

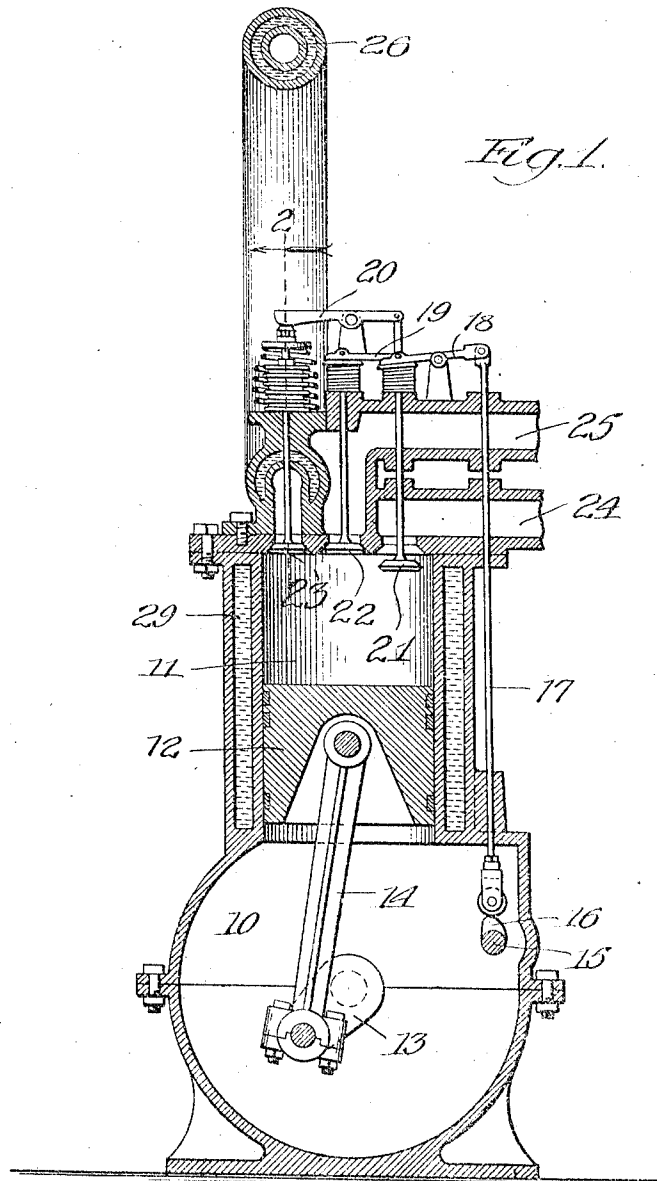
Nov. 15, 1927.

1,648,929

W. M. ZAIKOWSKY
INTERNAL COMBUSTION ENGINE

Filed Oct. 29, 1925

2 Sheets-Sheet 1



Inventor
Wladimir M. Zaikowsky
By J. J. G. Smith, Attorney
J. J. G. Smith

Nov. 15, 1927.

1,648,929

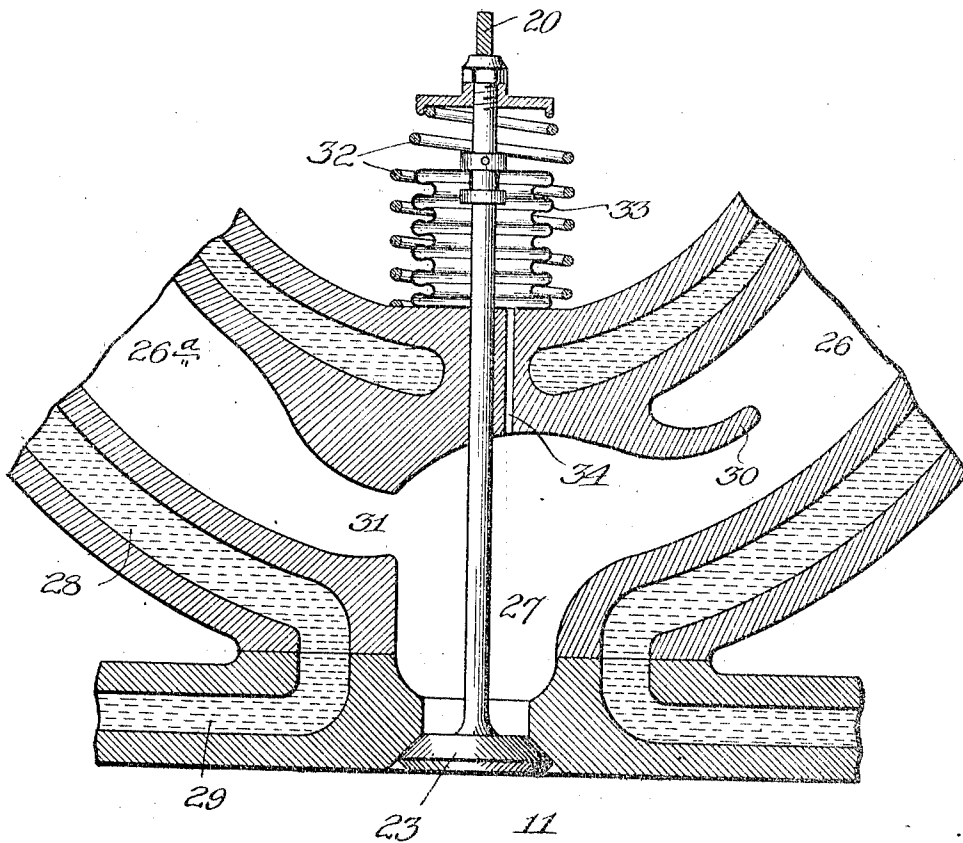
W. M. ZAIKOWSKY

INTERNAL COMBUSTION ENGINE

Filed Oct. 29, 1925

2 Sheets-Sheet 2

Fig. 2



Inventor
Wladimir M. Zaikowsky,
By *Edmund P. Sullivan*
Attorney

UNITED STATES PATENT OFFICE.

VLADIMIR M. ZAIKOWSKY, OF PASADENA, CALIFORNIA, ASSIGNOR TO STANDARD DEVELOPMENT CO., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

INTERNAL-COMBUSTION ENGINE.

Application filed October 29, 1925. Serial No. 65,622.

This invention relates to internal combustion engines and will be fully understood from the following specification which is illustrated by the drawings, in which:

5 Figure 1 is a vertical longitudinal section through an engine embodying the invention; and

Fig. 2 is a partial enlarged section on the line 2—2 of Fig. 1.

10 This is an improvement on my invention on internal combustion engine Serial No. 714,263, filed May 19, 1924.

The embodiment illustrated comprises an internal combustion engine of the four-
15 stroke-cycle type having a crank case 10, a cylinder 11 in which is slidably fitted a piston 12, the piston being connected to the crank shaft 13 by means of a connecting rod 14. A cam shaft 15 driven at one half the
20 engine speed has series of cams of which only one, 16, is shown, each adapted to operate a lift rod 17, each of which is connected to one of the rocker arms 18, 19 or 20. These in turn operate respectively the ex-
25 haust valve 21, the inlet valve 22 and the pressure-chamber valve 23.

The exhaust valve 21 controls communication between the cylinder 11 and the exhaust passage 24 while the intake valve 22
30 controls communication between the cylinder and inlet passage 25 which leads to a carburetor or other device for mixing fluid fuel and air. These valves operate in a manner common to internal combustion engines
35 of this type.

To this engine however is added a pressure chamber 26 which is tubular in form and which connects with the cylinder 11
40 through a passage 27 which is closed by the pressure chamber valve 23. This chamber is cooled as by means of the water jacket 28 which is connected to the water jacket 29 of the engine.

To improve the cooling effect of the
45 charge which passes into this compression chamber, it is desirable that the charge enter the chamber at one end and circulate through it and pass out at the opposite end. For this purpose, the walls of the passage
50 27 are curved and are gradually necked in at 30 so that as the gas enters, it will have a tendency to flow upwardly through the passage 27 and through the necked-in portion 30 rather than back through the narrow ab-

rupt opening 31 on the opposite side. This
55 gas then passes around the circular chamber in a counterclockwise direction as shown in Fig. 2 returning through 26^a and then down through the smoothly converging portion 31. The valve 23 having been opened and a
60 charge of gas admitted to the passage 26 and the valve 23 then having closed, the gas admitted to the chamber 26 will keep on circulating in a counterclockwise direction after the valve is closed.

The operation of the engine is as follows: Assuming that this engine has been in operation for some little time and that the pressure in the chamber 26 has been built up to
70 a point where successive charges will not appreciably raise it, on the upward movement of the piston 12 on the compression stroke, the valves 21 and 22 being closed, the chamber valve 23 will open, preferably
75 sometime before or near the middle of the compression stroke. When this happens the compressed charge within the compression chamber 26 is at a higher pressure than that
80 within the engine cylinder at the instant of the opening of this valve and the result is that the difference between the two pressures causes some of the charge in the chamber to
85 pass into the cylinder until the two pressures become substantially equalized. During this time however, the piston 12 continues to ascend forcing back into the compression chamber part of the charge then in
90 the cylinder. This continues until near the point of ignition when the valve 23 closes.

Thus it will be understood that by this
95 arrangement a very simple and effective means is provided for causing the charge delivered to the compression chamber to circulate therein so as to become thoroughly cooled before being returned to the cylinder
100 from the opposite end of the elongated chamber from that at which it was received when the valve 23 is again opened on the next compression stroke. This has the added advantage that there are no moving parts
105 to break or to get out of order.

The valve 23 is movably held upon its seat by the spring 32 and carries a sylphon spring 33 for sealing the opening thereof which the stem of the valve 23 passes. The interior of the sylphon spring connects with the
110 passage 27 by means of a hole 34.

While I have shown and described but a

single embodiment of this invention, it is to be understood that it is capable of many modifications. Changes therefore in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. The combination with an internal combustion engine of an auxiliary chamber communicating with the cylinder thereof, a valve controlling said communications, means for cooling the gaseous contents of said auxiliary chamber, and means for opening the said valve on the compression stroke of the engine and for closing the said valve prior to the ignition of the charge, said auxiliary chamber being a continuous tube and having means for causing the gas therein to circulate therethrough in a predetermined direction.

2. The combination with an internal combustion engine of an auxiliary chamber communicating with the cylinder thereof, a valve controlling said communications, means for cooling the gaseous contents of said auxiliary chamber, and means for opening the said valve on the compression stroke of the engine and for closing the said valve prior to the ignition of the charge, said auxiliary chamber being a continuous tube and having fixed means for causing the gas therein to

circulate therethrough in a predetermined direction.

3. The combination with an internal combustion engine of an auxiliary chamber communicating with the cylinder thereof, a valve controlling said communications, means for cooling the gaseous contents of said auxiliary chamber, and means for opening the said valve on the compression stroke of the engine and for closing the said valve prior to the ignition of the charge, said auxiliary chamber being a continuous tube and having its interior so formed as to cause the gas entering the chamber to pass through the tube in a predetermined direction.

4. The combination with an internal combustion engine of an auxiliary chamber communicating with the cylinder thereof, a valve controlling said communications, means for cooling the gaseous contents of said auxiliary chamber, and means for opening the said valve on the compression stroke of the engine and for closing the said valve prior to the ignition of the charge, said auxiliary chamber being a continuous tube and having its interior provided with a smoothly curved surface at one side to facilitate passage of the gas in that direction, the opposite end of the tube being tapering in the same clockwise direction and leading into said smoothly curved surface.

WLADIMIR M. ZAIKOWSKY.