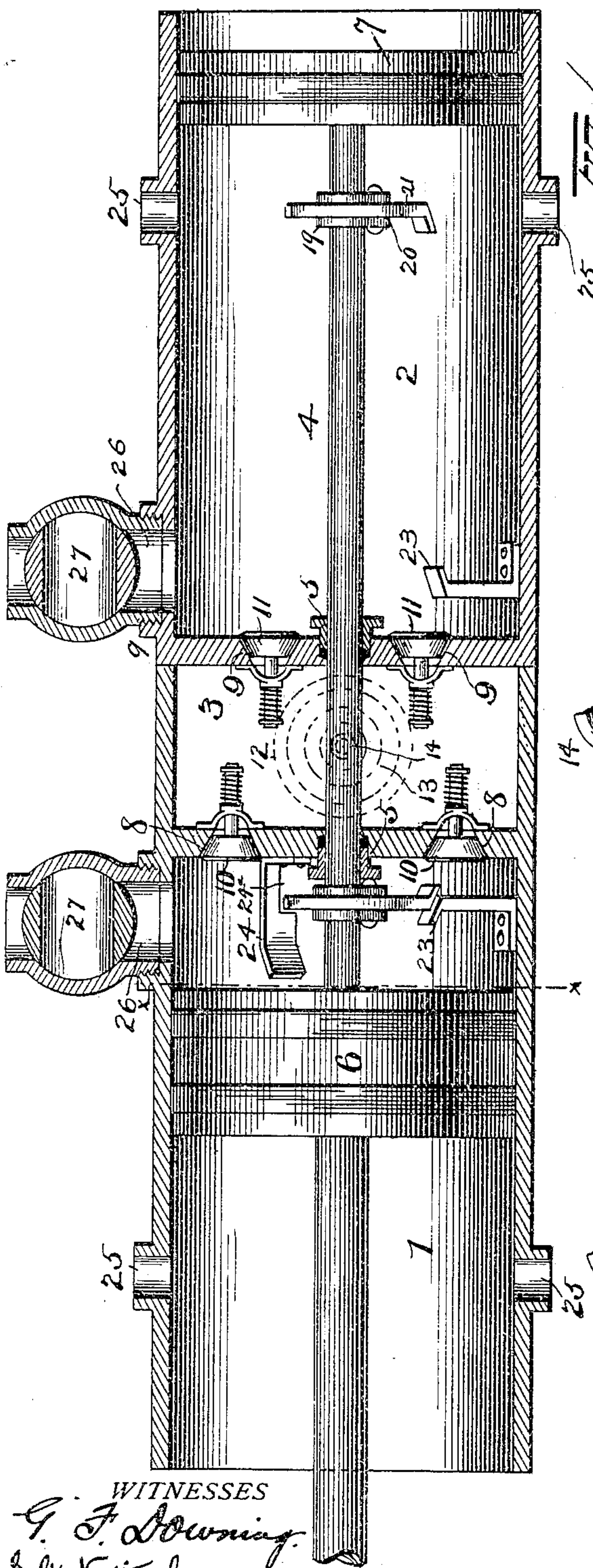


No. 793,091.

PATENTED JUNE 27, 1905.

F. L. PERRY.
EXPLOSIVE ENGINE.

APPLICATION FILED FEB. 28, 1901.



WITNESSES
G. F. Downing
S. G. Nottingham

Fig. 1 -

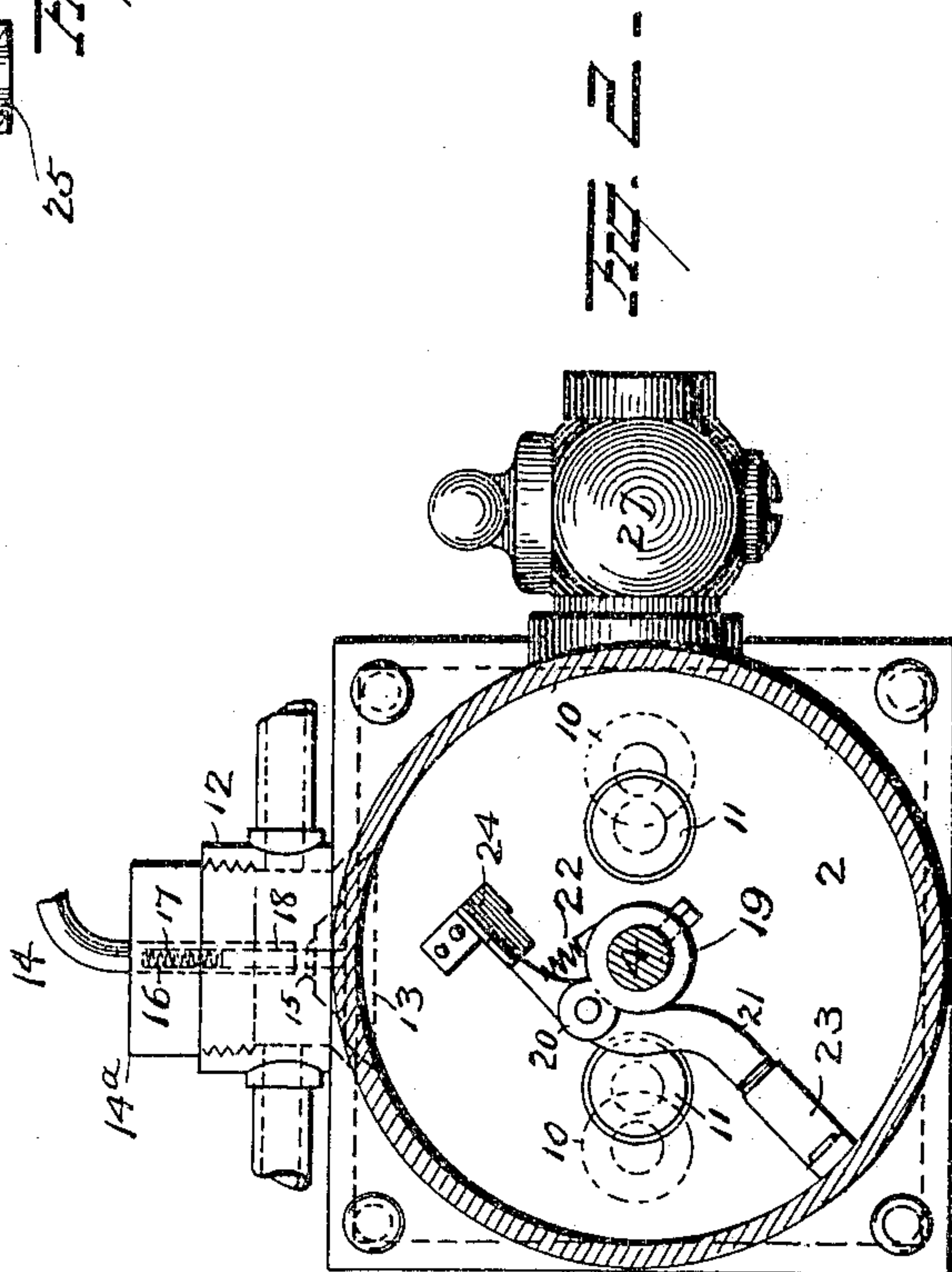


Fig. 2 -

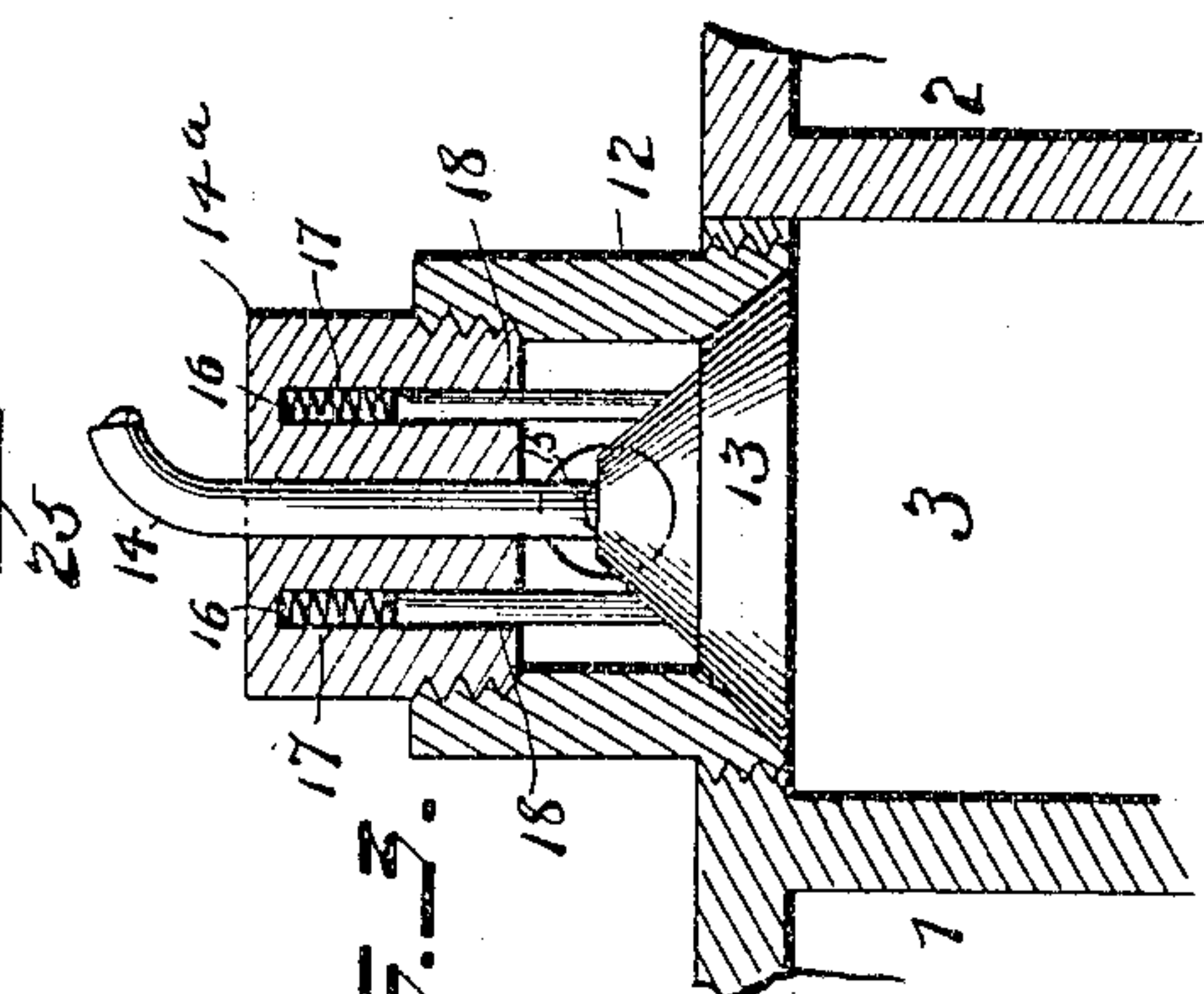


Fig. 3 -

INVENTOR
F. L. Perry
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

FRANCIS L. PERRY, OF BRIDGEPORT, CONNECTICUT.

EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 793,091, dated June 27, 1905.

Application filed February 28, 1901. Serial No. 49,332.

To all whom it may concern:

Be it known that I, FRANCIS L. PERRY, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and
5 useful Improvements in Explosive-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
10 same.

My invention relates to an improvement in explosive-engines, an object of the invention being to provide an improved engine of this character which will dispense entirely with
15 all valve-gear, the charge being drawn into the explosion-chambers by the suction of the piston.

A further object is to provide an engine with improved means for preventing explosions in one chamber and at the same time effectually cooling said chamber.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts,
25 as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section illustrating my improvements. Fig. 2 is a view on the line *xx* of Fig.
30 1, and Fig. 3 is an enlarged view illustrating the valve.

1 2 represent cylinders open at their outer ends, placed end to end, and having a preferably angular mixing-chamber 3 between them,
35 as shown in Fig. 2. This chamber 3 may be constructed in various ways—as, for instance, it may be made an integral part of one cylinder and secured to the other by bolts, as shown, or may be made separate and secured to both,
40 and hence I do not wish to be limited to any particular manner of mounting this chamber. A piston-rod 4, connected in any approved manner to the drive-shaft, passes through both cylinders 1 and 2 and through the walls of the
45 mixing-chamber 3, (which also form the ends of the cylinders,) where suitable gas-tight packings 5 are provided for the rod. Pistons 6 and 7 are secured on the rod 4 in the respective cylinders 1 and 2 and are so mounted on the
50 rod that when one piston is at its extreme in-

ner position the other will be at the extreme of its outward thrust.

The respective walls of the mixing-chamber 3 are made with one or more ports 8 and 9, respectively connecting the mixing-chamber
55 with the cylinders 1 and 2, and said ports are normally closed by spring-pressed valves 10 and 11, respectively.

One side of the mixing-chamber 3 is made with a screw-threaded opening, into which is
60 screwed an internally-beveled ring 12, forming a seat for a beveled valve 13, and a plug 14^a is screwed into the upper end of the ring 12 and made with a central hole to receive the oil
65 or gas pipe 14 to discharge oil or gas into the ring, and said valve 13 is made with an auxiliary valve 15 to close the pipe 14 when valve 13 is on its seat. The valve 13 is normally
70 held upon its seat by means of coiled springs 16, secured in sockets 17 in the plug 14^a and to which guide-rods 18 on the valve 13 are secured, and said rods 18 are movable in the sockets 17 to prevent displacement of the valve.

The sparking mechanism for both cylinders
75 of my improved engine are precisely alike, and hence the below description of one will apply alike to both.

A collar 19 is adjustably secured on the rod 4 by means of a set-screw and is provided with
80 a bifurcated lug 20, in which a lever 21 is fulcrumed between its ends and disposed at right angles to the rod. The lever 21 is curved on one side of its pivotal point to lie against the collar 19 and prevent any further downward
85 movement of that end, and a coiled spring 22 is interposed between the other end of the lever and collar to hold the lever in its normal position. A beveled or inclined arm 24, hav-
90 ing a notch 24^a, is secured to the head of the cylinder in the path of the upper arm of the lever 21 for the purpose of turning said lever on its fulcrum when the piston approaches the inner end of its throw, and thus moving
95 the lower beveled end of the lever out of the path of a beveled spring contact-arm 23, secured to the wall of the cylinder; but when the lever 21 more nearly approaches the cylinder-head the upper end of said lever will be
100 made to pass through the notch 24^a by the ac-

tion of the spring 22, and said spring will force the lever back to its normal position, with the beveled lower end of the lever in the path of the beveled upper end of the contact-arm 23, so that when the piston begins its outward movement the beveled contact end of lever 21 will make sliding contact with the spring-arm 23, and when it slides off of said arm the spark will be made to explode the charge. Discharge-ports 25 for the exploded gases are provided near the outer ends of the respective cylinders and are made preferably larger than the inlet-ports to insure the rapid escape of the exploded gases.

The operation of my improvements above described is as follows: When the parts are in the positions shown in Fig. 1, an explosion is about to take place in cylinder 1 and the exploded gases are escaping through the exhaust-ports 25 in cylinder 2. As the piston 6 moves outward the contact end of lever 21 will engage contact-arm 23, and upon its escape therefrom a spark will be made to explode the charge and force the piston outward. After the piston 6 in its outward thrust passes a given point the explosive power of the exploded gases will have been spent, and as the piston continues to move outward it will by suction open the valves 10, 13, and 15 and draw the mixed air and gas or oil into the cylinder 1. When the piston 6 passes the discharge-ports 25, the exploded gases will escape and continue to escape (being replaced by fresh air and gas) until the piston on its return movement closes said ports 25, when the further inward movement of the piston compresses the fresh charge and closes the valves 10. When the piston nears its extreme inward position, the upper end of lever 21 will engage the arm 24 to move the contact end of the lever out of the path of or around the contact-arm 23; but as the piston begins its outward thrust the lever 21 cannot be depressed by the arm 24, owing to its engagement with the collar 19, and hence it will displace said arm instead and permit the contact end of the lever to make and break contact with the spring-arm 23 to make a spark and explode the charge, when the operation above described will be repeated. The operation in cylinder 2 is precisely like that above described in connection with cylinder 1, save that the explosion in this cylinder takes place when the piston 6 in cylinder 1 is in its outward position, and vice versa, so that an explosion takes place at every half-revolution of the drive-shaft, and the explosive force in one cylinder serves as a motive power to compress the charge in the other.

A large air-inlet port 26 is provided in both cylinders 1 and 2, near the inner ends thereof, normally closed by cocks 27, as shown. These air-inlet ports are provided to permit the explosions in one cylinder to cease, for when the air-port 26 is open the movement of the

piston will simply draw air through the port 26 and expel it without operating the valves 10 or 11 in the slightest, and the fresh cool air passing in and out of the cylinder will rapidly cool the same if the cylinder be overheated. Thus it will be seen that these ports 26 can be alternately opened to cool the cylinders without stopping the engine or can both be opened simultaneously to stop the engine altogether.

Various slight changes might be resorted to in the relative arrangement of parts herein shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to confine myself to the exact construction of parts herein shown and described; but,

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

1. In an explosive-engine, the combination with two cylinders, pistons in said cylinders and a piston-rod secured to both of said pistons, of a mixing-chamber interposed between the heads and communicating through said heads with the two cylinders for supplying both of said cylinders with the explosive charge, an air-inlet to communicate with said mixing-chamber, a valve for closing said inlet, an oil or gas inlet to communicate with the air-inlet, a valve for the oil or gas inlet, and valves controlled by the pistons for regulating the supply of the mixed charge to the respective cylinders.

2. In an explosive-engine, the combination with two cylinders and pistons therein, of a chamber interposed between the heads of said cylinders, valved inlet-ports for the explosive charge operated by the suction and compression created by the pistons and a valved air-inlet port at the explosion end of the cylinder to prevent the operation of the first-mentioned valves when said valved air-inlet is open, said valved parts communicating with said interposed chamber.

3. In an explosive-engine, the combination with two cylinders, a piston-rod, and pistons in said cylinders secured to the rod, of a mixing-chamber interposed between the inner heads of the cylinders for supplying the explosive charge to both of said cylinders, valves in the inner heads of the cylinders for regulating the supply of the charge to said cylinders operated by the suction and compression of said pistons, and large air-inlet ports at the explosion ends of said cylinders to flush the same with outside air and prevent their operation and cocks for said ports.

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

FRANCIS L. PERRY.

Witnesses:

S. W. FOSTER,

A. W. BRIGHT.