No. 680,572. Patented Aug. 13, 1901.

G. F. DYER.

VAPORIZER FOR EXPLOSIVE ENGINES.

(Application filed Feb. 13, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

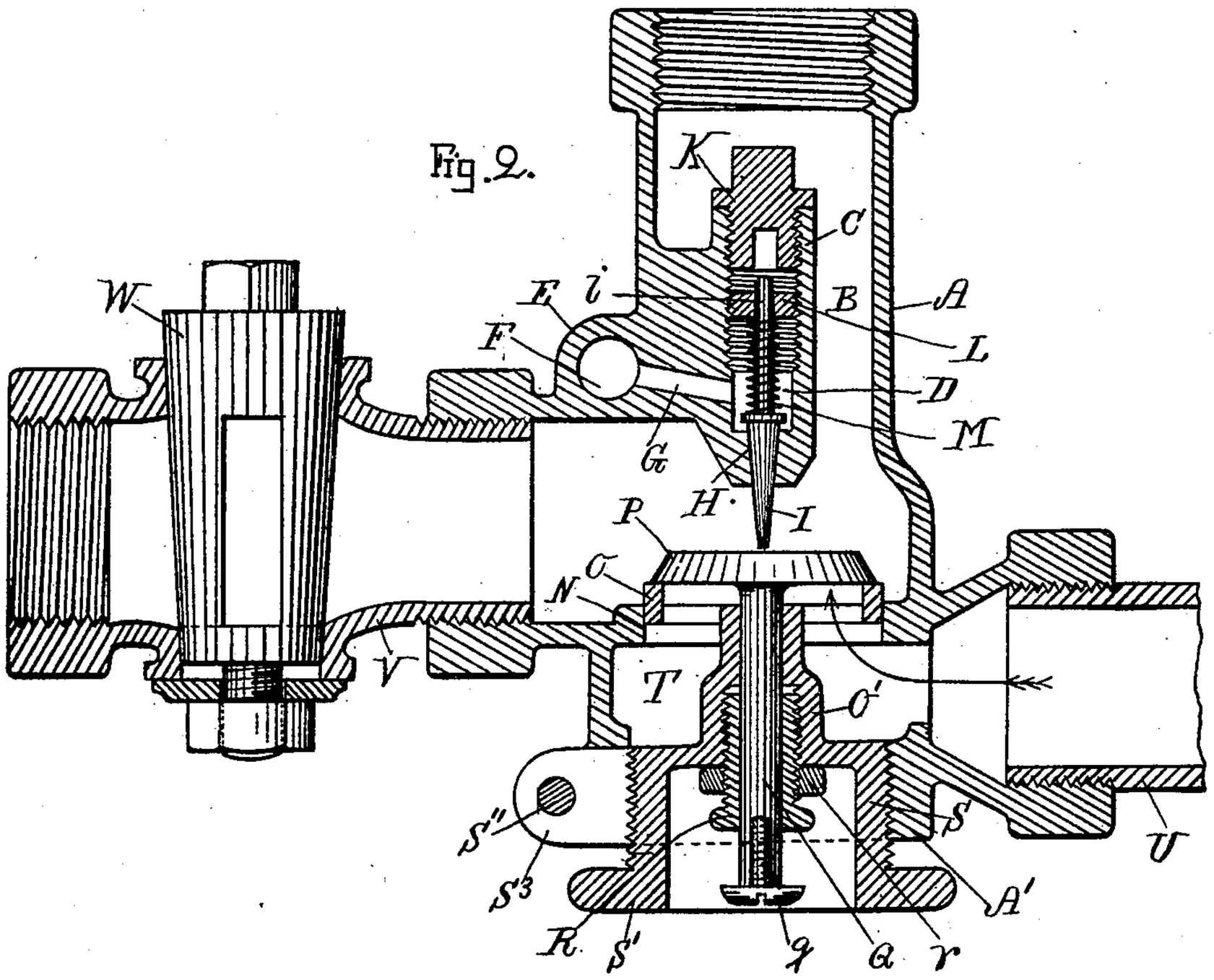
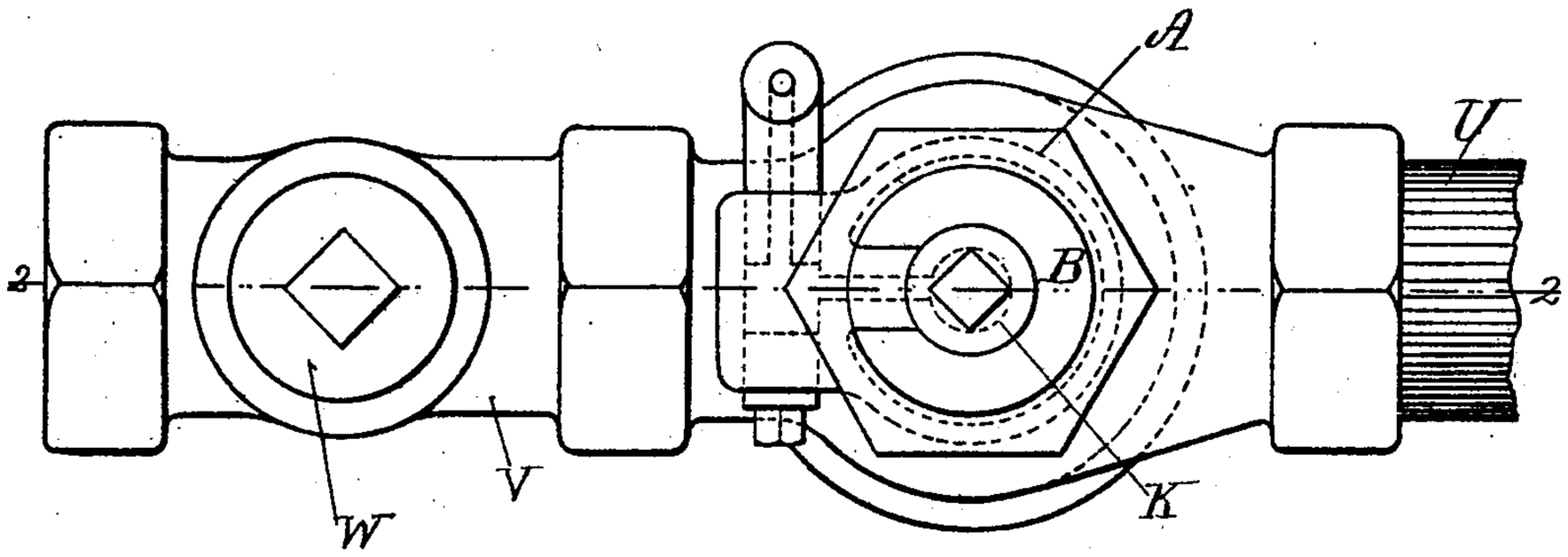


Fig. 1.



Witnesses.

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Fig. 3.

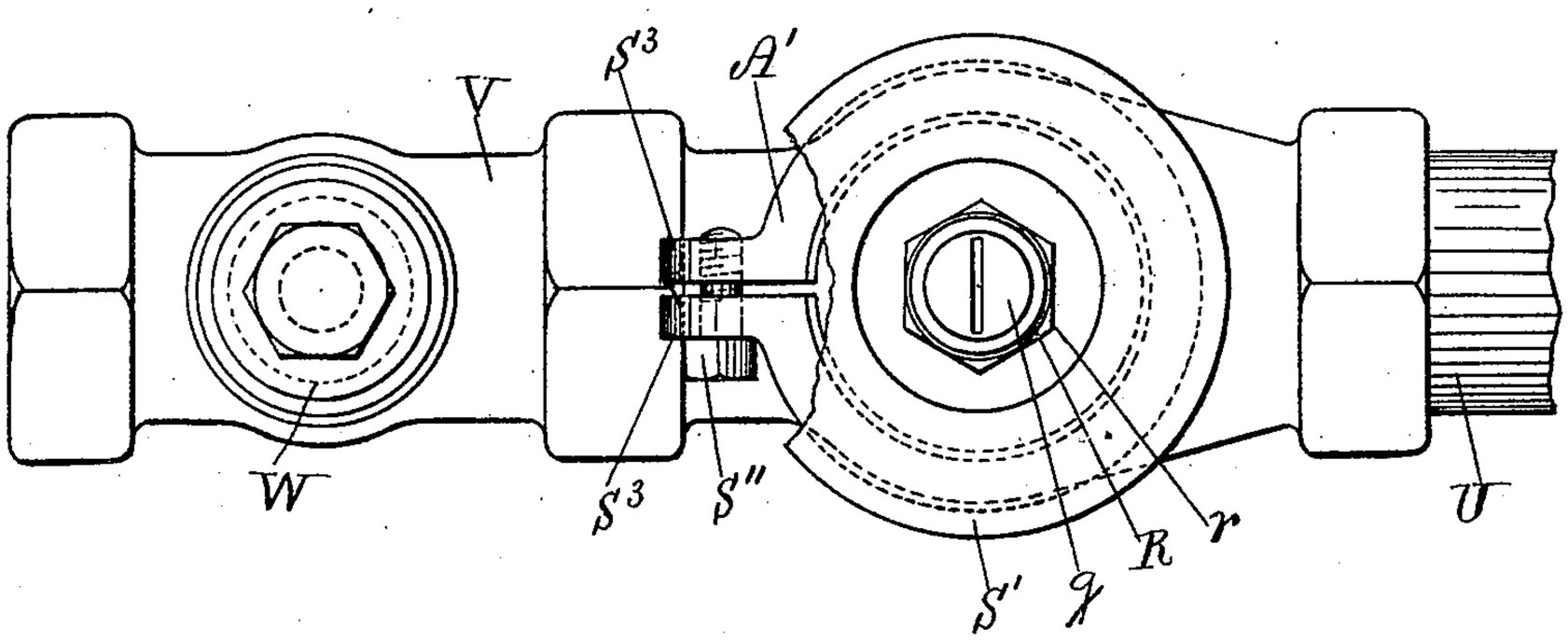
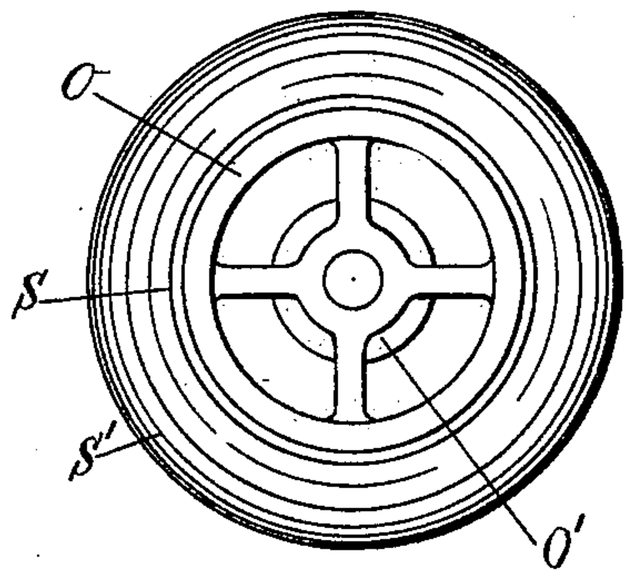


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE F. DYER, OF BEVERLY, MASSACHUSETTS.

VAPORIZER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 680,572, dated August 13, 1901.

Application filed February 13, 1901. Serial No. 47,090. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. DYER, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Vaporizers for Explosive-Engines, of which the following is a specification.

This invention relates to improvements in vaporizers for explosive-engines; and it is carried out as follows, reference being had to the accompanying drawings, wherein—

Figure 1 represents a top plan view of the invention. Fig. 2 represents a central longitudinal section on the line 2 2 in Fig. 1, showing the air-valves and hydrocarbon-supply valve in elevation. Fig. 3 represents a bottom plan view of the invention, showing a portion of the head of the adjusting-sleeve for the air-valve seat broken away; and Fig. 4 represents a detail top plan view of said air-valve seat and its adjusting-sleeve.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A represents the body of the vaporizer, and B is the mixing-chamber within said body, as shown in Fig. 2. The upper end of said mixing-chamber is connected to the cylinder of the explosive-engine, as is common in devices of this kind.

Within the mixing-chamber B is arranged a hydrocarbon-valve shell C, which is made integral with the vaporizer-body A and is provided with a hydrocarbon-chamber D, as shown in Fig. 2.

Integral with the vaporizer-body A is made a hub or projection E, provided with an internal channel F, which is connected in a suitable manner to the hydrocarbon-supply tank, as usual. From the channel F leads a conduit G to the hydrocarbon-valve chamber D, as shown in Fig. 2.

In the lower portion of the hydrocarbon-valve shell C is arranged a tapering valve-seat H, which is normally held closed by means of a spring-pressed conical valve I. (Shown in Fig. 2.) The internal portion of the valve-shell C is screw-threaded and its upper end closed by means of a screw-threaded plug K, as shown.

Within the internally-screw-threaded portion of the valve-shell C is arranged a screw-threaded nut L, which is centrally perforated for the guidance of the hydrocarbon-valve stem *i*, as shown in Fig. 2.

M is a coiled spring which surrounds the valve-stem *i* between the under side of the adjustable nut L and the upper end of the hydrocarbon-valve I, as shown. By adjusting the position of the nut L any desired tension on the spring M may be obtained.

In the lower portion of the mixing-chamber B is made a cylindrical perforation N, in which is vertically adjustable the annular air-valve seat O, upon which the air-supply valve P is normally supported, preferably by gravity. To said air-valve P is attached or made integral with it a downwardly-projecting stem Q, which is guided in a vertically-perforated hub O′, made integral with the valve-seat O, as shown in Figs. 2 and 4.

For the purpose of limiting the upward motion of the air-inlet valve P, so as to insure a constant and equal lift of the said air-inlet valve during the running of the engine and to prevent an undue supply of hydrocarbon, I prefer to attach to the lower end of its stem Q a headed screw or projection *q*, adapted to come to a stop against an adjustable annular screw-threaded sleeve R, which is screwed into a screw-threaded recess in the hub O′ of the valve-seat O, as shown in Fig. 2. In practice I prefer to secure the sleeve R, after being vertically adjusted relative to hub O′, by means of a check-nut *r*. (Shown in Figs. 2 and 3.) Integral with the hub O′ and valve-seat O is made a screw-threaded sleeve S, which is vertically adjustable in a screw-threaded lower extension A′ of the body A, as shown in Fig. 2.

S′ is a flange or head at the lower end of the adjustable sleeve S, which may be manipulated by the operator for the purpose of vertically adjusting said sleeve S, its valve-seat O, and air-valve P relative to the lower end of the hydrocarbon-supply valve I during the running of the engine and by such adjustment determine and regulate the proper proportions of air and hydrocarbon to be admitted into the mixing-chamber B.

After the sleeve S has been vertically ad-

justed for the purpose above stated it may be secured in position, preferably, by means of a clamping-screw S'' going through slitted ears S^3 S^3, made integral with the body portion A', as shown in Figs. 2 and 3.

Below the air-supply valve P is arranged the air-chamber T, which is in communication with the air-supply pipe U, as is common in engines of this kind.

In communication with the mixing-chamber B is arranged an air-supply valve V, provided with a regulating adjustable valve-plug W for the purpose of regulating such additional supply of air to the mixing-chamber B as may be required during the running of the engine.

In explosive-engines to which my improved vaporizer is applicable a vacuum takes place in the explosive-chamber of the engine during the outward stroke of the piston of said engine, causing at such time a vacuum to be formed in the mixing-chamber B of the vaporizer, and thereby causing the valve P to be lifted from its seat O and caused to come in contact with the lower end of the hydrocarbon-supply valve I, which is thereby raised upward against the influence of its spring M, thereby adjusting the desired supply of hydrocarbon from the conduit F, connected to the hydrocarbon-supply tank, at the same time as atmospheric air is admitted from the pipe U and drawn into the mixing-chamber B through the annular valve-seat O, thus causing the air and hydrocarbon to be thoroughly intermixed before being fed to the explosive-chamber of the engine.

By having the hydrocarbon-supply chamber and its valve arranged within the mixing-chamber B and arranged in a linear direction centrally above the air-supply valve P the air from the latter is caused to pass directly upward and around the hydrocarbon-supply valve, thereby causing a more thorough intermixing of the air and hydrocarbon, and consequently more perfect vaporization of the latter.

By placing the air-valve in position from below the hydrocarbon-valve it enables me to arrange the hydrocarbon-chamber containing the hydrocarbon-supply valve within the mixing-chamber B and integral with the body A of the vaporizer, by which I am enabled to supply the hydrocarbon at a very low point, thus permitting the use of a deeper hydrocarbon-containing tank particularly advantageous in connection with engines for launches, where a limited vertical space is had.

By adjusting the position of the sleeve S, its valve-seat S', and its valve-seat O the air-valve P can readily be adjusted relative to the lower end of the hydrocarbon-supply valve I for the purpose of regulating the supply of hydrocarbon relative to the air-supply as may be needed from time to time, and such adjustment can be readily made during the running of the engine simply by taking hold of the flange S' of the sleeve S and turning it to the right or left, as circumstances may require.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a vaporizer for explosive-engines, the combination with a shell in communication with the engine and provided with a pair of air-inlets and a mixing-chamber, of a valve-shell arranged in said mixing-chamber, in communication with a source of hydrocarbon-supply, and provided with a valve-seat, a plug for closing the top of said valve-shell, a spring-actuated valve operating through said valve-shell and engaging the seat thereof, an air-inlet valve engaging said spring-actuated valve for operating the same, an adjustable valve-seat for said air-inlet valve, a hub connected to said adjustable valve-seat, a sleeve integral with said hub for adjusting said air-inlet-valve seat, and a sleeve adjustably secured within said hub for limiting the movement of said air-inlet valve.

2. In a vaporizer for explosive-engines, a shell provided with air-inlets and a mixing-chamber, said shell in communication with the engine, a regulating-valve mounted in one of the said air-inlets, a valve-shell projecting in said mixing-chamber and communicating by a port with a source of hydrocarbon-supply, said valve-shell being interiorly screw-threaded, a plug for closing the top of said shell and having in its lower end a recess, a guide-nut secured within the said valve-shell, a valve-stem arranged in said valve-shell and operating through said nut and in said recess of the plug, a valve formed integral with the lower end of said shell and operating through the bottom of the latter, a spring mounted upon said stem between said valve and said guide-nut, an air-inlet valve, a stem suitably connected thereto, an adjustable valve-seat for said air-inlet valve, a hub formed integral with said valve-seat and adapted to have the valve-stem of the air-inlet valve operated therethrough, means formed integral with said hub for adjusting said valve-seat for the air-inlet valve, and means adjustably secured within said hub and engaged by the valve-stem of the air-inlet valve for limiting the movement of the latter, substantially as herein shown and described and for the purpose specified.

3. In a vaporizer for explosive-engines, a shell provided with air-inlets and a mixing-chamber, said shell in communication with the engine, a regulating-valve mounted in one of the said air-inlets, a valve-shell projecting in said mixing-chamber and communicating by a port with a source of hydrocarbon-supply, said valve-shell being interiorly screw-threaded, a plug for closing the top of said shell and having in its lower end a recess, a guide-nut secured within the said valve-shell, a valve-stem arranged in said valve-shell and operating through said nut and in said recess

of the plug, a valve formed integral with the lower end of said shell and operating through the bottom of the latter, a spring mounted upon said stem between said valve and said guide-nut, an air-inlet valve, a stem suitably connected thereto, an adjustable valve-seat for said air-inlet valve, a hub formed integral with said valve-seat and adapted to have the valve-stem of the air-inlet valve operated therethrough, means formed integral with said hub for adjusting said valve-seat for the air-inlet valve, means adjustably secured within said hub and engaged by the valve-stem of the air-inlet valve for limiting the movement of the latter, and means for securing said adjustable valve-seat in position when adjusted.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE F. DYER.

Witnesses:
ALBAN ANDRÉN,
KARL A. ANDRÉN.