April 8, 1924. 1,489,291

G. A. TUERK

INTERNAL COMBUSTION ENGINE

Filed July 1, 1922 2 Sheets-Sheet 1

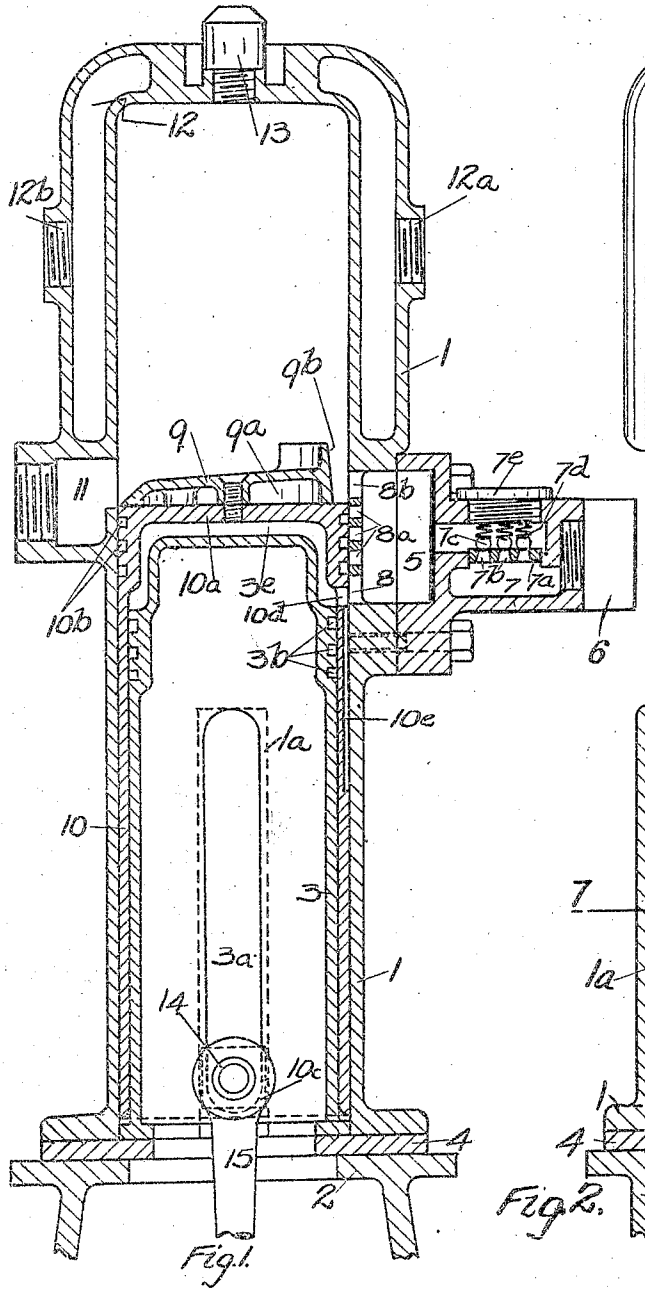

Fig. 1.

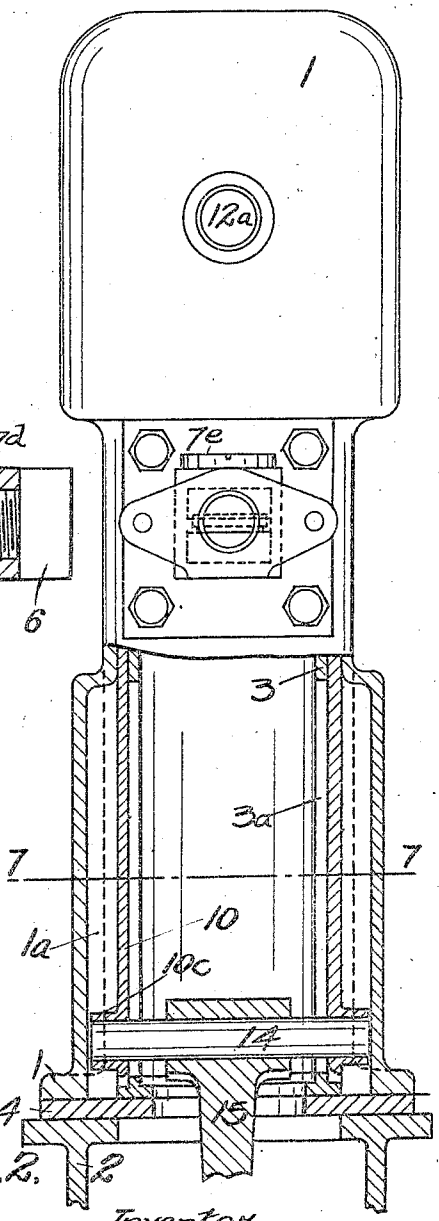

Fig. 2.

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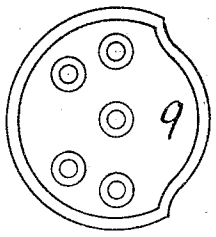

Fig. 3.

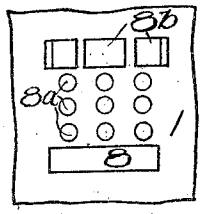

Fig. 4.

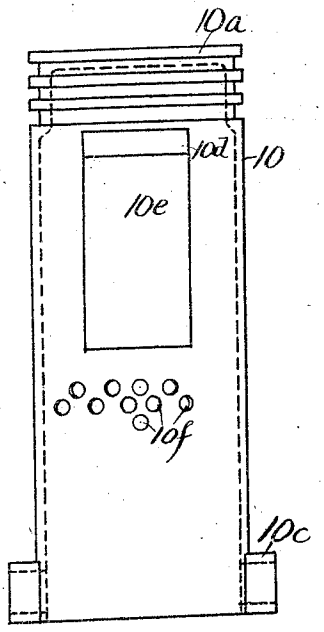

Fig. 5.

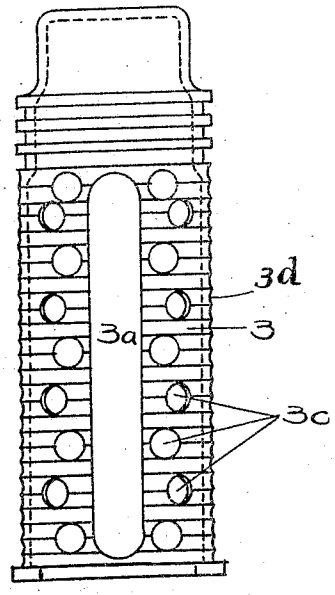

Fig. 6.

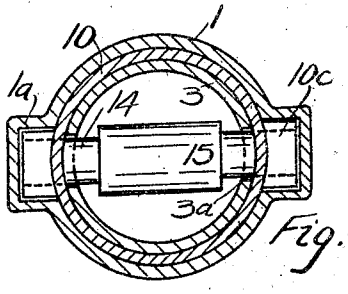

Fig. 7.

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Patented Apr. 8, 1924. 1,489,291

UNITED STATES PATENT OFFICE.

GUSTAVUS ADOLPHUS TUERK, OF KITCHENER, ONTARIO, CANADA.

INTERNAL-COMBUSTION ENGINE.

Application filed July 1, 1922. Serial No. 572,296.

To all whom it may concern:

Be it known that I, GUSTAVUS ADOLPHUS TUERK, a citizen of the United States of America, residing at the city of Kitchener, in the county of Waterloo, Province of Ontario, Canada, have invented a new and useful Improvement in Internal-Combustion Engines, of which the following is a specification.

My invention relates to improvements in internal combustion engines, and more particularly to engines of the two cycle type. It consists primarily in the provision of a sleeve piston mounted on a stationary annular guide so that a compression chamber is formed between the head of the said guide and the underside of the head of the sleeve piston. On the upper side of the said sleeve piston I secure a hollow deflector of necessary height to give the desired compression in the cylinder.

One of the objects of my invention is to provide means for obtaining greater compression than is possible with the usual two cycle engine at present in use.

Another object of my invention is to obviate the necessity of the mixture being introduced into the crank case.

A further object of my invention is to provide a light and hollow deflector of the required depth to keep the piston head cool, and which will give the desired amount of compression. And further to render it possible for the said deflector to be easily changed so that the amount of the compression can be readily varied to suit low grades of fuel when desired.

With these and other objects in view my invention consists in certain novel construction and combination of parts hereinafter more fully described and claimed.

In the accompanying drawings similar numerals refer to similar parts throughout all the views, in which:

Figure 1 shows a sectional elevation of my engine.

Figure 2 is a front view partly in section and partly in elevation.

Figure 3 represents an inverted plan of my deflector.

Figure 4 is a portion of the inside wall of the cylinder.

Figures 5 and 6 show side elevations of my sleeve piston and stationary annular guide respectively.

Figure 7 is a cross section on the line 7—7 of Figure 2.

Referring more particularly to drawings, 1 designates the cylinder casing mounted on any desired form of crank case 2. The stationary annular guide 3 I prefer to secure to a circular plate 4, the latter can however be made integral with the said guide if preferred. On one side of the cylinder 1, I provide a transfer chamber 5 into which communication is made from the carburetter of any known make indicated at 6, preferably through the ball valve 7. In the wall of the cylinder 1, I arrange lower, central, and upper ports 8, 8^a, and 8^b respectively. And onto the piston head 10^a I secure a deflector 9 so designed that an air space 9^a is formed thereunder, and I provide said deflector with an inclined face 9^b opposite the inlet ports 8^b. 11 is the exhaust port, the upper portion of which extends above the top of the inlet ports 8^b. 12 is a water space with suitable connections 12^a and 12^b, and 13 indicates the spark plug.

The piston 10 I furnish with rings 10^b, and towards its lower end I arrange studs 10^c to carry the gudgeon pin 14, to which latter the connecting rod 15 is pivotally secured. Recesses 1^a are provided in the lower portion of the cylinder casing 1 to allow the studs 10^c to move therein, and similarly slots 3^a are arranged in the sides of the annular guide 3 to allow movement of the gudgeon pin 14. On the outer face of the annular guide 3 I supply piston rings 3^b. And in the side of my sleeve piston 10 I provide an inlet 10^d and also a vertical passage 10^e.

I find that if I provide the annular guide 3 with a series of holes 3^c, and an irregular surface 3^d I attain three objects; the weight of the guide is considerably lessened; the friction between it and the inside circumference of my sleeve piston 10 is greatly reduced, and the irregular surface holds lubrication better. Similarly I prefer to provide holes throughout the wall of my sleeve piston 10 as indicated at 10^f. I find that it decreases the weight, lessens bearing surface and therefore the friction, and aids lubrication.

The ball valve 7 shown in Figure 1 may of course be changed for one of another design if it is so desired. My valve consists of a disc 7^a provided with holes 7^b on each

of which rests a ball 7^c held in place by means of a spring 7^b which in turn is pressed down by the cap 7^c.

The method of operation of my engine is as follows:—

On the upstroke as soon as the piston head 10^a closes the ports 8^b the mixture from the carburetter 6 is drawn through the ball valve into the transfer chamber 5 and from there passes through the ports 8^a and later the ports 8^b into the compression chamber 3^c the area of which is gradually increasing. Meanwhile entrance is also obtained through the port 8, and later the ports 8^a and 8^b into the vertical chamber 10^c and thus into the compression chamber 3^c.

When the piston 10 is about at the top of its stroke the mixture on its upper side is fired by the spark plug 13, and on the down-stroke the mixture in the compression chamber is compressed. As the down stroke continues the compression is increased and equalized throughout the said compression chamber and the transfer chamber until the piston head 10^a passes below the top of the inlet ports 8^b when the mixture rushes into the upper portion of the cylinder, strikes the deflector face 9^b, is turned upwards and assists in expelling the exhaust gases through the exhaust port 11, prior to the upstroke cutting off the ports again.

From the foregoing description it will be clearly seen that I have devised an entirely novel form of construction in which the compression chamber is within the cylinder itself, and in which the sleeve piston, though of considerably greater length than the usual piston, is so guided externally and internally that no great frictional loss is entailed.

Moreover it is understood that I may make certain alterations and modifications in the design and construction of my engine provided the said alterations and modifications fall within the scope of what I claim.

What I claim is:—

1. An internal combustion engine comprising a cylinder, and a sleeve piston closed at the upper end having a removable deflector mounted on the upper face thereof, said deflector being hollow in its lower side in combination with an annular guide within said sleeve piston.

2. An internal combustion engine comprising a cylinder having a series of ports arranged vertically, the upper of said ports communicating with the upper side of a sleeve piston when the latter is towards the bottom of its stroke, said sleeve piston also being provided with a port opening adapted to register at periods towards the lower end of its stroke with the said ports in the cylinder, and a fixed annular guide within the sleeve piston, forming a compression chamber between the top of said guide and the head of said piston, said piston having a channel arranged longitudinally thereof establishing communication between said compression chamber and said ports when the latter are closed by the piston during its instroke.

3. An internal combustion engine comprising a cylinder, a sleeve piston, and a stationary annular guide within said piston, the said guide being provided with piston rings towards its upper end and having a serrated outside circumference, vertical slots, and a series of holes through said circumference, in combination with a transfer chamber and a compression chamber.

GUSTAVUS ADOLPHUS TUERK.