

W. E. PARKER.
GAS ENGINE.

APPLICATION FILED SEPT. 19, 1907.

996,126.

Patented June 27, 1911.

3 SHEETS-SHEET 1.

Fig 1

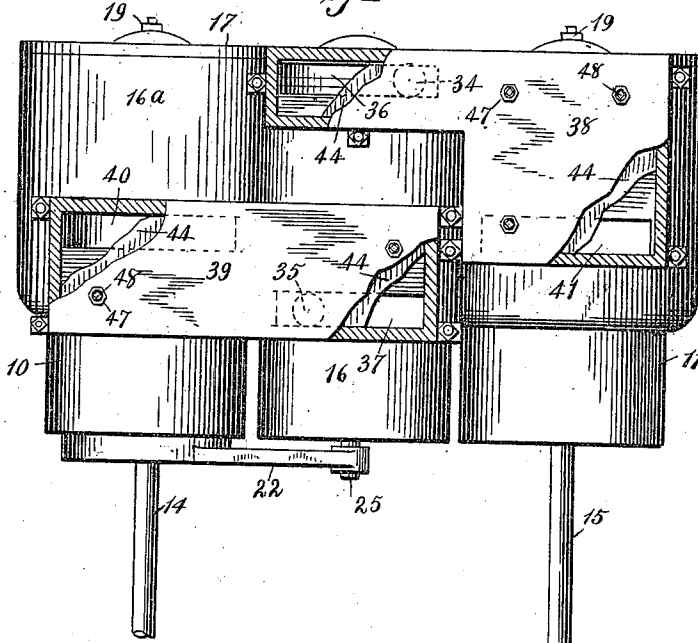
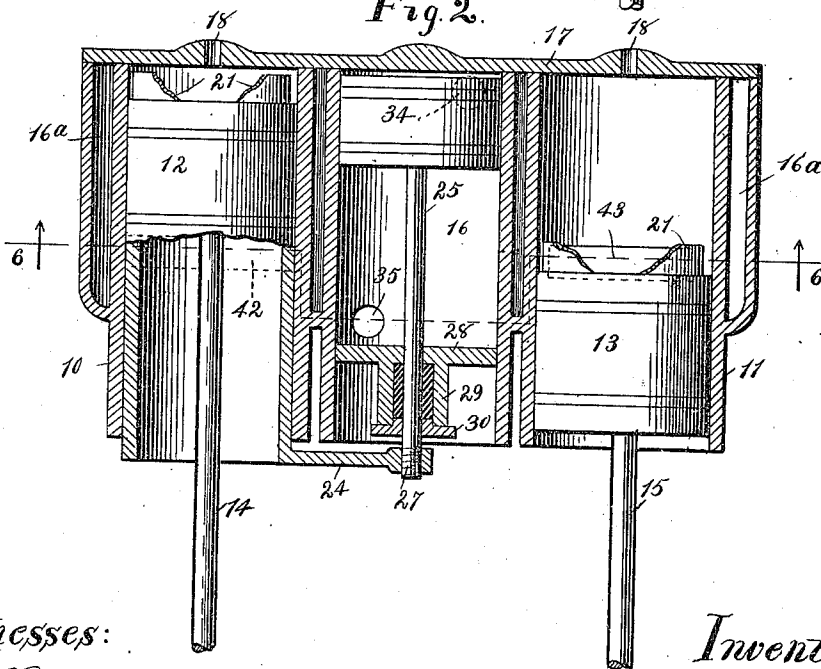


Fig 2.



Witnesses:

C. F. Bassett

Matt. J. Marty

Inventor

Wm E. Parker

By

Frederick Benjamin
Atty.

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3 SHEETS—SHEET 2.

Fig. 3.

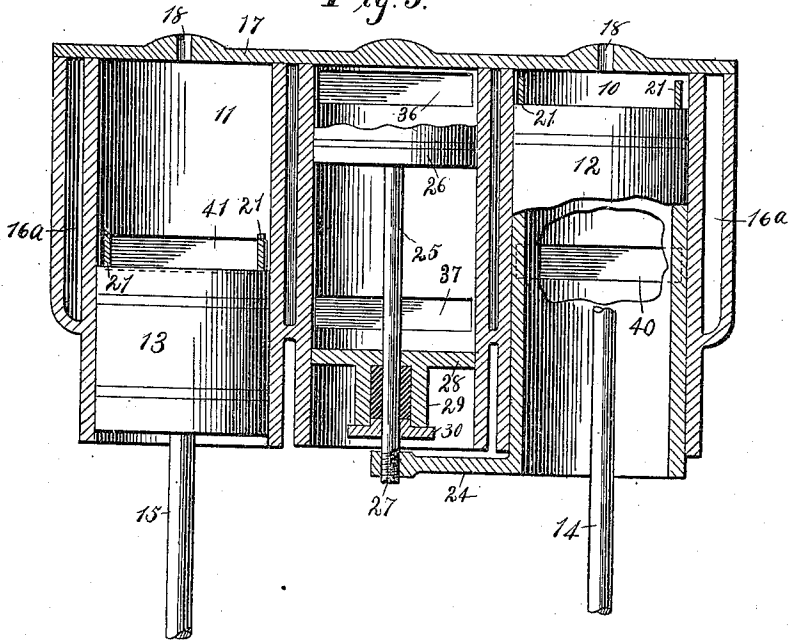
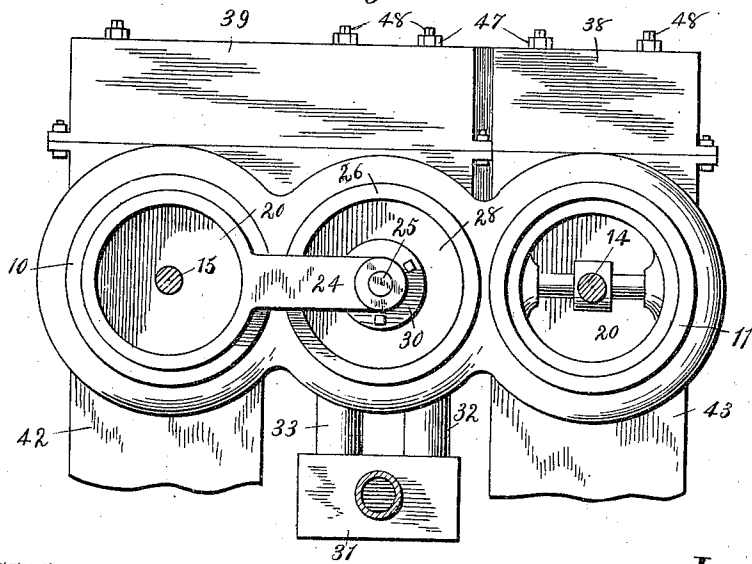


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

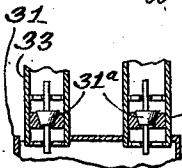
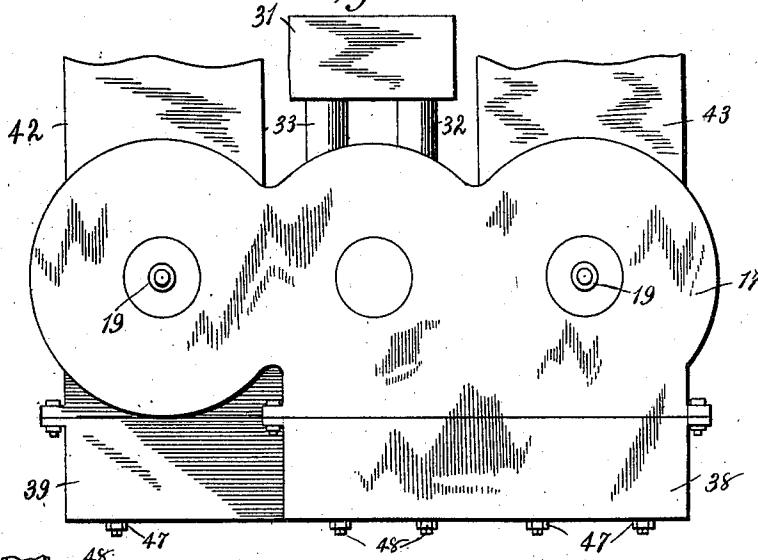


Fig. 8.

Fig. 6.

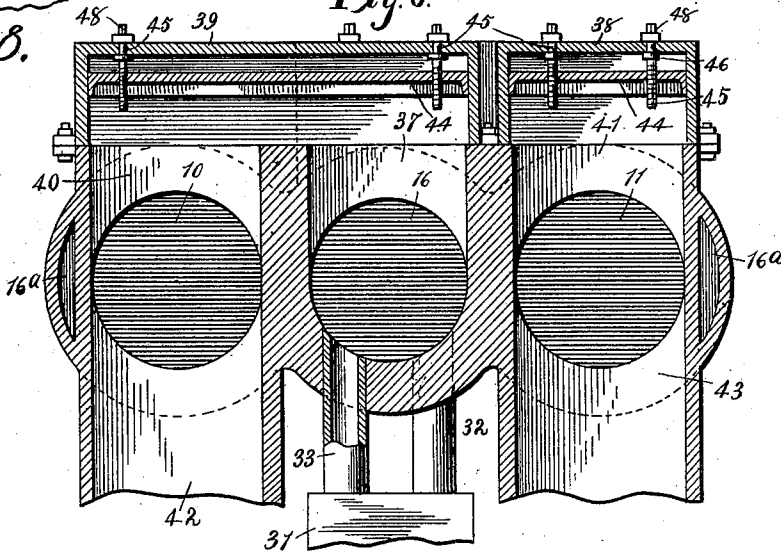
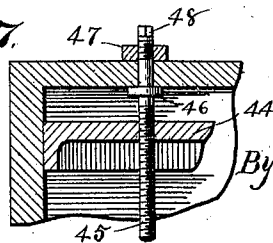


Fig. 7.



Witnesses:

C. F. Bassett
 Matt. J. Marty

Inventor
 Wm. E. Parker

By Frederick Benjamin
 Atty.

UNITED STATES PATENT OFFICE.

WILLIAM E. PARKER, OF DOWAGIAC, MICHIGAN.

GAS-ENGINE.

996,126.

Specification of Letters Patent. Patented June 27, 1911.

Application filed September 19, 1907. Serial No. 393,585.

To all whom it may concern:

Be it known that I, WILLIAM E. PARKER, a citizen of the United States, residing at Dowagiac, in the county of Cass and State of Michigan, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention relates to improvements in engines and refers especially to that class employing for fuel an explosive charge of mixed gases and commonly termed internal combustion engines.

The paramount objects of my invention are to provide means for forcing the fuel charge into the explosion chamber under pressure, and to furnish a supply chamber so arranged as to enable the amount of the said charge to be varied when desired.

Further objects of my improvements are to furnish ports both for induction and eduction having a comparatively large area so that the exchange of the fresh charge for the exhausted gases may take place expeditiously, and to supply a mechanical structure having few working parts, thus conducing to durability and economy of production.

I accomplish the above and other important objects by the employment of the apparatus illustrated in the accompanying drawings said apparatus consisting in a general way, of a plurality of power cylinders in which the charges are exploded, supply chambers connected therewith, and one or more supply cylinders, the piston of each supply cylinder being rigidly connected with the piston of a power cylinder, means for varying the capacity of the supply chamber by means of adjustable diaphragms, and the necessary ports and passages for connecting the appliance with a fuel reservoir and for disposing of the burned charges.

Referring to the drawings:—Figure 1 is a side elevation of my improved explosive engine, portions of the walls of the supply chambers being broken away to disclose the induction ports; Fig. 2 is a vertical section through the axis of the cylinders, the pistons being shown in full; Fig. 3 is a similar vertical section seen from a point diametrically opposite to the point of view of Fig. 2. Fig. 4 is a bottom plan view; Fig. 5 is a top plan view; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2 the pistons having been removed, Fig. 7 is an enlarged

fragmentary view showing one of the adjusting bolts for the diaphragm for a supply chamber, and Fig. 8 is a fragmentary section showing the check valves in the supply pipes.

Referring to the drawings in detail, the numerals 10, 11, indicate power cylinders, provided with pistons 12, 13, to which are attached in the usual manner piston rods 14, 15, journaled upon a common crank shaft, the latter being omitted from the drawing as showing no features that are novel. Between the cylinders 10, 11, is located a supply cylinder 16, and the whole is surrounded by the usual water jacket 16^a. The supply cylinder is intimately placed relatively to the power cylinders chiefly for economy in the construction, and because a more compact structure will thus appear. The upper ends or cylinder heads of the battery of cylinders thus arranged are formed of a single plate 17, furnished opposite the axes of the power cylinders with apertures 18 for the introduction of spark plugs 19, any form of which in common use may be employed.

The pistons of the power cylinders are formed of cylinders closed at one end to form a piston head 20 upon which is carried a deflecting arc 21, semicircular in extent. The cylinder forming the piston 12 of the power cylinder 10 is prolonged backward and is of sufficient length to protrude from the lower end of its cylinder when the piston head 20 is at the upper limit of its travel as shown in the drawings, Figs. 1, 2, and 3. The piston 12 has a lateral projection or arm 24 which is rigidly connected to the end of a piston rod 25 fixed to a piston 26 which reciprocates in the supply cylinder 16. I prefer to join the rod 25 and arm 24 by a threaded connection 27. As both sides of the piston 26 of the supply cylinder 16 are utilized it is necessary to furnish a tight head 28 opposite the plate 17 and since the piston rod 25 does not vary from its axial position it is feasible to provide a stuffing box 29, closed by a cap 30. It will be plainly evident that the connection thus set forth between the pistons 12 and 26 will compel them to move in unison.

The fuel supply passes through a carbureter 31 and thence into the cylinder 16 alternately through pipes 32, 33, and ports 34, 35, the said pipes being furnished with suitable check valves 31^a at their connections with the carbureter.

It will be understood from the arrangement that the explosive charge is drawn alternately into the opposite ends of the cylinder 16 by the suction or pump-like action of the piston 26. The opposite or forcing action of the piston will alternately expel the charges thus drawn into the supply cylinder, through outlet ports 36, 37, located in opposite ends of the said cylinder, into the supply chambers which will now be described. I prefer to make these chambers in the form of rectangular boxes 38, 39, there being one such box for each power cylinder, and locate them upon the side of the cylinders opposite to the carbureter. As previously mentioned these chambers communicate through rectangular ports 36, 37, with the supply cylinder and they open into the power cylinders 10 and 11, through the capacious induction ports 40, 41, respectively. The power cylinders are provided with eduction or exhaust ports 42, 43, each being located diametrically opposite to the corresponding induction port for that cylinder.

The supply chambers are preferably equal to each other in capacity, and bear such a relation to the cylinders that the charge forced therein will have a certain predetermined pressure, so proportioned as to result in an economical expenditure of fuel.

Certain circumstances may arise when it will be desirable to vary the primary compression set forth above, as when the atmospheric conditions are such as to affect the action of the carbureter. This is brought about by making provision for varying the available gas space in the box chambers. The mechanism by which this regulation of capacity is produced consists of a flanged plate or diaphragm 44, located in each chamber and attached to the outer wall by bolts 45, which pass through both said wall and diaphragm, having threaded connection with the latter but turning freely in the wall plate, a collar 46 limiting the outward thrust, and a lock nut 47 serving the double purpose of preventing the dislodgment of the bolts from their holes in the wall and also securing the diaphragms firmly in adjusted position. The outer ends 48 of the bolts are squared to permit the use of a wrench.

The operation of the twin cylinders is as follows: In the relative positions shown in the drawings the piston 13 is approximately at the lower point of its stroke and the combined pistons 12 and 26 at the upper limit of travel and are ready to descend. We may suppose that an explosion has just taken place in the cylinder 10 above the piston, which is consequently driven downward carrying the supply piston with it. As the latter descends the contents of the supply cylinder below its piston will be forced

through the port 37 into the supply chamber 39, and a fresh charge will enter the supply cylinder by way of the pipe 33 and port 34. The piston 13, at the same time ascending, covers the port 41, so that the fresh charge thus drawn into the supply cylinder will be confined in this cavity. The piston 12 having descended sufficiently to uncover the induction port 40, the charge in the chamber 39 will rush into the cylinder 10 driving out the burned gases through the exhaust port 42 which is uncovered simultaneously with the port 40, the deflector 21 acting to throw the incoming stream of mixed gases toward the upper end of the cylinder, thus insuring a perfect clearance of the cylinder of the products of combustion. While the piston 13 is ascending it is at the same time compressing a previous charge of fuel introduced into its cylinder and at the same time that the charge, as above described has entered the cylinder 10, the compressed charge in cylinder 11 is exploded driving the piston 13 downward until the intake 41 and the exhaust port 43 are uncovered, a fresh charge entering from the supply chamber 38 driven by the upward travel of the piston 26, a fresh charge for the supply cylinder 10 being at the same time drawn into the supply cylinder below the piston through the port 35. As the conjoined pistons 12 and 26 reach their upward travel the charge above the piston 12 will be ignited, causing the said piston to again descend and the piston 13 to ascend and this sequence of events will continue, an explosion taking place alternately in the twin cylinders for each half revolution of the crank shaft, thus constituting the apparatus a double engine of the two cycle type.

The large ports in the power cylinders for induction and eduction will have a special advantage in producing an effectual and rapid clearance of the passages, and to increase this effect I prefer to make the exhaust ports proportionally larger than the intakes.

While I have shown a battery comprising two power cylinders it is evident that any number of such cylinders may be arranged to act singly or in unison and while the preferable construction as herein shown would employ one supply cylinder for each pair of power cylinders it will be understood that more than two such cylinders may be supplied from one source the only changes required being in the proportional capacity of the supply and receiving chambers.

In view of the above and other variations which may be made in the devices of my invention as herein disclosed without departing from the spirit and scope thereof, I do not wish to be limited to the precise construction set forth.

Having thus described my invention what I claim is:—

1. In an explosive engine, the combination with a plurality of power cylinders having pistons, of supply chambers communicating with said cylinders, diaphragms in said chambers, means for adjusting said diaphragms from the outside of the chambers, a supply cylinder communicating with said supply chambers, a piston in said supply cylinder, and operative connection between the supply piston and the piston of one of the power cylinders.

2. In an explosive gas engine, the combination with a plurality of power cylinders, and pistons in said cylinders, of a supply cylinder, a supply chamber communicating with each of said power cylinders and the supply cylinder, a diaphragm in each supply chamber, means for adjusting said diaphragm from the exterior of the chamber and a rigid connection between the piston of one of the power cylinders and the piston of the supply cylinder.

3. In an explosive engine, the combination with a plurality of power cylinders, and pistons in said cylinders, of supply chambers communicating with said cylinders,

diaphragms arranged in said chambers, means for adjusting said diaphragms comprising bolts extending through the chamber walls and having threaded connection with said diaphragms, a supply cylinder communicating with said supply chambers, a piston in said supply cylinder, and a rigid connection between the piston of one of the power cylinders and the piston of the supply cylinder.

4. In an explosive engine, the combination with a plurality of power cylinders, of trunk pistons arranged in said cylinders, one of said pistons projecting externally to the cylinder, supply chambers communicating with said cylinders, a supply cylinder communicating with said chambers, a piston head in said supply cylinder, a piston rod fixed in said piston head and extending externally to the cylinder, and an arm rigidly connecting the said piston rod with the externally projecting piston.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM E. PARKER.

Witnesses:

JAMES H. ANNAM,
CHRIS. A. HUX.