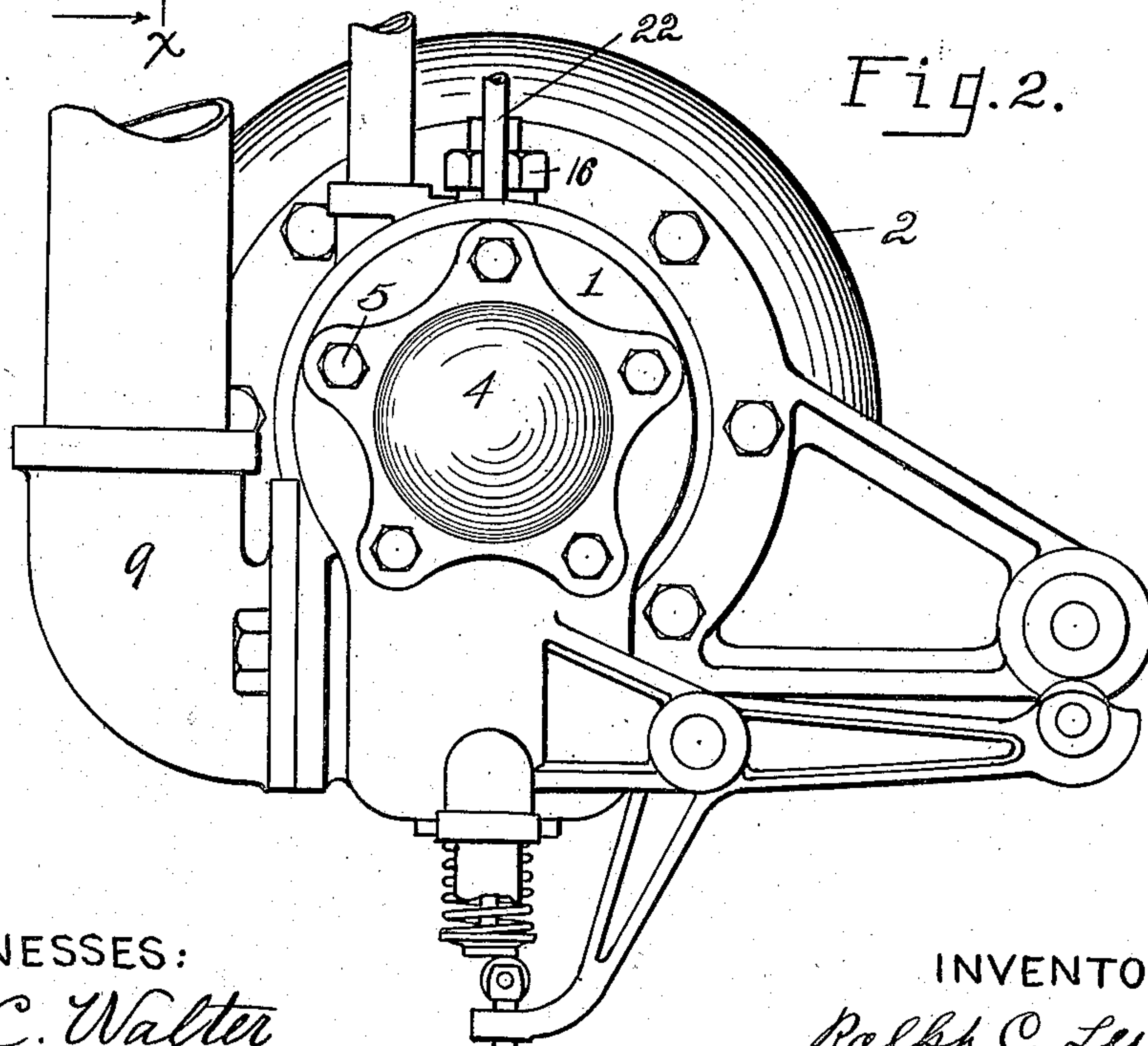
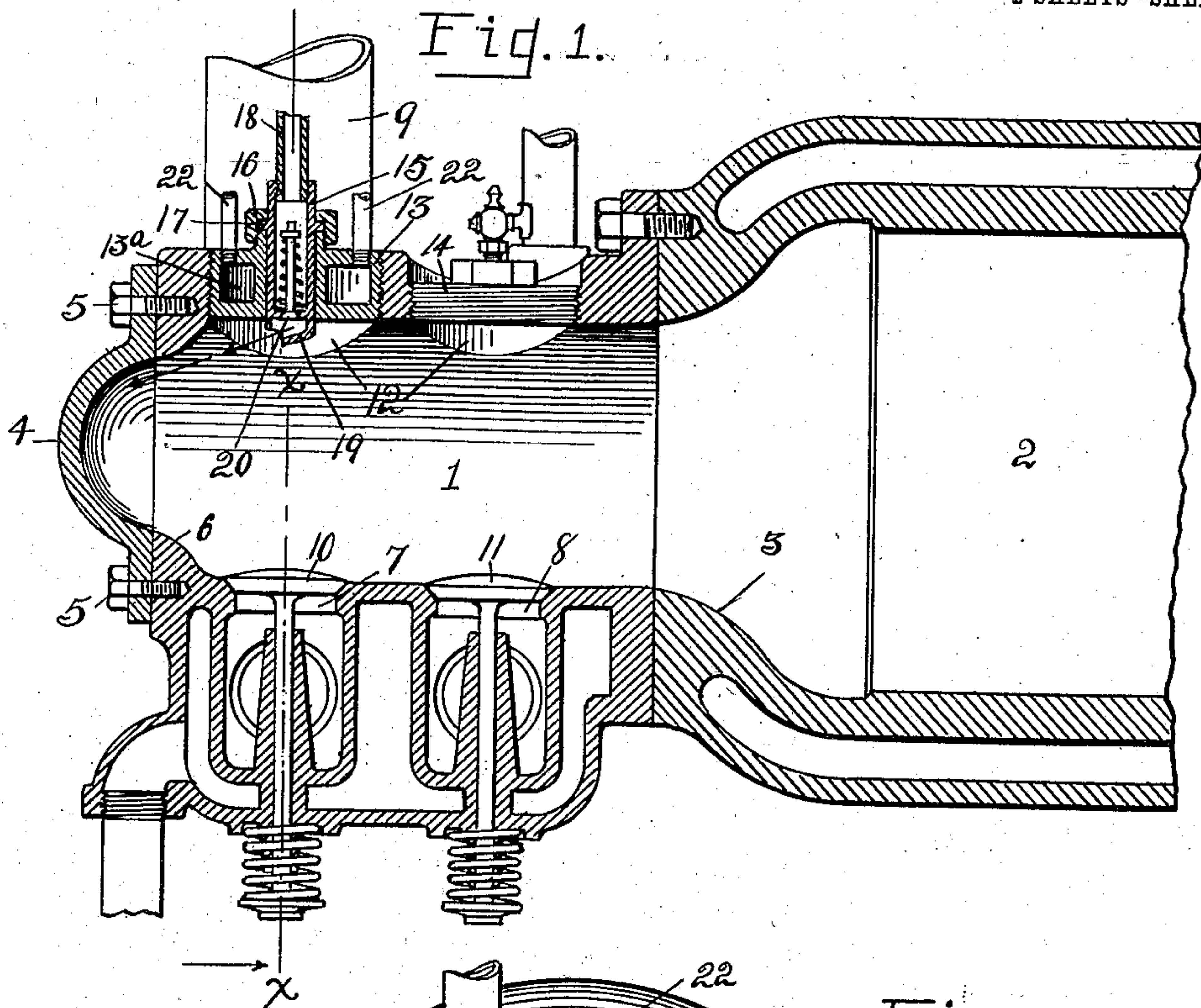


R. C. LEWIS.
HYDROCARBON ENGINE.
APPLICATION FILED AUG. 15, 1908.

911,138.

Patented Feb. 2, 1909.

2 SHEETS—SHEET 1.



WITNESSES:
D. C. Walter
Hazel B. Hiett

INVENTOR.
Ralph C. Lewis
By Brown & Brown,
His attys.

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2 SHEETS—SHEET 2.

Fig. 3.

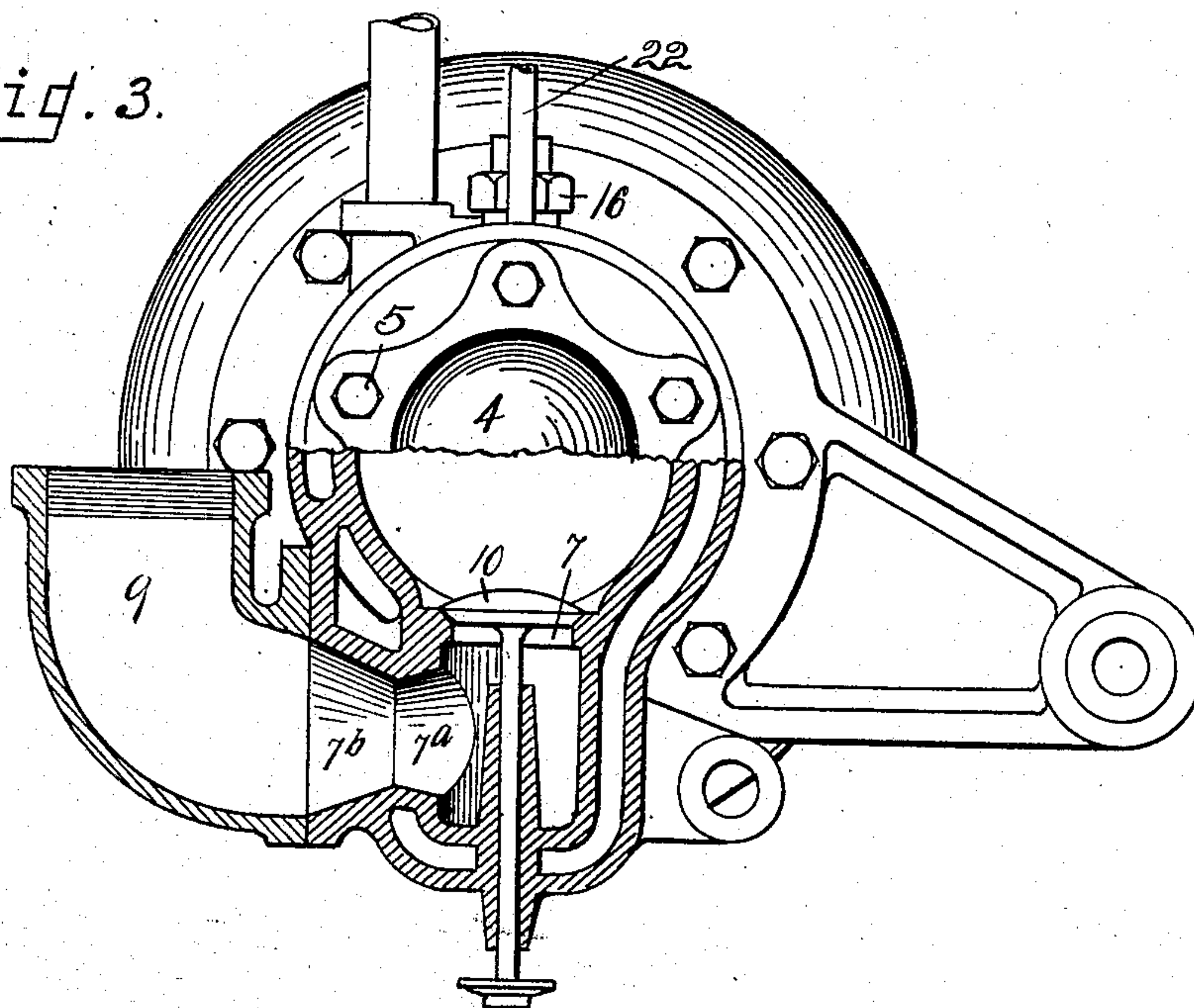
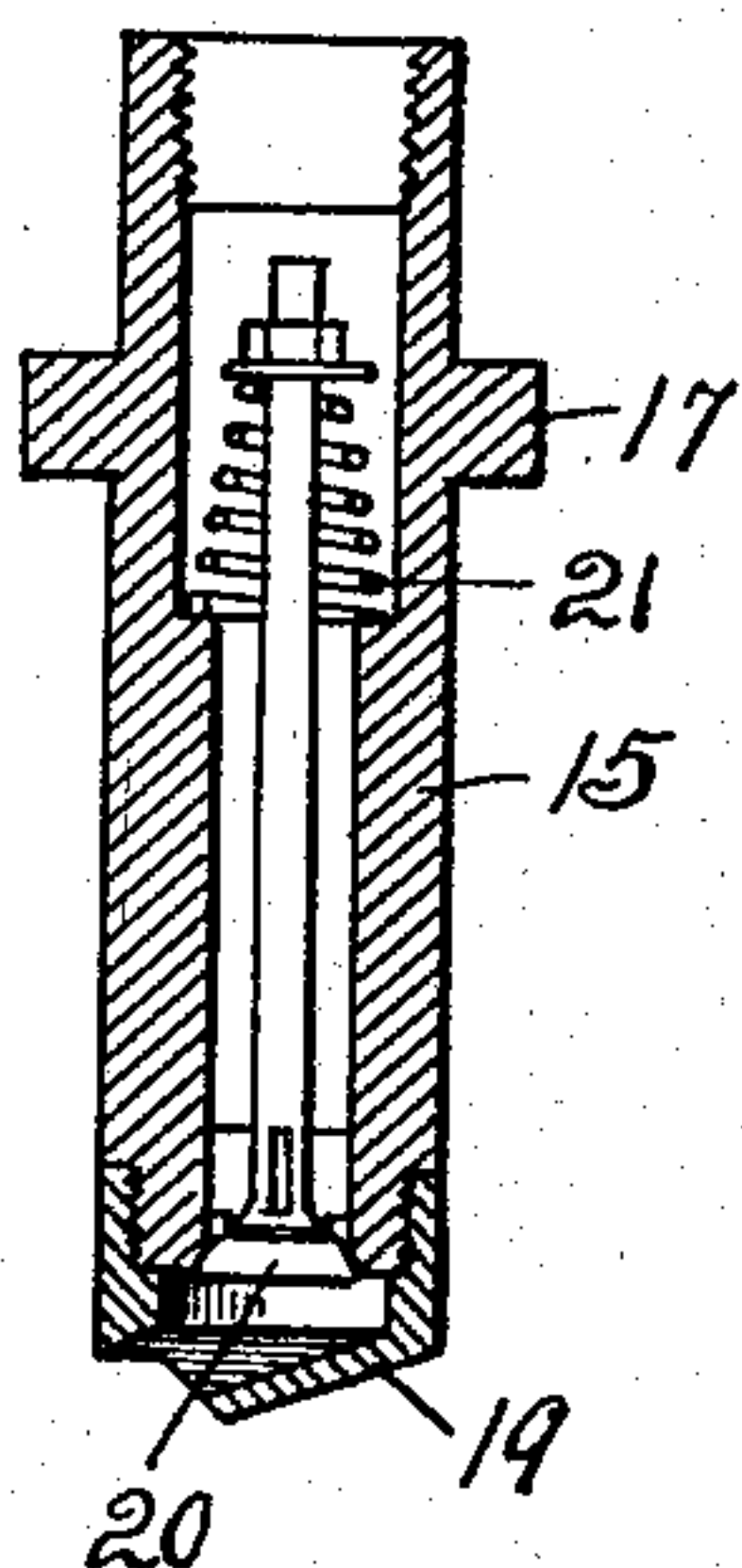


Fig. 4.



WITNESSES:

D. C. Walter
Hazel B. Klett

INVENTOR.

Ralph C. Lewis,
By Owen & Owen
His attys.

UNITED STATES PATENT OFFICE.

RALPH C. LEWIS, OF MUNCIE, INDIANA, ASSIGNOR OF THREE-FOURTHS TO CLOID A. ULSH, OF RISINGSUN, OHIO.

HYDROCARBON-ENGINE.

No. 911,138.

Specification of Letters Patent.

Patented Feb. 2, 1909.

Application filed August 15, 1908. Serial No. 448,670.

To all whom it may concern:

Be it known that I, RALPH C. LEWIS, a citizen of the United States, and a resident of Muncie, in the county of Delaware and State of Indiana, have invented certain new and useful Improvements in Hydrocarbon-Engines; 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 the figures of reference marked thereon, which form a part of this specification.

My invention relates to internal combustion engines of the type in which petroleum or other liquid hydrocarbon is used as a fuel, and has particular reference to the construction of the oil heads or combustion-chambers thereof into which the hydrocarbon oil is injected, converted into a vapor and thoroughly mixed with air preparatory to the ignition of the charge.

One of the objects of my invention is to so construct the interior of the oil-head and arrange the admission and exhaust ports that such head is thoroughly cleaned or scavenged of all carbon deposits and gases by the exhaust after the ignition of each charge, thus preventing the objectionable clogging and filling up of the head by the carbon deposits, which is incident to this kind of engines, and enhancing the commercial value and practicability thereof.

A further object of my invention is the provision of simple, improved and highly efficient means for injecting the oil into the head and maintaining it cool during such injection whereby the vaporization will not take place until the oil strikes the ignition or hot-plate, thus effecting a more thorough breaking up of the oil into a vapor or gas and a perfect commingling of the air and vapor before the ignition of the charge.

A still further object of my invention is to so fashion or shape the exhaust outlet as to materially augment the force of the exhaust whereby the scavenging of the cylinder of burned gases and carbon deposits will be more thoroughly effected than has heretofore been the case.

The invention is fully described in the following specification, and illustrated in the accompanying drawings, in which,—

Figure 1 is a longitudinal vertical section

of the oil-head embodying the features of my invention and the associated end portion of the cylinder to which it is attached. Fig. 2 is an outer end elevation thereof. Fig. 3 is a similar view with a portion in section on the line $x-x$ in Fig. 1, and Fig. 4 is an enlarged longitudinal section of the oil-injector nozzle.

Referring to the drawings, 1 designates the oil-head comprising the features of my invention, which is secured to the outer end of an engine cylinder 2 with its bore in communication with that of the cylinder 2, as shown in Fig. 1. The bore of the oil-head is cylindrical in form and either has its inner end enlarged in tapered or curved lines to the size of the cylindrical bore, or the outer end of the cylinder bore is contracted in such manner, as shown at 3, to avoid any sharp corners or recesses wherein eddies of exhaust gases might be formed and thus prevent a thorough scavenging of the two cylinders after each explosion. The outer end of the oil-head is closed by an ignition or hot-plate 4, which is secured thereto by cap-screws 5, or in any other suitable manner, and is substantially semi-spherical in shape with its concave side disposed inwardly. The concavity of this hot-plate is preferably of less width at its edge than the major diameter of the oil-head bore to enable the bore to be contracted preferably in a curved line at such end and coincide with the lines of the concavity, as shown at 6 in Fig. 1, for the purpose hereinafter explained.

The head 1 is provided in the bottom of its bore with the two ports 7 and 8, the former, which is nearest the hot-plate 4, being the exhaust port, and the latter the air-inlet port. The port 7 communicates with the exhaust-pipe 9, as shown more clearly in Fig. 3. To facilitate the exhaust action of the gases whereby to effect a more perfect scavenging of the two cylinders of carbon deposits I conically contract the outlet of the exhaust port, as at 7^a, and then conically enlarge the same, as shown at 7^b, to a greater diameter than said port, thus first effecting a gradual restriction of the exhaust gases and then permitting an expansion thereof to create a greater suction and consequently a more perfect scavenging of the cylinder than would otherwise be the case. The ports 7 and 8 are equipped with the usual valves 10 and 11, respectively, which are opened at properly timed intervals against

the tension of their seating springs by any suitable means.

The top of the oil-head 1 is tapped, as at 12, 12, directly above the valves 10 and 11, to facilitate an insertion or removal of such valves, and these openings are closed by the plugs 13 and 14 being threaded therein. The plug 13 is disposed nearest to the hot-plate 4 and is provided therethrough with an axially disposed opening through which the oil-injection nozzle 15 projects, being held by the gland 16 threading to an annular shoulder on the top of the plug and engaging an annular shoulder 17 on the nozzle, which latter shoulder also limits the inward movement of the nozzle in the plug, as shown. This nozzle has the outer end of its throat in communication with an oil supply through the pipe 18, and has its inner end provided with a spray-head 19, as shown in Figs. 1 and 4 for directing the oil against the hot-plate 4 as it is discharged from the nozzle. The communication between the nozzle throat and spray-head is normally closed by the valve 20, which is held to its seat by a spring 21 and intended to open inwardly or toward the interior of the oil-head 1 against the tension of such spring to permit a discharge of oil therefrom against the hot-plate 4. To effect this discharge of the oil it has a forced feed, such as a pump, the pulsations of which are regulated to inject the charges as the proper running of the engine may require.

To effect a cooling of the oil within the nozzle 15, I water-jacket the nozzle 15 by providing the plug 13 with an annular chamber 13^a, which surrounds said plug 15 and is provided with the inlet and outlet water-pipes 22, 22. This is a very important feature in the proper operation of engines, as the oil is thereby maintained in a liquid state while being thrown through the hot cylinder 1 and until it impinges against the ignition or hot-head 4. In case this is not done the liquid hydrocarbon begins to vaporize as it leaves the nozzle so that it enters the cylinder in little oil globules or mist and does not impinge against the heated surface which is intended to break it up into real vapor or gas, thus preventing a thorough commingling of the air and gas and a consequent thorough combustion of the charge.

The operation of my invention is as follows:—The hydrocarbon oil being ejected from the nozzle 15 on an impulse of the oil pump, or other forcing means, is directed in liquid form against the hot-plate 4 by which it is broken up to form a fine vapor or gas which readily mixes with the air admitted at approximately the same time through the port 8. On the return stroke of the piston in

the cylinder 2 after an ignition of the charge the burned gases rush into the smaller cylinder of the head 1 and escape from the rear end thereof through the exhaust port 7. The curved or tapered form of the walls at the inlet to the cylinder 1 and the semi-spherical form of the hot-plate 4 combined with the coinciding curved inner end portion 6 of the cylinder 1 and the location of the exhaust port at the base of said portion 6, as shown, cause the out rushing gases to carry with them substantially all carbon deposits in the cylinder, thereby materially improving upon the running of engines of this class and requiring the same to be internally cleaned about once a week only during constant running, whereas it has heretofore been necessary to clean the same about every twenty-four hours. It is apparent that the formation of the exhaust outlet also materially assists in the scavenging process.

I wish it understood that I do not desire to be restricted to the exact details of construction and arrangement of the parts of the invention shown and described, as obvious modifications will occur to persons skilled in the art.

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

1. In a hydrocarbon vapor engine, an oil-head having a semispherical ignition-plate at its rear end against which the fuel is discharged, and having the engine exhaust port located in its bottom near such end and its interior wall contracted between said port and ignition plate to coincide with the curve formed by the concavity of such plate.

2. In a hydrocarbon engine, the combination with the engine cylinder, of an oil-head having a cylindrical bore of less diameter than the cylinder bore, the meeting ends of said two bores being fashioned to gradually merge into each other to eliminate sharp corners and recesses, said oil-head having a semispherical ignition-plate at its outer end, an exhaust port in its bottom near such end, and its bore contracted in a curved line intermediate said plate and port whereby the wall of the hot-head bore is made to coincide with the semispherical surface of said plate.

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

RALPH C. LEWIS.

Witnesses:

CLEUMART RIDER,
NELLE POSTMA.