

**No. 712,929.**

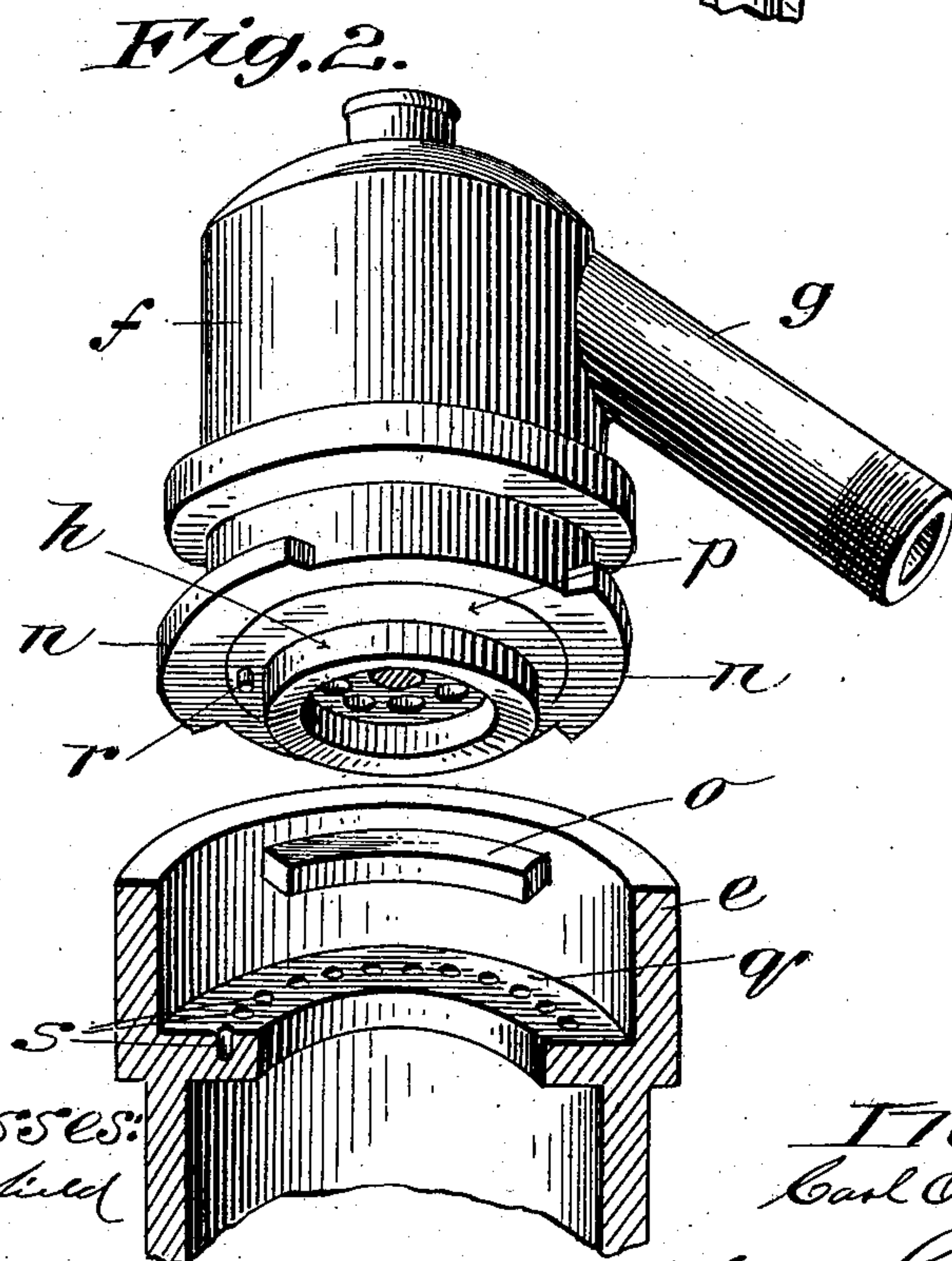
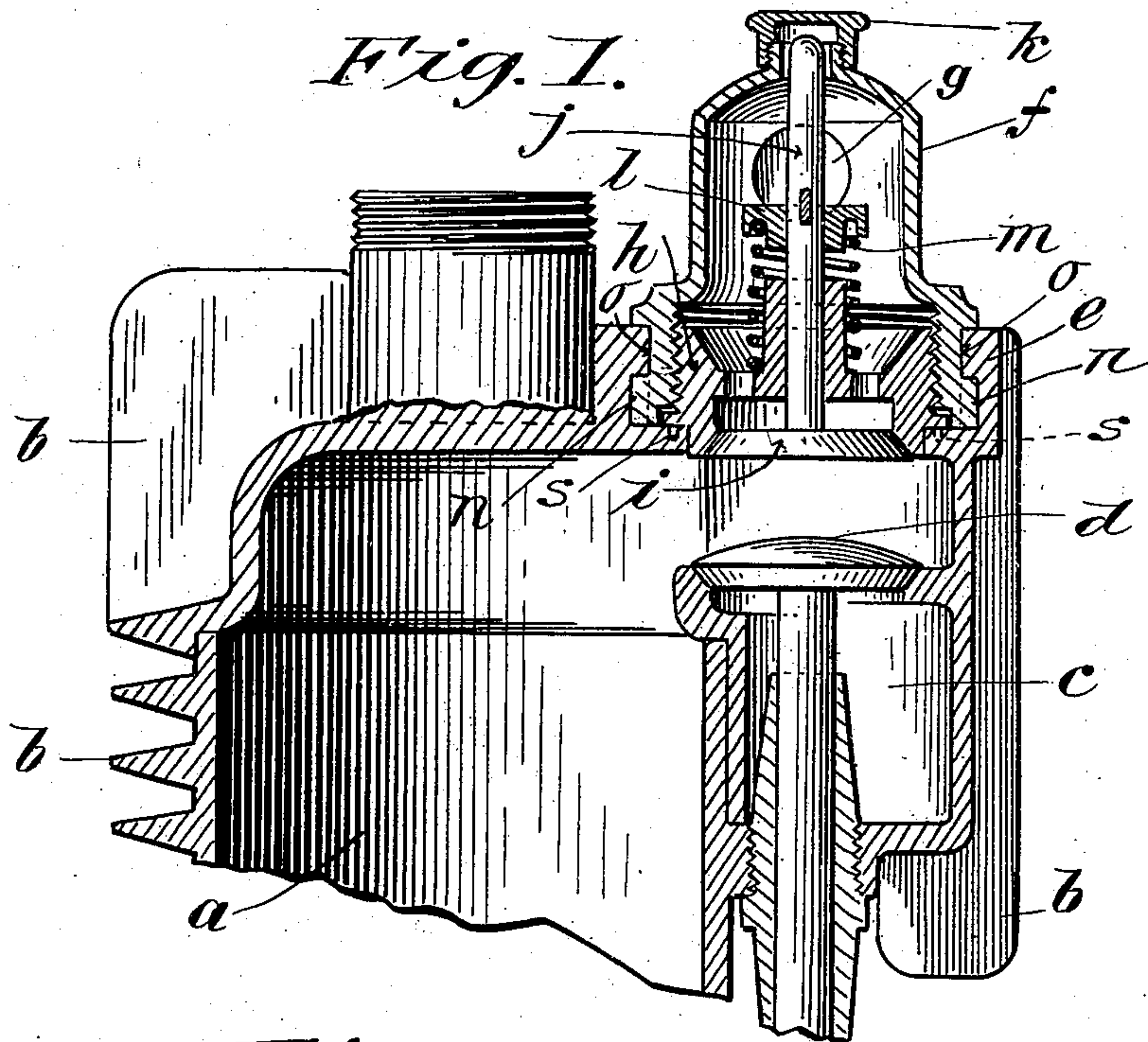
**Patented Nov. 4, 1902.**

C. O. HEDSTROM.

**VALVE FOR INTERNAL COMBUSTION ENGINES.**

(Application filed Oct. 28, 1901.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## VALVE FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 712,929, dated November 4, 1902.

Application filed October 28, 1901. Serial No. 80,191. (No model.)

*To all whom it may concern:*

Be it known that I, CARL OSCAR HEDSTROM, a citizen of the United States of America, residing at Portland, in the county of Middlesex and State of Connecticut, have invented new and useful Improvements in Valves for Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal-combustion engines, and has for its object the improvement in the construction of the admission-valve, whereby the latter may be easily removed from the cylinder and replaced thereon without the use of tools for the purpose of adjustment and cleaning, a further object being to provide means whereby the valve may be inspected and tested without the removal of the valve-body from the cylinder.

In the drawings forming part of this application, Figure 1 shows in sectional elevation the upper end of a cylinder of an explosion-engine having my invention applied thereto. Fig. 2 is a perspective view of the body of the admission-valve and of a neck on the cylinder which receives it, the parts being shown in separated relation.

In the drawings, *a* indicates the cylinder of an explosion-engine which is provided with the usual radiating ribs *b*, and on one side of the cylinder there is cast a cylindrical casing *c*, within which is located the exhaust-valve *d*, operated by suitable connection with the crank-shaft of the motor. The continuation of the cylindrical casing *c* constitutes an annular projection or neck *e* at the top of the cylinder, (shown in section in Fig. 2 most clearly,) and within this neck is secured the inlet-valve body *f*, which forms the subject of this application. This valve-body (which is shown in perspective in Fig. 2) is cylindrical in form and has connected with the upper end thereof a pipe *g*, preferably integral therewith and with which connection is made with a suitable carbureter or atomizing device. Within the lower end of this valve-body there is located therein a screw-threaded bushing *h*, in the lower extremity of which the valve *i* is seated, and in a centrally-located hub on said bushing *h* the valve-stem *j* has a bearing, there being a passage through said bushing around said hub for the gas.

The valve-stem projects through an opening in the upper end of the valve-body, which is tightly sealed by a screw-cap *k*. On the valve-stem *j* there is secured a head *l*, between which and the bushing *h* is a suitable spring *m*, whereby the valve *i* is held to its seat in said bushing.

Near the bottom of the valve-body *f* and oppositely located thereon are two lugs *n*, the diameter of the body of the valve from edge to edge of these lugs being equal to the interior diameter of the upper portion of the neck *e*. Within the latter are two oppositely-placed lugs *o*, under which the lugs *n* are located when the valve-body is in operative position in the cylinder. Neither the lugs *n* nor the lugs *o* have tapered meeting surfaces; but the former are forced up against the under side of the latter to retain the valve-body in its place by means now to be described.

By referring to the drawings it will be seen that that part of the bushing *h* in which the valve is seated is of smaller diameter than the body of the bushing above it, whereby a flat bearing-surface *p* on the under side of said bushing is provided. This surface bears against the upper surface of an annular flange *q*, located within the neck *e*, said two contacting surfaces being ground together to form a tight joint.

Projecting from the surface *p* of the bushing *h* there is a pin *r*, and in the flange *q* there are a number of holes *s*, into any one of which this pin may enter, and these holes do not pass entirely through the flange.

As stated above, the bushing *h* is screw-threaded into the valve-body *f*, and the adjustment of said bushing relative to the body is such that when the latter is passed into the neck *e* the pin *r*, entering one of the holes *s*, holds said bushing stationary. Then the turning of the valve-body to bring the lugs *n* around under the lugs *o* and to bring the pipe connection *g* into proper alinement with the connection leading to the carbureter will impart to said valve-body a spirally-vertical movement on the screw-threads of the bushing *h*, whereby when said lugs *n* arrive under the lugs *o* the latter will bind tightly against the former, and this pressure, downwardly acting, will hold in close contact the ground



surfaces of the bushing and the annular flange *g*, making a tight joint between them through which no gas can escape at the moment of the explosion of the charge in the cylinder. Connection with the pipe *g* and a pipe leading to the carbureter may be made by an ordinary union-joint, whereby the parts may be easily disconnected, and using the short pipe *g* as a handle the valve-body *f* may be partially rotated and disengaged from the neck *e*. If by reason of wear between the contiguous surfaces of the lugs *n* and *o* the valve-body is not securely held in the neck *e* when the pipe *g* is in position to be secured to the other portion thereof, then the bushing may be screwed outwardly of the valve-body a sufficient distance to make up for any wear between the meeting surfaces of the lugs referred to. This adjustment, while obviously very slight, is most easily effected by the means described.

When it is desired to test the valve *i* to see that it works freely and seats properly, it can be done by unscrewing the cap *k* and pressing on the stem thereof with the finger. The cap *k*, screwed onto the upper end of the valve-body, provides for the proper closure of the latter, for it has only to resist the suction force of the piston, the valve-body *f* being closed by the valve at the moment of the explosion in the cylinder.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination with the cylinder of an engine, of a valve-body, and means for removably securing the latter to the cylinder consisting of interlocking devices between the valve-body and the cylinder, a bushing screw-threaded into said valve-body, and means to hold the bushing against rotation, whereby the rotation of the valve-body will cause the said interlocking devices to engage.

2. An inlet-valve for an explosion-engine

comprising a valve-body, a threaded bushing therein, lugs on said body, and other lugs on said cylinder; means for holding said bushing stationary whereby the rotation of the body thereon will effect the interengagement of said lugs to secure the valve-body to the cylinder.

3. An inlet-valve for an explosion-engine comprising a valve-body, a screw-threaded bushing in the end thereof adjustable axially of said body, and a valve seated in said bushing, means for holding said bushing stationary on the engine, and a lug on the latter with which said valve-body may be forcibly engaged by a rotative movement around said bushing.

4. An inlet-valve for an explosion-engine, a cylinder comprising a valve-body having a passage therethrough, a valve for closing said passage, a stem on said valve extending through an opening in the valve-body, a closure for said opening, a bushing in said body having a screw engagement therewith, means for holding the bushing stationary on the cylinder, and means of engagement between the valve-body and cylinder, whereby the rotation of the valve-body will lock it to said cylinder.

5. A valve for the cylinder of explosion-engines consisting of a valve-casing member and a valve-seat member screw-threaded therein and bearing on the cylinder; a valve in said last-named member, and means for removably securing said casing to said cylinder consisting of a lug on the latter adapted to be engaged by a part of said casing; means for holding one member stationary during the relative rotation of the other to bring it into engagement with said lug on the cylinder.

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