L. H. R. ROGGE.

ENGINE.

APPLICATION FILED JULY 21, 1915.

1,181,802. Patented May 2, 1916.

Fig. 1.

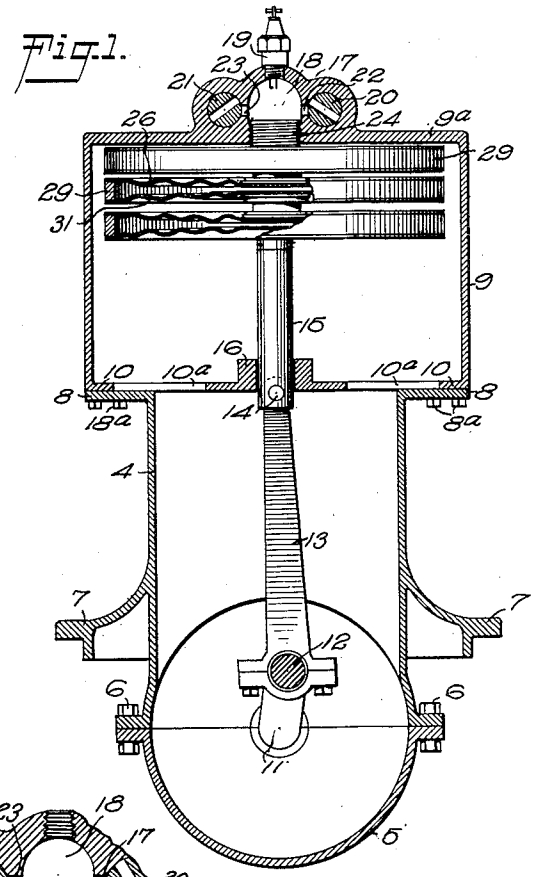


Fig. 2.

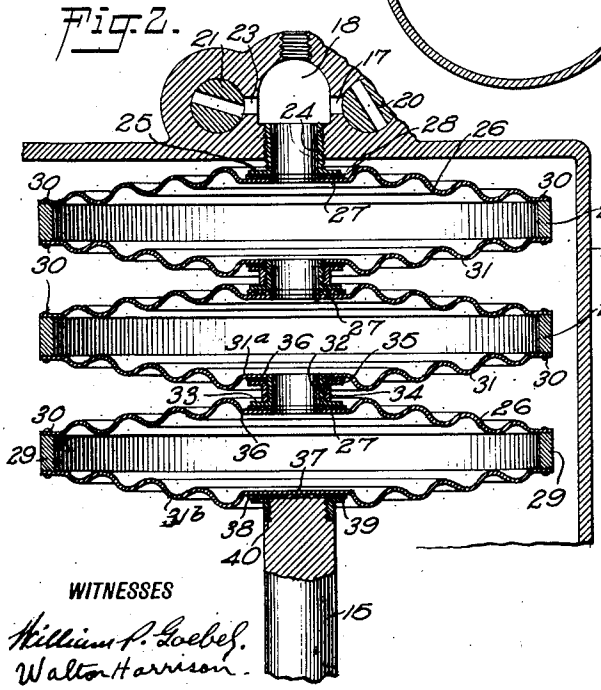
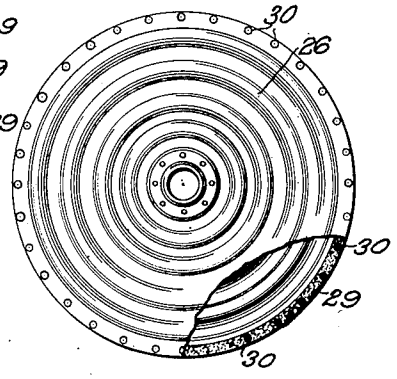


Fig. 3.



WITNESSES

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ENGINE.

1,181,802. Specification of Letters Patent. Patented May 2, 1916.

Application filed July 21, 1915. Serial No. 41,080.

To all whom it may concern:

Be it known that I, LOUIS H. R. ROGGE, a citizen of the United States, and a resident of Bernheimer, in the county of Warren and State of Missouri, have invented a new and Improved Engine, of which the following is a full, clear, and exact description.

My invention relates to engines and admits of general use, but is of particular value in connection with power engines using steam, gas, air or other elastic medium.

More particularly stated, my invention comprises an engine cylinder built up in sections each adapted to be inflated and deflated so that the cylinder as a whole expands and contracts and thus applies power to a crank shaft or the like.

While my invention may be used in a great variety of engines it is well adapted for service upon internal combustion engines and may be used not only for applying the power of the stroke to the mechanism to be driven, but also for compression, scavenging and all other purposes for which a cylinder would ordinarily be used.

In the particular instance here contemplated I disclose the invention as applied to a four-cycle internal combustion engine.

Reference is made to the accompanying drawings forming a part of this specification and in which like letters indicate like parts.

Figure 1 is a cross-section through the device; Fig. 2 is a fragmentary section showing the composite cylinder and parts immediately associated therewith; and Fig. 3 is a plan view of one of the sectional units of which the cylinder is made up.

A crank casing appears at 4 and is provided with a depending portion 5 connected to it by bolts 6. The crank casing is provided with feet 7 upon which its weight rests, and it is also provided with a pair of horizontally disposed flanges 8. A cylinder casing 9 is provided with a head 10 and with openings 10^a in this head. By aid of bolts 8^a the head 10 is secured to the flanges 8. A crank shaft is shown at 11 and a crank at 12. A connecting rod 13 is connected to this crank and is also connected with a sliding rod 15. For this purpose a pivot pin 14 extends through the sliding rod and the connecting rod. The head 10 is provided with a thickened portion 16 of substantially annular form which serves as a guide for the sliding rod 15. This guide is of massive construction and extends a sufficient distance along the sliding rod 15 to hold this rod in true alinement under all conditions to which it may be subjected. The cylinder casing 9 is provided with an end wall 9^a having a massive middle portion 17, and a mixing chamber 18 is formed within this massive portion. A spark plug 19 extends into the mixing chamber. A pair of rocking valves 20, 21 are provided, and adjacent these rocking valves are ports 22, 23, which are opened and closed by rocking movements of the valves. The mixing chamber 18, the rocking valves 20, 21, the ports 22 and 23 and the spark plug 19 may not differ materially from analogous parts now in use upon internal combustion engines.

Secured to the end wall 9^a is a threaded sleeve 24 which opens directly into the mixing chamber 18, as may be understood from Fig. 2. The sleeve 24 is provided with an annular flange 25 integral with it. A diaphragm 26 made of concentrically corrugated sheet metal has a general circular form and is provided with a middle portion 27 of annular form, the latter being secured to the flange 25. Interposed between the flange 25 and the annular portion 27, however, is a gasket 28 of asbestos or other heat-insulating material. A ring 29 made of metal is secured by fastenings 30 to the outer edge of the diaphragm 26. Another diaphragm 31, similar to the diaphragm 26, is connected at its outer edge to the ring 29 by aid of fastenings 30. Any reasonable number of diaphragms 26, 31, connected together by rings 29 as above described and as shown in Fig. 2, may be employed. Connected with an annular middle portion 31^a of each diaphragm 31, is a sleeve 32 which is threaded externally and is provided with a flange 33 of annular form. Fitted upon the threaded sleeve 32 is a threaded sleeve 34, the latter being provided with an annular flange 35. Disposed between this annular flange and the adjacent annular portion 31^a of the diaphragm 31 is a gasket 36 of asbestos or similar heat-insulating material. A similar gasket 36 is disposed between the flange 33 and the adjacent middle portion 27 of the next successive diaphragm 26. Connected with the lowermost ring 29, according to Fig. 2, is a diaphragm 31^b,

similar to the diaphragms 31 above described but differing therefrom by having a middle portion 37 which is unbroken. This middle portion is connected rigidly to a collar 39 carried by the sliding rod 15 and preferably insulated by a gasket 38 of heat-insulating material, such as asbestos.

The various diaphragms 26, 31, 31^b with the connections therebetween, and the rings 29, together constitute a composite cylinder which may be expanded and contracted in the general direction of the length of the common axis of all of the diaphragms. With the cylinder expanded the parts appear as indicated in Fig. 2. With the cylinder contracted the various parts appear as shown in Fig. 1. Essentially the cylinder is built up of separate units each of which expands and contracts along its general axis. When the units are contracted the middle portion of each diaphragm 26 is comparatively close to the middle portion of the companion diaphragm 31 or 31^b forming a part of the same section. When, however, the cylinder is expanded, as indicated in Fig. 2, the middle portion of each section is at a comparatively great distance from the middle portion of the mating or companion diaphragm of the same section. The composite cylinder thus constructed may be expanded by the gases of explosions occurring within the explosion chamber 18, or by mechanical action of the crank 12, depending upon the condition of the engine at the particular moment when the cylinder is expanded. Such being the case, the cylinder may be employed for compression or for purposes of scavenging in practically the same manner as the cylinder of any other internal combustion engine.

It will be noted that in my construction I do not employ any piston or any part analogous to a piston. Neither are there any slidable packings, nor any sliding parts which are subjected directly to gas pressure. The internal diameter of the sleeves 24 and 32 is small as compared with the internal diameter of the rings 29. I do not limit myself, however, to the precise proportions here shown for the various parts. Neither do I limit myself to the exact construction here disclosed, as variations may be made therefrom without departing from the spirit of my invention.

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

1. A device of the character described comprising a cylinder casing provided with a mixing chamber and with valves communicating with said mixing chamber, a sleeve carried by said cylinder casing and communicating with said mixing chamber, a flexible diaphragm within the casing and connected at its approximate middle portion with said sleeve and having a general diameter greater than the internal diameter of said sleeve, a ring connected with said diaphragm at the outer edge thereof, another diaphragm connected with said ring and movable relatively to said first mentioned diaphragm and also free to flex relatively to the same, and mechanism for transmitting motion from said last mentioned diaphragm to a shaft for delivering power.

2. An engine cylinder comprising a casing provided with an explosion chamber, a plurality of sectional units in the casing, said units being connected together and provided with flexible diaphragms, whereby said sectional units may each be expanded and contracted in a predetermined direction so that the total expansion and contraction of the various units is cumulative, a sliding rod connected to one of said sectional units at a point remote from said mixing chamber, a connecting rod having guided movement in the casing and secured to said sliding rod, and a crank shaft connected to said connecting rod and in operative relation thereto.

3. In an engine, a support having a chamber at one end and a guide at its other end, valves controlling the admission of an elastic medium into the said chamber, a plurality of expansible units carried by the support, said units communicating with each other and one of them with the said chamber, a sliding rod secured to the unit remote from the chamber and working in the guide of the casing, a crank shaft, and a connecting rod connected to the crank shaft and having a pivotal connection with the sliding rod.

4. An engine, comprising a cylindrical casing having a chamber on its top and a guide in its bottom, a valve on each side of the said chamber, a crank case secured to the bottom of the cylindrical casing and communicating therewith, a crank shaft in the crank case, a connecting rod secured to the crank shaft, a plurality of expansible units in the cylindrical casing, one below the other and communicating with one another, the uppermost unit being in communication with the said chamber, a sliding rod secured to the lowermost unit, said rod sliding in the guide and pivotally connected to the connecting rod.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS H. R. ROGGE.

Witnesses:
HY FUERST,
FRITZ HAASE.