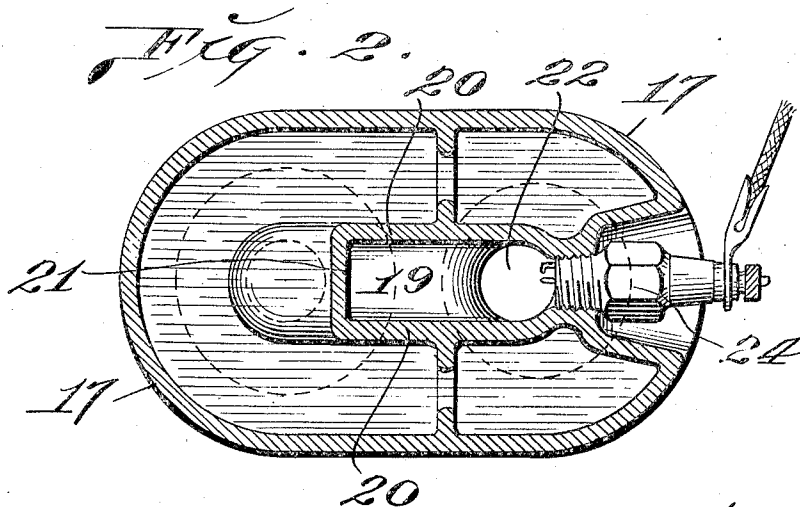
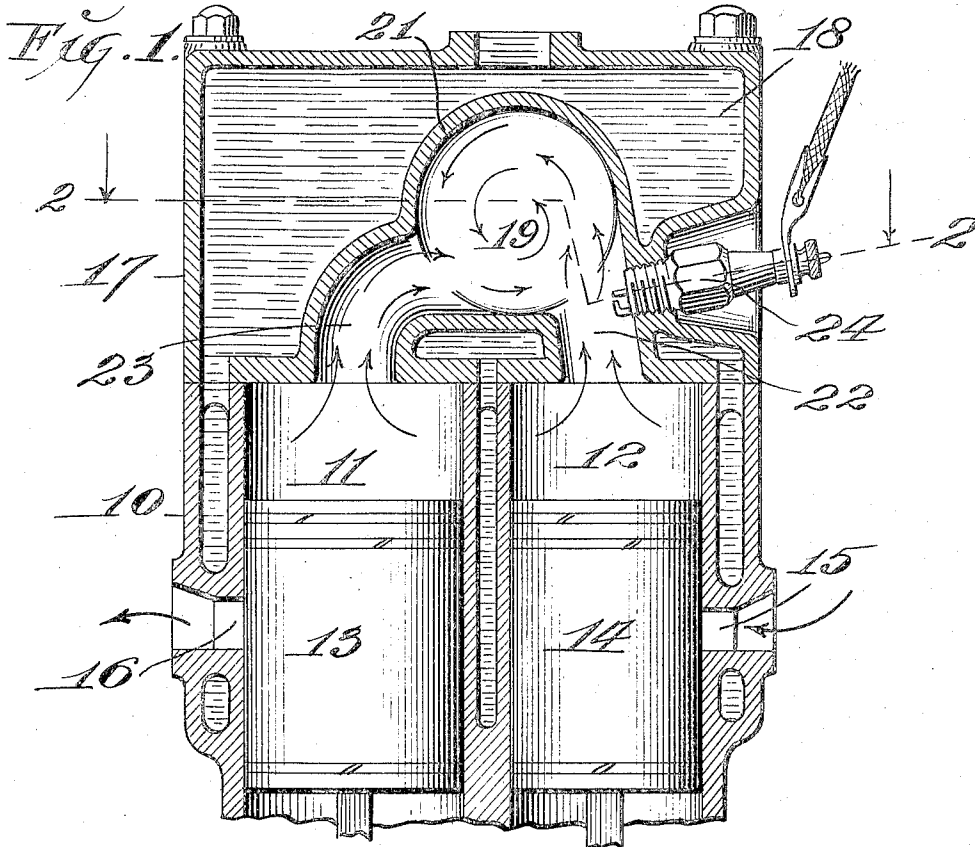


Sept. 29, 1925.

1,555,809

E. R. BURTNETT
INTERNAL COMBUSTION ENGINE

Filed Sept. 18, 1924



Inventor:—
Everett R. Burnett.
By Martin Smith atty.

Patented Sept. 29, 1925.

1,555,809

UNITED STATES PATENT OFFICE.

EVERETT R. BURNETT, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AUTOMOTIVE VALVES CO., OF LOS ANGELES, CALIFORNIA, A VOLUNTARY TRUST.

INTERNAL-COMBUSTION ENGINE.

Application filed September 13, 1924. Serial No. 738,420.

To all whom it may concern:

Be it known that I, EVERETT R. BURNETT, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates generally to internal combustion engines, and more particularly to a cylinder head for an adjacent pair of combustion cylinders in an engine, which cylinder head is provided with a chamber that has a common clearance space for the two combustion chambers in the engine cylinders and which common clearance space also serves as a turbulence chamber, inasmuch as the combined residual and fresh gaseous fuel charge passes into said common clearance chamber during the compression stroke of the pistons within the two cylinders, said fuel charge being highly agitated within said chamber so as to effect a thorough and intimate mixture of the residual gases and the fresh gaseous fuel charge that is inducted to the combustion chambers.

My present invention is an improvement upon the invention forming the subject matter of my co-pending application for U. S. Letters Patent filed Sept. 25, 1924, Serial No. 739,914.

In my co-pending application just mentioned, the turbulence chamber is substantially disk-shaped and it occupies a horizontal plane. It is one of the objects of my present invention to arrange the disk-shaped turbulence chamber in a vertical plane and to connect the lower portion thereof with the two combustion chambers of the engine by means of tangentially disposed ducts, one of which is arranged so that its axis occupies a position approximately 90° relative to the axis of the other duct or that particular portion thereof that joins the peripheral portion of the turbulence chamber.

With the foregoing and other objects in view, my invention consists in the features of construction and combination and arrangement of parts hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section taken through the center of a pair of combustion cylinders of an engine, showing

the head block thereof provided with a turbulence chamber as contemplated by my invention;

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1.

Referring by numerals to the accompanying drawings, 10 designates a cylinder block in which is formed a pair of combustion chambers 11 and 12, the axes thereof being substantially parallel with each other and arranged for operation within said combustion chambers are respective power pistons 13 and 14 that are connected in the usual manner to the crank shaft of the engine. Formed through the wall of cylinder block that surrounds combustion chamber 12 is a gaseous fuel inlet port 15, and formed in the wall of the block that surrounds combustion chamber 11 is an exhaust port 16. These inlet and exhaust ports are positioned so that they are wholly uncovered and open only when the pistons 13 and 14 are at the lower or outer ends of their stroke.

Secured in any suitable manner on the head end of block 10 is a head block 17 that is preferably provided with a chamber 18 through which may be circulated a fluid cooling medium, such as water, and formed within said head block, preferably at a central point, is a turbulence chamber 19. This chamber is formed between parallel side walls 20 and a substantially circumferential wall 21, and this turbulence chamber 19 has the general form of a disk that occupies a vertical position. Leading from one side of the chamber 19 downward through the lower portion of head block 17 is a short throat or duct 22 that is tangentially disposed with respect to the outer portion of chamber 19, and said throat communicates directly with the upper head end of combustion chamber 12.

Formed in the lower portion of block 17 and above the chamber 11 is an elbow shaped duct or throat 23, the upper horizontally disposed portion of which is tangentially disposed relative to the outer circumferential portion of chamber 19, and said upper portion of this duct 23 occupies a plane substantially at right angles to throat or duct 22; the lower portion of duct 23 occupies a substantially vertical position, and the lower end thereof communicates directly with the head of combustion chamber 12.

Seated in head block 17 above combustion chamber 12 is an ignition device, such as a spark plug 24, and the inner ends of the electrodes thereof project into the throat or duct 22 at a point just above the head end of combustion chamber 12.

In the operation of my improved engine, pistons 13 and 14 in passing lower or outer center uncover inlet port 15 and exhaust port 16, and as such ports are thus uncovered a gaseous fuel charge, preferably under pressure, enters inlet port 15 and passes upward through chamber 12, duct 22, chamber 19, duct 23, chamber 11, and so said gaseous fuel charge will drive before it a substantial portion of the products of combustion remaining in the combustion chambers from the previously ignited charge. These products of combustion will be driven through exhaust port 16.

As pistons 13 and 14 start on their upward or inward stroke, ports 15 and 16 will be closed, and the charge of fresh gaseous fuel previously inducted to the combustion chambers and whatever residual gases or products of combustion remain in said combustion chambers will be forced upward into the ducts or throats 23 into chamber 19 and said gaseous fuel and the residual products of combustion will, as the pressure and column movement increases, be given a whirling movement within the turbulence chamber, due to its circular shape and also due to the tangential arrangement of the ducts 22 and 23 and the angular position of said duct 23 relative to said duct 22.

This whirling movement within the turbulence chamber results in a very thorough mixture of the fresh fuel gases and the residual products of combustion, and this condition of turbulence and agitation increases as the pistons approach high center or the point of highest compression. When this point is reached, or when the pistons pass high center, a spark is produced between the electrodes of the spark plug 24, thereby igniting the intimate mixture of gaseous fuel and residual products of combustion, and the rapid rise in pressure following combustion of the compressed gaseous fuel charge will act on the heads of the pistons 13 and 14 to drive the same downward or outward on their power stroke.

Inasmuch as the inducted charge of fresh gaseous fuel is thoroughly and intimately mixed with the residual products of combustion through the action of turbulence within the chamber 19, the flame propagation within the entire fuel charge after ignition will take place with great rapidity and as the residual products of combustion absorb a certain amount of heat developed by the combustion of fresh gaseous fuel, a substantial decrease in combustion temperatures is effected, thereby minimizing and

tending to wholly eliminate the undesirable results arising from detonation.

Obviously the construction of the engine and its turbulence head may be varied in minor details without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. An internal combustion engine having a pair of combustion chambers, one of which is provided with a gaseous fuel inlet port and the other being provided with an exhaust port, a head closing said chambers and said head being provided with a substantially disk-shaped turbulence chamber that occupies a vertical plane within the central portion of said head and which turbulence chamber is connected respectively to the two combustion chambers by means of ducts, one of which is tangentially disposed with relation to the circumferential portion of said turbulence chamber.

2. An internal combustion engine having a pair of combustion chambers, one of which is provided with a gaseous fuel inlet port and the other being provided with an exhaust port, a head closing said chambers, said head being provided with a substantially disk-shaped turbulence chamber that occupies a vertical plane within the central portion of said head, a tangentially disposed duct formed in said head and connecting one side of said turbulence head with one of the combustion chambers, and a duct connecting the other combustion chamber with the lower portion of said turbulence chamber, the upper portion of which last mentioned duct is disposed substantially at right angles to the first mentioned tangentially disposed duct.

3. An internal combustion engine having a pair of combustion chambers, one of which is provided with a gaseous fuel inlet port and the other being provided with an exhaust port, a head closing said chambers, said head being provided with a substantially disk-shaped turbulence chamber that occupies a vertical plane within the central portion of said head, a tangentially disposed duct formed in said head and connecting one side of said turbulence head with one of the combustion chambers, a duct connecting the other combustion chamber with the lower portion of said turbulence chamber, the upper portion of which last mentioned duct is disposed substantially at right angles to the first mentioned tangentially disposed duct, and an ignition device seated in said head and projecting into the first mentioned tangentially disposed duct.

4. An internal combustion engine having a pair of combustion chambers, one of which is provided with a gaseous fuel inlet port and the other chamber being provided with an exhaust port, a head closing said cham-

- bers, said head having a disk-shaped turbulence chamber that occupies a vertical plane within the central portion of said head, a tangentially disposed duct connecting one of the combustion chambers with one side of said turbulence chamber, and an elbow-shaped duct connecting the lower portion of said turbulence chamber with the other combustion chamber.
5. An internal combustion engine having a pair of combustion chambers, one of which is provided with a gaseous fuel inlet port and the other chamber being provided with an exhaust port, a head closing said chambers, said head having a disk-shaped turbulence chamber that occupies a vertical plane within the central portion of said head, a tangentially disposed duct connecting one of the combustion chambers with one side of said turbulence chamber, an elbow-shaped duct connecting the lower portion of said turbulence chamber with the other combustion chamber, and an ignition device seated in said head and projecting into the lower portion of the tangentially disposed duct.
- In testimony whereof I affix my signature.

EVERETT R. BURTNETT.