Dec. 13, 1927. 1,652,487

G. A. LOUD

VALVE FOR INTERNAL COMBUSTION ENGINES

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Fig. 2.

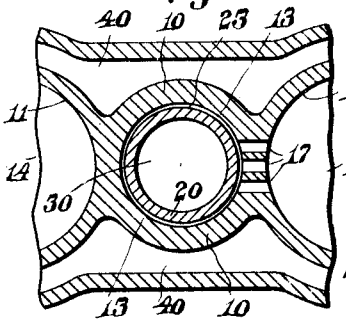


Fig. 1.

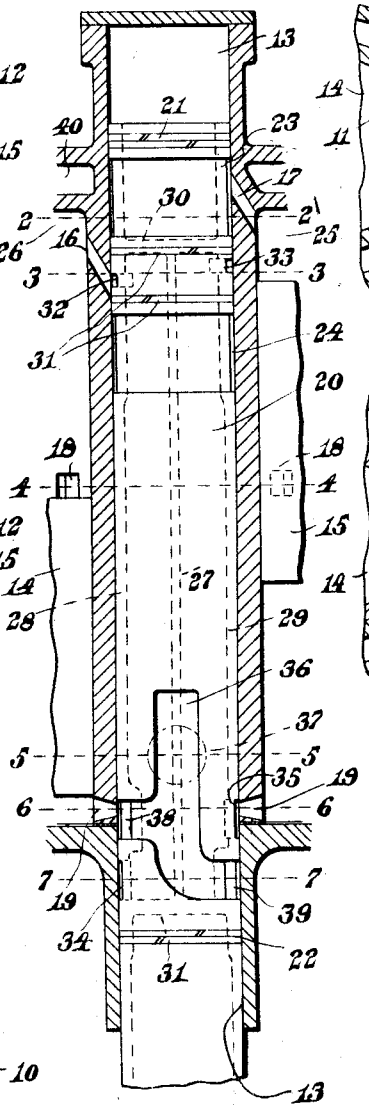


Fig. 3.

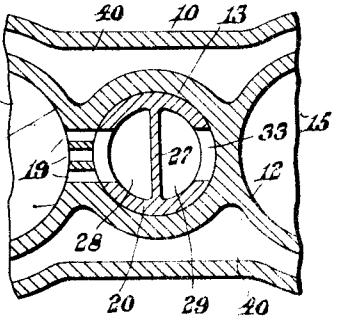


Fig. 4.

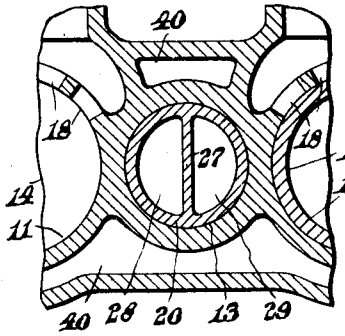


Fig. 5.

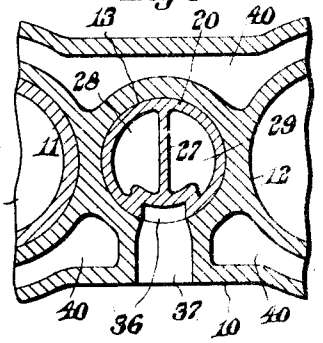


Fig. 6.

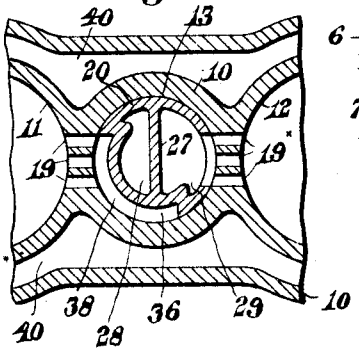
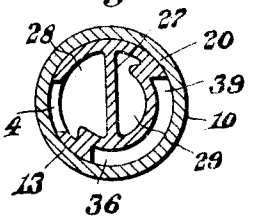


Fig. 7.



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VALVE FOR INTERNAL COMBUSTION ENGINES

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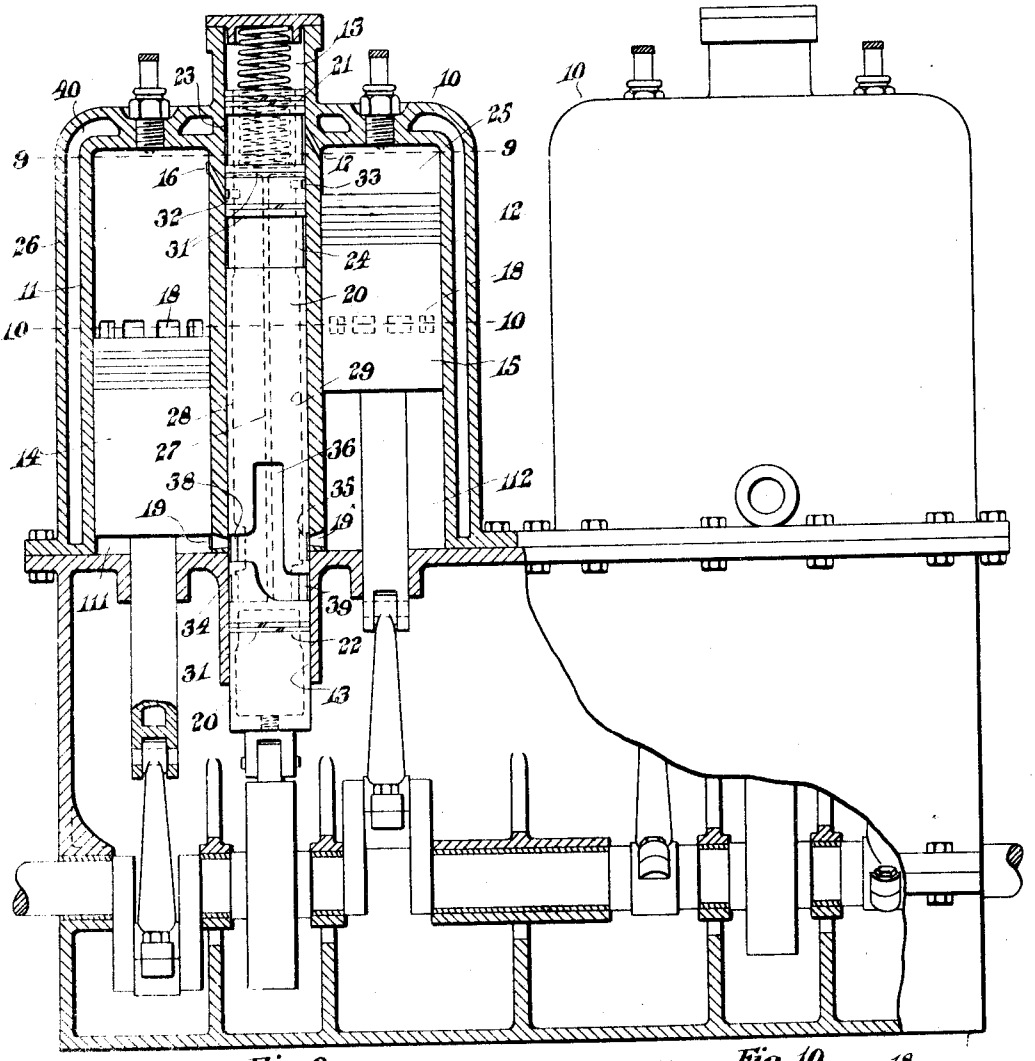


Fig. 9.

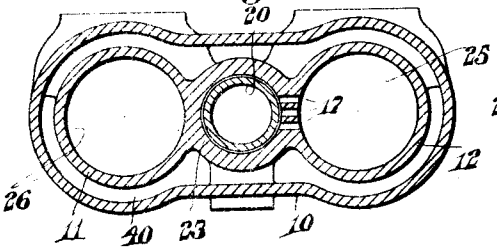
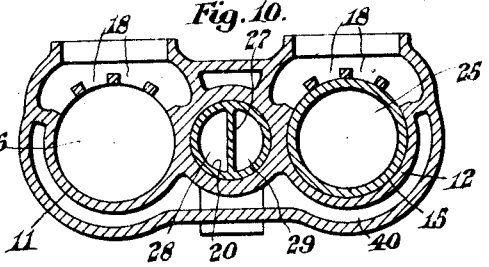


Fig. 10.



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Patented Dec. 13, 1927. 1,652,487

UNITED STATES PATENT OFFICE.

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VALVE FOR INTERNAL-COMBUSTION ENGINES.

Application filed August 12, 1926. Serial No. 128,898.

This invention relates to valves for internal combustion engines and has for its object the production of a device of this character which is adapted to supply an explosive mixture to two cylinders, said mixture being admitted to the explosion chamber greatly compressed, atomized, and preheated.

This object is attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described except as required by the scope of the appended claims.

Of the drawings:

Figure 1 represents a vertical section of a valve embodying the principles of the present invention shown in connection with portions of two cylinders of an internal combustion engine.

Figures 2 to 7 inclusive represents horizontal sections of the same on lines 2, 2, to 7, 7, inclusive on Fig. 1.

Figure 8 represents a vertical section of an internal combustion engine showing said valve as applied thereto.

Figure 9 represents a horizontal section of same on line 9, 9, on Fig. 8, and

Figure 10 represents a horizontal section of same on line 10, 10, on Fig. 8.

Similar characters indicate like parts throughout the several figures of the drawings.

In the drawings, 10 is a portion of the casing of an internal combustion engine, provided with two cylinders 11 and 12, between which is a cylindrical chamber 13.

In the cylinder 11 is the usual reciprocating piston 14 and in the cylinder 12 is the usual reciprocating piston 15.

In the upper end of the cylinder 11 is an explosion chamber 26 which has a passage 16 extending therefrom into the chamber 13 and likewise in the upper end of the cylinder 12 is an explosion chamber 25 which has a passage 17 extending therefrom into the chamber 13.

Each cylinder 11 and 12 is provided with the exhaust passages 18.

From the compression chambers 111 and 121 in the lower ends of the cylinders 11 and 12 respectively extend the passages 19, 19× to the chamber 13.

Within the chamber 13 is a reciprocating valve 20, this valve being reciprocated by suitable cam mechanism coacting with the lower end thereof, this cam mechanism having four independent throws to impart the necessary movements to said valve.

As the cam mechanism itself forms no part of the present invention, it is deemed unnecessary to illustrate the same.

Such a mechanism as is used in connection with the reciprocating valve 20 is fully described in my application Serial No. 128,897 of even date and to which reference is made.

The valve is provided with the usual packing rings 21 and 22 and in the periphery of said valve near the upper end thereof are two annular depressions 23 and 24.

In the operation of the valve the depression 23 is disposed opposite the passage 17 to the explosion chamber 25 when the explosion is about to take place.

When an explosion takes place some of the expanding gases pass through the passage 17 and into the recesses 23 and expand in opposite directions against the end walls of said recesses, thereby balancing the valve and preventing any strain thereon.

The recess 24 operates in the same manner in connection with the explosion chamber 26, said recess 24 being disposed opposite the passage 16 when the explosion takes place in the explosion chamber 26.

The valve 20 is provided with a central partition 27 forming two compartments 28 and 29 in said valve extending lengthwise thereof, the upper end of these compartments being closed by the wall 30 and the lower end by the wall 31.

The distances between these walls 30 and 31 may be varied to make the compartments 28 and 29 longer or shorter in order to regulate the expansion of the gases admitted through the valve 20 into the explosion chambers 25 and 26.

At different levels the valve 20 has ports 32 and 33 which during the reciprocation of the valve are adapted to register respectively with the passages 16 and 17 extending from the chamber 13 to the explosion chambers 26 and 25.

The lower ends of the compartments 28 and 29 have extending therefrom ports 34 and 35 which are adapted to register respectively with the passages 19 and 19× during the reciprocation of said valve.

In the periphery of the valve 20 and at the lower end thereof is a recess 36 extending longitudinally of said valve and always in communication with the gas inlet 37.

From the recess 36 extends lateral recesses 38 and 39 in opposite directions, these lateral recesses being at different levels and are adapted to register with the passages 19 and 19× during the reciprocation of the valve 20.

The port 34 is below the recess 38 and the recess 39 is below the port 35 as is clearly shown in Fig. 1 of the drawings.

As the recess 36 is always in constant communication with the inlet 37 for the combustible mixture, it is evident that this recess is at all times filled with said combustible mixture.

When the valve is in its lowest position as indicated in Fig. 1 the recess 38 is shown communicating with the passage 19 into the cylinder 11. At this time the explosion is about to take place in the explosion chamber 25 of the cylinder 12.

When the explosion takes place the piston 14 will move upwardly in the cylinder 11 and permit the compression chamber below the piston 14 to be filled with combustible mixture.

On the downward movement of the piston 14 this combustible mixture in the compression chamber 111 will be compressed and as soon as, in the movement of the valve 20, the port 34 registers with the passage 19, this compressed gas will be forced into the compartment 28.

From this compartment 28 the gas is adapted to pass through the port 32 and passage 16 into the explosion chamber 26 when, upon the return movement of the valve 20, said passage 16 and port 32 are in register, as indicated in Fig. 1.

The same operation takes place in connection with the other cylinder 12 and in a similar manner as just described.

The valve casing 10 is provided with water chambers 40 in which the water becomes heated during the operation of the engine and assists in heating the various parts of the engine and thereby effecting a better operation thereof by preheating the combustible mixture before and during its compression.

When the piston 14 moves upwardly the combustible mixture being drawn into the combustion chamber of the cylinder 11 will expand and will be again compressed when the piston 14 moves downwardly.

After this compression and when the passage 19 and port 34 are in register, this compressed mixture will escape into the compartment 28 where it will again expand. It will then pass through the port 32 and passage 16 into the cylinder 11 above the piston, and when this piston 14 moves upwardly it will again be compressed before the explosion in the explosion chamber 26 takes place.

This operation is all substantially the same as fully described in my application Serial No. 128,897 of even date and to which reference is made for the complete operation of the engine.

It is believed that the operation and many advantages of the invention will be understood without further description.

Having thus described my invention, I claim:

1. In an internal combustion engine having two cylinders, each having compression and explosion chambers and provided between said cylinders with a valve chamber having a gas inlet communicating therewith, a reciprocating valve in said chamber having a peripheral recess adapted to constantly communicate with the gas inlet, and temporarily with the passage to the compression chamber of either cylinder.

2. In an internal combustion engine having two cylinders, each having compression and explosion chambers and provided between said cylinders with a valve chamber having a gas inlet communicating therewith, a reciprocating valve in said chamber having a peripheral recess in constant communication with said gas inlet and provided with oppositely extending lateral recesses at different levels adapted to alternately register with passages to the compression chambers of said cylinders.

3. In an internal combustion engine having two cylinders, each having compression and explosion chambers and provided between said cylinders with a valve chamber having a gas inlet communicating therewith, a reciprocating valve in said chamber having a peripheral recess in constant communication with said gas inlet and temporarily registering with the passages to the compression chambers of said cylinders, said valve having passages extending lengthwise thereof through which compressed gas may pass from either compression chamber to the explosion chamber of the same cylinder.

4. In an internal combustion engine having two cylinders, each having compression and explosion chambers, a reciprocating valve provided with separated compartments for the passage of compressed gas from the compression chamber to the explosion cham-

oer of the engine and having two annular depressions, each of which is adapted to be disposed opposite a passage to an explosion chamber when the explosion takes place therein.

5. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a valve associated with said cylinders and provided with means for temporarily connecting the gas inlet with the compression chamber of either cylinder and having means whereby compressed gas from the compression chamber of each cylinder may pass to its explosion chamber.

6. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a cylindrical chamber between said cylinders communicating by ports with said explosion and compression chambers of said cylinders and to the inlet for the explosive mixture; and a reciprocating valve in said cylindrical chamber having a vertical partition forming two compartments having at opposite ends ports adapted to communicate with passages to said explosion and compression chambers, said valve having a peripheral recess communicating with said explosive mixture inlet and adapted to communicate with the passages to either compression chamber during the reciprocation of said valve.

7. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a cylindrical chamber between said cylinders communicating by ports with said explosion and compression chambers of said cylinders and to the inlet for the explosive mixture, and a reciprocating valve in said cylindrical chamber having at opposite ends ports adapted to communicate with passages to said explosion and compression chambers, said valve having a peripheral recess communicating with said explosive mixture inlet and adapted to communicate with the passages to either compression chamber during the reciprocation of said valve.

8. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a cylindrical chamber between said cylinders communicating by ports with said explosion and compression chambers of said cylinders and to the inlet for the explosive mixture, and a reciprocating valve in said cylindrical chamber having a vertical partition forming two compartments having at opposite ends ports adapted to communicate with passages to said explosion and compression chambers, said valve having a peripheral recess extending longitudinally of said valve communicating with said explosive mixture inlet and having laterally extending recesses adapted to communicate with the passage to either compression chamber during the reciprocation of said valve.

9. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a cylindrical chamber between said cylinders communicating by ports with said explosion and compression chambers of said cylinders and to the inlet for the explosive mixture, and a reciprocating valve in said cylindrical chamber having a vertical partition forming two compartments having at opposite ends ports adapted to communicate with passages to said explosion and compression chambers, said valve having a peripheral recess extending longitudinally of said valve communicating with said explosive mixture inlet and having laterally extending recesses adapted to communicate with the passage to either compression chamber at different levels during the reciprocation of said valve.

10. In an internal combustion engine having two cylinders, each having compression and explosion chambers; a cylindrical chamber between said cylinders communicating by ports with said explosion and compression chambers of said cylinders and to the inlet for the explosive mixture, and a reciprocating valve in said cylindrical chamber having a vertical partition forming two compartments having at opposite ends ports adapted to communicate with passages to said explosion and compression chambers, said valve having a peripheral recess extending longitudinally of said valve communicating with said explosive mixture inlet and having laterally extending recesses adapted to communicate during the reciprocation of said valve with the passage to either compression chamber, one of said recesses being below and the other above the valve ports communicating with said compression chambers.

Signed by me at 746 Old South Bldg., Boston, Mass., this 11th day of August, 1926.

GEORGE A. LOUD.