March 23, 1954 J. Z. BRUBAKER 2,672,854

AIR-COOLED VALVE

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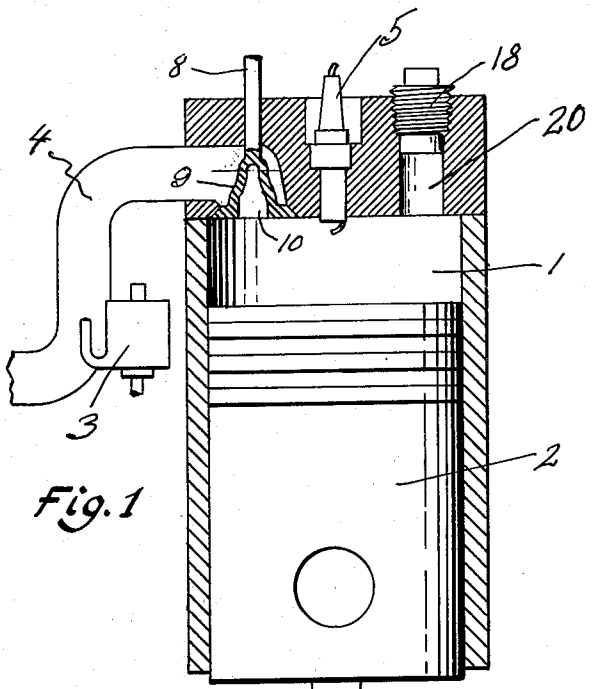


Fig. 1

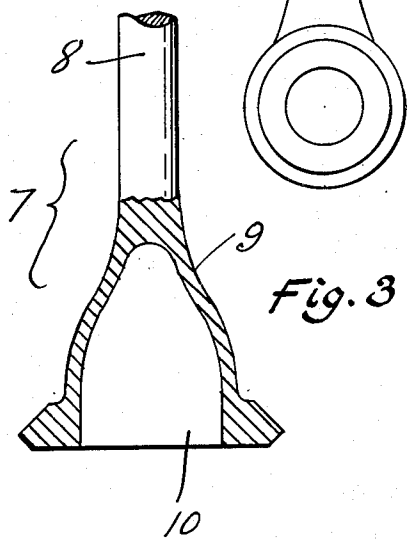


Fig. 3

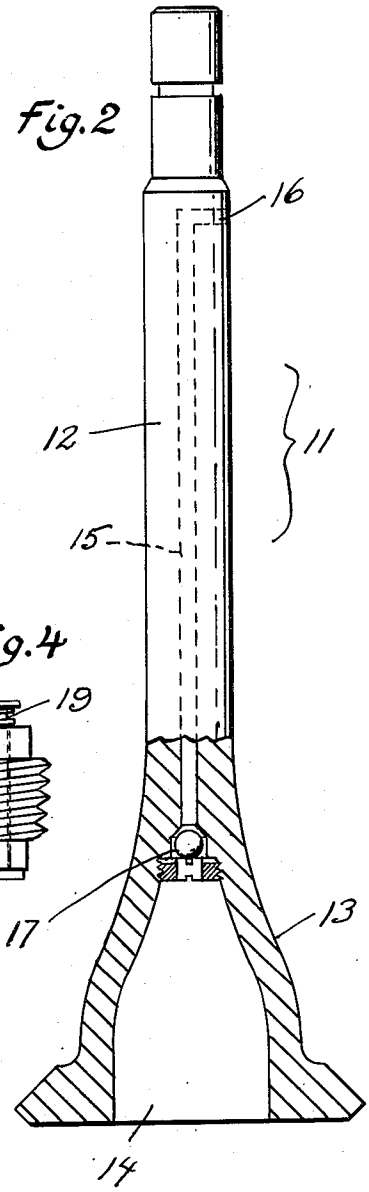


Fig. 2

Fig. 4

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AIR-COOLED VALVE

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4 Claims. (Cl. 123—41.41)

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This invention relates to internal combustion engines and more particularly to means for eliminating the characteristic motor ping which takes place at certain times in said engines.

One object of my invention is to provide novel and simple device which can be readily applied to an internal combustion engine and which effectively eliminates the characteristic motor ping which usually results in such engines when low octane fuel is used in a high compression engine structure.

Another object is to provide such a device in the form of a special intake valve design.

A further object is to provide such a device which can be secured in position in the cylinder lead of each piston chamber.

It is also an object to provide such a device which will permit a small amount of trapped gaseous fluid to remain in the cylinder after each piston cycle and which trapped fluid functions as a cushion during the subsequent explosion of the gas in said cylinder, to thereby prevent the ping that would otherwise result.

With these and other objects in view, which will become more apparent from the following detailed description of the embodiments of my improvements shown in the accompanying drawings, the invention comprises the novel device, elements, features of construction and arrangement of parts in cooperative relationship, as more particularly defined by the hereto appended claims.

In the accompanying drawings:

Figure 1 is a central vertical sectional view through a typical cylinder head of an internal combustion engine, and shows my invention applied thereto.

Fig. 2 is an enlarged fragmentary side elevational view, partly broken away and in section, of the form of my novel engine ping preventing device, shown in Fig. 1.

Fig. 3 is a view similar to Fig. 2, but illustrates a modified form of my novel device shown in Figs. 1 and 2.

Fig. 4 is a side elevational view of another modified form of my novel engine ping preventing device.

In Fig. 1 I have shown certain well-known parts of a conventional internal combustion engine, such as a piston chamber 1, a piston 2, a carburator 3, an intake manifold 4, a spark plug 5 and a connecting-rod 6.

My invention can be applied to such an engine and is designed to eliminate the "ping" or "knock" which results in a high compression engine when a low octane gas is used. My invention can be applied at various locations in such an engine, for example, at the location of either the intake valve or the exhaust valve, or in the cylinder head.

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When the invention is applied at the location of the intake valve, the embodiment of my invention comprises a valve element 7 having a valve stem 8 and a valve head 9 provided with an internal bell-shaped air chamber 10 that is open at its bottom. When this form of my invention is in operation, a dead air pocket forms within the upper end of the bell-shaped chamber 10, that is not ignitable, and functions as an air cushion when ignition of the gas in the firing chamber takes place. In other words, the ignited gas in the firing chamber is permitted to expand beyond the limits of the chamber and this extra expansion or air cushion effect eliminates the said ping or knock of the engine.

When the invention is provided at the location of the exhaust valve, I provide an exhaust valve structure which comprises a valve element 11, having a stem 12, a valve head 13, provided with a bell-shaped air chamber 14 which is similar to the chamber 10 in Fig. 3. The stem 12 is provided with an internal air intake channel 15, and a lower end which terminates at a ball check valve 17, arranged to permit flow of air through the channel 15 in one direction only. The structure just described functions on the suction cycle of the piston to draw air through the channel 15 into the upper end of the chamber 14, which will not ignite, and serves as an air cushion only, when the ignition of the gas occurs in the combustion chamber of the engine. In addition, the flow of continuous incoming air through the channel 15, will tend to cool the exhaust valve element 11, and this is an outstanding and important feature since it accomplishes a new result never attained before.

When my invention is applied to the cylinder head 1, it may be constructed in the form of a plug-like element 18, arranged to be threaded into the cylinder head as shown in Fig. 1. The element 18 performs the same function in the same manner as the element 7 shown in Fig. 3.

The plug-like element 18 may also be modified to include an air intake check valve 19 as shown in Fig. 4. With this arrangement a small amount of air is drawn into the small air chamber 20 (see Fig. 1) during the intake cycle of the engine, and this air is not ignitable and serves only as an air cushion to prevent the ping, in substantially the same manner as previously described in connection with the other forms of my invention.

In connection with consideration of my inven-

tion it is to be remembered that the efficiency of a motor practically depends upon the compression ratio, the higher the compression the more power there is developed from the fuel that is consumed. In designing the modern automobile engine, the engineers are governed by the high octane gasoline that is available on the open market, because low octane gasoline in a high compression motor develops an annoying motor ping.

The various forms of my improvements herein specifically shown and described can be modified in various ways without departing from my invention more particularly defined by the claims.

I claim:

1. An engine valve for an internal combustion engine comprising in combination, a valve stem, a centrally apertured valve head having a frustro-conical valve face thereon, and a hollow substantially conical neck portion integrally fixed at its opposite ends to said stem and head to connect the same and provide a cavity extending inwardly from the outer end of said head, said cavity at its outer end being of a greater diameter than that of said valve stem and extending inward a distance greater than the largest diameter of said cavity.

2. An exhaust valve for an internal combustion engine comprising in combination, a valve stem having a passage extending longitudinally thereof from one end and the other end of said passage communicating with the exterior of said stem, a valve head integral with said stem and having a cavity extending inward from the outer end thereof substantially in axial alignment with said passage in said stem and communicating with said one end of said passage, and a check valve mounted interiorly of said exhaust valve and operable to prevent flow of fluid in one direction through said passage and cavity.

3. An exhaust valve for an internal combustion engine comprising in combination, a valve stem having a passage extending longitudinally thereof from one end and the other end of said passage communicating with the exterior of said stem, a valve head integral with said stem and having a substantially conical cavity extending centrally inward from the outer end thereof substantially in axial alignment with said passage in said stem and communicating with said one end of said passage, and a check valve mounted interiorly of said exhaust valve and operable to prevent flow of fluid in one direction through said passage and cavity.

4. An exhaust valve for an internal combustion engine comprising in combination, a valve stem having a passage extending longitudinally thereof from one end and the other end of said passage communicating with the exterior of said stem, a valve head integral with said stem and having a cavity extending inward from the outer end thereof substantially in axial alignment with said passage in said stem and communicating with said one end of said passage, and a check valve mounted adjacent the inner end of said cavity and operable to prevent flow of fluid in one direction through said passage and cavity.

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