Sept. 10, 1946. H. E. CROZIER ET AL 2,407,478

ANTIKNOCK OR DETONATION DAMPENING DEVICE

Filed March 20, 1944

Fig. 1.

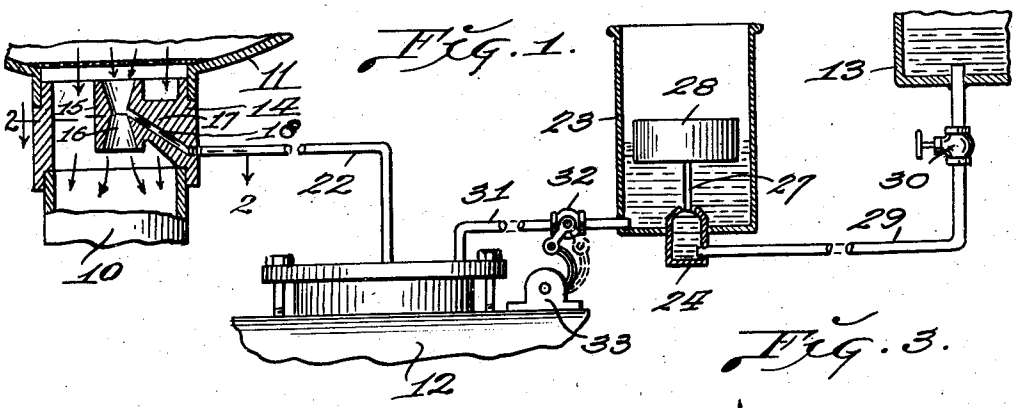


Fig. 3.

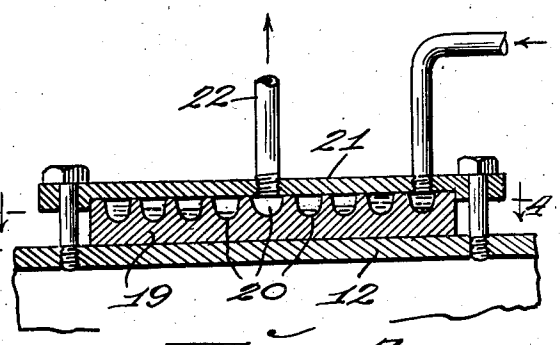


Fig. 2.

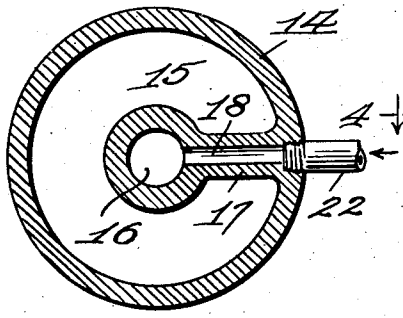


Fig. 4.

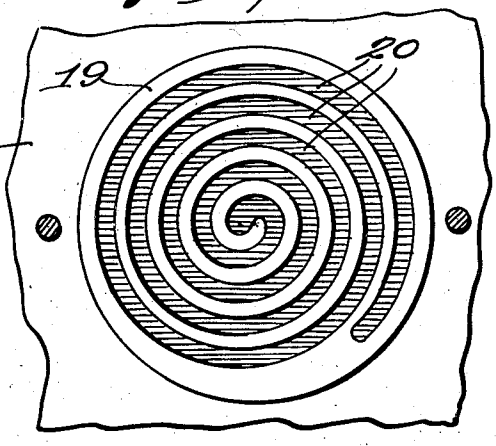
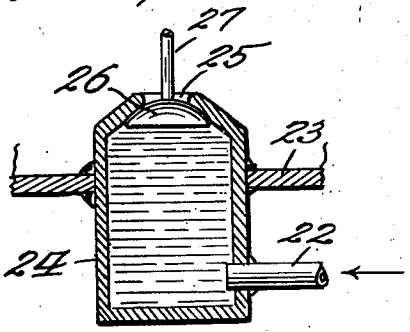


Fig. 5.



INVENTORS:-
HAROLD E. CROZIER AND
ALBERT G. H. VANDERPOEL.
BY Martin P. Smith ATTY.

Patented Sept. 10, 1946

2,407,478

UNITED STATES PATENT OFFICE

2,407,478

ANTIKNOCK OR DETONATION DAMPENING DEVICE

Harold E. Crozier and Albert G. H. Vanderpoel, Hawthorne, Calif.

Application March 20, 1944, Serial No. 527,252

2 Claims. (Cl. 123—25)

1

Our invention relates generally to internal combustion engines and more particularly to simple and efficient means for counteracting and dampening detonation or engine "knock," and the principal object of our invention is to provide simple and efficient automatic means for introducing steam vapor to the carburetor to mix with the combustible gaseous mixture drawn into the cylinders.

The steam vapor when entering the combustion chamber acts as a coolant during the explosion cycle and its expansion through the differential in temperature will act as a cushion or dampener respectively producing a gas of its own to further assist combustion, so that detonation, more familiarly known as an engine "knock" is thus eliminated.

It may readily be seen that with a device of this kind, higher compression ratios can be utilized materializing more power and fuel economy and also permitting the use of lower grade fuels.

Further objects of our invention are, to provide a device of the character referred to, having a simple and effective steam generator, constructed so as to be conveniently mounted on the exhaust manifold of the engine and thus be heated by the exhaust gases passing through said manifold and further, to provide means for utilizing the velocity of the air entering the carburetor for regulating the amount of steam to correct proportions for all engine speeds and throttle positions.

With the foregoing and other objects in view, our invention consists in certain novel features of construction and arrangement of parts which will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is an elevation view partly in section and showing the device associated with the air filter, carburetor and exhaust manifold of an internal combustion engine.

Fig. 2 is an enlarged horizontal section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken through the center of the steam generator.

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 3.

Fig. 5 is a detail section of a float actuated valve for controlling the flow of water to the steam generator.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of our invention, 10 designates the upper portion of a conventional carburetor, 11 the air filter associated therewith, 12 the exhaust manifold and 13

2

a source of water supply which may be the water jacket of the engine or the radiator.

Connecting the carburetor with the air filter is a collar 14 in the center of which is a short vertically disposed tube 15 having a Venturi passageway 16, said tube being connected to the wall of collar by a narrow web 17 through which is formed a duct 18 the inner end of which communicates with the center of the Venturi 16.

The steam generator includes a metal disc 19 with a spiral duct 20 in its upper portion, said duct being closed by a cover plate 21. Bolts or screws 22 pass through cars on the cover plate into the manifold, thereby securing the generator thereto.

Thus with the cover secured on the disc, the duct 20 provides an elongated steam generating chamber.

Secured to cover plate 21 and leading from the inner end of duct 20 to the outer end of duct 18 is a conduit 22. As a result of this arrangement the steam or moist vapor from the generator enters the carburetor at a point in advance of its main nozzle. A small tank or container 23 is located below the source of water supply 13, and located in the bottom of said tank is a valve housing 24 provided in its upper end with an inlet 25 which is normally closed by a downwardly opening check valve 26. A stem 27 connects valve 26 to a float 28 within tank 23.

Leading from the source of water supply 13 to the lower portion of valve housing 24 is a conduit 29 in which is located a valve 30.

Leading from the lower portion of tank 23 to the outer end of duct 20 in the steam generator is a conduit 31, the flow of water through which is controlled by a valve 32 actuated by a conventional thermostat 33 located on exhaust manifold 12 adjacent the steam generator.

Through the action of float actuated valve 26, a constant supply of water is maintained in receptacle 23 and under a predetermined degree of heat from the exhaust products of combustion passing through manifold 12, thermostat 33 will open valve 32, thereby permitting water to flow through conduit 31 into duct 20 in disc 19, which latter is also heated by the products of combustion passing through the exhaust manifold. Thus, the water flowing through the elongated duct in the disc 19 will be heated and finally converted into steam which is drawn through conduit 22, and thence through duct 18 to unite and mix with the air drawn through the venturi and such air enters the carburetor to unite with the liquid hydrocarbon to form an exceptionally ef-

fective and powerful gaseous fuel for the engine.

The addition of moisture in vapor form, to the gaseous fuel drawn into the combustion chambers of the engine, materially increases the power output counteracts the formation of carbon in the combustion chambers and assures smooth running of said engine.

The steam generator comprising disc 19 and cover 20 is directly attached to the exhaust manifold and has a relatively large heating area with a small water space thus insuring the rapid and effective generation of steam while the device is in operation.

Float actuated valve insures a constant supply of water in receptacle 23, while thermostatic valve 32 regulates the flow of water to the steam generator and passageway 16 regulates the amount of steam to correct proportions in relation to engine speeds and throttle position.

Thus it will be seen that we have provided an anti-knock or detonation dampening device which is simple in structure, inexpensive of manufacture, exceptionally economical in point of fuel consumption, capable of being readily used in connection with practically all internal combustion engines, and said device being very effective in performing the function for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of our anti-knock or detonation dampening device may be made and substituted for those

herein shown and described without departing from the spirit of the invention, the scope of which is set forth in the appended claims.

We claim as our invention:

1. The combination with an internal combustion engine, its exhaust manifold, carburetor, and an air filter, of a collar connecting said filter and carburetor, a venturi axially located in said collar, the wall of said collar being provided with a duct, the inner end of which communicates with the center of said venturi, a receptacle, float actuated valvular means associated with said receptacle for maintaining a constant supply of water therein, a heater mounted on the exhaust manifold and provided with a tortuous passageway, a duct leading from said receptacle to one end of said passageway and a duct leading from the other end of said passageway to the outer end of the duct that leads to said venturi.

2. In an anti-knock or detonating dampening device, the combination with an air filter and a carburetor, of a collar connecting said filter and carburetor, a member disposed concentrically within said collar and provided with a venturi, a narrow radial web connecting the wall of said collar with said member, said member provided with a duct, the inner end of which communicates with the center of said venturi and means for supplying steam to the end of said duct.

HAROLD E. CROZIER.
ALBERT G. H. VANDERPOEL.