

No. 877,590.

PATENTED JAN. 28, 1908.

D. L. OULTON.
TWO CYCLE HYDROCARBON ENGINE.
APPLICATION FILED MAY 17, 1907.

3 SHEETS—SHEET 1.

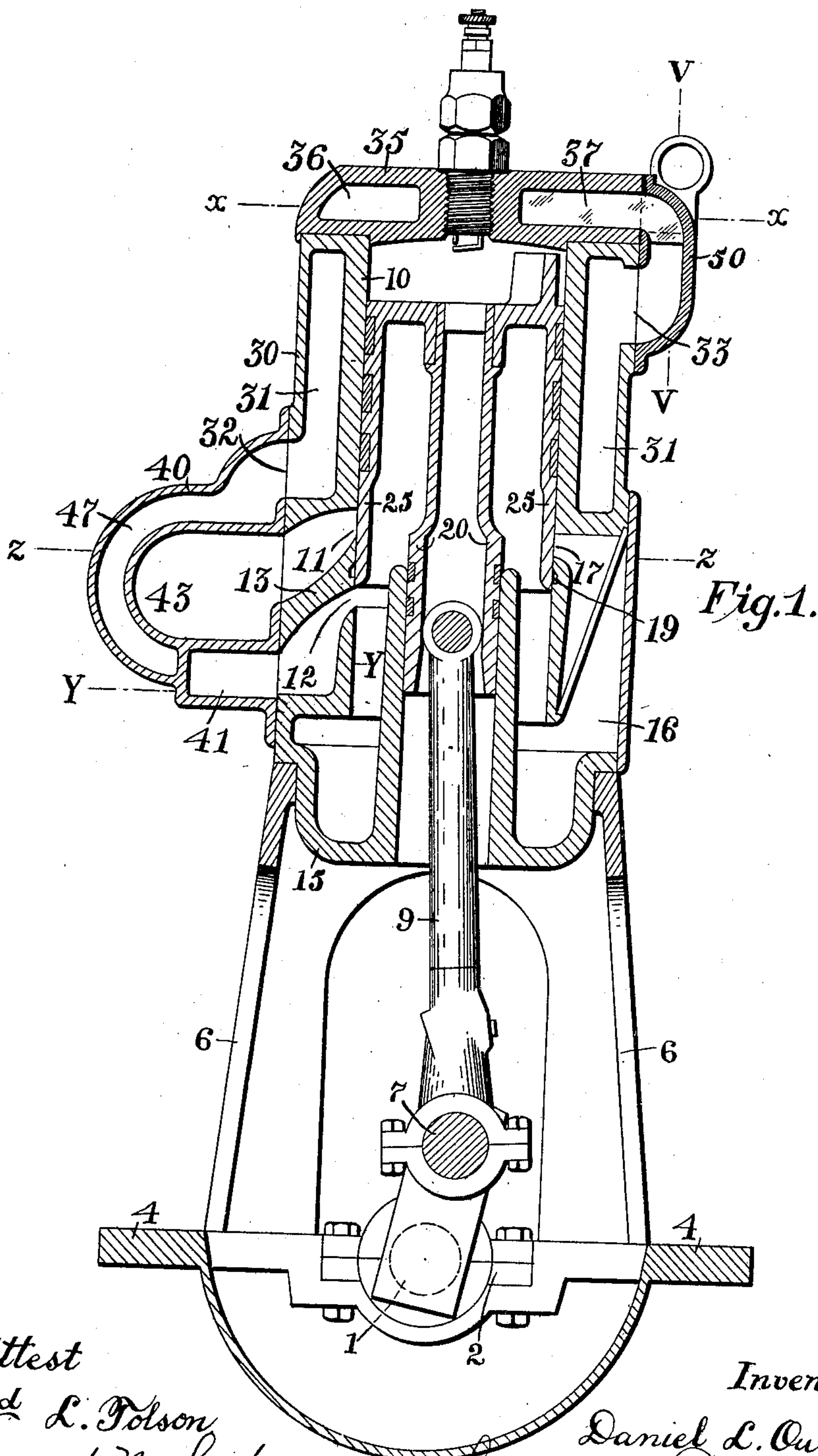


Fig. 1.

Attest
Edw. L. Tolson
Edward M. Sartou

Inventor,
Daniel L. Oulton.
By *Spear, Middleton, Donaldson & Spear*
Attys.

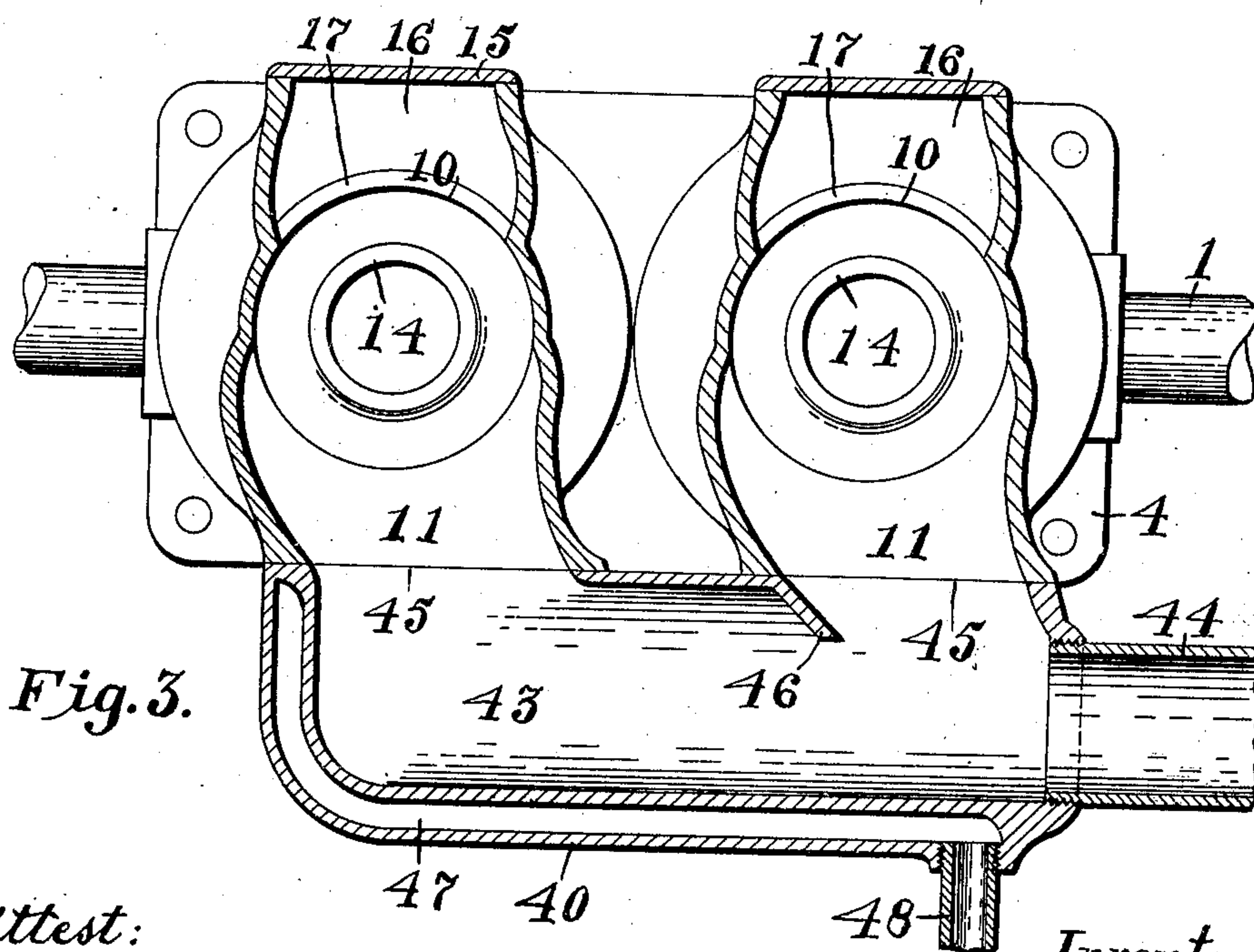
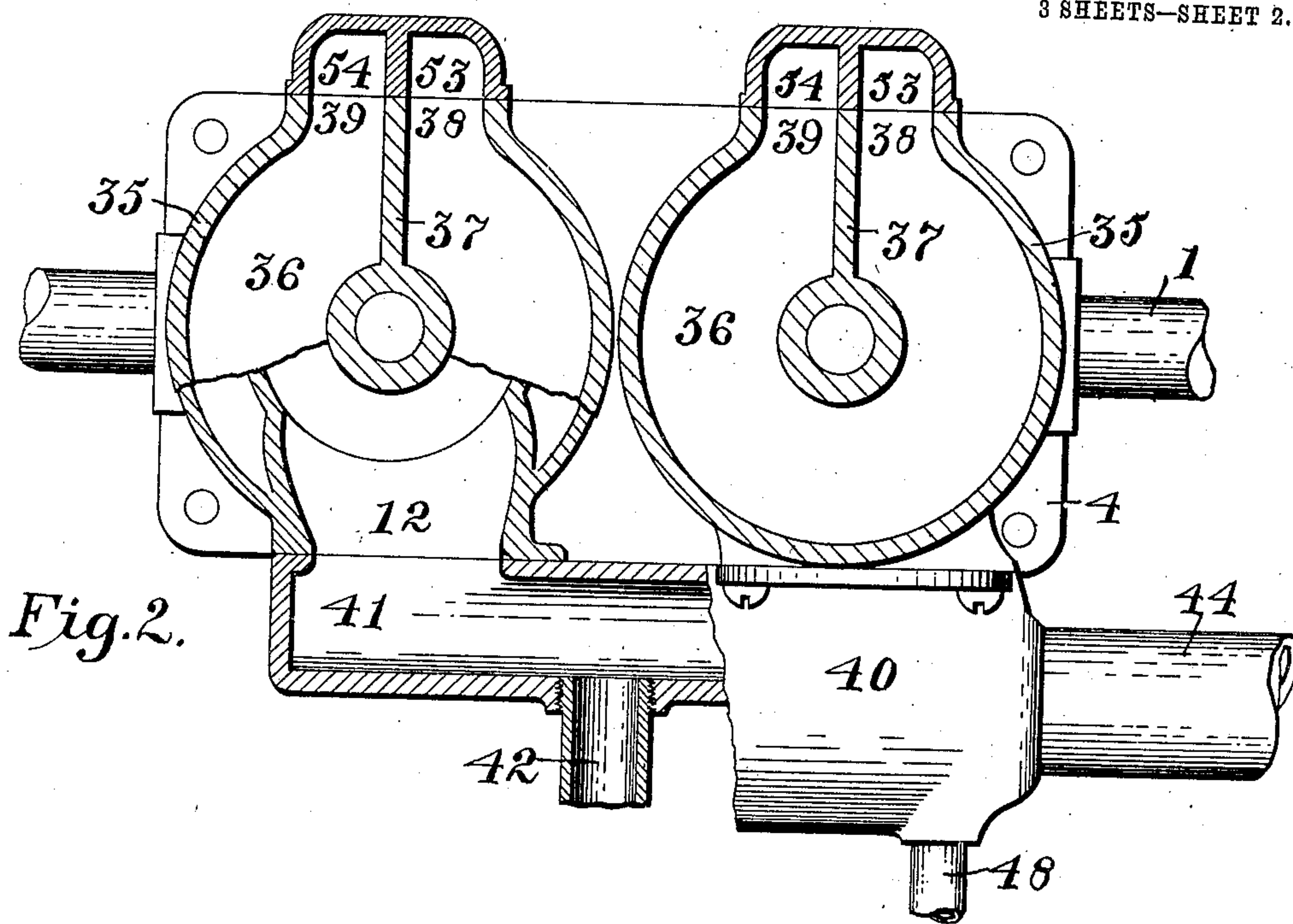
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3 SHEETS—SHEET 2.



Attest:
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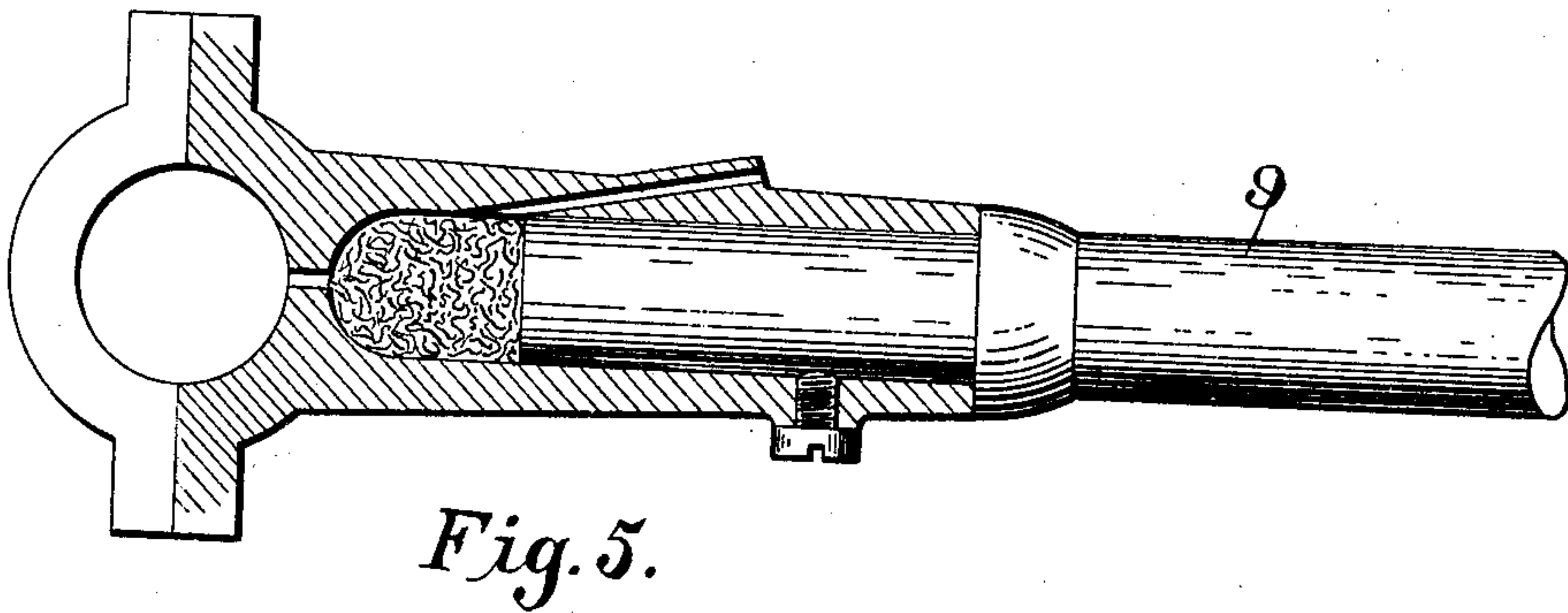
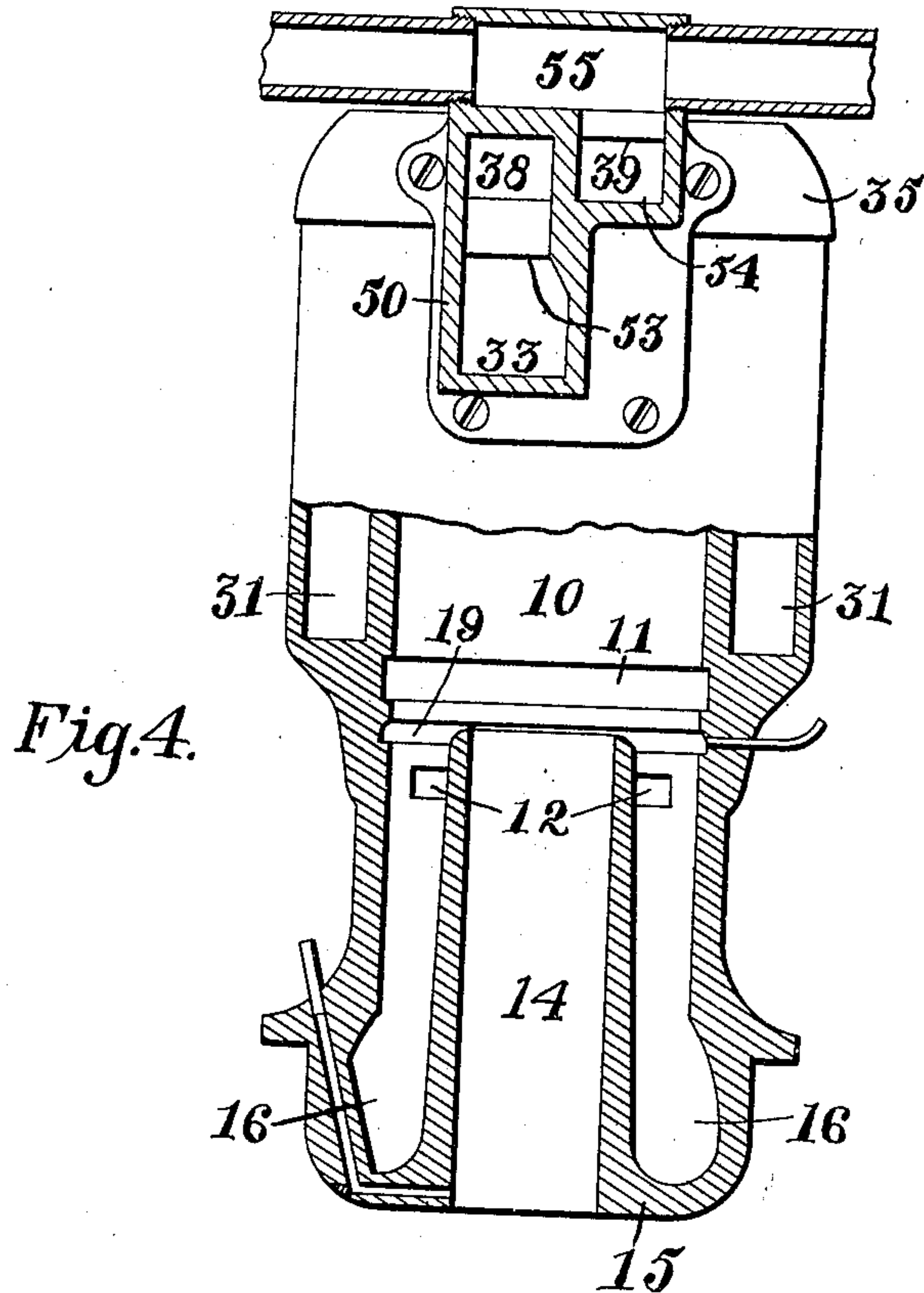
Inventor,
Daniel L. Oulton
By *Spear, Middleton, Dimeson & Spear*
Attys.

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3 SHEETS—SHEET 3.



Attest:
Edw. L. Tolson.
Edward W. Sarton

Inventor,
Daniel L. Oulton.
By *Spear, Middleton, Donaldson & Spear*
Attys.

UNITED STATES PATENT OFFICE.

DANIEL L. OULTON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE DUO MOTOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

TWO-CYCLE HYDROCARBON-ENGINE.

No. 877,590.

Specification of Letters Patent.

Patented Jan. 28, 1908.

Application filed May 17, 1907. Serial No. 374,171.

To all whom it may concern:

Be it known that I, DANIEL L. OULTON, a citizen of the United States, residing at Boston, Massachusetts, have invented certain new and useful Improvements in Two-Cycle Hydrocarbon-Engines, of which the following is a specification.

My invention relates to hydrocarbon engines and is shown in connection with that form of hydrocarbon engines set forth in an application filed by me on the 17th day of March, 1906, having the Serial Number 306,526.

It is illustrated in the accompanying drawings, in which,

Figure 1 is a central sectional elevation of the engine. Fig. 2 is a horizontal section on the line $x-x$ of Fig. 1 showing a two-cylinder engine, a part of the section being at line $y-y$ Fig. 1. Fig. 3 is a horizontal section of the line $z-z$ of Fig. 1. Fig. 4 is an elevation of the cylinder section at $v-v$ of Fig. 1, and the lower part. Fig. 5 shows the pitman partly in section.

That part of my invention illustrated in the drawings relates to the construction of the water jacket and the passages for the flow of water in connection with said jacket.

The object of the invention is to cheapen the construction and to eliminate the piping ordinarily used with its attendant elbows, unions and joints and involving large original expense and subsequent care and work to insure their continued water-tight character.

My invention consists in the peculiar construction of the castings with the passages and chambers therein, whereby I reduce the number of parts as more fully hereinafter explained.

For the purpose of clearness I have described other parts of the invention not herein claimed but more or less intimately connected with the parts claimed.

The engine shaft 1 is mounted in the usual manner in bearings 2 supported by the base-plate 4. From this base plate rise suitable posts 6 rigidly secured to the cylinder casting 15, and within the cylinder 10 is the bucket plunger 25 joined by a tubular piston rod 20 to the pitman 9, the latter being connected with the crank-pin 7.

Between the upper section of said cylinder and the water jacket 30 cast integral there-

with, is the water chamber 31, the cylinder head 35 being also chambered and put into communication with the former as herein-after set forth.

As shown in Fig. 1, the intake port 12 opens into the cylinder 10 immediately below the topmost limit of the lower edge of the plunger or piston 25, and the by pass 17, which communicates with the compression chamber 16, is located at just above the upper surface of said piston when in its lowermost position. In order that the products of the explosive combustion may escape as the compressed mixture enters the main cylinder, the exhaust port 11 opens from the cylinder 10 opposite to the by-pass and at substantially the same horizontal plane, or slightly thereabove.

As is evident, one of the marked causes for considerable of the expense of an engine of this character is the labor entailed in the many pipe fittings ordinarily required. To minimize this as much as possible, I provide a casting 40 for securing to the cylinder casting and taking the place of several of the pipe sections, elbows, joints and other fittings otherwise needed. The value of this is especially great for multiple cylinder engines, where by its means no more piping and fittings are required than for the single cylinder engine. As shown in Figs. 1, 2, and 3 this casting is formed with a central passage communicating with the various exhaust ports 11 of the various cylinders, and terminating in an exhaust pipe 44, a passage 41 taking the mixture through a supply pipe 42 receiving the air and hydrocarbon from any suitable carbureter and delivering the same to the intake ports 12 of the cylinders. Not only does this reduce the number of pipes and fittings, but in case it is necessary to remove the cylinder for any purpose, the piping can remain in this casting 40 intact, the latter alone being unbolted from the cylinder casting.

Another and even more important function performed by this casting is the possibility thereby made of permitting the exhaust gases to be so cooled as they escape from the cylinder, as to materially contract their volume and reduce their back-pressure. This reduction in back-pressure not only increases proportionally the work performed by the

engine, but diminishes the noise of the exhaust and serves as a partial muffler without the resistance inseparable from the latter as usually constructed.

5 To cool the exhaust as stated, the passage 43 is almost wholly surrounded by a water jacket 47 forming a part of the channel for conducting the water from any suitable supply-pipe 48 to the cylinder water jacket 10 31, the latter being formed with ports 32 communicating with this channel 47. In addition to this advantage of cooling the exhaust, the water thus supplied to the cylinder water jacket is partially warmed, and so does 15 not strike the cylinder with the chill inseparable from the usual type of internal combustion engine for marine purposes, where the water jacket is supplied direct from the water beneath the boat. It is found that where 20 the engine cylinder is cooled too much, the strains of the extremes of heat and cold not alone rack and weaken it with undue quickness, but the best results in the production of power are not obtained. Just what are 25 the reasons for this I am not prepared to state, but the fact seems clear. By thus giving the water a preliminary warming, those ill effects are obviated and at the same time positive advantages obtained of cooling the 30 exhaust.

Ordinarily the exhaust port runs horizontally from the cylinder, but as shown in Fig. 1 I prefer to slant it downward to a considerable degree. The main advantage of this is 35 that it permits of the water inlets 32 being located at the lowest line of the water jacket, as illustrated in Fig. 1, and so enables the same to be thoroughly drained whenever desired.

40 The partition 13 separating the intake and exhaust is concaved on both surfaces in order to render the same sufficiently thin to permit the heat from the exhaust to strike through and warm the ingoing mixture while at the 45 same time allowing enough surface within the cylinder for the groove 19, and enough exterior surface to give a gas-tight joint between itself and the casting 40. By having said partition 13 comparatively thin and the 50 intake mixture warmed thereby, the latter is better prepared for its work.

The water from the water jacket 31 is conducted therefrom to the space in the cylinder head 35 in the following manner. This is 55 sometimes done by means of piping, which with its attendant elbows, and unions, requires no less than nine joints. This means original expense and subsequent care and work to insure their constant water-tight 60 character. Moreover, whenever it is necessary to remove the cylinder head, as is so often required in order to overhaul the piston and parts within the cylinder, most of these joints have to be unscrewed, entailing much

labor in separating and much more in reuniting. 65

By means of my improvement, which consists of a single casting 50 for each cylinder, no piping is needed but a single section uniting the casting of each cylinder. As shown, 70 the water space in each cylinder head is formed with a radial partition 37 and the water is supplied to one side of the same, in order to force the current to flow entirely through such space 36. Over the two open- 75 ings in said space, and also over the outlet 33 of the cylinder casting is bolted the casting 50 which is so partitioned that it takes the water from said outlet, conveys it to the opening at one side of the partition 37, and 80 then takes it from the other side and conducts it to the pipe 52. As shown in Fig. 4, said casting 50 is divided into two sections, one section or chamber 53 communicating with the outlet 33 and one opening 38 in the 85 head, the second chamber 54 communicating with the openings 39 in the head and also with the cylindrical section 55 into the ends of which are tapped the pipe sections by which the water flows therefrom to the over- 90 flow. Not only is this method of conveying the water from the cylinder to its head a great advantage over the system of piping described above, but also over the more customary method of having openings directly 95 downward from the space 36 into the space 31. The trouble with this is that it is practically impossible to insure the permanent water tight character of such arrangement, and water is found to leak through into the 100 cylinder itself, seriously affecting the operation of the engine.

With my device I avoid all possibility of such leakage, and at the same time dispense with the complicated piping method. 105

What I claim as my invention and for which I desire Letters Patent is as follows:—

1. The combination of a water jacketed internal combustion engine cylinder and head having each a peripheral surface, one a 110 continuation of the other, of a member removably secured to said surfaces and formed with a plurality of chambers one of which communicates with the water space about the cylinder and also with the water space in 115 the head, and another of which chambers communicates with the water space in said head and with any suitable water drain.

2. The combination with a water jacketed internal combustion engine cylinder having 120 means for supplying water to one part thereof and formed with a flat surface at an elevated part of its periphery through which is an opening, a removable head for said cylinder having an annular water space, a radial 125 partition and a flat surface in the same plane with the first named flat surface, there being two openings through the last named flat sur-

face, one at each side of said partition, of a member removably secured to said two flat surfaces and formed with two chambers, one of which is in communication with the opening from the cylinder water jacket and also with the opening at one side of said partition, and the other of which chambers communicates with the opening at the other side of

said partition and with one or more water drain pipes.

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

DANIEL L. OULTON.

Witnesses:

A. H. HARRIMAN,
ELLIS SPEAR, Jr.