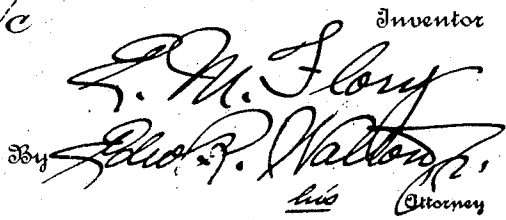


1,390,897.

Patented Sept. 13, 1921.



UNITED STATES PATENT OFFICE.

ERNEST M. FLORY, OF HARRISONBURG, VIRGINIA.

FUEL-SAVER FOR ENGINES.

1,390,897.

Specification of Letters Patent. Patented Sept. 13, 1921.

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To all whom it may concern:

Be it known that I, ERNEST M. FLORY, a citizen of the United States, residing at Harrisonburg, in the county of Rockingham and State of Virginia, have invented a new and useful Fuel-Saver for Engines, of which the following is a specification.

The present invention is an attachment for internal combustion engines, and is particularly designed to permit the ordinary carbureted fuel mixture to be remixed with atmospheric air, or with hot vapors from the radiator or exhaust of the engine.

The object of the invention is to increase the power of the engine, use less fuel, and decrease carbon deposits in the engine cylinders by obtaining the proper vaporized mixture which, when compressed by the engine, will entirely explode and be consumed, and not leave half burnt and wet mixture charges to accumulate and cause corrosion in the cylinders and on the pistons.

A further object of the invention is to provide a simple, economical, and efficient attachment of the above mentioned character, which is extremely durable, has no parts to become out of order, may be readily adjusted according to the desires and needs in each particular case and can be applied to any make of engine with extreme facility and celerity.

The invention resides in novel features of construction, combination and arrangement of parts hereinafter more fully described and pointed out in the appended claims.

In this specification and the annexed drawings, the invention is disclosed in the form in which it is considered to be the best, but the invention is not limited to such form because it is capable of being embodied in other forms; and it is to be understood that in and by the claims following the description herein it is intended to cover the invention in whatever form it may embody within the scope thereof.

Referring particularly to the drawings: Figure 1 is a side elevation of the invention showing the same applied to the intake manifold of an internal combustion engine, Fig. 2 is a longitudinal sectional view of Fig. 1 taken through the attachment forming the invention, but with the vapor pipe V detached therefrom,

Fig. 3 is a top plan view of the fuel saver device shown in Fig. 2, and

Fig. 4 is a detail view of the valve of the

attachment and illustrating the detail construction thereof.

Referring particularly to the drawings, the invention, which is termed a "fuel saving device," consists of a cylindrical casing 1 internally threaded at one end in which is threadedly secured a plug 2. The other end of the casing or tubular body 1 is provided with a reduced axial bore 3, connecting the interior of the casing with the atmosphere and in which a valve 4 is slidably mounted.

The valve 4 is provided with a head *a* on its inner end formed with a chamfered surface to engage and seat on the annular valve seat at the inner end of the bore 3. Extending from the valve head *a* is a shank *b* of the same diameter as the bore 3, that is, having a sliding fit therewith.

The valve is maintained in place and in normal seated position, as shown in Fig. 2, by a spiral spring 5 having one end connected to an adjusting screw 6 threaded in the plug 2 and extending axially of the casing 1. The other end of the spring 5 bears against the inner face of the head *a* of the valve 4 and is seated in an annular groove *c*, whereby the spring is maintained in position and in engagement with the valve. The lower end of the screw 6 extends through the plug 2 and is provided with a thumb piece 7 permitting the ready adjustment of the screw so as to vary the degree of tension exerted on the valve 4 by the spring 5. A nut 8 is threaded on the outer end of the screw 6 to abut with the surface of the plug so as to bind or lock the screw in adjusted position. The plug 2 is formed with a passage 9 therein extending from the inner face of the plug to an outer side face thereof. The outer end of the passage 9 has threaded therein a coupling or extension 10 which has its other end threaded as at X to be tapped in the intake manifold of an internal combustion engine in the manner shown in Fig. 2. The coupling extension 10 extends at right angles to the casing 1 so that the latter, when the device is attached, will lie substantially in the same direction as the manifold. The extension 10 is further provided with a cut off valve 11, which will render the fuel saving device either operative or inoperative.

The valve 4 will become unseated, against the action of the spring 5, when the valve 11 is properly adjusted, by the suction of the

engine. The valve 4 is provided, however, with a longitudinal passage or bore 12 therein which will permit a predetermined amount of air, or the like, to always pass through the valve. As the suction of the engine increases the valve 4 will be unseated to admit in a greater amount of air, or other fluid which will pass into the manifold.

In order that the volume of air admitted to the valve 4 may be regulated and in proportion to the suction of the engine, the shank *b* of the valve 4 has its exterior face cut-away or otherwise grooved to provide two or more longitudinally extending passages *d*, *e*, and *f*, of varying size.

In the present instance this is accomplished by cutting away at varying depths the side surfaces of the shank *b* of the valve to provide flat surfaces spaced from the bore 3 at varying degrees so as to provide the passages *d*, *e*, and *f*, permitting, respectively, an increased volume of air or fluid to pass therethrough, as shown in Fig. 3.

It will be observed from Fig. 4, that the cut-away portions *d*, *e*, and *f* extend from the outer end of the shank *b* of the valve inwardly to the chamfered surface *s* of the valve head, so that, when the valve is first unseated by the suction of the engine, the smallest passage *d* will be uncovered and as the suction of the engine increases the passages *e* and *f* will successively be uncovered, each admitting a greater volume of air than the passage *d* and in addition to the latter.

In the present form of the invention, where the passages *d*, *e*, and *f* are provided by cutting away the surfaces of the valve, it is preferred to have the inner ends of the passage in circular form, as indicated at *h*, so that as the valve becomes unseated the air from each passage will be gradually admitted in larger volume according to the degree of the suction of the engine.

As before stated, the operation of the valve may be readily regulated by adjustment of the spring 5 by means of the adjustment screw 6 so that the device will become operative at the desired suction of the engine.

It is preferred that the device be applied in the manner shown in the drawings with its valve-end uppermost, and this end of the device is tapered, as shown particularly in Figs. 1 and 2, to receive the cap of the vapor pipe V. This pipe may be of copper, rubber, or any suitable material, and is adapted to have its end 13 tapped, or otherwise suitably connected, to the top of the radiator of the engine so as to permit the hot water vapors from the radiator to be drawn into the manifold and mixed with the carbureted charge. The end 13 of the pipe V may be, at the option of the user, connected to the exhaust pipe Z to permit the hot exhaust gases to be drawn into the intake, as

indicated in dotted lines of Fig. 1. The cap of the pipe V may be of any suitable construction to either threadedly or frictionally engage the tapered end 14 of the casing 1, but it is wholly at the option of the user as to whether the pipe V be used, as the invention may be used solely to admit atmospheric air into the intake in the manner shown in Fig. 2.

The fuel saver device of the present invention may be attached either directly to the manifold, as shown in the drawings, or may be mounted anywhere on the engine or automobile best suited to the convenience of the operator. In case the device is not attached in the manner shown in the drawings, it is only necessary to have a pipe extension from the end X of the coupling 10 to the manifold.

The fuel saver device of this invention is composed of only seven parts which are extremely durable and free from getting out of order. The adjustment screw 6 having once been adjusted in the desired manner, no further attention to the device is needed and the same will act automatically in accordance with the speed of the engine.

The invention can also be used as a primer for starting, by admitting a small quantity of gasolene in the bore 12 or through the passages *d*, *e*, and *f*.

When the device is attached to the radiator or to the exhaust pipe, as shown in Fig. 1, the spiral spring 5 which is of conical formation will serve to break up the heated vapors preparatory to their entering the intake manifold to be mixed with the carbureted charge.

What is claimed is:

1. A device of the character specified comprising a casing having a cylindrical opening at one end, a substantially cylindrical valve body, having a cylindrical bore and also having a plurality of flat depressions of different depths and lengths about its periphery, for closing said opening, an adjusting screw threaded in the opposite end of the casing and in alinement with said valve body, a helical spring in said casing confined between the inner end of the adjusting screw and the inner end of the valve body and adapted to normally hold the latter in closed position, and a passage through the casing at the end opposite the valve body adapted to furnish communication with the intake manifold of an internal combustion engine.

2. A fuel saver for internal combustion engines adapted to be connected to the intake manifold thereof, comprising a casing, an adjusting screw-carrying plug screw threadedly connected to one end of the casing said plug having an aperture for the passage of fluid, the other end of said casing having a reduced bore adapted to receive a substantially cylindrical spring - pressed

valve, said valve having an axial bore and having a plurality of flat surfaces upon its periphery, of varying depths and lengths, said surfaces being adapted to be successively
5 uncovered according to the degree of the opening movement of the valve to permit varying amounts of fluid to be admitted.

3. A fuel saver adapted to be connected to the intake manifold of an internal combustion engine, comprising a cylindrical casing
10 having one end internally screw threaded for the reception of an externally screw threaded plug, said plug carrying an adjusting screw and having a passage adapted to
15 connect the interior of the casing and the intake manifold of an engine; the other end

of the casing being reduced and forming a cylindrical bore, the inner end of said reduced bore forming a valve seat; a substantially cylindrical, spring-pressed, axially
20 apertured valve in said bore having an enlarged head adapted to contact said seat, said valve being provided with a plurality of flat surfaces, each having parallel edges, the lengths and depths of said surfaces being
25 varied and adapted to be successively uncovered according to the degree of the opening movement of the valve, to permit varying amounts of fluid to be admitted.

In testimony whereof I have hereunto set
30 my hand.

ERNEST M. FLORY.