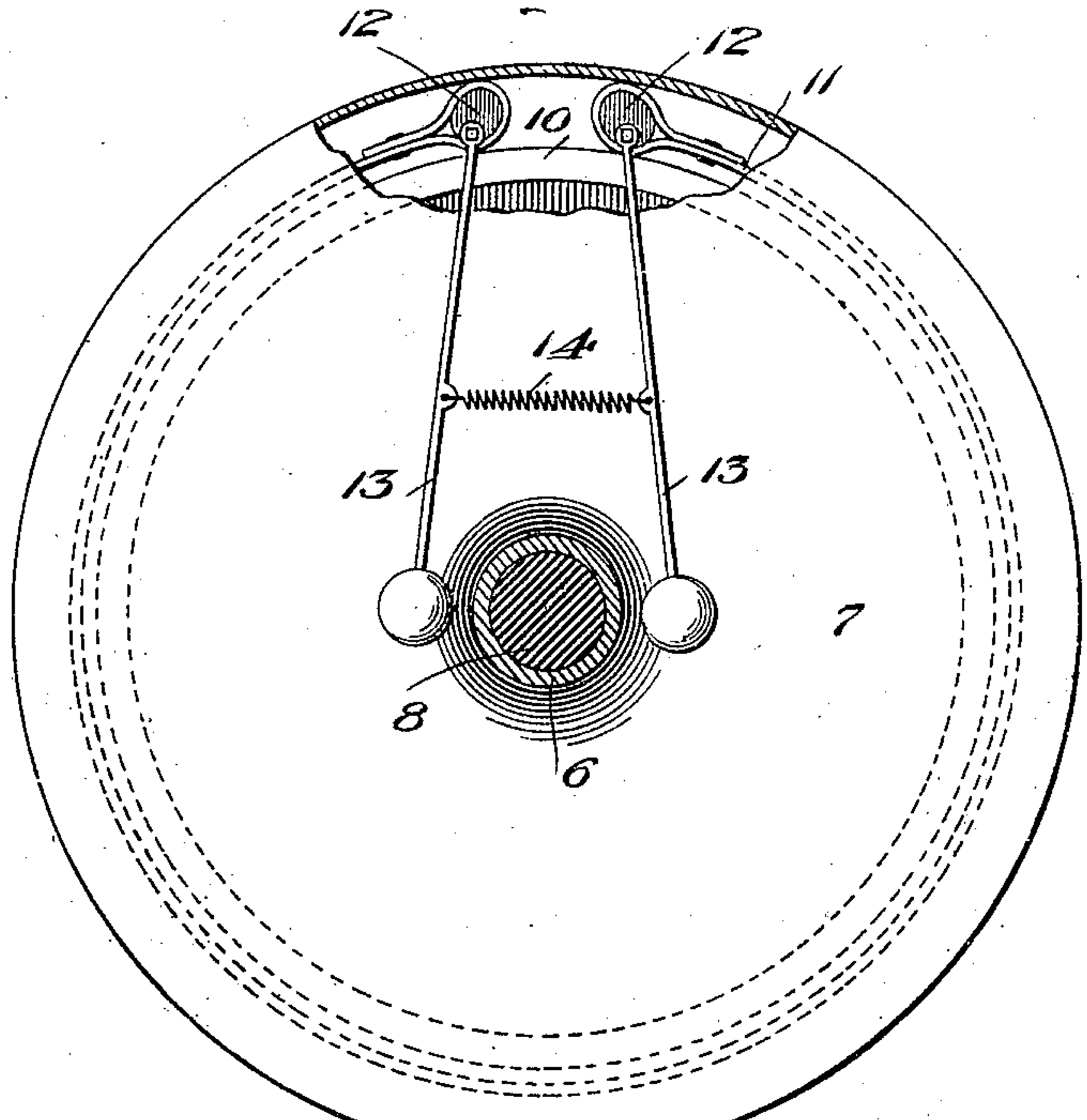


Fig. 4.

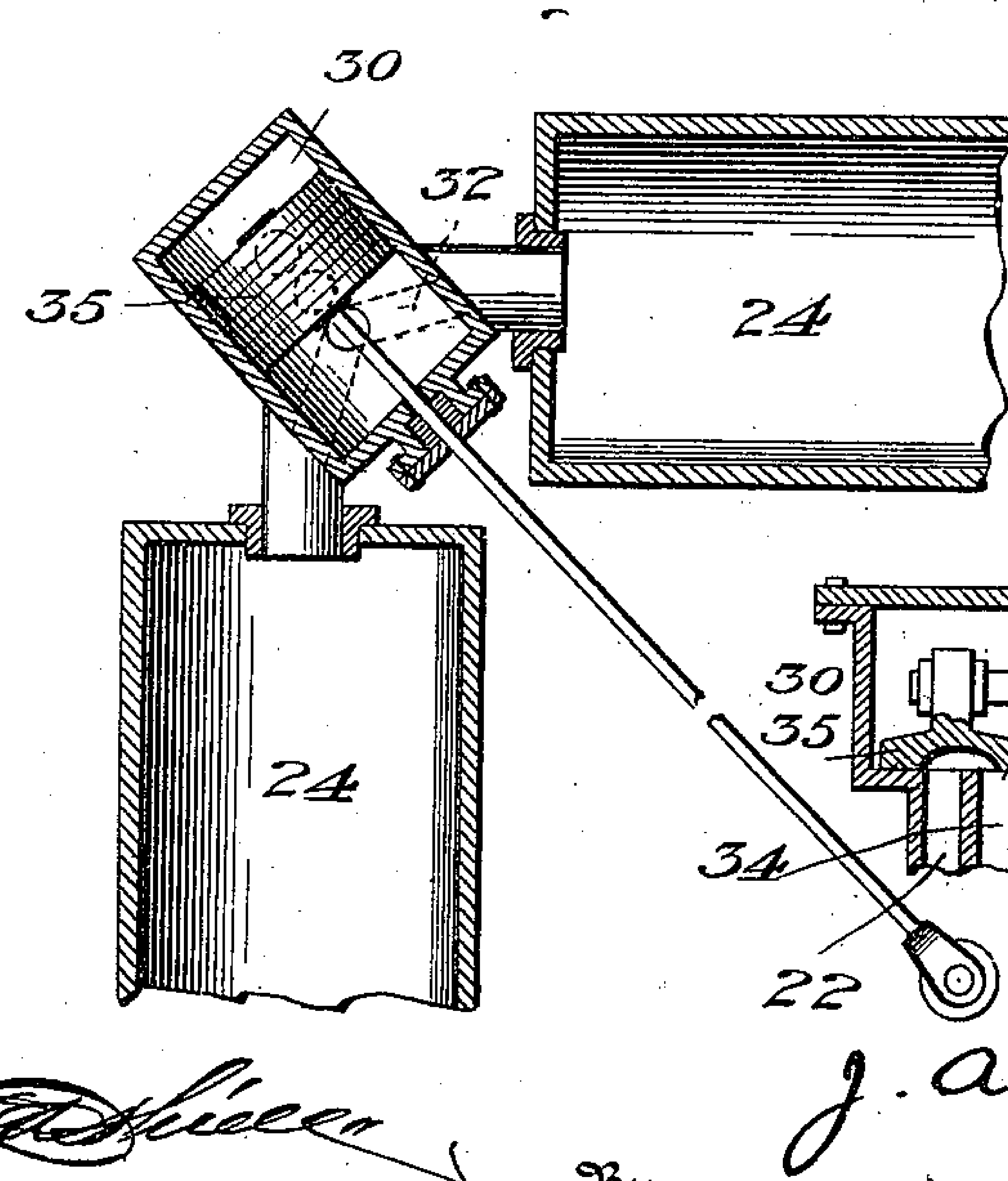
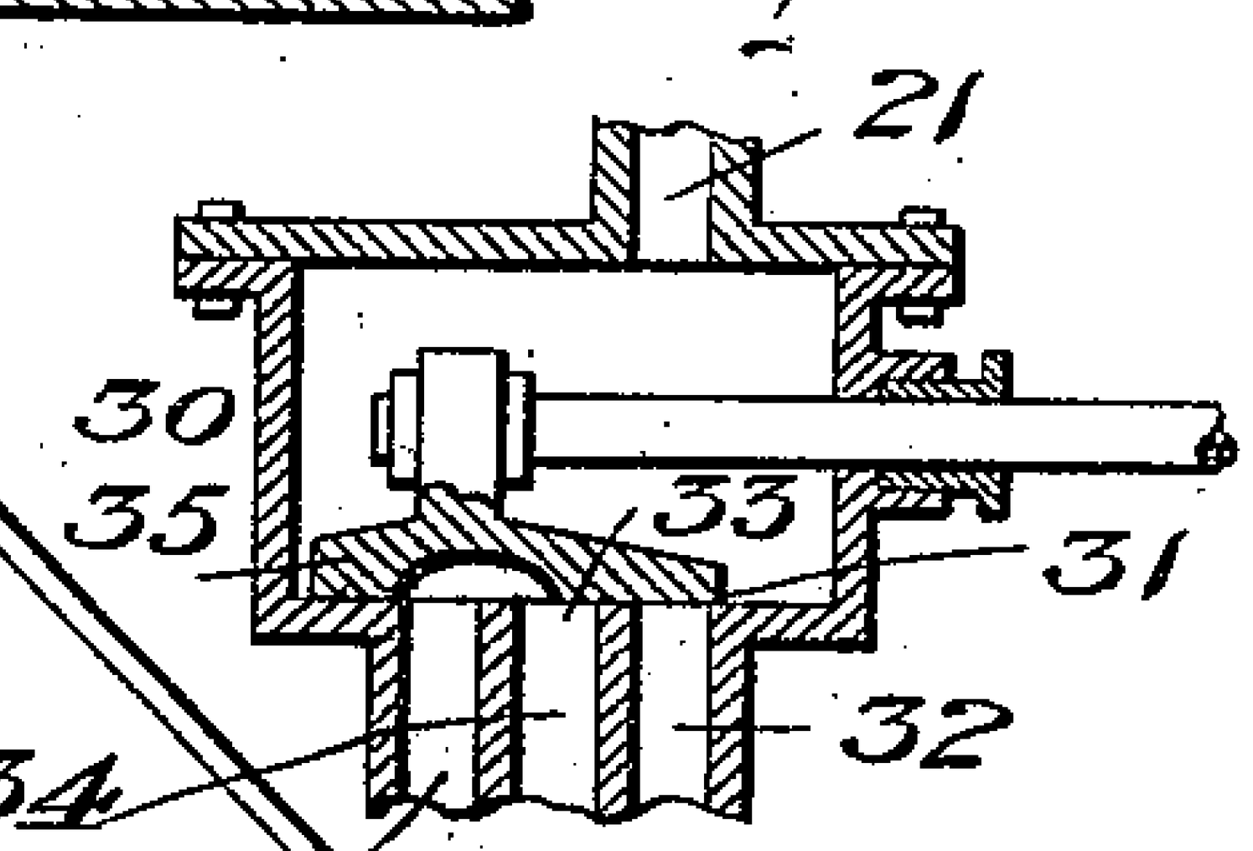


Fig. 5.



Witnesses

[illegible]

Geo. [illegible]

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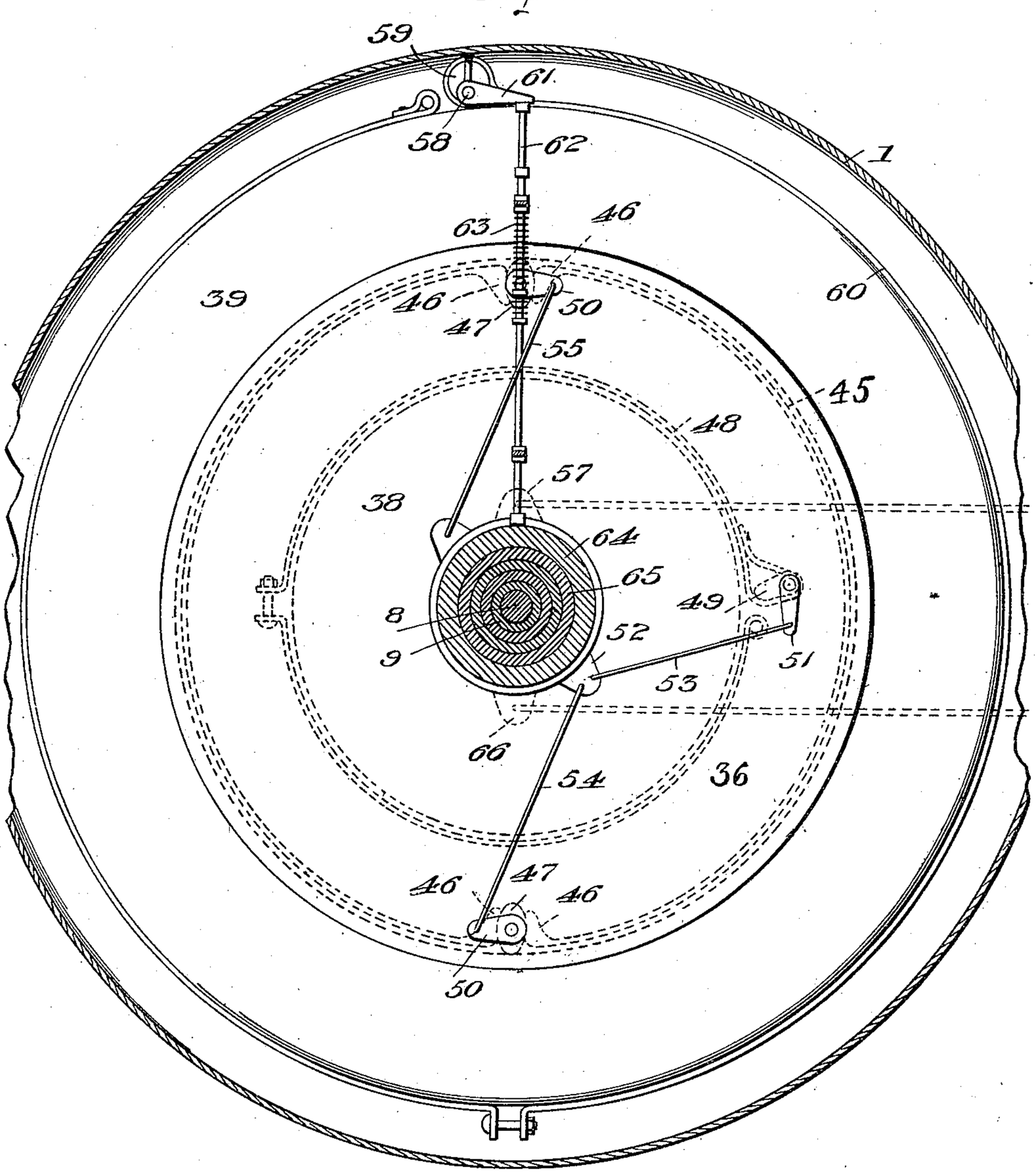
4 SHEETS—SHEET 4.

Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN A. WALTMAN, OF LOS ANGELES, CALIFORNIA.

ROTARY MULTIPLE-CYLINDER STEAM-ENGINE.

975,486. Specification of Letters Patent. **Patented Nov. 15, 1910.**

Application filed January 26, 1910. Serial No. 540,200.

To all whom it may concern:

Be it known that I, JOHN A. WALTMAN, a citizen of the United States, residing at Los Angeles, county of Los Angeles, and State of California, have invented certain new and useful Improvements in Rotary Multiple-Cylinder Steam-Engines, of which the following is a specification.

This invention relates to rotary multiple cylinder steam engines.

The present invention has for its object the provision of the steam engine of novel construction which is particularly adapted to be carried by a traction wheel for use with vehicles of any kind, although also intended for use as a self-contained rotary steam engine.

The invention contemplates the provision of a novel self-contained steam engine having a plurality of cylinders, gears, brakes, valve motions and controls, and other features combined in a new manner, providing an engine which can be started, stopped, and reversed by the same controlling lever or its equivalent, and wherein increased speed may be obtained by the utilization of a novel arrangement of devices, said engine having its power pulley or traction wheel adapted for use as a self-contained traction wheel for vehicles or as a self-contained driving rotary engine.

In another aspect, the invention contemplates the provision of novel means for clutching its driving elements to a power shaft, whereby several of the engines may be used for driving the same shaft and controlled independently, permitting one or more of the engines to be connected with the shaft when under full speed, without injury or disturbing the remaining engines.

Certain embodiments of the invention are set forth hereinafter and in the accompanying drawings in which—

Figure 1 is a vertical section; Fig. 2, a horizontal section; Fig. 3, an enlarged detail view, partly broken away of the automatic clutch; Figs. 4 and 5, details of the valve chest and connections to the cylinders; and Fig. 6, a vertical section on line 6—6 of Fig. 2.

As shown in the drawings, the invention is adapted for use as a self-contained rotary engine, serving as its own pulley, but it will be understood that it is, as illustrated, just as well adapted for use as a self-contained traction wheel for vehicles. The shell or casing is composed of a tread or side part 1 and a removable side plate 2, connected by fastenings 3, affording convenience of access to the interior mechanism. If the engine is used as a traction wheel, any suitable tire or facing may be applied thereto or to any extension thereof.

As illustrated, the engine has two bearings 4 and 5, the bearing 4 receiving the journal 6 formed integral with the side plate 2, and being provided with a shell 7. A shaft 8 extends through the journal 6 and through the entire engine, and on the other side of the engine is surrounded by a sleeve 9 which is received in the bearing 5. Secured to the shaft 8 is a friction wheel 10, while carried by the shell 7 and surrounding the said wheel is a friction strap brake 11 (Fig. 3), the said brake having eccentrics 12 to which are connected governor arms 13 drawn together by a spring 14, the entire brake being carried by the shell 7 and the governor arms lying on opposite sides of the journal 6. The rotation of the shell or casing 1 is communicated to the shell 7 and the centrifugal action throws the governor arms outwardly, causing the friction strap brake 11 to clutch the friction wheel 10, thereby communicating motion to the shaft 8, and even if the engine is thrown into engagement with the shaft while the latter is being rotated by another steam engine, there is no shock or damage to either engine or to the shaft.

The bearing 4 is provided with inlet pipes 15 and exhaust pipes 16, the former being connected to any suitable source of steam, or air supply, preferably the former, by suitable pipes which are not shown. The side plate 2 is provided with circular channels or grooves 17 and 18 in its face, which, as the engine revolves are always in communication with the respective inlet and exhaust pipes 15 and 16 and are also in communication with feed and exhaust channels 19 and 20 formed in or on the plate 2 in any preferred manner and from which pipes 21 and 22 lead to the cylinders of the engine.

As many engines may be employed as found desirable, four being shown in the present instance. Each engine is composed of opposed high pressure cylinders 23 and

opposed low pressure cylinders 24 in which pistons 25 reciprocate, the latter being connected by the cross-heads 26 and 27. The engines are suitably connected to the shell 1 by supports or frame-pieces 28, and a spider 29 supports them from the shaft 8.

For the high and low pressure cylinders of each of two of the engines there is a common valve chest 30 (Figs. 4 and 5) which has the inlet pipe 21 leading thereto and the exhaust pipe 22 leading therefrom. A port 31 in said valve chest leads to the high pressure cylinders of the two engines by a pipe 32, and a port 33 leads to the low pressure cylinders by a pipe 34. Thus, the two high pressure cylinders of the two engines and the two low pressure cylinders are jointly fed, the feed being governed by a slide valve 35 which is of such construction that the exhaust port is only uncovered to the low pressure port 34 on the one hand, and the high pressure port 31 is either uncovered to receive the pressure from the pipe 21 or is uncovered only to the low pressure port 33, the consequence being that the steam at its initial pressure is originally received in the high pressure cylinders of the two engines, and thereafter the high pressure goes from said high pressure cylinders into the low pressure cylinders and subsequently is exhausted from said low pressure cylinders. The actuation of the valves appears more fully hereinafter.

Connected to or formed integral with the bearing 5 is a plate or disk 36. Loose on the sleeve 9 are a gear 37 and a friction disk 38 which are formed integral or connected together, as shown in Fig. 2. There is a loose internal gear 39 arranged concentrically to the gear 37, said gear being in the present instance loosely mounted between the gear 37 and the friction disk 38. The crank shafts 40 of the engines coöperate with the connecting heads or yokes 26 and 27 and carry pinions 41 which mesh with both the gears 37 and 39. Secured to the gear 37 are the ovoidal cams 42 and 43 which operate the stems or rods 44 of the different valves 35.

Carried by the disk 36 are friction straps 45 which have heads 46 between which are located rockable cams 47 pivoted to said disk 36 (Fig. 6). Surrounding the disk 38 is a friction strap 48 which is carried by the disk 36 and is operated by a cam 49. The cams 47 have arms 50 and the cam 49 an arm 51. One of the arms 50 and the arm 51 are both connected to a rocker 52 on one side thereof and the other arm 50 is connected to the rocker on the other side thereof by rods 53, 54 and 55 (Fig. 6), the arrangement being such that when the rocker is turned the straps 45 are applied to an annular friction flange 56 on the gear 39, and thus the said gear 39 is held stationary, while the friction strap 48 is loosened and the gear 37 is free to run idly. When the parts are in the full line position shown in Fig. 6, both the friction straps 45 and 48 are loose and both the gears 37 and 39 are free to run idly. When the rocker is turned beyond the dotted line position, the friction straps 45 are loosened and the strap 48 tightened so that the gear 37 is then stationary and the gear 39 loose. Thus, it will be seen that when the gear 37 is stationary, the engagement of the pinions 41 will cause the shell 1 to run in one direction, and when said gear is loose and the gear 39 is stationary, the shell will run in the opposite direction and that when both gears are loose, the shell 1 will remain stationary, regardless of the operation of the engine.

To conveniently operate rocker 52, it is provided with a sleeve Fig. 2, having an ear 57 adapted for connection to any suitable operating lever or its equivalent.

In order that a greater speed of the shell 1 may be obtained from the same given speed of the pinions 41, as shown in Fig. 6, there is provided on the shell or casing 1 a cam shaft 58 having cam 59 for operating friction strap brake 60 around the internal gear 39. The shaft 58 has an arm 61 which is operated by an actuating rod 62, the latter being urged downwardly by a spring 63, its lower end being provided with a foot which bears on a cam 64, which is carried by a sleeve 65 having an ear 66 adapted for connection to any suitable lever or operating device. The inner face of the sleeve or rocker 65 is provided with a cam 67 bearing against a similar cam surface on the rocker 52. In consequence, when the rocker 65 is turned, the cam face 64 will elevate the actuating rod and apply the brake 60, but when the rocker is released, the tension of the spring 63 and the cam surface 67 will throw off such engagement. The diameter of the shell or casing 1 being somewhat greater than that of the internal gear 39, the coupling of the two together by the friction brake 60 will give a greater speed at the periphery of the casing 1 than if such brake were not used.

The general operation is as follows: Steam or air or other suitable motive fluid pressure being admitted through the pipes 15, is admitted into the high pressure cylinders of the engines and the pinions 41 are rotated. According to which of the gears 37 or 39 is stationary, the shell 1 will run forward or backwardly. The arrangement of the cams 42 and 43 and the valve stems 44 is such that the rotation of the engine causes the valves 35 to feed the steam from the high pressure cylinders into the low pressure cylinders and the pistons of the latter

do their work, after which the steam is exhausted through the pipes 22, conduits 20 and ports 18 and 16. Once the shell 1 is in rotation, either backwardly or forwardly, the governor arms 13 fly outwardly by centrifugal action and apply the friction clutch 11 to the wheel 10, thereby imparting motion to the shaft 8. When a greater speed is desired, the rocker 65 is operated to throw in the friction band 60 to couple the shell 1 to the gear 39.

The engine can be started, stopped, or reversed without any necessity for reversing the course of the motive fluid pressure to the cylinders and the pistons may continually operate while the engine is at rest.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, a motor carried by the wheel, a pinion meshing with said gears and operated by the motor, operable means for holding either of said gears against rotation, and independent means for coupling one of said gears to the wheel.

2. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, a motor carried by the wheel, a pinion meshing with said gears and operated by the motor, operable means for holding either of said gears against rotation, and an independently operable friction strap carried by the wheel and adapted for locking one of said gears thereto.

3. In an engine, the combination with a rotary wheel, of an inner gear, an outer internal gear, said gears being mounted for rotation independently of each other and independently of the wheel, a motor carried by the wheel, a pinion meshing with said gears and operated by the motor, operable means for holding either of said gears against rotation, and a friction strap brake carried by the wheel and adapted to engage and lock the internal gear thereto.

4. In an engine, the combination with a rotary wheel, of a motor carried thereby, gears mounted for rotation independently of each other and independently of the wheel, a pinion operated by the motor and meshing with said gears, friction strap brakes for holding the respective gears against rotation, a rocker for operating said friction strap brakes so that one or the other will be tight or both of them loose, an independent friction strap brake for coupling one of the gears to the wheel, and an independent rocker for actuating said last-named brake.

5. In an engine, the combination with a rotary wheel, of a motor carried thereby, gears arranged mounted for rotation independently of each other and independently of the wheel, a pinion operated by the motor and meshing with said gears, friction strap brakes for holding either of said gears against rotation, a friction strap brake for locking one of the gears to the wheel, an actuating rod for said last-named friction strap brake, and a rocker having a cam adapted to coact with said actuating rod to release or tighten the brake.

6. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, operable means for holding either of said gears against rotation, a motor carried by said wheel, a pinion operated by the motor and meshing with the gears, a power shaft, a friction wheel carried thereby, and an automatic governor controlled friction strap clutch carried by the wheel to clutch the wheel to the shaft when the wheel is in rotation.

7. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, a motor, a pinion meshing with said gears and operated by the motor, operable means for holding either of said gears against rotation, and independent means for coupling one of said gears to the wheel.

8. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, means for holding either of said gears against rotation, pinions meshing with the said gears, a plurality of engines each having high and low pressure cylinders, and pistons operating therein which are connected to the respective pinions, valve gear for controlling the supply and exhaust of the respective engines, and means for supplying motive fluid pressure to the engines.

9. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, pinions meshing with said gears, means for holding either of said gears against rotation, independent engines, pistons therefor which are operatively connected to the respective pinions, valve chests common to the cylinders of a plurality of the engines, slide valves for said valve chests, means for operating said slide valves, and means for admitting motive fluid pressure to the valve chests.

10. In an engine, the combination with a rotary wheel, of gears mounted for rotation independently of each other and independently of the wheel, pinions meshing with the said gears, means for holding either of said

gears against rotation, a plurality of compound engines whose pistons are respectively operatively connected to the pinions, valve chests having ports common to the high and low pressure cylinders of a plurality of the said compound engines, slide valves working in said valve chests and controlling the admission and exhaust of the motive fluid pressure, and cams controlling the movement of said slide valves.

In testimony whereof, I hereunto affix my signature in presence of two witnesses.

JOHN A. WALTMAN.

Witnesses:

WM. A. DASHIELL,

GEO. N. HAMLIN.