

No. 632,762.

Patented Sept. 12, 1899.

H. SMITH.
GAS ENGINE.

(Application filed June 13, 1898.)

(No Model.)

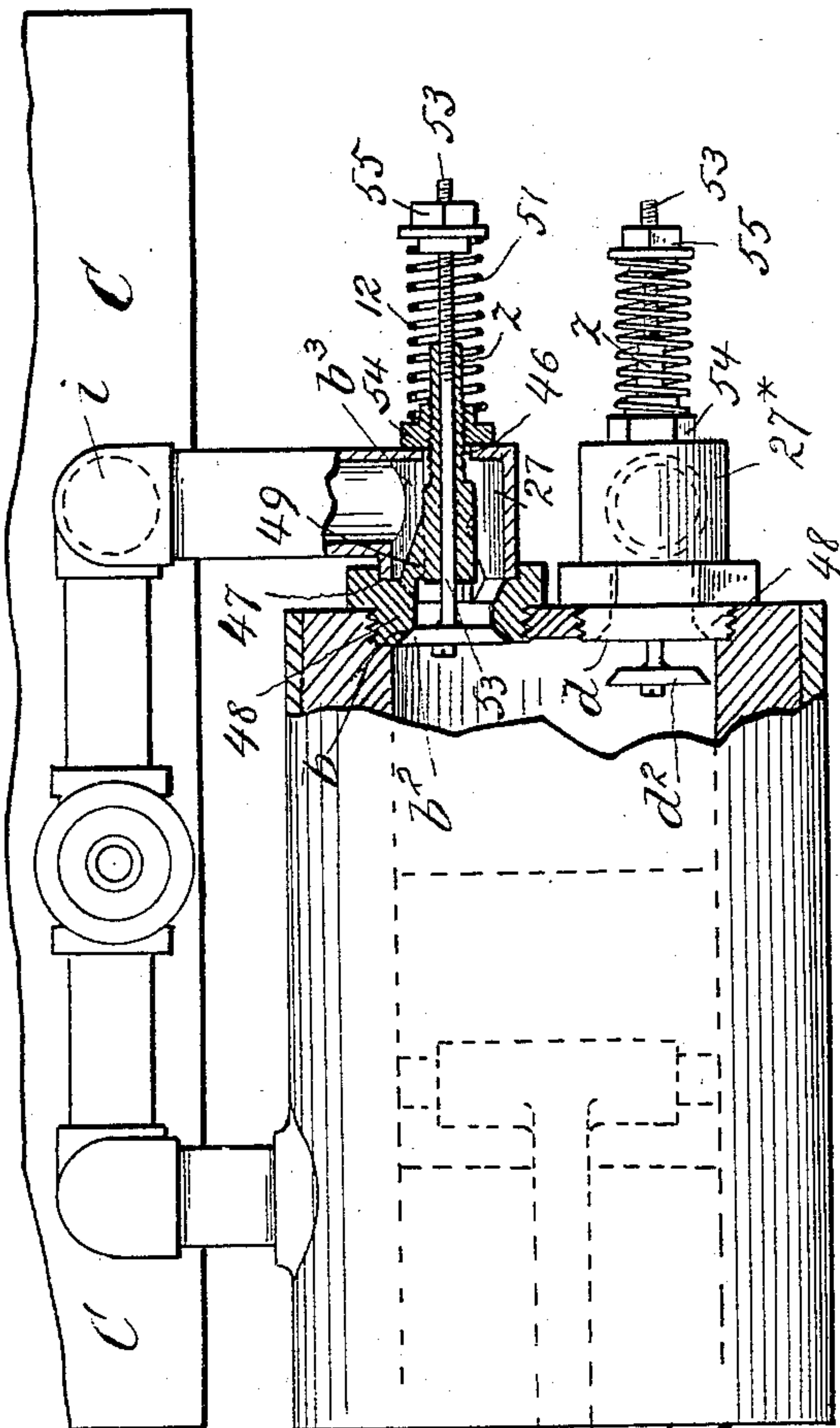


Fig. 1.

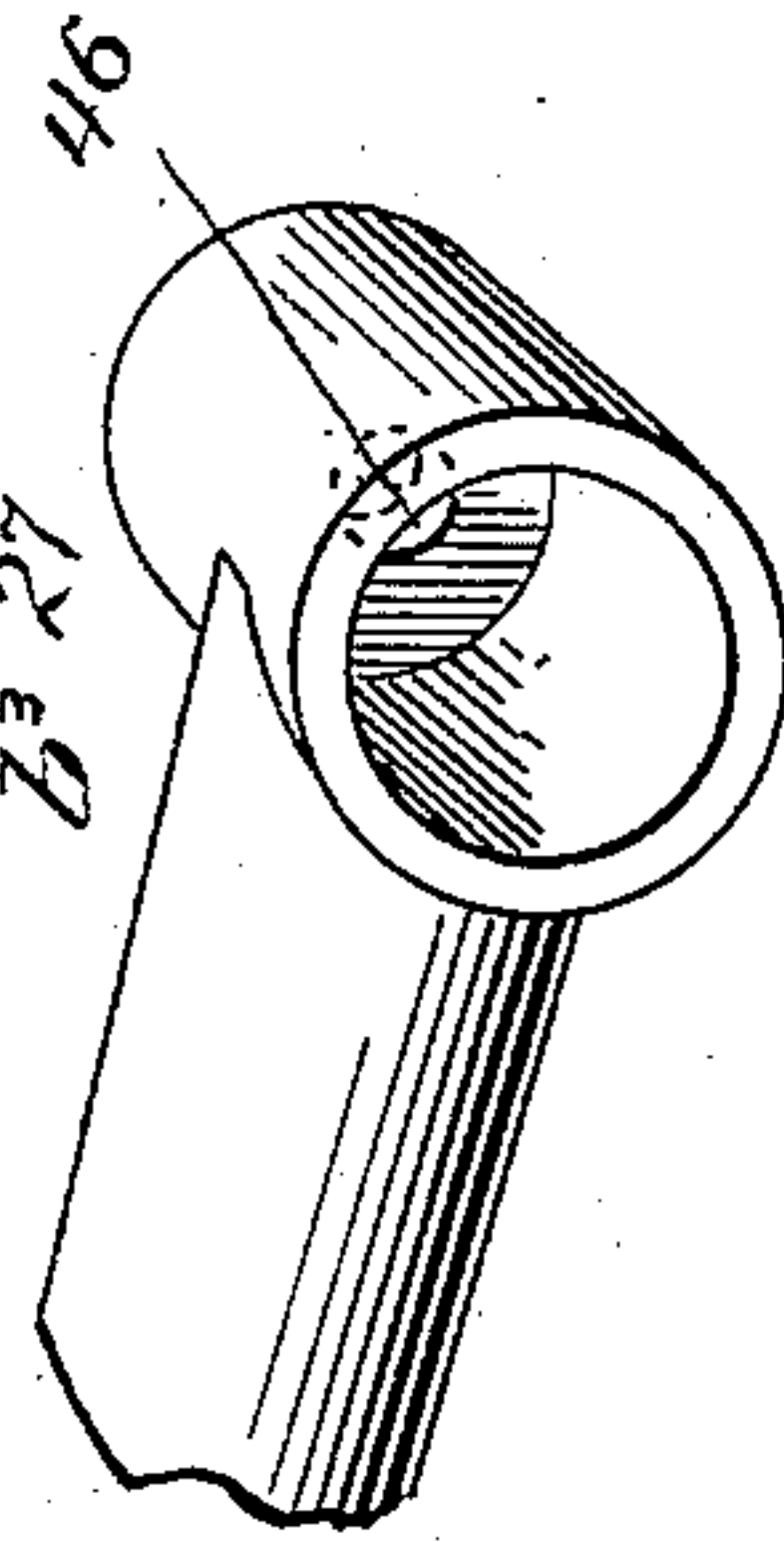


Fig. 2.

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UNITED STATES PATENT OFFICE.

HINSDALE SMITH, OF SPRINGFIELD, MASSACHUSETTS.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 632,762, dated September 12, 1899.

Application filed June 13, 1898. Serial No. 683,310. (No model.)

To all whom it may concern:

Be it known that I, HINSDALE SMITH, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Gas-Engines, of which the following is a full, clear, and exact description.

This invention relates to improvements in gas-engines which are operated by the explosion of gas, vaporized hydrocarbon, or other suitable explosive fluid within the cylinder or cylinders thereof.

The invention relates to improvements in the construction of the valves for the cylinder or cylinders of the engine for the attainment of objects and advantages hereinafter rendered manifest; and the invention consists in the constructions and combinations or arrangement of parts and appliances, all substantially as will hereinafter be described and set forth in the claims.

Figure 1 is a plan view of sufficient of an explosive gas-engine to illustrate the applicability of the novel valve mechanism which is shown in place thereon. Fig. 2 is a perspective view of a part in detail to be hereinafter particularly referred to.

The cylinder has at its rear end or head the ingress-port b and the exhaust-port d , with respectively-provided valves b^2 d^2 , alternately closing and opening, the suction force exerted by the piston in its alternate forward strokes causing the ingress-valve to then open against its spring 12, while the exhaust-valve may be positively operated by any suitable mechanism.

C represents a carbureter located in one side of and below each cylinder or otherwise suitably located. A conduit i leads from the carbureter into the inclosing chamber b^3 , within which is provided the valve for the ingress-port for the cylinder aforesaid. The conduit i , leading from the carbureter to the ingress-valve appliances for each cylinder, comprises the pipe-section or hollow casting 27, located toward the cylinder, which is angular or formed with the elbow, which constitutes the casing-like portion b^3 , the same having its end nearest the cylinder open for substantially its whole diameter, while in the line of the axis of the elbow portion of this casting,

through the "back" thereof, is the hole 46. The open-ended elbow portion is seated in a rabbeted depression 47 therefor in the annular bushing 48, which screws into an opening therefor in the end of the cylinder, in the inner end of which part 48 is formed the valve-seat b , and which part 48 is externally polygonal or otherwise properly constructed, whereby to enable it to be screwed into its place. The said annular valve-seat has integrally cast as one therewith the spider-legs 49 and the spider-supported tubular guide z for the stem 53 of the valve b , said stem protruding outwardly beyond the end of the guide 52. The outer end of said valve-stem guide 52 is externally screw-threaded, receiving thereon the nut 54 to be set against the back of the elbow and to hold such portion of the conduit-section 27 firmly to its seat. The outer end portion of the valve-stem is also screw-threaded, receiving thereon the nut 55, between which and the nut 54 the outwardly-reacting spring 12 is provided under suitable compression to normally maintain the valve closed. The spring, however, is comparatively light, so as to be overcome by the suction-pressure as the piston has its suction-stroke between the explosive strokes.

Each exhaust-valve d^2 has provided in conjunction therewith duplicates of the parts just described, constituting the valve-seat bushing and extended valve-stem guide, angular pipe-section 27* corresponding to the one 27, nuts, and springs, although it is to be stated that each angular conduit-section 27* is outwardly continued in the exhaust-conveyer, which, if desired, may terminate in the muffler.

The valve devices, which have been illustrated and described quite in detail and of which the inlet and exhaust valves are substantially duplicates, are designed to the end of rendering more convenient the assemblage and replacement of the valves proper and their seats than heretofore in gasoline-engines, so far as known to me. The valves after more or less extended use become fouled, clogged up, and worn, failing to properly seat or to remain tight, and it is often more expeditious and desirable to substitute new valves and seats b^2 b^2 or d^2 d^2 than to attempt at once to clean or repair those so defective.

Therefore by unscrewing the valve-seat section 48 from the head of the cylinder, detaching the elbow-section 27 from its seat 47, and removing the nuts 54 55 the stemmed valve 5 and its seat-section, which are cheap and simply-constructed parts, may be removed and as readily replaced.

Avoidance of the necessity of turning for unscrewing the pipe-sections 27 or 27* and 10 the parts therewith connected are deemed quite an important advantage, and especially in respect of the interchangeable portions of the ingress-valves where the part 27 may be disconnected from the valve-seat part 48, 15 while such part 27 remains coupled to the remainder of the conduit \bar{i} , the section 27 and its coupling may be swung on the axis of the vertical portion of the pipe rising above the carbureter, and aside from the capability for 20 the placing of the valve devices in their connected relations with other parts of the apparatus, as described, the constructions constitute very simple, inexpensive, and efficiently-operative valve devices.

25 Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a gas-engine, the combination with a cylinder having an opening through its wall, 30 of removable valve devices, consisting of an annular bushing-piece, entered into said cylinder-opening, provided with a spider-supported tubular valve-stem guide, having a seat depression 47 in its outer end, and provided at its inner end with a valve-seat opening, the valve having its stem extended 35 through said valve-stem guide, and a conduit or connection member having the angularly-turned hollow portion b^3 with the hole 46 in its back, through which the valve-stem passes, 40 the forward end portion thereof being entered in said depression, substantially as described.

2. In a gas-engine, the combination with a 45 cylinder having an opening through its wall, of removable valve devices, consisting of an annular bushing-piece screwing into said cyl-

inder-opening, and provided with a spider-supported tubular valve-stem guide, and having a seat depression 47 in its outer end, and 50 provided at its inner end with a valve-seat opening, the valve seated therein having its stem extended through said valve-guide and provided with a shoulder 55, and a conduit or connection member having the angularly- 55 turned portion with the hole 46 in its back, through which the valve-stem and its guide pass, the end portion thereof being entered in said depression, the nut screwing on the end portion of the valve-stem guide against 60 the back of said connection member, and the valve-spring 12, substantially as described.

3. In a gas-engine, the combination with a carbureter or gas-supplying apparatus and a 65 cylinder having an opening through its wall, of removable valve devices, consisting of an annular bushing-piece screwing into said cylinder-opening, and provided with a spider-supported tubular valve-stem guide externally screw-threaded, at its extremity, having 70 a seat depression 47 in its outer end, and provided at its inner end with a valve-seat opening, the valve seated therein having its stem extended through said valve-guide and provided with a shoulder 55, and a conduit or 75 connection member 27 connected with said gas-supplying apparatus, having the angularly-turned portion with the hole 46 in its back, through which the valve-stem and its guide pass, the end portion thereof being entered 80 in said depression, and permitting the bushing-piece to be turned without necessarily rotating said part 27, the nut screwing on the end portion of the valve-stem guide against the back of said connection member, 85 and the valve-spring 12, substantially as described.

Signed by me at Springfield, Massachusetts, this 11th day of June, 1898.

HINSDALE SMITH.

Witnesses:

WM. S. BELLOWS,
M. A. CAMPBELL.