H. F. OBERGFELL.

INTERNAL COMBUSTION ENGINE.

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1,139,364.

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Fig. 1.

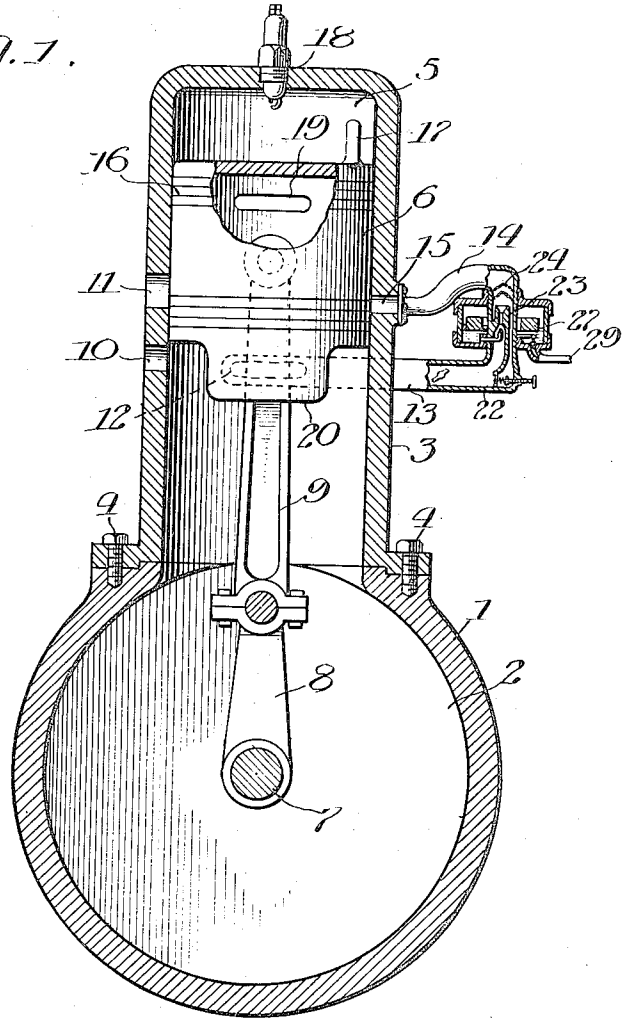
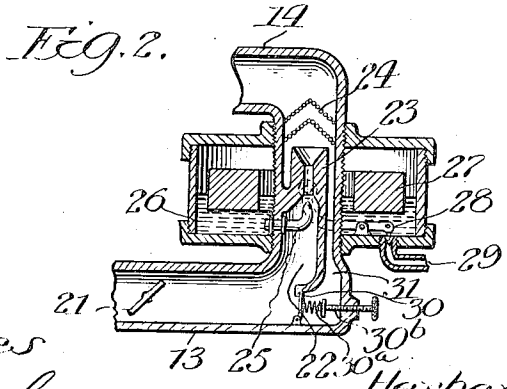


Fig. 2.



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UNITED STATES PATENT OFFICE.

HERBERT F. OBERGFELL, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-THIRD TO TALBOT G. MARTIN AND ONE-THIRD TO JOHN ERICKSON, BOTH OF CHICAGO, ILLINOIS.

INTERNAL-COMBUSTION ENGINE.

1,139,364. Specification of Letters Patent. Patented May 11, 1915.

Application filed June 8, 1912. Serial No. 702,553.

To all whom it may concern:

Be it known that I, HERBERT F. OBERGFELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Internal-Combustion Engines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to internal combustion engines and has for its object the provision of an improved engine of this character capable of operation without the use of valve mechanism.

In the preferred form of my invention, I utilize a crank case or a portion analogous to, say a compression chamber, for the supply of fluid, but such fluid as used in the crank chamber is free from combustible material. This greatly promotes safety in the operation of engines of this class. In the form herein shown the compressed fluid is forced at a given predetermined time into the explosion chamber and draws with it through means arranged extraneously of the crank chamber the combustible material, preferably in carbureted form. I employ suitably arranged ports and controlling mechanism to control the entire operation of the engine.

I will explain one embodiment of my invention in connection with the accompanying drawings, in which—

Figure 1 is a vertical transverse sectional view of an engine equipped in accordance with my invention, and Fig. 2 is a detailed vertical sectional view of the carbureting mechanism.

Referring more particularly to Fig. 1, I show an engine having an inclosing casing 1 to form a crank chamber 2. A cylinder 3 is mounted by means of the bolts 4 on the crank casing and has at its upper end an explosion chamber 5. A piston 6 operates within the cylinder and the space upon the opposite side of the cylinder to that confining the explosion chamber communicates directly with the crank chamber 2 and for all practical purposes is a part of this crank chamber. A shaft 7 carrying a crank 8 is associated with the piston 6 through the agency of the connecting rod 9. An air inlet port 10 formed in the cylinder 3 periodically admits air of atmospheric pressure to the crank chamber. An exhaust port 11 is also provided within the cylinder to permit the discharge of the products of combustion after each explosion. The cylinder likewise is provided with a port 12 through which the compressed air is forced from the crank chamber to the explosion chamber through the pipe 13. This pipe 13 communicates directly with the port 12 and covers the entire port. This pipe 13 leads through the interposition of suitable carbureting and controlling mechanism herein after to be explained to the pipe 14, which pipe 14 leads directly to an inlet port 15 from the explosion chamber. The piston is hollow and this hollow interior communicates directly with the crank chamber, the hollow interior of the piston being cut off from the explosion chamber by the upper wall 16 of this piston. The wall 16 of the piston carries a baffle plate 17 to direct the flow of incoming gases as will presently appear. Any suitable kind of spark plug 18 is provided. The piston also has a port 19, which port at suitable times registers with the port 12 to thereby permit the gases to flow from the crank chamber through the ports 19 and 12 into the pipe 13. The piston has downwardly projecting aprons 20 to maintain closure of the port 12 when the piston is at the upper extremity of its stroke. Depending aprons are provided on opposite sides of the piston and the one adjacent the port 12 always keeps the port 12 closed except when the port 19 registers with this port 12.

The general operation of the engine thus far outlined is as follows: Assuming the parts to be in the position shown in Fig. 1, air is admitted to the crank case at atmospheric pressure through the inlet port 10. The piston now moving downwardly closes the port 10 and compresses the air in the crank case until such time as the port 19 registers with the port 12, at which time the compressed air flows through the pipe 13 through the carbureting apparatus, to be explained, then through the pipe 14, after reaching which pipe the air has been supplied with the combustible material. Before the piston has reached its lowermost position, port 10 has been partially opened to permit the compressed gases in the explosion chamber 5 to flow out through this

exhaust port 11 and the piston in its further downward travel finally opens the port 15, which thereupon permits the rich explosive mixture under pressure to flow into the explosion chamber being diverted upwardly by the baffle plate 17. This explosive mixture entering the explosion chamber helps to force out the products of combustion from the explosion chamber through the said port 11.

It will be seen that the port 15 is smaller than the port 11, but the lowest portion of the port 15 is on a line with the lowest portion of the port 11. The reason that the port 11 is larger is to permit the products of combustion to begin leaving the explosion chamber before the combustible gases enter. The piston then travels upwardly, closing the port 12, the port 15 and then the port 11, thereby further to compress the combustible mixture in the explosion chamber until such time as the explosion occurs, which again directs the piston downwardly. During the time that the piston has occupied its uppermost position, a fresh supply of air has been taken into the crank casing through the port 10.

Referring more particularly to Fig. 2, I show in the tube 13 a suitable throttle 21. The compressed air from the crank casing passing through the tube 13 enters a passageway 22 having a Venturi tube 23 therein through which the compressed air passes, passing then through suitable gauzes 24 into the tube 14. A nozzle 25 projects into the Venturi tube and leads directly into a supply chamber 26 for explosive fluid. The level of the liquid in the chamber 26 should preferably be even with the mouth of the nozzle 25. A float 27 is provided in the chamber 26 and maintains the level of the liquid within the chamber 26 at the level desired by controlling through suitable valve mechanism 28 the influx of explosive fluid from the supply tube 29. A by-pass controlling valve 30 is provided which controls the flow of air from the tube 13 through a by-pass 31 past the Venturi tube 23. This valve 30 is held against its seat by means of a spring 30^a and the tension of this spring is controlled by the screw threaded adjustable handle 30^b. In this way the degree of throttle opening tends partly to regulate the opening of the valve 30 and the degree of opening in accordance with a certain amount of throttle opening is dependent upon the amount of adjustment of the element 30^b.

It is designed that the adjustment of the valve 30 be in its nature rather of a permanent character depending upon the characteristics of the engine and the duty it is called upon to perform. Other regulations may then be effected by the throttle 21 to control the engine. It will thus be seen that the compressed air flowing through the tube 13 gathers explosive fluid or liquid in carbureted form in its passage through the Venturi tube so that by the time it reaches the tube 14 an explosive mixture has been provided ready for use in the explosion chamber 5.

It will also be apparent that my invention may have many applications and may be widely deviated from without departing from its spirit.

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

1. An internal combusion engine having a cylinder, an explosion chamber therein, an inclosed crank chamber, a piston for said cylinder adapted to compress fluid in the crank chamber, means to conduct compressed fluid from said crank chamber to said explosion chamber, a source of combustible fluid associated with said means whereby in the passage of compressed fluid through said means, said combustible fluid is mixed with said compressed fluid, said piston having means to prevent the return of explosive mixture from said first aforesaid means to said crank chamber, a port in said cylinder coöperating with said means in said piston and controlled by said piston to control the flow of compressed fluid into said means, and means to conduct more or less of said compressed fluid around said source of combustible fluid.

2. An internal combustion engine having a cylinder, an explosion chamber therein, an inclosed crank chamber, a piston for said cylinder adapted to compress fluid in the crank chamber, means to conduct compressed fluid from said crank chamber to said explosion chamber, a source of combustible fluid associated with said means whereby in the passage of compressed fluid through said means, said combustible fluid is mixed with said compressed fluid, said piston having means to prevent the return of explosive mixture from said first aforesaid means to said crank chamber, a port in said cylinder coöperating with said means in said piston and controlled by said piston to control the flow of compressed fluid into said means, a port in said cylinder controlled by said piston to control the influx of fluid mixture into said explosion chamber, and means to conduct more or less of said compressed fluid around said source of combustible fluid.

3. An internal combustion engine having a cylinder, an explosion chamber therein, an inclosed crank chamber, a piston for said cylinder adapted to compress fluid in the crank chamber, means to conduct compressed fluid from said crank chamber to said explosion chamber, a source of combustible fluid associated with said means whereby in the passage of compressed fluid through said means, said combustible fluid is mixed with said compressed fluid, said piston having

means to prevent the return of explosive mixture from said first aforesaid means to said crank chamber, a port in said cylinder coöperating with said means in said piston and controlled by said piston to control the flow of compressed fluid into said means, and a port in said cylinder controlled by said piston to control the influx of fluid mixture into said explosion chamber, a port in said cylinder controlled by said piston to control the influx of fluid to be compressed in the said crank chamber, and means to conduct more or less of said compressed fluid around said source of combustible fluid.

4. An internal combustion engine having a cylinder, an explosion chamber therein, an inclosed crank chamber, a piston for said cylinder adapted to compress fluid in the crank chamber, means to conduct compressed fluid from said crank chamber to said explosion chamber, a source of combustible fluid associated with said means whereby in the passage of compressed fluid through said means, said combustible fluid is mixed with said compressed fluid, said piston having means to prevent the return of explosive mixture from said first aforesaid means to said crank chamber, a port in said cylinder coöperating with said means in said piston and controlled by said piston to control the flow of compressed fluid into said means, and a port in said cylinder controlled by said piston to control the influx of fluid mixture into said explosion chamber, a port in said cylinder controlled by said piston to control the flux of fluid to be compressed in the said crank chamber, a port in said cylinder controlled by said piston to control the exhaust of combusted fluid from said explosion chamber, and means to conduct more or less of said compressed fluid around said source of combustible fluid.

5. An internal combustion engine having a cylinder, an explosion chamber therein, an inclosed crank chamber, a piston for said cylinder adapted to compress fluid in the crank chamber, means to conduct compressed fluid from said crank chamber to said explosion chamber, a source of combustible fluid associated with said means whereby in the passage of compressed fluid through said means, said combustible fluid is mixed with said compressed fluid, said piston having means to prevent the return of explosive mixture from said first aforesaid means to said crank chamber, a port in said cylinder coöperating with said means in said piston and controlled by said piston to control the flow of compressed fluid into said means, and a port in said cylinder controlled by said piston to control the influx of fluid mixture into said explosion chamber, a port in said cylinder controlled by said piston to control the influx of fluid to be compressed in the said crank chamber, a port in said cylinder controlled by said piston to control the exhaust of combusted fluid from said explosion chamber, baffling means carried by said piston, and means to conduct more or less of said compressed fluid around said source of combustible fluid.

In witness whereof, I hereunto subscribe my name this 24th day of May, A. D., 1912.

HERBERT F. OBERGFELL.

Witnesses:
MAX W. ZABEL,
HAZEL JONES.