Sept. 6, 1932. H. FEUILLÉE 1,876,406

APPARATUS FOR PREVENTING THE BACK FIRING IN INTERNAL COMBUSTION ENGINES

Filed April 1, 1930 2 Sheets-Sheet 1

FIG 1

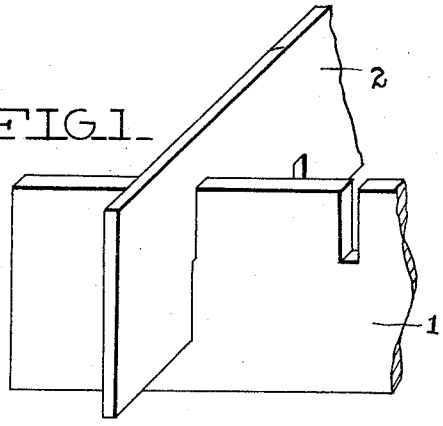


FIG 2

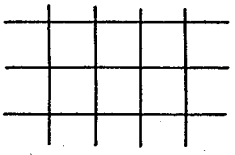


FIG 3

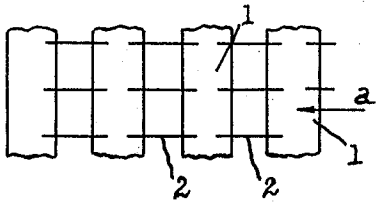


FIG 4

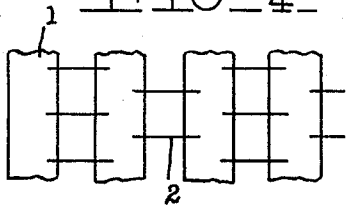


FIG 5

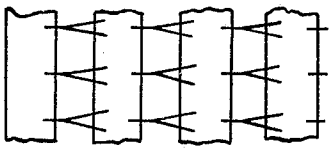


FIG 6

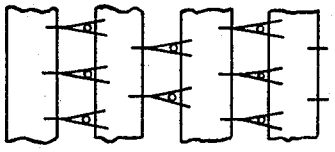
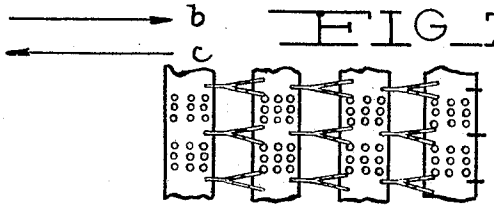


FIG 7



Inventor:
Henri Feuillée,
By Alfred Thurston
Atty.

Sept. 6, 1932. H. FEUILLÉE 1,876,406

APPARATUS FOR PREVENTING THE BACK FIRING IN INTERNAL COMBUSTION ENGINES

Filed April 1, 1930 2 Sheets-Sheet 2

Fig_10

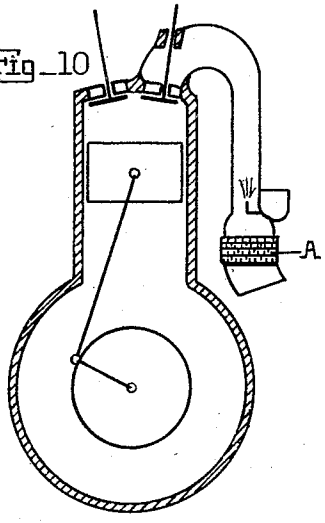


Fig_11

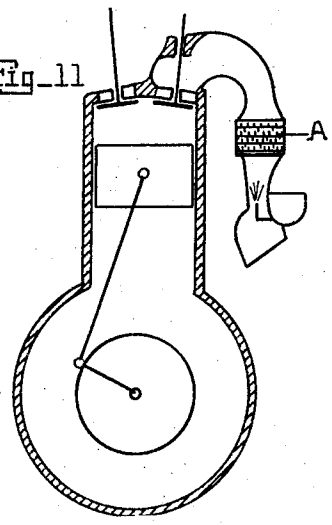


Fig_8

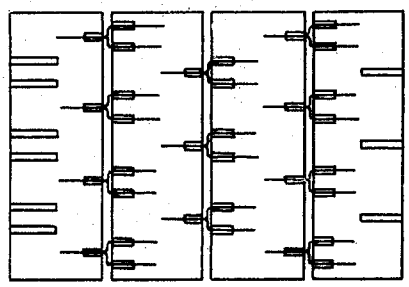


Fig_12

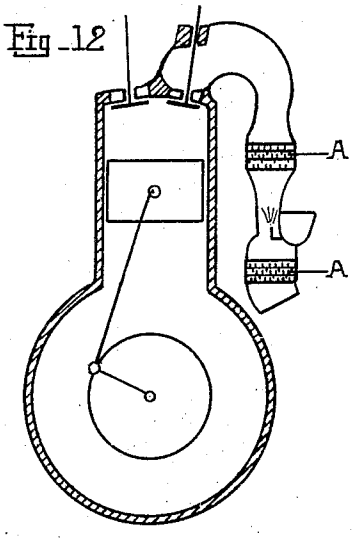
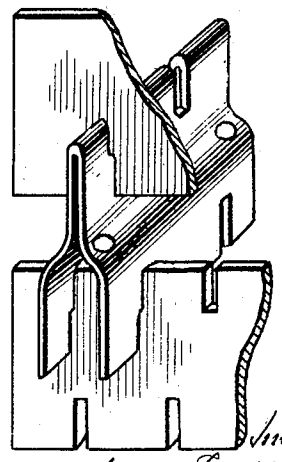


Fig_9



Inventor:
Henri Feuillée
By
Atty.

Patented Sept. 6, 1932 1,876,406

UNITED STATES PATENT OFFICE

HENRI FEUILLÉE, OF GENTILLY, FRANCE

APPARATUS FOR PREVENTING THE BACK FIRING IN INTERNAL COMBUSTION ENGINES

Application filed April 1, 1930, Serial No. 440,710, and in France December 13, 1929.

My invention provides a new device acting as a safeguard against back firing in internal combustion engines and operating to diminish the risks of fire. The dangerous effects of back firing are well known, especially in aviation where they are the cause of many accidents. Devices have already been proposed reducing this danger but the greater number of them cause a throttling of the gas at the inlet to the motor and are therefore detrimental to the efficiency of the motors, and it may in some cases even be said that they themselves are the cause of back firing, because they become dirty and do not permit the air to be admitted freely in response to the partial vacuum.

The apparatus which forms the subject matter of the present invention has none of the disadvantages mentioned above, and it permits a free entry of the air and gas to the motor without any throttling, whilst at the same time offering a very efficient protection against back firing due for instance to a lack of fuel, mis-adjustment of the valves or of the ignition or any other cause.

The simplicity of the design of this apparatus and the possibilities of adopting it on various types of motors allows it to be used in all cases, either in the motor car or in air craft.

Several constructional forms of the invention are shown as examples in the accompanying drawings wherein:

Fig. 1 represents a possible coupling system of the plates constituting the flame guard device.

Figs. 2, 3, 4, 5, 6 and 7 show some of the ways in which the plates may be arranged, these arrangements may of course be subject to further variations according to the requirements of the case.

Figure 8 is a diagrammatic illustration of an assembly of the plates shown in Figure 9.

Figure 9 is a detail perspective view showing the construction and manner of relatively arranging the plates according to the embodiments of the invention illustrated in Figures 5, 6 and 7 of the drawings; and

Figures 10, 11 and 12 are diagrammatic illustrations of different ways of associating the device with the fuel supply conduit of an internal combustion engine.

The apparatus according to this invention may be interpolated in the suction pipe, either in front of the carburetter or between the latter and the motor according to requirements.

It is constituted by a large number of metallic plates which are maintained in spaced relation by means of notches (Fig. 1) in such a manner as to constitute a rigid unit.

These plates are arranged to form a cellular structure (Fig. 2) which is placed in the path of the ignited gases so as to ensure their being cooled, thus suppressing the danger of a fire caused by these gases.

The shape of the individual cells or chambers may vary and such variations may be attained by varying the arrangement of the plates among themselves.

In Fig. 3, the vertical plates 1 are supported by the horizontal plates 2 in the manner represented in Fig. 1, each range of horizontal plates being in the same plane, while the gases which are led according to the arrow *a* follow a direct path without being deflected.

In Fig. 4 the horizontal plates 2 are arranged in a staggered fashion, thus deviating from their normal path the return gases which are not consumed and thus force them to extend their travel across the apparatus, a fact which prolongs their contact with the cooling surface thus decreasing their temperature further and also the risk of fire.

There are, however, certain cases in which it is particularly difficult to arrest an explosive flame caused by back firing. For dealing with this contingency the horizontal plates have been arranged baffle-wise as shown in Figures 5 to 9. These baffles are arranged so as to present a minimum of resistance to the gases admitted, that is to say in the direction of the arrow *b* whereas they tend to oppose any return of this gas in the direction of the arrow *c*. In that direction the gases are in fact restrained and are submitted to a whirling or mixing motion when they enter the cul de sac or impasse forward in the angles of the baffles. At that moment a real vortex motion

is produced, which considerably increases the fire extinguishing action of the device, and these baffles may also be pierced with holes so as to accelerate the extinction by a blowing action, see Fig. 7.

It is also possible that the apparatus may be called upon to act in a particularly cold or moist temperature where the dangers of freezing may have to be faced. According to the invention it is proposed to fit the apparatus with a system of pipes (Fig. 6), for the circulation of hot water or hot oil which may be obtained from the motor.

I claim:

1. A device to be arranged in the fuel supply conduit of an internal combustion engine to diminish the fire hazard due to back firing of the engine, comprising a plurality of plates arranged in crossed relation to form a cellular structure, some of said plates being of approximately V-shape in cross section and said device being adapted to be arranged in said conduit with the apexes of said approximately V-shaped plates facing away from the engine, whereby the device offers comparatively little resistance to the flow of fuel to the engine but offers comparatively great resistance to flow of ignited gases in the opposite direction.

2. A device to be arranged in the fuel supply conduit of an internal combustion engine to diminish the fire hazard due to back firing of the engine, comprising a plurality of sets of plates arranged in advance of one another, the plates of each set being disposed in spaced side to side relation, the plates of adjacent sets being disposed in crossed relation, the plates of alternate sets being disalined with respect to each other, and all of said plates being arranged with their corresponding edges facing in the same direction whereby the plates of the different sets cooperate to provide a cellular structure through which the fuel is adapted to pass in its flow to the engine.

3. A device to be arranged in the fuel supply conduit of an internal combustion engine to diminish the fire hazard due to back firing of the engine, comprising a plurality of plates arranged in crossed relation to form a cellular structure through which the fuel is adapted to pass in its flow to the engine, and pipes extending through certain of said plates through which a heating medium is adapted to be circulated.

4. A device to be arranged in the fuel supply conduit of an internal combustion engine to diminish the fire hazard due to back firing of the engine, comprising a plurality of plates arranged in crossed relation to form a cellular structure, some of said plates being of approximately V-shape in cross section and said device being adapted to be arranged in said conduit with the apexes of said approximately V-shaped plates facing away from the engine, whereby the device offers comparatively little resistance to the flow of fuel to the engine but offers comparatively great resistance to flow of ignited gases in the opposite direction, said V-shaped plates being perforated for the purpose set forth.

5. A device to be arranged in the fuel supply conduit of an internal combustion engine to diminish the fire hazard due to back firing of the engine, comprising a plurality of sets of plates arranged in advance of one another, and the plates of which are laterally spaced from each other, the plates of adjacent sets being arranged in crossed relation to form a cellular structure through which the fuel is adapted to pass in its flow to the engine, adjacent plates of certain of said sets being disposed in approximately V-shaped relation.

In testimony whereof he has affixed his signature.

HENRI FEUILLÉE.