June 13, 1933. A. DEFRANCE 1,914,111

APPARATUS FOR THE PREVENTION OF BACKFIRING IN INTERNAL COMBUSTION ENGINES

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Fig. 1

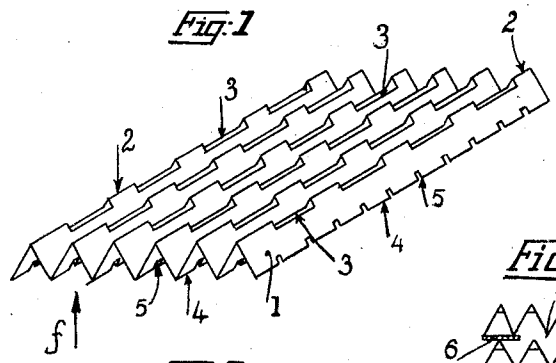


Fig. 2

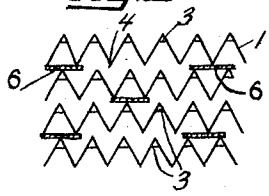


Fig. 3

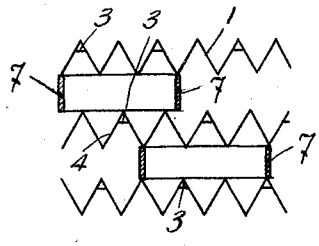


Fig. 4

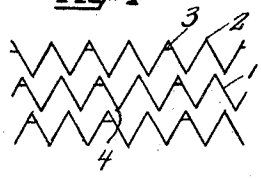


Fig. 5

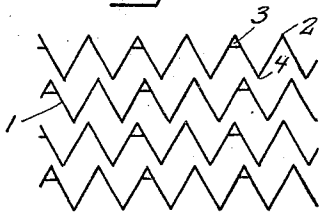


Fig. 6

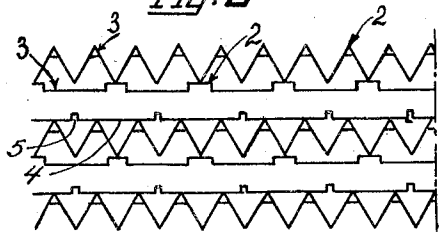


Fig. 7

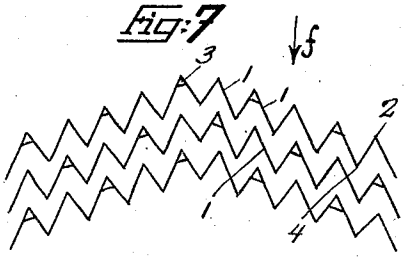
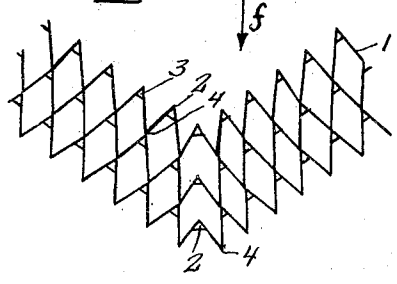


Fig. 8



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APPARATUS FOR THE PREVENTION OF BACKFIRING IN INTERNAL COMBUSTION ENGINES

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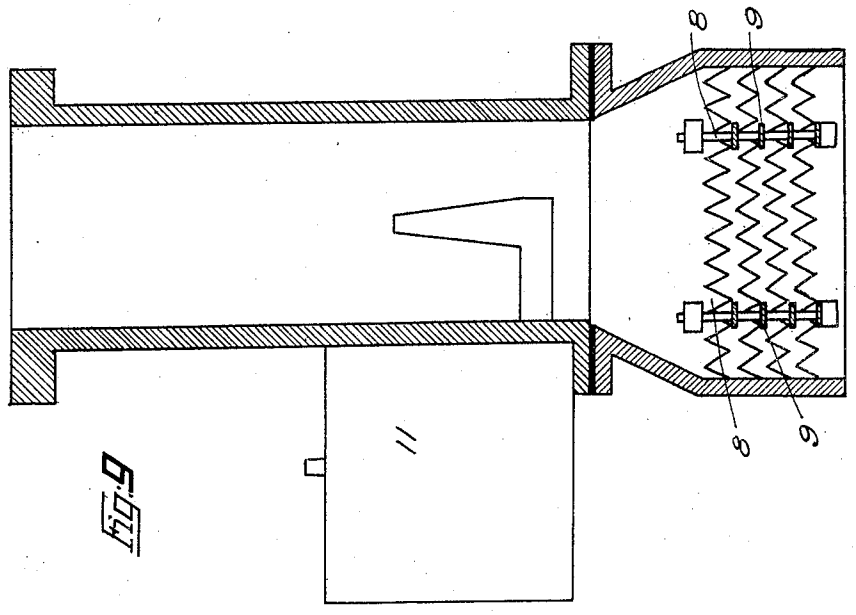


Fig. 9

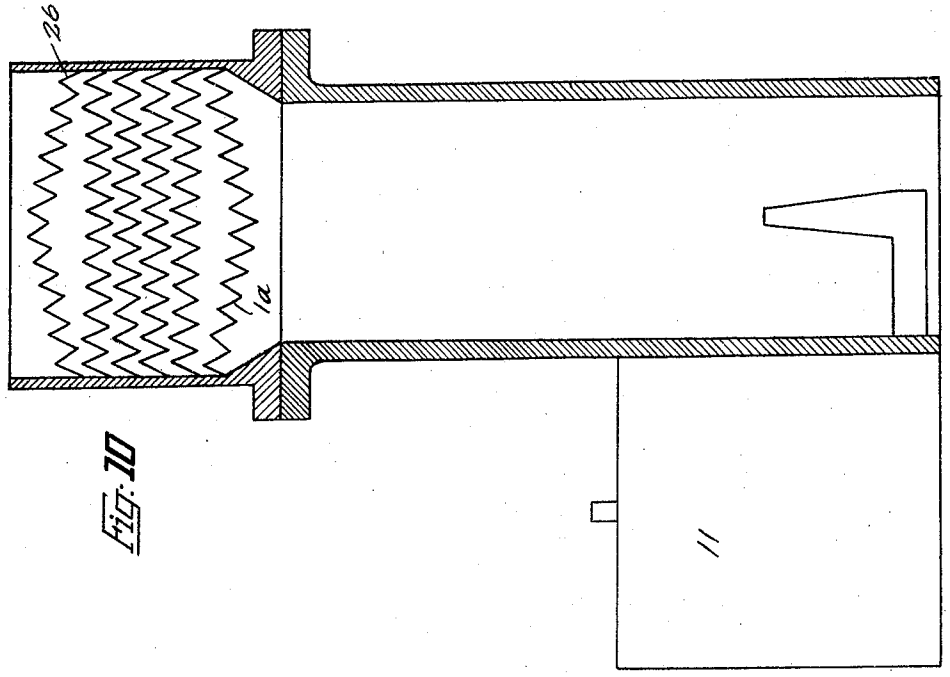


Fig. 10

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UNITED STATES PATENT OFFICE

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APPARATUS FOR THE PREVENTION OF BACKFIRING IN INTERNAL COMBUSTION ENGINES

Application filed December 29, 1931, Serial No. 583,618, and in France December 3, 1931.

The present invention relates to apparatus consisting of a superposed set of units having a great number of perforations, this apparatus being mounted in the suction conduit of an internal combustion engine, in front or in the rear of the carbureter, in order to subdivide the current of air or of fuel mixture circulating through the apparatus, into a great number of small streams. In this manner the fuel mixture for the engine is completely stirred up when the apparatus is placed after the carbureter, and in all cases the apparatus prevents all backfiring from the engine into the adjacent parts.

The invention has for its object an apparatus of this class which can be very readily manufactured and is of a small size, it has a light weight but is however substantial and reliable.

The apparatus is characterized by the fact that the unit perforated parts consist of corrugated or pleated sheet metal pieces in which the top parts of the pleats or corrugations situated on the side next the engine are pierced along their length with narrow orifices whose length is sufficient to afford the proper flow section, and such orifices can be readily formed by the punching process, or preferably by milling the top edge of the bent or corrugated part. Thus each unit piece will offer to the gas stream a series of juxtaposed channels, each of which has a general triangular or like cross section, with a large intake opening which corresponds to the engine feeding, and with a narrow discharge orifice.

A certain number of like units may be superposed with the bent or curved parts in the parallel or the crossed position, such units being assembled by cross-pieces, bolts or the like, and this construction forms a device which is of light weight as well as substantial and will withstand the great strains which occur in the event of back-firing while it is most effective in preventing all such back-firing.

The accompanying drawings show by way of example a constructional form of a unit element and various modifications of the same as well as methods of assembling and mounting the apparatus.

Figure 1 is a perspective view of a unit consisting of a pleated piece of sheet metal. Figs. 2 to 6 show various methods of assembling the units. Figures 7 and 8 represent respectively convex and concave forms which may be given to the different superposed units, or to those situated at the ends. Figure 9 shows an arrangement of the apparatus in the air intake conduit of the carbureter. Figure 10 relates to a preferred arrangement of the device between the carbureter and the engine.

Each element or unit part consists of a sheet of metal piece 1 which is pleated or corrugated. The arrow *f* shows the direction of flow of gas supplying engine. The top part or edge of each fold or corrugation is cut out, preferably by the milling process, according to short lengths 3 forming long and narrow orifices, between which are left the intact parts of the edge 2 in order that the unit piece may be sufficiently rigid and may hold its shape without distortion.

In order to prevent the gasoline, which may be deposited during its flow through the superposed set of pieces from accumulating in the lower angles 4, which in the case of back-firing would cause the ignition of this liquid fuel, small orifices 5 may be milled or otherwise formed in these lower parts 4, thus allowing the liquid to flow towards the bottom of the device, and it may then be taken up by the air circulating through the apparatus. Obviously, these orifices 5 must be sufficiently small to prevent all passage of the flame.

The orifice 3 for the flow of the gas mixture to the engine may be provided upon all of the top edges 2 or only upon certain of these edges, for instance upon every alternate edge, as shown in Fig. 3.

Unit pieces of this construction may be mounted together in various ways. For instance as shown in Fig. 2 the orifices 3 are situated on the same line; in Fig. 3 the edges 2 having the orifices 3 are adjacent the lower edges 4; Figure 4 shows an arrangement in which the rows of orifices 3 are (in

cross section) displaced progressively in the same direction; in Figure 5 these rows of orifices are displaced in one direction and then in the other. In Figure 6, the edges of the superposed units are not parallel but are crossed in such manner that the edges are directed alternatively in one plane and then in a plane perpendicular to the latter, and this arrangement provides for a most energetic mixing of the fuel and air, and is also proof against back-firing.

To allow the superposed units to rest upon one another, they may have between them suitable supporting plates 6 (Fig. 2) by which the units will be near one another, or frames 7 (Fig. 3) by which the units are properly spaced apart. In the arrangement shown in Fig. 6 the edges of the units themselves form the respective points of support between the units, due to their crossing.

As shown in Figs. 7 and 8, the set of units can be given a general shape which is not flat as in the preceding cases, but is angular or rounded, whether convex (Fig. 7) or concave (Fig. 8) with reference to the direction of the current *f*.

The units may be connected together by any suitable means, for instance by bolts 8 traversing the superposed set and in contact with small plates or washers 9 as shown in Fig. 9. This diagrammatic figure shows the arrangement of the apparatus in the air intake of the carbureter 10. Fig. 10 is a diagrammatic view showing the apparatus mounted between the carbureter and the engine, and herein the lower unit 1_a has preferably a curved shape, thus offering a convex part to the fuel stream proceeding to the engine, in order to spread the fuel upon the whole surface and to direct it as far as possible to the outer walls of the suction conduit, which latter may be heated. The upper unit 1_b is also preferably curved, but in the other direction, in order to prevent a convex part to any back motion of the flame, and thus the flame will be distributed upon the entire surface.

It will be observed that with the essential arrangement which forms the characteristic feature of the invention that is, the use of long and narrow orifices at the top part of a corrugation or an angular edge of the sheet metal and of small orifices 5 in the lower edges, there will be no danger that the orifices will be clogged up by oil which may be brought in by the back-firing, on account of the large surface which is exposed to the gas current.

Obviously, the several arrangements and methods of assembling the parts of the apparatus as herein disclosed are given exclusively by way of example, and are susceptible of all desired modifications without departing from the spirit of the invention.

I claim:

1. Apparatus for the prevention of back-firing in the suction conduit of an internal combustion engine, comprising a pile of corrugated sheet metal pieces, disposed crosswise to the conduit and provided with narrow orifices formed along the edge of the corrugations on the side next the engine.

2. Apparatus for the prevention of back-firing comprising a pile of units having a number of perforations and consisting of corrugated sheet metal pieces having long and narrow orifices formed along the edge of the upper corrugations and small orifices formed in the lower edges preventing the accumulation of liquid fuel in these latter.

3. Apparatus for the prevention of back-firing comprising a pile of units of cross shaped arrangement, having a number of perforations and consisting of corrugated sheet metal pieces having long and narrow orifices formed along the edge of the upper corrugations and small orifices formed in the lower edges preventing the accumulation of liquid fuel in these latter.

4. Apparatus for the prevention of back-firing comprising a pile of units having a number of perforations and consisting of corrugated sheet metal pieces having long and narrow orifices formed along the edge of the upper corrugations and small orifices formed in the lower edges preventing the accumulation of liquid fuel in these latter, the lower unit of the pile being convex towards the bottom, and the upper unit being convex towards the top.

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