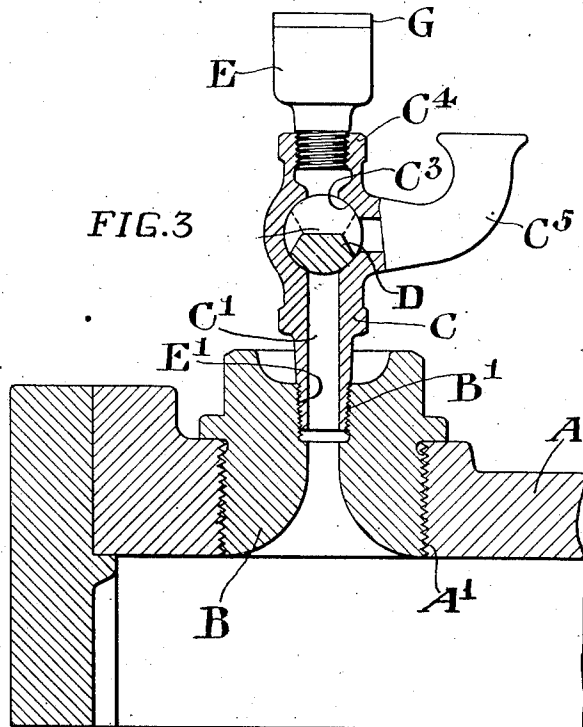
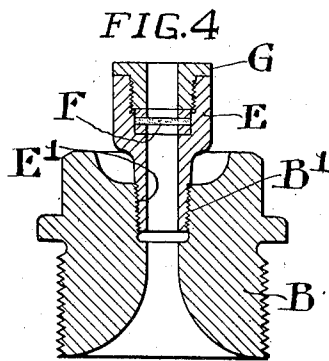
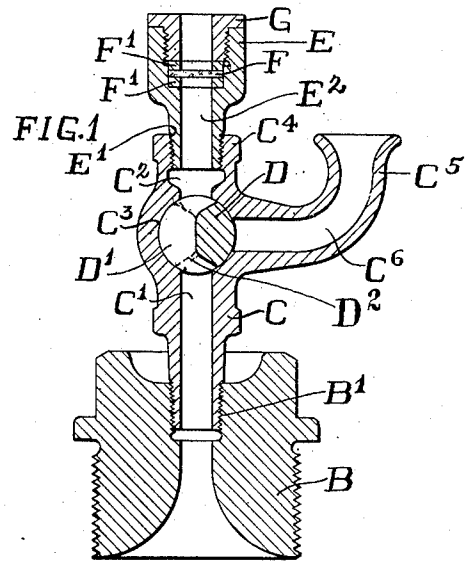
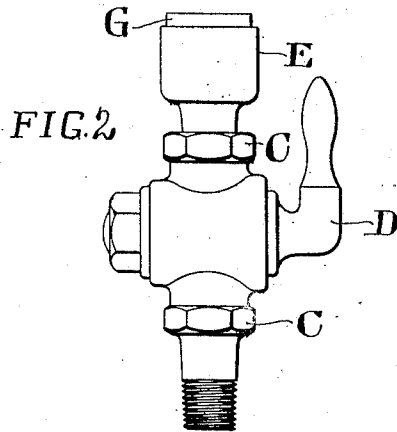


L. J. BORDO.
 GAS ENGINE ATTACHMENT.
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WITNESSES:

Stewart
A. J. Williams

INVENTOR

Lambert J. Bordo

BY

Francis J. Chandler
 his ATTORNEY.

UNITED STATES PATENT OFFICE.

LAMBERT J. BORDO, OF HILLSIDE, PENNSYLVANIA.

GAS-ENGINE ATTACHMENT.

1,044,125.

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To all whom it may concern:

Be it known that I, LAMBERT J. BORDO, a citizen of the United States of America, residing in Hillside, county of Montgomery, State of Pennsylvania, have invented a certain new and useful Improvement in Gas-Engine Attachments, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

One object of the present invention is the production of a novel attachment or fitting which is adapted to be secured in the cylinder wall of an internal combustion engine, and is formed with a passage and a transparent window closing the passage, and is provided with a valve controlling said passage, and is so arranged that when the valve is in one position the interior of the engine cylinder may be visually observed, and when the valve is in another position the passage is closed, whereby the window may be protected from the pressure in the engine cylinder if desired at times of inspection and the breaking or removal of the window will not prevent the operation of the engine.

A second object of the invention is the production of an attachment or fitting adapted to accomplish the first mentioned object of the invention and having provisions for opening the interior of the cylinder at will to permit the introduction of gasoline or like fuel for starting the engine when cold, or, in the operation of the engine, to permit of the discharge of a jet of a burning fuel at the time of explosion in order that the manner in which the engine is functioning may thereby be determined.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and its advantages and specific objects reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the forms in which the invention may be carried out.

Of the drawings, Figure 1 is a sectional elevation of one form of fitting or attachment embodying my invention. Fig. 2 is an elevation of the fitting or attachment taken at right angles to Fig. 1. Fig. 3 is a sectional elevation of a portion of an in-

ternal combustion engine equipped with the attachment shown in Fig. 1, and Fig. 4 is a view illustrating a modified structure which may be built up out of parts of the apparatus shown in Fig. 1.

In the drawings, A represents the cylinder wall of an internal combustion engine. In a threaded socket A' formed in the cylinder wall A is screwed a bushing or hollow plug B; to the latter is secured a fitting part C. As shown the fitting part C is formed with alined passages C' and C² extending in opposite directions from a central valve chamber C³. Within the valve chamber C³ is located a rotary valve cock D which is cut away at D' so that when the valve is in the position shown in Fig. 1, it permits of the inspection of the interior of the cylinder A through the alined passages C' and C². When the valve is given a quarter turn in the clockwise direction into the full line position of Fig. 3 however, it serves to close communication between the chamber C' and the valve chamber C³. An extension E of the fitting part C supports a window closing the outer end of the passage C² or rather the extension E² of that passage formed in the fitting portion E. This window may be formed of any suitable transparent material adapted to stand up under the conditions of use. As shown, it comprises a disk F of mica, fused quartz or the like, having its margin between washers F' of suitable material, and with the washers is held in place by a hollow nut G screwed into the outer end of the fitting part E. As shown, the extension E is separate from the part C being provided with a threaded nipple E' which is screwed into the socket C⁴ of the port C.

With the apparatus described it will be apparent that when the valve D is in the position shown in full lines in Fig. 1 the interior of the engine cylinder may be visually inspected, and in particular the time and manner in which the firing or explosions in the cylinder occur may be definitely determined. Ordinarily the fitting will be so placed that the action of the igniter may be directly observed. Except when it is desired to look into the cylinder the valve D may be in the full line position of Fig. 3, thus normally relieving the window from exposure to the pressures within the cylinder, and of course the valve D fur-

nishes means by which injury to the window can be prevented from affecting the regular operation of the engine.

Preferably, as shown, the fitting part C is provided with a lateral upturned or spout like extension C⁵ having a passage C⁶ formed in it which is open at its lower end to the valve chamber C³ in position to be closed from said valve chamber by the valve D when the latter is in the full line position shown in Fig. 1. The channel C⁶ may be placed in communication with the channel C⁷ by turning the valve D into either of the dotted line positions of Figs. 1 and 3. When communication between the passages C⁶ and C⁷ are established as described, gasoline or like fuel may be introduced into the engine cylinder by pouring it into the upper end of the passage C⁶ at times when it is desired to introduce fuel in this manner, as in starting the engine when cold. In this condition of the apparatus, also, the manner in which the explosions occur within the engine cylinder may be determined by observing from the character of the jets of flame issuing from the mouth of the channel C⁶ on explosion.

It is of course apparent that the fitting parts B, C and E may be made integral with each other, or separable, as shown, without affecting the operation of the apparatus as hereinbefore described. I prefer, however, to make the fitting parts B and C separable, particularly in view of the fact that it is now common practice for manufacturers to provide engines with bushing parts constructed and arranged like the part B described and illustrated herein. Such bushing parts are provided to permit the users of the engines to obtain access to the engine valves and seats therefor, and to employ any fitting they may desire to use for the purpose of introducing fuel into the engine for starting when cold, and to determine the operation of the engine by watching the fire jets when explosions occur. I also prefer to make the fitting parts E and C separable for two reasons. One of these is due to the fact that when the parts are separable and a window disk blows out, a spare fitting part E, with the window intact, may be inserted in a few seconds. A second reason for making the fitting parts E and C separable, as shown, is that, when trouble occurs with the fitting part C, as in case the valve D begins to leak unduly or when it is desired to save the cost of the fitting part C, the fitting part E may be inserted directly into the bushing D, as shown in Fig. 4.

While, in accordance with the provisions of the statutes, I have illustrated and described the best form of my invention known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention, and

that certain features of the apparatus disclosed may be employed with advantage under some conditions without a corresponding use of other features, and I do not wish the claims herein made to be limited to the particular apparatus disclosed more than is made necessary by the state of the art.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. An attachment for an internal combustion engine comprising a valve casing adapted to be secured in the cylinder wall of the engine and formed with a passage extending through it and directed toward and open to the interior of the cylinder, a separate part also formed with a passage through it and adapted to be secured to said valve casing with the passages in said part and casing in alinement, a transparent diaphragm secured in said separate part and closing the passage therethrough and a valve located in said casing and movable from one position in which the interior of the cylinder may be inspected through said diaphragm and passages into another position in which it closes said casing passage.

2. An attachment for an internal combustion engine, comprising a member adapted to be secured in the cylinder wall of the engine and formed with a valve chamber and with two alined passages extending in opposite directions from said chamber, one of said passages being open at its inner end to the interior of the engine cylinder, a transparent diaphragm extending across the other passage, and a valve in said valve chamber moving from one position in which it closes communication between said alined passages, into another position in which the interior of the cylinder may be observed through said passages and said diaphragm.

3. An attachment for an internal combustion engine, comprising a member adapted to be secured in the cylinder wall of the engine and formed with a valve chamber and alined passages extending in opposite directions from said chamber, one of said passages being open at its inner end to the interior of the cylinder, a transparent diaphragm extending across and closing the other passage, said member having a lateral passage formed in it open at its inner end to said valve chamber, and a valve movable from one position in which it closes communication between said valve chamber and the passage running to the interior of the engine cylinder, into another position in which it closes communication between said lateral passage and said valve chamber.

4. An attachment for an internal combustion engine, comprising a bushing adapted to be secured in the cylinder wall of the engine, a fitting part adapted to be detachably

secured to said bushing and formed with a passage through it in alinement with the passage through said bushing, a valve mounted in said fitting part and controlling the passage therein, and a hollow part adapted to be detachably secured to said fitting part with the passages in said fitting and hollow parts in alinement and said hollow part being provided with a transparent diaphragm closing the passage therein, the engaging portions of said bushing and fitting part and of said fitting part and hollow part being similar respectively to permit said hollow part to be detachably secured to said bushing on the removal therefrom of said fitting part.

5. An attachment for an internal combus-

tion engine, comprising a member adapted to be secured in the wall of the engine cylinder and formed with a passage open to the interior of the cylinder, and with a branch passage closed by a transparent diaphragm through which the interior of the cylinder may be inspected, and with another branch passage through which the interior of the engine cylinder may be opened to the atmosphere, and a valve mounted in said member and adapted to open or close communication between either of said branch passages and said first mentioned passage as desired.

LAMBERT J. BORDO.

Witnesses:

ARNOLD KATZ,
J. STEWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."