

G. HOLLOWAY.
INTERNAL COMBUSTION ENGINE.
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1,103,047.

Patented July 14, 1914.

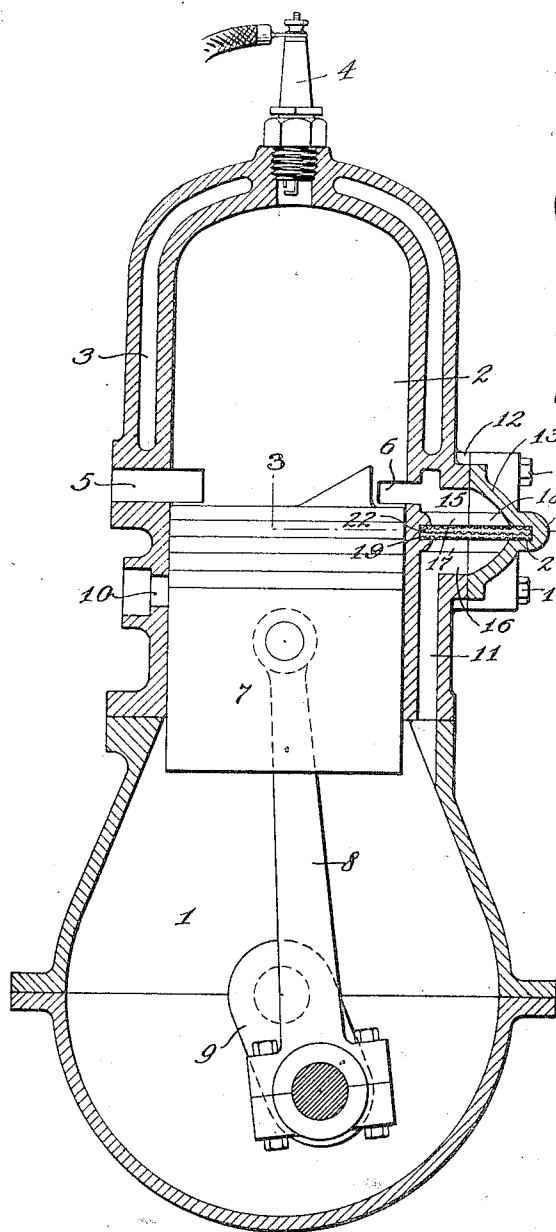


FIG. 1

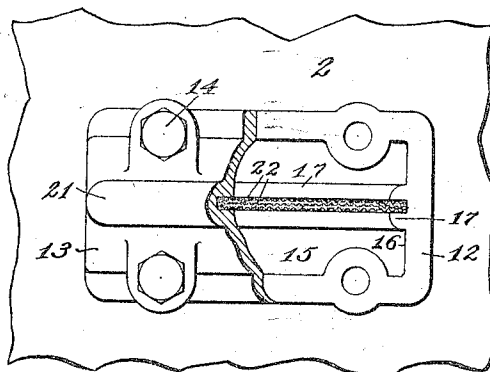


FIG. 2

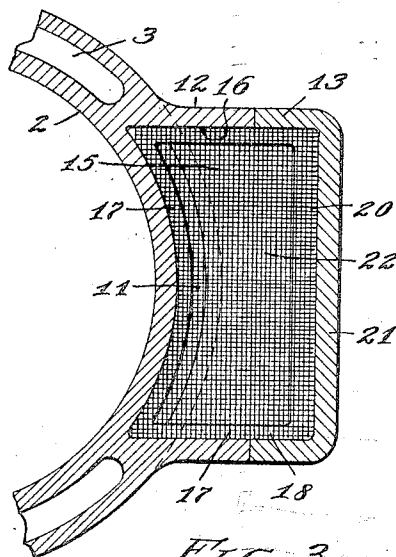


FIG. 3

WITNESSES:

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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE HOLLOWAY, a citizen of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented a certain new and useful Improvement in Internal-Combustion Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates generally to improvements in internal combustion engines and has particular reference to that class known as "two-cycle" engines. In engines of this type the combustible fluid is first drawn into the closed crank case by a suction produced therein by the ascent of the piston to the upper end of the cylinder. As the piston is forced downwardly, this fluid is compressed, and, when the piston has reached substantially its lowest position and has uncovered the exhaust and admission ports into the cylinder, the gas escapes from the crank case through a by-pass or transmission port into the cylinder, scavenging the cylinder of the burnt gases resultant from the former explosion and filling it for the subsequent compression and explosion. During the moment, therefore, that the ports in the cylinder are uncovered the compressed charge of fluid which occupies the crank case and by-pass is brought into direct association with the hot gases, which are present in the cylinder, and such a condition quite frequently results in a premature explosion of the gases in the crank case and by-pass. It is obvious that such occurrences are detrimental to the operation of the engine, and means for eliminating this objectionable feature have heretofore been provided, consisting usually of a piece of wire gauze, a perforated plate, or a tubular member which may be inserted in the by-pass for arresting the flame or hot gases which may enter the admission port at the moment it is uncovered, and thus prevent the ignition of the charge of gas within the crank case. These methods of obviating this difficulty have been more or less objectionable, principally because of their construction, which prevents easy access to the parts, and again because of their ineffectiveness.

The objects of this invention are to provide means in the by-pass of a two-cycle engine for preventing the ignition of the

compressed gas within the crank case when communication is established between the crank case and the cylinder of the engine, such means being simple in its construction yet very effective in the accomplishment of its purpose and which will well withstand the heat to which it is subjected; to provide a construction that will permit of quick and easy access to the parts, for the purpose of cleaning or repair; and a construction wherein the parts which require replacement may be made of cheap and very durable material.

Generally speaking, my invention may be defined as consisting of the combination of elements set forth in the claims annexed hereto and illustrated in the drawing forming a part hereof wherein—

Figure 1 is a central vertical section of a two cycle internal combustion engine having my invention applied thereto; Fig. 2 is a fragmentary side elevation of the engine cylinder in the vicinity of the by-pass opening, the cover of the opening being broken away to reveal the inside construction, and Fig. 3 is a horizontal section through a portion of the cylinder and the by-pass, the plane of such section being indicated by the line 3—3 of Fig. 1.

Taking up a detailed description of the invention by the use of reference characters, 1 denotes the crank case of the engine which is surmounted by the cylinder 2. The cylinder 2 is provided with the usual water jacket 3, spark plug 4, exhaust port 5, and the admission port 6. 7 denotes the piston, 8 the pitman and 9 the crank of the engine. A port 10 supplies combustible fluid to the crank case when the piston is at the upper end of its stroke.

A by-pass or transmission port 11 communicates at its upper end with the cylinder 2 through the admission port 6 and at its lower end it opens into the crank case 1. A hollow boss 12 projects from the side of the engine cylinder and is substantially the width of the by-pass 11. A concave cover 13, which is secured to the outer face of the boss 12 by cap screws 14, forms, with the interior of the boss 12, a chamber 15. The side walls 16 of the chamber 15 are coincident with the sides of the by-pass 11. 17 denotes a pair of flanges which extend horizontally about the inner arcuate wall of the by-pass 11 and across the end walls 16 of

the chamber 15, the flanges being preferably cast with the cylinder. A pair of flanges 18 on the end walls of the cover coincide with the flanges 17 and form, in effect, a continuation of the said flanges, when the cover is in place. The flanges are spaced vertically from each other, forming therebetween a groove 19 which is coincident with a groove 20 within a rib 21 on the cover 13.

Adapted to have their edges received by the grooves 19 and 20 are a plurality of screens 22, three of such screens being shown in the drawing, although any desired number may be employed. These screens are of the same shape and area as the horizontal cross sectional area of the by-pass 11, the chamber 15, and the groove 20. I prefer to employ a cheap screen of comparatively heavy wire and consequently a coarse mesh in connection with my device, in order to secure the maximum durability at a minimum cost; and I use a number of layers of such screening for the purpose of producing a more efficient arrester for the flame or hot gases which may enter the admission port while it is uncovered by the descent of the piston. By this construction it will be seen that I have all the advantages of a finer wire gauze, with the additional advantage of greater durability and economy.

When it is desired to remove the screens 22 for the purpose of cleaning or replacing them, it requires only the simple operation of removing the four screws 14 and the cover 13, which will permit the screens to be drawn out of the groove 19.

Having thus described my invention, what I claim is:—

1. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass communicating at one of its ends with the cylinder and at its opposite end with the interior of the crank case, said by-pass having an opening in its side, a cover for said opening, there being a groove about the walls of the by-pass adjacent said opening and within the inner face of the cover, and a screen the edges of which are adapted to be received by said groove.

2. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass communicating at one of its ends with the cylinder and at its opposite end with the interior of the crank case, the by-pass having an opening in its side, a cover for said opening, there being a groove about the walls of the by-pass adjacent the said opening and within the inner face of the cover, and one or more screens extending across the by-pass and having their edges supported within said groove.

3. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass communicating at one of its ends with

the cylinder and at its opposite end with the interior of the crank case, the by-pass having an opening in its side, a cover for said opening, a pair of flanges extending horizontally about the by-pass and forming a groove therebetween and the cover having a groove coincident with said groove, and a screen having its edges supported within said groove.

4. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass formed with the outer surface of the cylinder wall and communicating at one end with the cylinder and at its opposite end with the crank case, the cylinder being provided with a pair of spaced flanges projecting from the outer cylinder wall and the lateral walls of the by-pass and forming therebetween a groove, one or more screens fitted in said groove, and a cover removably applied to the by-pass and extending across the plane of said groove.

5. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass formed with the outer surface of the cylinder wall and communicating at one end with the cylinder and at its opposite end with the crank case, the cylinder being provided with a pair of spaced flanges projecting from the outer cylinder wall and the lateral walls of the by-pass and forming therebetween a groove, one or more screens fitted in said groove, and a cover removably applied to the by-pass and extending across the plane of said groove and itself having a groove adapted to register with the groove within the by-pass and to receive the outer edge of the screen or screens therewithin.

6. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass communicating at one of its ends with the cylinder and at its opposite end with the interior of the crank case, a hollow boss projecting from the side of the cylinder, the opening within the boss being of substantially the same width as the width of the by-pass, a cover for said boss having vertical side walls coincident with the side walls of said boss, a pair of vertically spaced horizontal flanges extending along the walls of the by-pass within the boss, similar flanges on the side walls of the cover adapted to register with the former flanges, and one or more screens adapted to have their edges contained within said grooves.

7. The combination, with the cylinder and crank case of a two-cycle engine, of a by-pass communicating at one of its ends with the cylinder and at its opposite end with the interior of the crank case, a hollow boss projecting from the side of the cylinder, the opening within the boss being of substantially the same width as the width of the

by-pass, a cover for said boss having vertical side walls coincident with the side walls of said boss, a pair of vertically spaced horizontal flanges extending along the inner
5 wall of the by-pass and the side walls of the opening within the boss, similar flanges on the end walls of the cover, the cover having a groove along the inner face which is coincident with the groove formed by the

aforesaid flanges, and one or more screens 10 contained within said grooves.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

GEORGE HOLLOWAY.

Witnesses:

JAMES M. FRENCH,
MARGARET NOLAN.