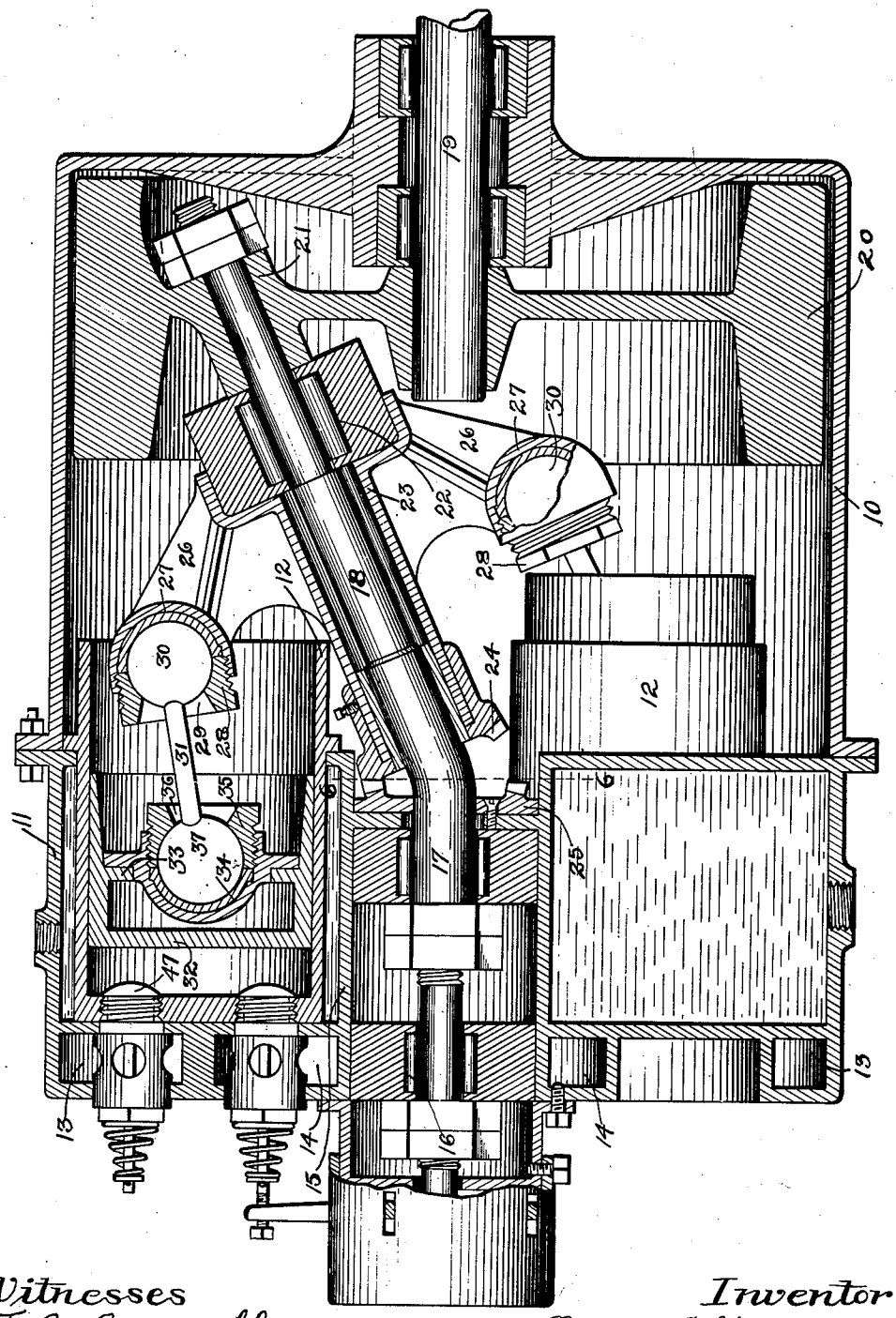
O. P. UNDERWOOD.

MECHANICAL MOVEMENT.

APPLICATION FILED FEB. 8, 1910.

1,116,768. Patented Nov. 10, 1914.



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UNITED STATES PATENT OFFICE.

OLIVER P. UNDERWOOD, OF INDIANOLA, IOWA.

MECHANICAL MOVEMENT.

1,116,768. Specification of Letters Patent. Patented Nov. 10, 1914.

Application filed February 8, 1910. Serial No. 542,782.

To all whom it may concern:

Be it known that I, OLIVER P. UNDERWOOD, a citizen of the United States, residing at Indianola, in the county of Warren and State of Iowa, have invented a certain new and useful Mechanical Movement, of which the following is a specification.

The object of my invention is to provide a mechanical movement of the type adapted for use with engines having a series of parallel cylinders arranged in a circle around a central shaft which is successively moved through a part of a revolution by each cylinder.

My object is to provide a mechanical movement of this class of simple, durable and inexpensive construction which may be contained in a small space and which is not likely to get out of repair.

My invention consists in certain details, in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawings, in which the figure shows a vertical, central, sectional view through a complete engine embodying my invention.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate a containing casing for the engine. Arranged at one end of this casing is a water jacket 11 and contained within this water jacket is a series of five cylinders indicated by the reference numeral 12. At the head of the engine are two concentric circular chambers 13 and 14, the former being preferably designed to communicate with a carbureter and the latter being the exhaust chamber for the engine. Arranged in the center of the engine casing between the cylinders is a cylindrical frame member 15 designed to receive the bearings 16 of the engine shaft. The engine shaft proper is indicated by the numeral 17 and is mounted within the bearings 16 and has an extension 18 at one end arranged at an obtuse angle relative to the body of the shaft and extended to a point adjacent to the rear end of the casing 10. Mounted in the central portion of the rear end of the casing 10 is a power shaft 19 having fixed to it a balance wheel 20. This balance wheel has the extension 18 of the engine shaft 17 rotatably mounted in it and is also provided with a boss 21 provided with an opening to receive the upper end of the extension 18. By this arrangement the shaft 17 may rotate and it will carry with it the balance wheel 20, the end of the shaft being so arranged that it will turn freely in the bearing of the balance wheel.

In order to impart a rotary motion to the shaft 17 by means of the reciprocating motion of the engine pistons, I have provided on the part 18 of the engine shaft a sleeve 23 having secured to one end a pinion 24 which pinion is in mesh with a stationary pinion 25 fixed to the cylinder 15 surrounding the straight portion of the engine shaft. It is obvious that only a portion of the pinion 24 will be in mesh at one time with the pinion 25, and when the shaft 17 is rotated the sleeve 23 will be held against rotation but the sleeve together with the end 18 of the engine shaft will incline in various directions from the main portion of the shaft 17 so that the teeth of the pinion 24 will successively engage the teeth of the pinion 25. Mounted on the extension 18, just below the boss 21, is a bearing 22 which may be of the roller type. Formed on the upper end of the sleeve 23 is a socket to receive the bearing 22. Formed on or fixed to the socket on the sleeve 23 is a series of arms 26, one for each cylinder, each arm being extended in the direction of one of said cylinders and each arm also being provided with a ball socket 27 having a detachable member 28 provided with an opening 29. Detachably mounted in this ball socket is a ball 30 having an arm 31 extended outwardly through the opening 29 thereof. Within each cylinder is a piston 32 of ordinary construction provided with a central cross head 33 in which is fixed a ball socket 34 provided with a detachable member 35 having an opening 36 therein through which the arm 31 is extended, which arm is connected to a ball 37 within said ball socket. By this arrangement a universal movement is provided for each end of the arm 31 connected respectively with the piston and with the arm 26. Therefore when the piston moves outwardly the arm 31 will press upon the arm 26 in such a manner as to impart a rotary movement to the inclined portion 18 of the engine shaft and as the various pistons are successively operated by

explosions within their cylinders the inclined end of the shaft 18 will be continuously rotated.

It is obvious that my improved mechanical movement is of extremely simple and inexpensive construction and that a comparatively large number of cylinders, in the present instance five being shown, may be employed. The number may be very easily altered to suit the requirements of the use.

When an explosion takes place within any one of the cylinders, the full power imparted thereby to the piston will be transmitted to the inclined portion 18 of the engine shaft tending to rotate the balance wheel 20 and on account of the arrangement of parts the explosions will take place consecutively as the engine shaft 17 is rotated so that each cylinder in turn will have this force applied to the engine shaft in a direction tending to rotate it at the exactly proper point in the rotation of the engine shaft. Furthermore all of the arms 26 will be held at all times in line with their respective pistons on account of the gearing device 24 and 25.

On account of the construction and arrangement of the boss 21, the bearing 22, the sleeve 23 and its socket, I have provided an extremely strong and simple construction for transmitting motion from the piston thread to the engine shaft. The arrangement of the boss, the bearing and the socket takes up and cares for the end thrust and also the radial thrust of the arms 26 so that the sleeve 23 will at all times be held in proper position and the gear members 24 and 25 will be properly held in mesh.

I claim as my invention:

In a device of the class described, the combination of a shaft having one end extended at an obtuse angle relative to the body portion, said body portion being rotatably mounted in a suitable bearing, a balance wheel rotatably mounted and having formed thereon a boss, receiving the end of said extension, a bearing on said extension adjacent to said boss, a stationary gear wheel surrounding said body portion, adjacent to the extension thereon, a sleeve mounted upon said extension having at its outer end a socket in which said bearing is received, a gear wheel mounted on said sleeve, in mesh at one point with said stationary gear wheel, a plurality of arms placed at regular intervals upon said socket and a reciprocating member operatively connected with each of said arms.

Des Moines, Iowa, Dec. 8, 1909.

OLIVER P. UNDERWOOD.

Witnesses:

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