No. 851,293. PATENTED APR. 23, 1907.

G. LEHBERGER.

ENGINE OR MOTOR.

APPLICATION FILED JUNE 7, 1905.

2 SHEETS—SHEET 1.

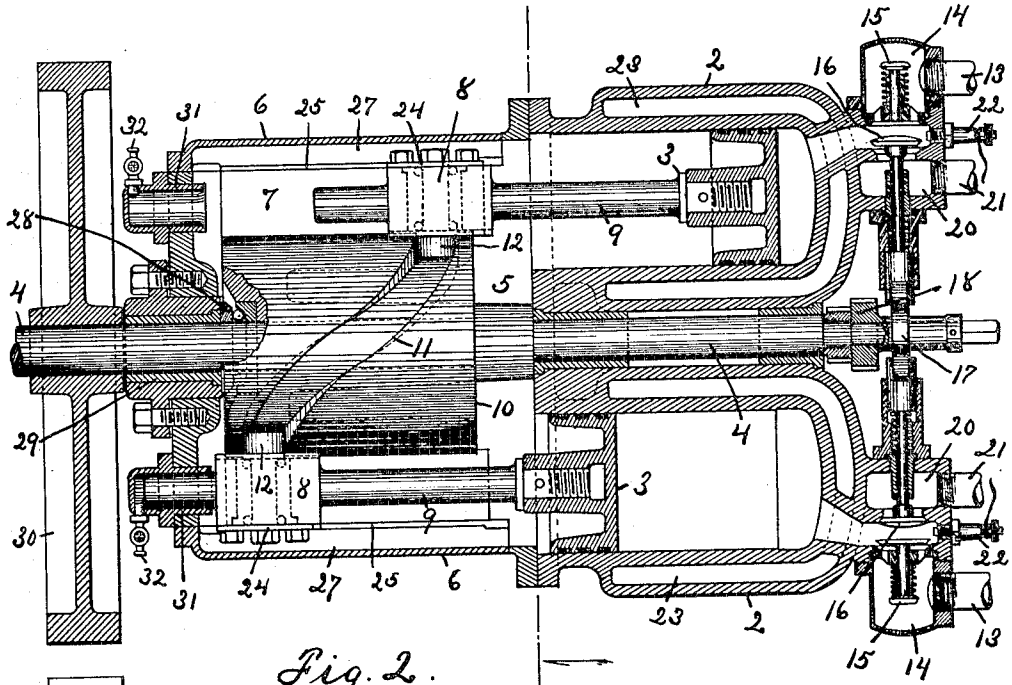


Fig. 2.

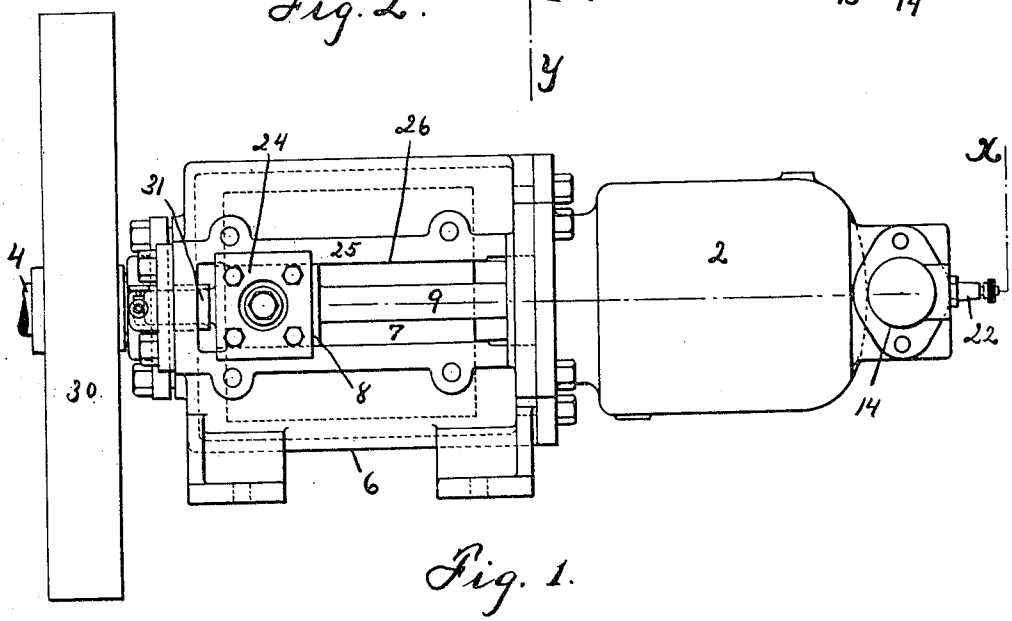


Fig. 1.

WITNESSES:

Alfred J. Soden.

Russell M. Everett.

INVENTOR

George Lehberger.

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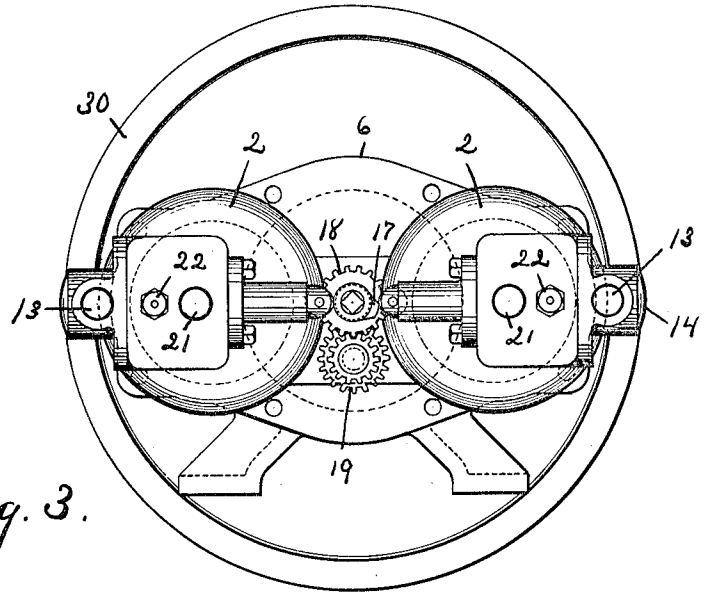
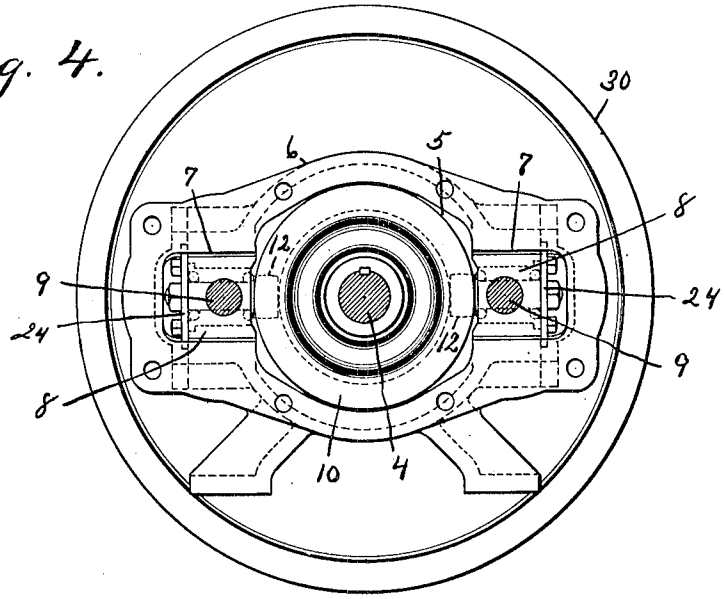


Fig. 3.

Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE LEIBERGER, OF NEWARK, NEW JERSEY.

ENGINE OR MOTOR.

No. 851,293. Specification of Letters Patent. Patented April 23, 1907.

Application filed June 7, 1905. Serial No. 264,044.

To all whom it may concern:

Be it known that I, GEORGE LEIBERGER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Engines or Motors; and I 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to any motors or engines in which pistons are reciprocated by a pressure fluid, but is particularly intended for the gas engines which are now in such common use.

The objects of the invention are to dispense with the crank as a means for transmitting power from the piston to the driving shaft; to obviate the great variation of angle at which the power of the piston is applied through said crank; to enable the power to be always applied at a uniform radial distance from the shaft; to provide for a piston connected directly to a shaft parallel thereto, and to obtain other advantages and results, some of which may be hereinafter referred to in connection with the description of the working parts.

The invention consists in the improved engine or motor, and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of an engine of my improved construction; Fig. 2 is a horizontal longitudinal section of the same taken upon line *x*, Fig. 1; Fig. 3 is an elevation of the engine from the cylinder end, and Fig. 4 is a vertical cross-section on line *y*, Fig. 2, looking in the direction indicated by the arrow.

In said drawings, 2, 2 indicate two pressure fluid cylinders having pistons 3, 3, and between which cylinders a driving shaft 4, has its journal bearings. Each of said cylinders 2, opens at its rear end into the open chamber 5, of a casting 6, and radially outer portions 7, of said chamber which are in line with the cylinders 2, 2, receive each a slide piece 8, fast on the rod 9, of the piston 3, of the adjacent cylinder 2. In the central portion of said chamber 5, is a drum 10, mounted on the shaft 4, and which drum has in its peripheral surface an endless groove 11, extending obliquely to the length of the drum around the same, as shown. The pitch, or distance between the extreme points of the groove measured along the drum, is equal to the stroke of the pistons, and the slide-piece 8, of each piston rod has a pin 12, projecting into the groove. Thus as the piston 3, reciprocates, the drum 10, is forced continuously forward in a rotary movement and the shaft with it.

Hydrocarbon vapor or mixture is supplied to each cylinder through a duct 13, and chamber 14, a spring controlled valve 15, admitting it from said chamber 14, into the cylinder automatically as is common. Other valves 16, operated by a cam 17, driven through gears 18, 19, from the main shaft 4, serve to exhaust the cylinders through a chamber 20, and ducts 21. A sparker 22, is provided for each cylinder, as is common, and the cylinders have water jackets 23.

Each of the slides 8, fits at its sides nicely into the extension 7, of the chamber 5, so that a large stable bearing is afforded; furthermore, at the outer face of said slide is a plate 24, which overlaps outside the edges 25, of a slot or longitudinal opening 26, in the chamber casting 6. A cap 27, then covers this opening 26, and at its edges forms a way for the plate 24, to slide. The pins 12, in the said slide-blocks 8, have stems extending through the same and preferably mounted in ball bearings, as indicated. Preferably a roller or ball thrust bearing 28, is placed between the end of the chamber casting 6, and the adjacent end of the drum 10, a bearing 29, being furnished for the shaft 4, in said end of the casting. A pulley wheel 30, may be placed upon the shaft 4. At the further end of the chamber 5, from the cylinders 2, are arranged dash pots 31, to receive the ends of the piston rods 9, and cushion the strokes, the said dash-pots having pet cocks 32, as usual.

In operation, the engine being started, obviously one slide piece 8, travels along one slope of the groove 11, while the other slide piece is traveling in an opposite direction along the other part of the groove. Mo-

mentum carries past the ends or dead points of the groove, and thus the drum 10, will be rotated continuously.

It will be understood that while I have shown only two cylinders in the drawings, three, four, six or any desired number could be used equally well, arranged in a circle around the shaft 4. Furthermore the drum 10, may be any kind of a member which will provide at a distance out from the shaft 4, an obliquely disposed groove every point of which is at the same distance from the shaft.

By my improved construction, it will be noted that the use of a crank is avoided in transmitting power from the pistons to the shaft 4, and as a consequence I eliminate that vibration in running which is due to the crank. This enables the engine to be run much faster without danger of injury. Furthermore my construction conduces to economy of space.

Various other modifications in detail construction could be made without departing from the spirit and scope of my invention, and I do not wish to be understood as limiting myself by what I have herein positively shown and described, except as the state of the art may require.

Having thus described the invention, what I claim as new is:—

An engine or motor comprising a casing forming a crank casing, a series of cylinders projecting from one end of the casing, a piston and a piston rod in each cylinder, a shaft journaled in the casing projecting from the casing between the cylinders, a grooved drum on the shaft in the crank casing, a roller near the end of each piston rod in the groove of the drum, a dash-pot in the end of the casing for the reception of the end of each piston rod, a valve on the projecting end of each cylinder, and means on the end of the shaft adjacent to the valve for operating the valve.

In testimony, that I claim the foregoing, I have hereunto set my hand this sixth day of June 1905.

GEORGE LEHBERGER.

Witnesses:

RUSSELL M. EVERETT,

M. V. DOYLE.