E. ENGEBRETSON.

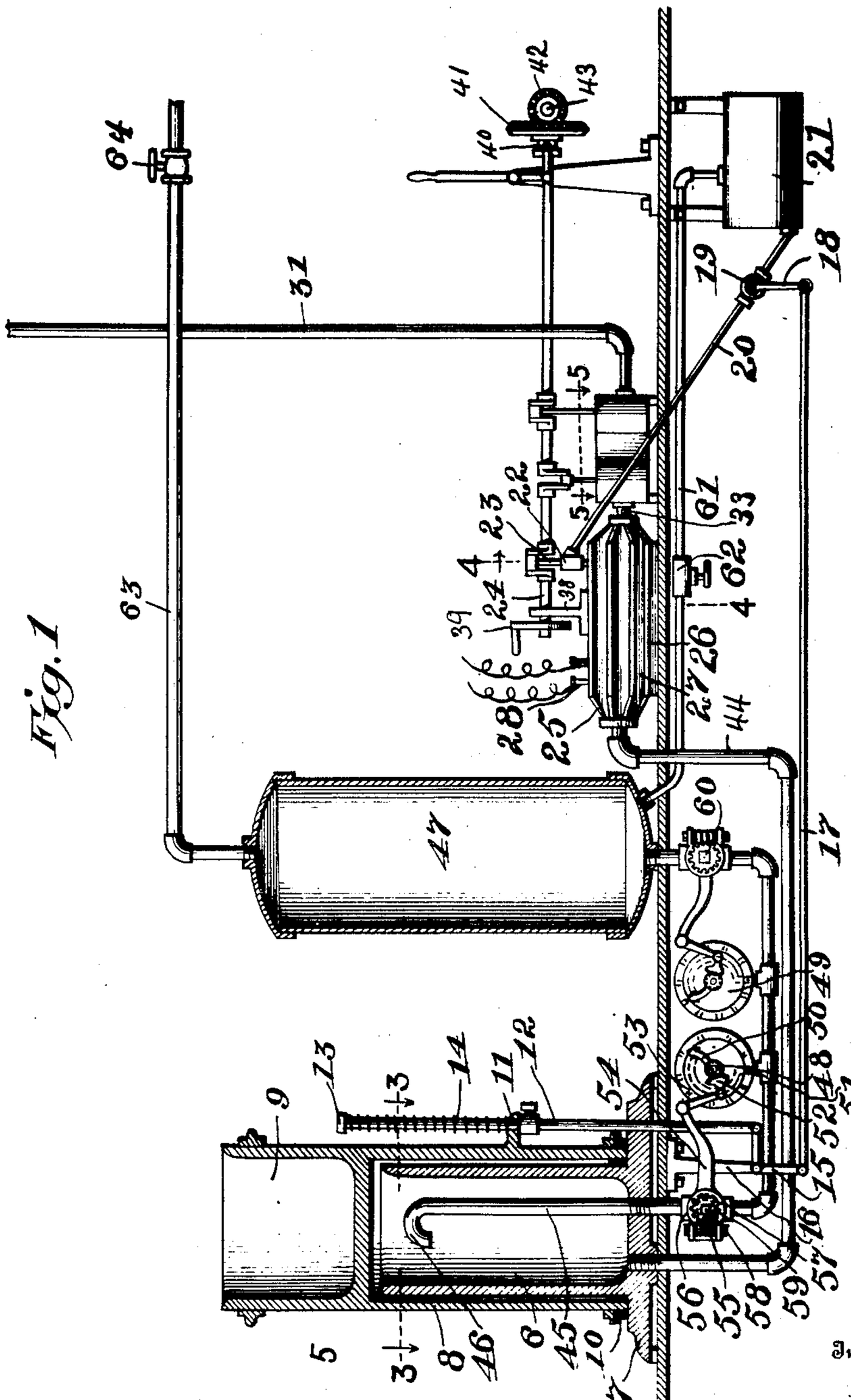
APPARATUS FOR PRODUCING UNIFORM FLUID PRESSURE FOR ENGINES.

APPLICATION FILED SEPT. 29, 1908.

925,627. **Patented June 22, 1909.**

3 SHEETS—SHEET 1.

Fig. 1



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By E. E. Vrooman, his Attorney

Witnesses

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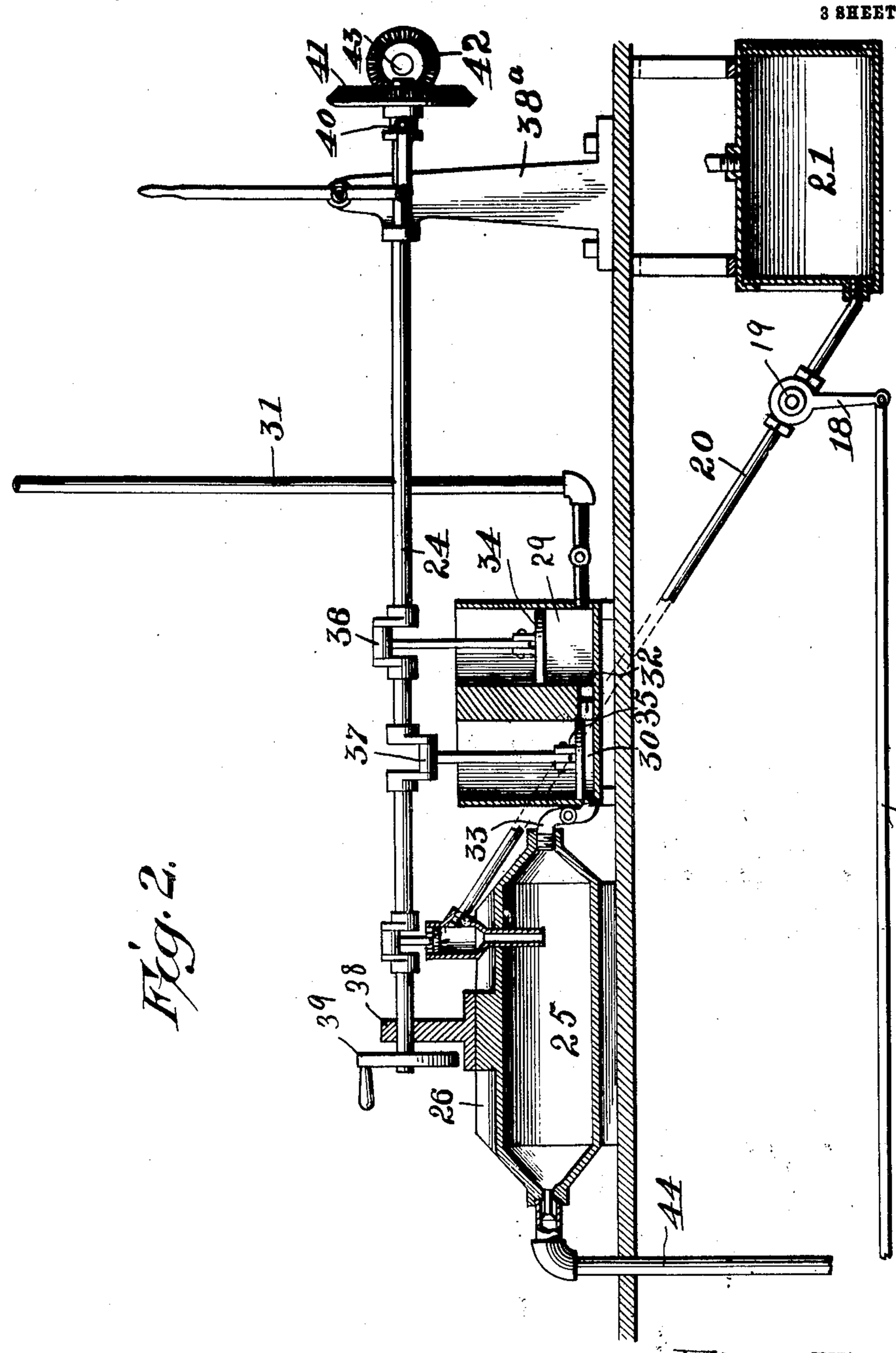

Fig. 2.

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3 SHEETS—SHEET 3.

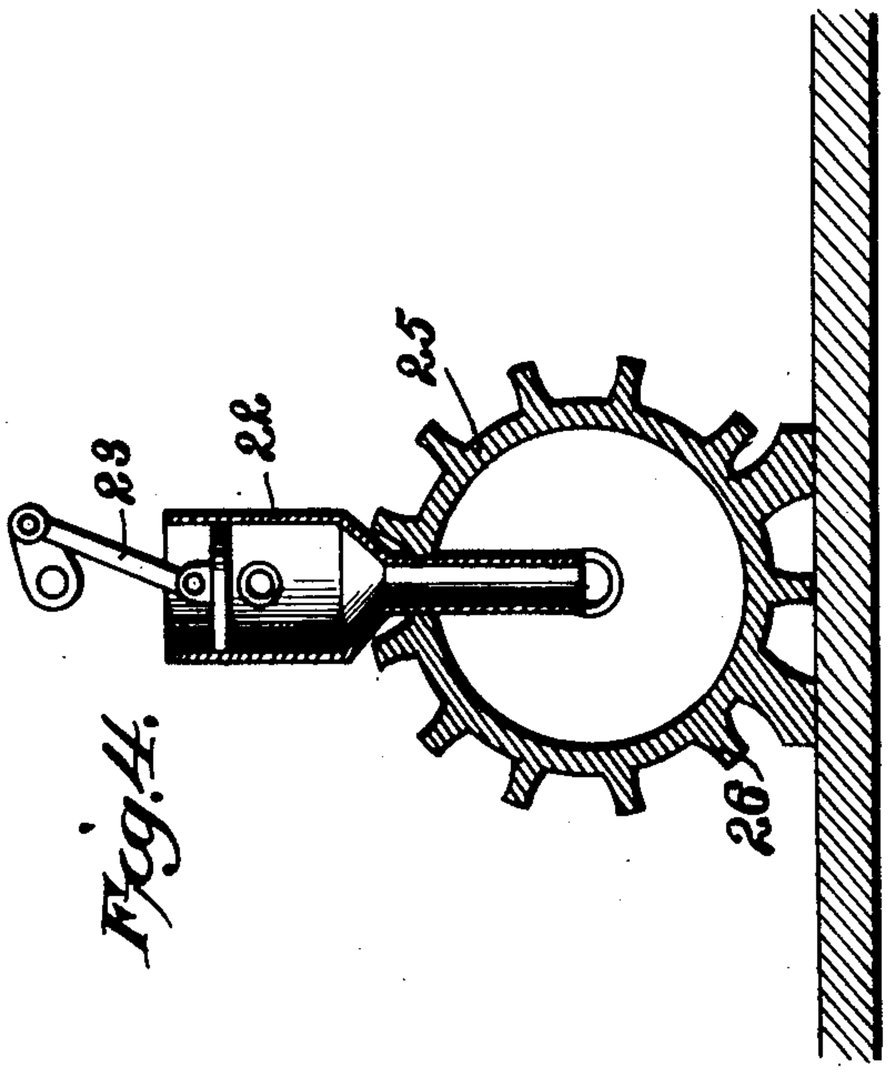

Fig. 4.

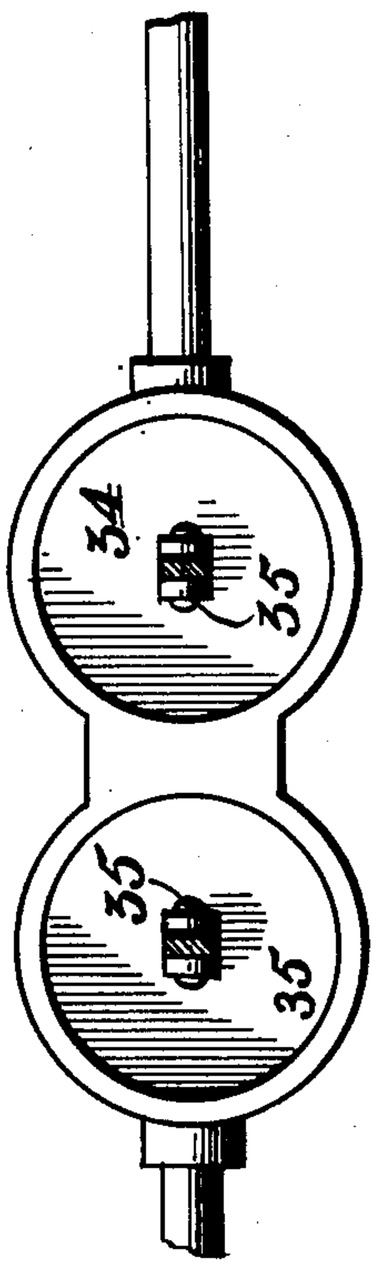

Fig. 5.

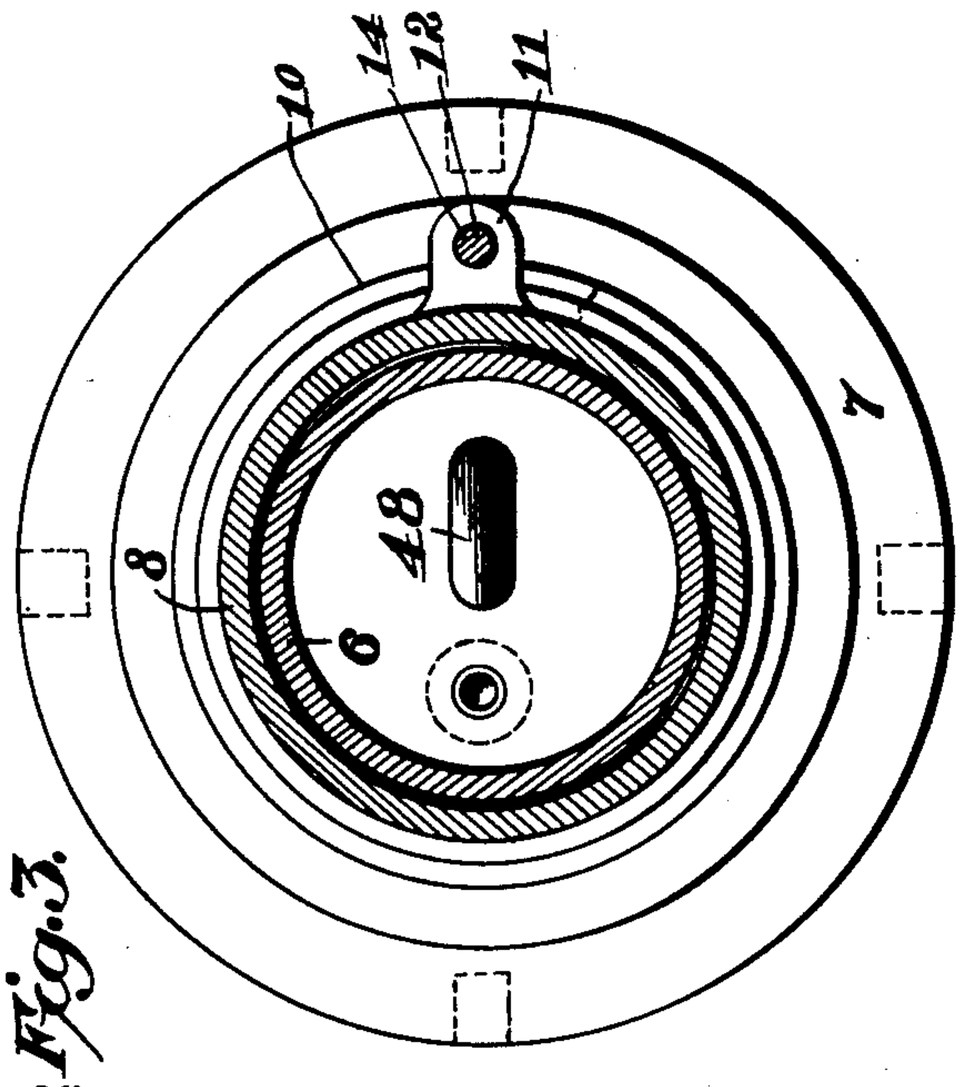

Fig. 3.

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UNITED STATES PATENT OFFICE.

ELMER ENGEBRETSON, OF DEVILS LAKE, NORTH DAKOTA.

APPARATUS FOR PRODUCING UNIFORM FLUID-PRESSURE FOR ENGINES.

No. 925,627. Specification of Letters Patent. Patented June 22, 1909.

Application filed September 29, 1908. Serial No. 455,358.

To all whom it may concern:

Be it known that I, ELMER ENGEBRETSON, a citizen of the United States, residing at Devils Lake, in the county of Ramsey and State of North Dakota, have invented certain new and useful Improvements in Apparatuses for Producing Uniform Fluid-Pressure for Engines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an apparatus or mechanism for producing fluid pressure composed of exploded gasolene and air for actuating engines, and the primary object of the same is to store energy resulting from the explosion of a proper mixture of air and gasolene under a predetermined pressure and feed it regularly and uniformly to an engine and avoid the fluctuations or irregular strokes existing in ordinary gasolene engines due to irregularity of explosions.

To the accomplishment of the recited object and others coördinate therewith, the preferred embodiment of the invention resides in that construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and embraced within the scope of the appended claims.

In the drawings:—Figure I is a sectional elevation of an apparatus embodying the features of the invention. Fig. II is a longitudinal section, partially in side elevation, of a portion of the apparatus. Fig. III is a horizontal section on the line 3—3 of Fig. I. Fig. IV is a transverse vertical section on the line 4—4 of Fig. I. Fig. V is a horizontal section taken in the plane of the line 5—5 of Fig. I, showing the air compressors in plan.

The numeral 5 designates what may be generally termed a compressing gasometer, and comprises an upright cylinder (6) with open top and supported by a base (7) anchored or secured by any suitable means to a support as shown. Over this cylinder (6) a shell or casing (8) is movably mounted to have vertical movement and is similar to a gasometer shell or bell with the exception that the present structure has an upper weight chamber (9) to establish a desirable or predetermined resistance to the forceful entrance into the cylinder of a fluid pressure or kinetic energy created by the explosion of a suitable admixture of a hydrocarbon product or gasolene and air. The shell or casing (8) will be set, by application of weights in the chamber (9), to resist a certain pressure and maintain in the cylinder a given temporarily stored pressure that will not obstruct incoming pressure charges, due to successive explosions carried on in another part of the apparatus as will be presently explained. The shell or casing (8) will move vertically on the chamber (6), as hereinbefore stated, and excessive impulses affecting the interior of the compressing gasometer will cause the said shell or casing to appreciably rise and fall and automatically check or control the flow or supply of gasolene to the explosive medium. To prevent leakage, the lower extremity of the shell or casing (8) is provided with a packing or gasket (10) coöperating with the base (7) and the cylinder (6). The shell or casing (8) is also provided with a lug (11) movably engaging a rod or trip (12) having an upper headed end (13), and between the latter and said lug a spring (14) surrounds and operates to restore the rod to normal position when free from the restraint of the casing or shell (8). The rod or trip (12) projects below the support for the compressing gasometer and is connected to one arm of a bell-crank lever (15) supported by a hanger (16), the remaining bell-crank arm being connected by a rod (17) and lever (18) with a plug valve (19) in a feed pipe (20) from a gasolene tank or supply reservoir (21), preferably suspended as shown.

The pipe (20) leads upwardly at an incline to and connects with a pump (22) having a piston (23) operatively associated with a shaft (24). The lower extremity of the pump body is fitted in the upper portion of a combustion chamber (25) having exterior ribs (26) and intervening channels (27) to cool it and at the same time preserve the necessary strength. This combustion chamber will be provided with any suitable form of approved sparking plugs and attachments conventionally shown, as at 28, and which will be under operative control of the engine. To one end of the combustion chamber twin compressors (29) and (30) are connected, the one compressor (29) being fed by a pipe (31) leading to the atmosphere, and communicating with the other compressor (30) by a suitable valve port (32), the latter compressor being directly connected to the combustion chamber by a pipe (33) having a suitable check valve therein. Both compressors (29) and (30) are provided with pistons (34) and (35), respectively, connected up to cranks (36) and (37) of the shaft (24) and having alternate

reverse reciprocations imparted thereto so that while the piston (34) is conpressing, the piston (35) will be rising and on return will compress and close communication through the valved port (32) with compressor (29) and open communication with the combustion chamber (25) through valved pipe (33). By this means air will be forced under pressure into the combustion chamber (25).

The air in the combustion chamber (25) will commingle with the gasolene fed into said chamber in predetermined quantities by the pump (22) and under the control of the valve (19), and at regular and properly timed intervals the sparking plugs (28) will ignite the successive charges in the combustion chamber. The shaft (24) is supported on the combustion chamber (25) by an upright (38) and also by an upright (38[a]) and is provided with a hand wheel (39) for initial starting operations. The shaft (24) may be connected by a suitable lever operated clutch (40) and gear (41) with a gear (42) on a shaft (43) running to the engine so that the shaft (24) may be regularly run from the engine after the latter is fully started and works regularly. As before indicated the mechanism will be initially started or actuated in the event that the engine runs down or from some cause ceases to operate by manually rotating the wheel and at which time the gear (41) will be disconnected from the gear (42.) After the generating mechanism starts, the said gear (41) is thrown into mesh with the gear (42) and the explosion and storage of the energy will continue and feed to the motor regularly ensue.

The potential energy generated in the combustion chamber (25) passes out through a suitably valved pipe (44) connected to the end thereof opposite that with which the compressor (30) communicates, the said pipe (44) opening at its opposite end into the bottom of the cylinder (6) and constitutes the feed means for said cylinder. The outlet of the cylinder (6) consists of a pipe (45) extending upwardly thereinto and having an upper crooked extremity (46) below the open top of the cylinder. The pipe (45) continues below the base (7) of the cylinder (6) through which it passes to and communicates with the bottom of a storage reservoir (47), and operatively associated with said pipe are two pressure gages (48) and (49). The index (50) of the gage (48) has a toothed disk or wheel (51) secured to or forming part of the inner end thereof, and with said disk or wheel (51) a toothed segment (52) is held in continual mesh and carried on the end of an angle arm (53) operatively connected to a controlling arm (54) carrying a worm (55) and connected to a reducing valve casing (56) to have a swinging movement. The worm (55) meshes with a worm gear (57) secured to the stem (58) of a reducing valve plug (59) having a suitable opening therethrough to increase or decrease the passage through the valve and regulate or reduce the pressure of the fluid flowing through the pipe (45) and which pressure will be constant in accordance with the setting or adjustment of the gage (48). The pipe (45) adjacent the reservoir (47) also has a reducing valve (60) in all respects similar to that just described and in like manner controlled by the gage (49). These reducing valves provide for storage of the fluid under uniform pressure in the reservoir (47) in accordance with a predetermined calculation and which may be varied at will.

From the bottom of the reservoir (47) a small pipe (61) leads to the top of the gasolene reservoir or tank (21), and said pipe is provided with a suitable cut-off valve (62) whereby, if desired, pressure from the reservoir (47) may be fed to the reservoir or tank (21) to assist in forcing or feeding the gasolene upwardly to the pump (22). To the center of the top of the reservoir (47) a supply pipe (63) is attached and leads to the cylinder of the engine, and this supply pipe has a suitable cut-off valve (64) to control the flow of the fluid to the engine.

From the foregoing the operation will be understood, and briefly stated, the primal fluid pressure is generated in the combustion chamber (25) and from the latter flows into the compressing gasometer (5). From the compressing gasometer it flows into the reservoir (47) being reduced to a degree required for effectively operating an engine and in accordance with the proportions and capacity of the engine supplied. Should the fluid pressure, or the pressure of the kinetic energy flowing through the pipe (45) exceed that predetermined the fluctuation will be immediately rectified by the gages (48) and (49) which operate the reducing valves, and in the event that the gage (48) should fail to properly actuate the valve or reduce the excessive pressure, the gage (49) will insure the necessary reduction. When excessive pressure is present, the reducing valves will partially or fully close and thereby check the flow through pipe (45) until the pressure is normally restored. By this means irregularity in the explosions, or rapidity of explosions will not affect or fluctuate the pressure of the fluid in the reservoir (47) and the fluid passing from the latter to the engine will have a constant or uniform pressure with obvious advantages in the regular actuation or stroke of the engine piston and associated power transmitting instrumentalities.

It should be understood that in its broader aspect the invention comprehends the employment not only of the various means described, but of equivalent means for performing the recited functions. While the arrangement shown is thought, at the present time, to be preferable, it is desired to reserve

the right to effect such modifications and variations thereof as may come fairly within the scope of the appended claims.

What is claimed as new is:—

1. An apparatus of the class specified, comprising a prime generating means having compressed air and gasolene supply devices, a compressing gasometer connected to said means, a storage and supply reservoir connected to the compressing gasometer, and pressure reducing valves between the compressing gasometer and reservoir.

2. An apparatus of the class specified, comprising a prime generating means having compressed air and gasolene supply devices, a compressing gasometer having a conduit connection with the said means, a storage and supply reservoir having a pressure reducing connection with the compressing gasometer.

3. An apparatus of the class specified, comprising a prime generating means having compressed air and gasolene supply devices, a compressing gasometer having a conduit connection with said means, a storage reservoir having a conduit connection with the compressing gasometer, and a valved pipe connection between the storage reservoir and a part of the gasolene supply devices.

4. An apparatus of the class specified, comprising a prime generating means having compressed air and gasolene supply devices, a compressing gasometer having a conduit connection with said means, a storage reservoir having a conduit connection with the compressing gasometer, reducing valves and gages in the conduit connection between the compressing gasometer and reservoir, and a valved pipe connection between the storage reservoir and a part of the gasolene supply devices.

5. An apparatus of the class specified, comprising a prime generating means having compressed air supply devices, gasolene supply devices involving a feed pipe with a valve, a compressing gasometer having a cylinder and a movable shell, a trip rod movable by the shell, connecting means between the trip rod and the valve of the gasolene feed pipe, a conduit between the prime generating means and cylinder of the compressing gasometer, a storage reservoir, conduit between the cylinder of the compressing gasometer and reservoir, and pressure reducing means operatively associated with the conduit between the cylinder and reservoir.

6. An apparatus of the class specified, comprising a prime generating means having twin air compressors connected to one extremity thereof, a gasolene supply means including a pump connected to the prime generating means and a cut-off valve, a compressing gasometer having a conduit connected to said prime generating means and provided with a weighted shell movable thereon, a trip rod connected to said cut-off valve and operatively associated with said shell, a storage reservoir having a conduit connection with the ram, reducing valves in the latter conduit, and pressure gages having their indices operatively connected to the reducing valves.

7. An apparatus of the class specified, comprising a prime generating means having compressed air and gasolene supply devices, a compressing gasometer having a movable pressure maintaining member and provided with a conduit connected to the prime generating means, a storage chamber, having a conduit connected to the compressing gasometer and provided with reducing valves, and pressure gages in the latter conduit and operatively attached to the said valves.

8. An apparatus of the class specified, comprising a prime generating means, twin air compressors for feeding said prime generating means, a gasolene supply having a pump communicating with the generating means, manually operative shaft for actuating the air compressors and the gasolene pump, a compressing gasometer having compressing means and a conduit leading to the generating means, a storage reservoir having a conduit leading to the compressing gasometer, pressure controlling valves in the latter conduit, and an engine shaft adapted to be thrown into and out of connection with said manually operative mounted shaft.

9. An apparatus of the class specified, comprising a prime generating means, twin air compressors for feeding said prime generating means, a gasolene supply having a pump communicating with the generating means, a manually operative shaft for actuating the air compressors and the gasolene pump, a compressing gasometer having compressing means and a conduit leading to the generating means, a storage reservoir having a conduit leading to the compressing gasometer, and an engine shaft adapted to be thrown into and out of connection with said manually operative mounted shaft.

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

ELMER ENGEBRETSON.

Witnesses:

ARTHUR M. LIND,

JOHN M. BLUMER.