

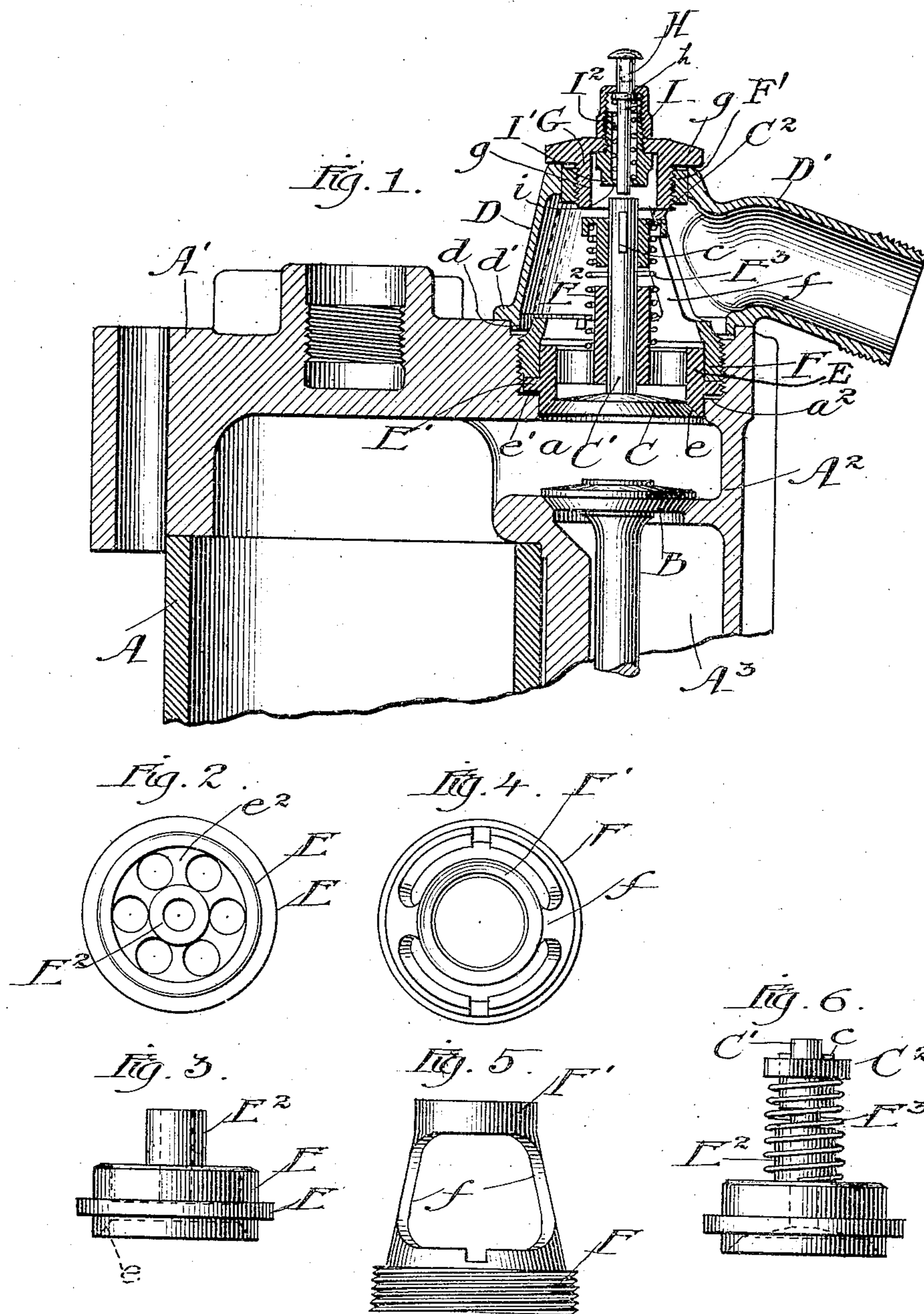
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W. OTTAWAY.

INLET VALVE MECHANISM FOR EXPLOSIVE ENGINES.

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UNITED STATES PATENT OFFICE.

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INLET-VALVE MECHANISM FOR EXPLOSIVE-ENGINES.

No. 876,582.

Specification of Letters Patent.

Patented Jan. 14, 1908.

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To all whom it may concern:

Be it known that I, WILLIAM OTTAWAY, a citizen of the United States, of Aurora, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Inlet-Valve Mechanism for Explosive-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the
10 accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in explosive engines and refers more specifically
15 to an improved admission valve by which is controlled the admission of the explosive mixture to the engine cylinder.

Among the objects of the invention is to simplify the construction of the valve and to
20 produce a valve which may be readily removed from the cylinder head and replaced thereon.

A further object of the invention is to provide a casing or shell for the inlet valve of
25 such construction that it may be angularly adjusted so that its admission opening or branch may be turned to any angular position desired.

A still further object of the invention is to
30 provide an improved means for unseating the valve preparatory to starting the engine, or at any other time when the inlet valve tends to stick on its seat.

The invention consists in the matters
35 hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a vertical sectional view of the head end of an explosive engine cylinder, showing my improved inlet
40 valve mechanism applied thereto. Fig. 2 is a top plan view of the seat ring of the valve mechanism. Fig. 3 is a side elevation thereof. Fig. 4 is a top plan view of a specially
45 formed locking ring by which the seat ring and also the valve casing or shell are locked in place. Fig. 5 is a side elevation thereof. Fig. 6 is a side elevation of the assembled seat ring, valve closure or disk and the spring for holding the valve disk against its seat.

50 As shown in said drawings, A designates the cylinder of an explosive engine and A¹ the head thereof. The head A¹ is formed at one side of the cylinder to provide a casing A² in which is formed the ignition chamber
55 a, and B C designate, respectively, the ex-

haust and inlet valve disks which open towards said ignition chamber. The said casing A² is extended downwardly at the side of the cylinder to form an exhaust passage A³ which communicates with the ignition chamber a through a port controlled by the valve disk B.

D designates the inlet valve casing or shell inclosing an inlet chamber which communicates with the cylinder through a port controlled by the inlet valve disk C. Said casing is provided with a hollow branch D¹, herein shown as made integral with the casing, and adapted for communication with a carbureting device, not shown. The said
65 admission valve disk is provided on its upper face with a conical annular seat that engages a downwardly facing conical seat e formed on the lower margin of a seat ring E. The
70 said seat ring E is removably fitted within a vertical opening in the lateral extension of the cylinder head.

The ring is provided between its ends with an exterior annular flange E¹ which opposes an upwardly facing shoulder a² in said opening of the extension, and said ring is held in place by means of a locking ring F which surrounds the upper end of the seat ring and bears against the flange of the said ring, and is exteriorly screw-threaded to engage the
85 interior screw-threads of said opening. Preferably, a gasket or packing ring e¹ is interposed between said flange E¹ of the seat ring and the shoulder a² of the casing A². Rising from said ring and formed integral
90 with an apertured web e² thereof is a short, vertical tube or nipple E², upwardly through which extends the stem C¹ of the inlet valve disk and which constitutes a guide for said stem. The said stem extends beyond the
95 tube or nipple E² and is provided at its upper end with a short flanged sleeve C², constituting a shoulder, between which and the apertured web of the seat ring is interposed an expansively acting spring E³ which acts to
100 hold the inlet valve disk C against its seat. The said sleeve C² is fixed to the upper end of the stem by means of a short key c extending through a transverse opening in the upper
105 end of the stem.

The shell or casing D is confined between the cylinder head and a nut G having screw-threaded engagement with a ring F¹ which is rigidly connected with the locking ring F by means of bars f f, preferably made inte- 110

gral with said rings F and F¹; said ring F¹ and the bars *ff* constituting a rigid outward extension of said locking ring F¹. The cylinder head has an annular valve-casing seat, which surrounds the valve opening, and the valve casing D is provided at its inner end with an annular bearing surface which rests or fits upon the said annular seat. In the particular construction shown in the drawings the said casing D is provided at its inner margin with a cylindric extension *d* which fits within the opening in the cylinder head and also with an outwardly extending annular flange *d*¹ which bears against an annular, outwardly facing surface surrounding said opening. The valve casing or shell D is provided at its outer end with a concentric opening, within which is located the outer ring F¹, that is rigidly connected with or forms an extension of the locking ring, as before stated. The said nut G has screw-threaded engagement with said outer ring F¹ preferably by means of external screw-threads on said nut engaging internal screw-threads on the said ring. Said nut G is provided with an outwardly extending annular flange *g* which is adapted to bear against an annular outwardly facing bearing surface surrounding the opening in the outer end of the shell or casing. When the said nut is tightened against the outer end of said shell or casing the latter is clamped between said nut and the annular seat on the cylinder. The said ring F, with the outer ring F¹ and the bars *f* connecting said ring, so far as the function of these parts in clamping the valve shell or casing to the cylinder is concerned, constitutes, with the nut G, clamping means located inside of, or extending through, the valve shell or casing and connected with, or secured to, the cylinder wall inside of the annular casing seat thereon; it being obvious that, in the particular construction of such clamping means illustrated in the drawings, the ring F with its extension, constitutes one clamping member, and the nut G the other clamping member, of such clamping means.

The clamping of the valve casing or shell D between the flange *g* of the nut G and the cylinder head, in the manner described, affords means by which the shell may be readily removed, thereby permitting convenient access to the locking ring to remove the same from the seat ring. The valve disk and its stem are removable together, as the parts are herein shown as assembled. Such removal of the casing D exposes the valve seat *e* to view and leakage in the valve can be readily detected. The construction described also permits the valve casing or shell D to be angularly adjusted so as to direct the branch D¹ thereof in any convenient direction for connection with the carbureting device. When said casing has

been adjusted to the required angular position, it may be locked rigidly between the flange *g* of the locking nut G and the head of the cylinder, whereby the casing is held rigidly in its adjusted position.

As a further improvement, novel means are provided for unseating or forcing the valve disk off its seat preparatory to starting the engine, or to release the disk if it should stick or adhere to its seat.

My improvements consist in a plunger H which extends through a suitable opening in the nut G, in axial alinement with the stem. Said plunger is normally spring-pressed to hold it away from the stem of the valve disk and is forced inwardly against the end of the stem to force the valve disk off its seat. As herein shown, said plunger extends through a two-part sleeve consisting of an outer part I and an inner part I¹. Said inner part extends outwardly through an opening in the nut G and has screw-threaded engagement therewith, and the outer member I fits over and has screw-threaded engagement with the upper end of said inner part. Contained within said two-part sleeve is an expansively acting spring I² which is interposed between a shoulder *i* at the inner end of the inner member of the two-part sleeve and a flange or shoulder *h* on said plunger H, said spring tending to hold the plunger in its outermost position, as more clearly shown in Fig. 1.

I claim as my invention:

1. In an explosive engine, the combination with the cylinder thereof provided with a valve opening and with an annular casing-seat surrounding said opening, of a valve casing or shell having at its inner end an annular bearing surface fitting said casing-seat, and an opening at its outer end, and clamping means embracing a clamping member which is connected with the cylinder inside of the said casing-seat, and a nut having screw-threaded engagement with said clamping member and which bears against the outer end of the said shell or casing to clamp the same against said casing-seat.

2. In an explosive engine, the combination with the cylinder thereof provided with a valve opening and with an annular casing-seat surrounding the said opening, of a valve casing provided at its inner end with an annular bearing surface fitting said seat, a clamping member embracing a ring having screw-threaded engagement with the said cylinder inside of said casing-seat, and a nut having screw-threaded engagement with the said clamping member and which bears on the outer end of said shell or casing to clamp the same against said casing-seat.

3. In an explosive engine, the combination with the cylinder thereof provided with a valve opening and with an annular casing-

seat surrounding said opening, of a valve casing provided at its inner end with an annular bearing surface fitting said seat, and at its outer end with an opening, a ring having screw-threaded engagement with the cylinder inside of said casing-seat, a second ring rigidly connected with and forming an outward extension of said first named ring and which is located in the outer part of the casing, and a nut having screw-threaded engagement with the said outer ring and which bears on the outer end of the shell or casing to clamp the latter against the said casing-seat.

4. In an explosive engine, the combination with a cylinder provided with a valve opening and a seat ring fitted in said opening of a locking ring for locking said seat ring in place, a removable valve casing, and a nut engaging a screw threaded aperture in said locking ring for locking the casing in place.

5. In an explosive engine, the combination with the cylinder provided with a valve opening, and a seat ring fitted in said opening, of a screw threaded locking ring entering said opening to lock said seat ring in place, and provided with an extension, a valve casing, a nut having screw threaded engagement with an opening in said extension and between which and the cylinder the casing is locked in place.

6. In an explosive engine, the combination with the cylinder provided with a valve opening and an inlet valve, a casing for the inlet valve provided with a tubular branch and clamping means for holding the said casing upon the cylinder embracing a clamping member secured to the cylinder inside of said casing, said casing having annular concentric bearing surfaces at its inner and

outer ends to engage respectively with the cylinder and with said clamping means, whereby said casing is adapted for rotative adjustment on the cylinder.

7. In an explosive engine, the combination with the cylinder thereof provided with a valve opening of a removable seat ring fitted in said opening, a screw threaded locking ring for fastening said ring in place, a valve disk engaging a seat on the seat ring and provided with a stem extending outwardly from the ring, a removable casing surrounding said stem and a nut having screw threaded engagement with an opening in said locking ring and between which and the cylinder the casing is removably locked in place.

8. In an explosive engine, the combination with the cylinder thereof provided with a valve opening, and a removable seat ring fitted in said opening, of a screw threaded locking ring for fastening said ring in place, a valve disk engaging a seat on said ring and provided with an outwardly extending stem, a removable casing surrounding said stem, a nut having screw threaded engagement in a suitable opening in a part of said locking ring and between which and the cylinder the casing is removably locked in place, and a spring pressed plunger extending through an opening in said nut and adapted to engage the outer end of the stem of the valve disk for forcing said disk away from its seat.

In testimony, that I claim the foregoing as my invention I affix my signature in presence of two witnesses, this third day of March A. D. 1906.

WILLIAM OTTAWAY.

Witnesses:

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JAS. A. NIELD.