

No. 628,125.

Patented July 4, 1899.

W. S. SHARPNECK.
GAS ENGINE.

(Application filed Oct. 20, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

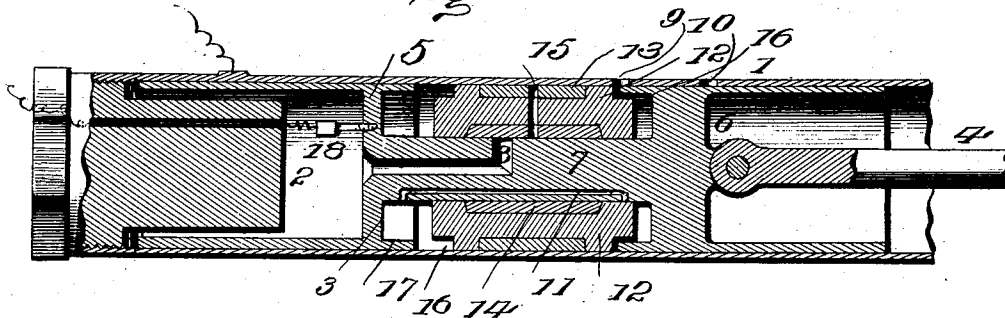


Fig. 2.

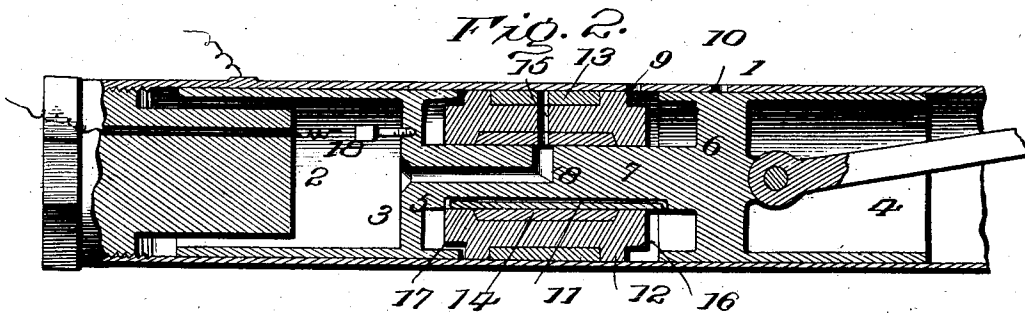
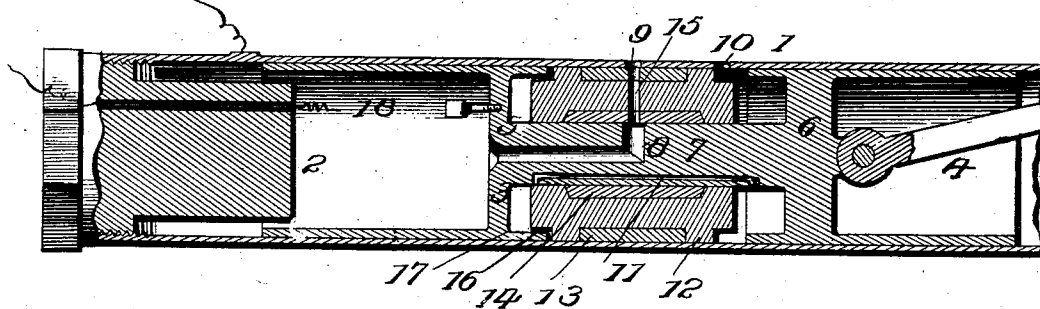


Fig. 3.



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2 Sheets—Sheet 2.

Fig. 4.

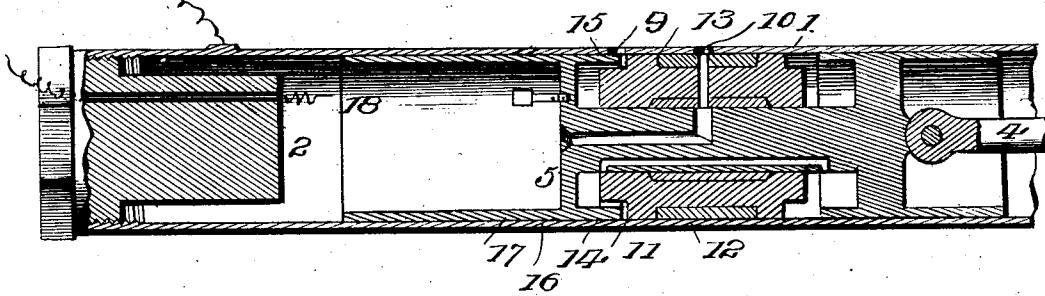


Fig. 5.

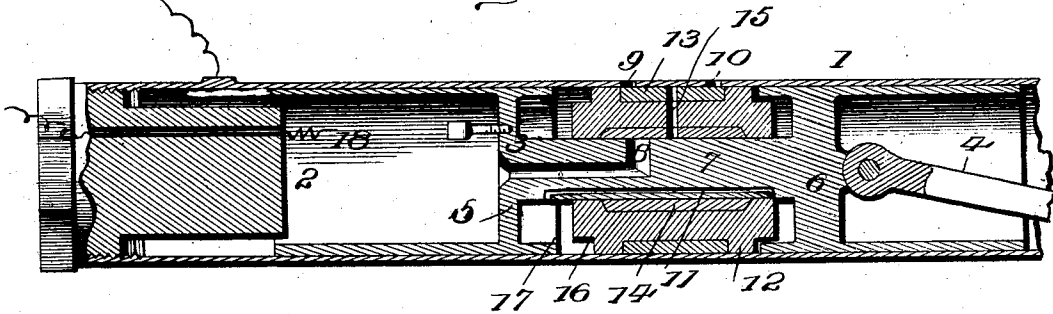
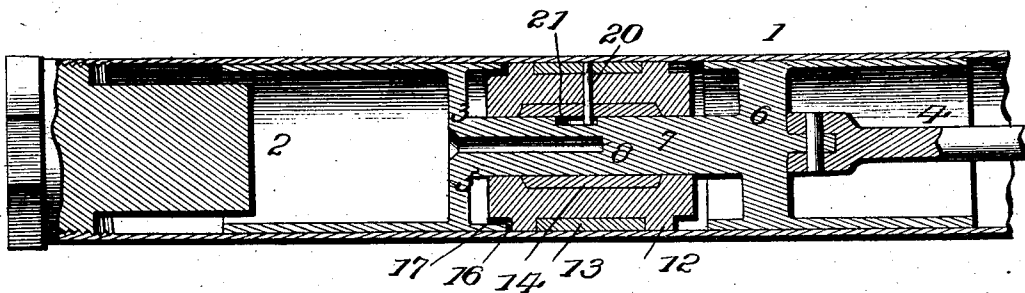


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM S. SHARPNECK, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS
TO JOHN D. ROSS AND EVERETT W. BROOKS, OF SAME PLACE.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 628,125, dated July 4, 1899.

Application filed October 20, 1898. Serial No. 694,113. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SHARPNECK, 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 Gas-Engines, of which the following is a specification, reference being had to the accompanying drawings.

This improvement relates to that class of gas-engines in which the explosive mixture is first compressed and then exploded and allowed to escape after driving the piston forward; and the invention consists in the peculiar construction of the piston, whereby the admission of the gas and the emission of the burned charge are governed in the manner hereinafter more particularly described and then definitely claimed at the end hereof.

In the accompanying drawings, Figure 1 is a vertical central section of the cylinder and piston of an engine constructed according to my improvement, showing the piston in the position it occupies at the time the explosion occurs. Fig. 2 is a similar section of the same parts immediately after the explosion. Fig. 3 is a similar section at the time of the escape of the burned charge. Fig. 4 is a similar view at the time of taking in the charge, and Fig. 5 is a similar view when the charge is being compressed. Fig. 6 is a horizontal central section of the same parts.

Referring now to the details of the drawings by numerals, 1 represents the cylinder, provided with the filler 2 and in which works the piston 3, having the connecting-rod 4 attached to its outer end. The piston consists of two main parts or sections 5 and 6, connected by a neck 7, having a passage 8, which opens at one end into the working part of the cylinder, and its other end communicates at suitable times with the exhaust-port 9 and the inlet-port 10. The neck has also a smaller passage 11, whose ends terminate near the ends of the neck to prevent too great pressure in the space between the sections of the piston and a spool 12, now about to be described.

Between the sections of the piston is set the before-mentioned spool 12, provided with packing-rings 13 and 14, through which rings and spool is a passage 15, which registers at

the proper times with the exhaust and inlet ports and the passage 8. At each end of the spool a recess 16 is turned, so as to allow the ends of the spool to enter pockets 17 in the piston to form cushions. At 18 are shown contacts for making the spark. The passage 11 should have its ends so arranged as to allow of the spool moving perfectly free until the end of the spool has fairly entered the pockets.

The operation is as follows: Supposing the piston to be in the position indicated by Fig. 1, as soon as the engine is started the spark from the contacts explodes the charge and the piston is driven forward, so as to encircle the end of the spool, as shown in Fig. 2, thus forming an air-cushion which prevents noise by the contact of the piston with the spool. As the piston is driven still farther forward and has made half its travel in this direction the passage 15 comes in line with the discharge-port 9, as shown in Fig. 3, and the burned charge escapes. As the motion of the piston is continued by its own momentum and that of the fly-wheel (not shown) a vacuum is formed, and as the piston reaches the position shown in Fig. 4 the exhaust is cut off and communication is established between the inlet and the acting part of the cylinder and a charge of the explosive mixture enters, for which there is plenty of time, as the spool is stationary for a considerable period after the crank has passed the center. As the piston starts to return the neck 7 slides through the spool, breaking connection between the passages 8 and 15, as shown in Fig. 5, and thus as the piston travels back the charge is compressed in the cylinder, and when the piston starts to commence another stroke, as shown in Fig. 1, the charge is exploded and the operation above described is repeated. As the passage 11 extends a short distance into the recesses 16 air can pass from one end of the piston to the other for a portion of the time that the piston-neck is moving through the spool. When the piston first begins to move, the air is very much compressed in the recess in which the end of the spool is then contained, so that when the piston moves the compressed air in the partially-filled recess expands, and

as soon as the piston has moved far enough out of the recess to uncover the opening to the passage 11 there is free communication between the recesses 16 at the opposite ends of the spool until the spool has entered the opposite recess and passed beyond that end of the passage 11, when compression again forms a cushion, as before.

In order to prevent the spool and packing rings from turning and thus disconnecting the passages 8 from the inlet and exhaust ports, a pin 20 is set through the spool and packing-ring and whose ends project into a slot 21 in the neck 7, which will allow the spool and rings to slide on the neck and yet prevent their turning thereon; but any other means of preventing the turning of the parts referred to may be used.

What I claim as new is—

1. The combination in a gas-engine, of a cylinder having an exploding-chamber at one end and a gas-inlet at the other, and a two-part piston working in a cylinder and having its opposite ends connected by a stem, with a port opener and closer sliding lengthwise of the stem, the cylinder being provided with an exhaust-port near the center of the stroke of the piston, and the latter having a passage through the stem forming a communication between the exhaust and the exploding-chamber, substantially as described.

2. The combination in a gas-engine, of a cylinder having an exploding-chamber at one end and a gas-inlet at the other, and a two-part elongated piston having its opposite ends connected by a stem, working in said cylinder, one of whose ends closes the gas-inlet at appropriate periods, with a port opener and closer sliding lengthwise of the stem, the cylinder having an exhaust-port near the center of the stroke of the piston, and the latter being provided with a passage forming a communication between the exhaust-port and the explosion-chamber, substantially as described.

3. The combination in a gas-engine, of a cylinder having an exploding-chamber at one end, a gas-inlet near the other end, an exhaust-port near the center, and a two-part piston connected by a stem working in said cylinder, one of whose ends closes the gas-inlet at appropriate periods, with a port opener and closer moving lengthwise of the stem and opening communication between the exploding-chamber and the gas-inlet and exhaust-port, substantially as described.

4. The combination in a gas-engine, of a cylinder having an exploding-chamber at one end, a gas-inlet near the other end, and an exhaust-port near the center, with a two-part piston working in said cylinder, one of whose ends closes for appropriate periods the gas-inlet, the two parts of said piston being connected by a stem having a passage connected with the exploding-chamber, and a port opener and closer sliding lengthwise of the stem and opening communication between the exploding-chamber and the gas-inlet and exhaust alternately, substantially as described.

5. The combination in an engine, of a cylinder having inlet and outlet ports, a two-part piston having pockets and a port opener and closer working between the two parts of the piston and constructed to enter said pockets, substantially as described.

6. The combination in an engine, of a cylinder having inlet and outlet ports, a two-part piston connected by a neck and having pockets and a passage through the neck terminating near the pockets, with a port opener and closer adapted to enter said pockets, substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 17th day of October, 1898.

WILLIAM S. SHARPNECK.

Witnesses:

CHARLES F. MORSE,

JAMES C. F. BRADLEY.