

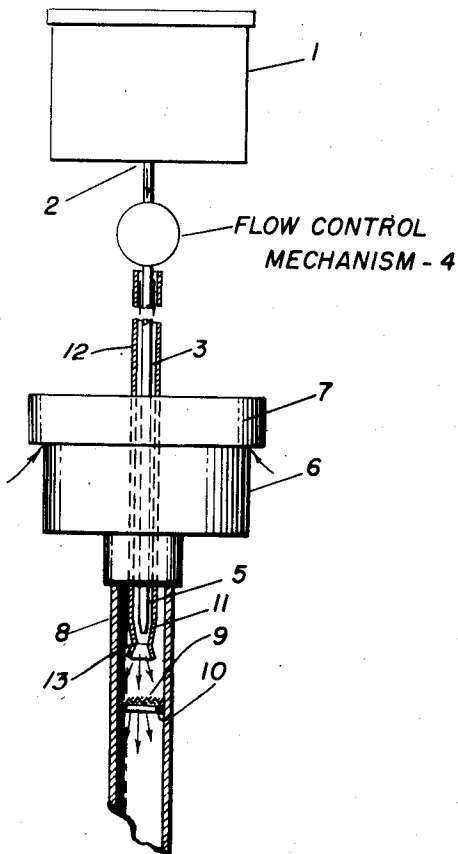
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BOOSTER DEVICE FOR INTERNAL-COMBUSTION ENGINES

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BOOSTER DEVICE FOR INTERNAL-COMBUSTION ENGINES

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4 Claims. (Cl. 123-119)

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This invention relates to internal combustion engines and, particularly, to a device accessory thereof, hereinafter referred to as booster or booster device.

The term booster, as herein understood, designates a jet-type injector, adapted to deliver a boosting agent, separately from the motor fuel proper, directly into the intake assembly of an internal combustion engine. Characteristics of the type of boosting agents employed for this purpose are set forth hereinbelow.

The object of the invention differs from other boosters in the simplicity of both its individual elements and overall structure, as also in its mode of operation and functioning.

The booster device and the boosting agents of this invention will improve ordinary engine performance, will permit good engine operation with even low-cost fuels of low octane rating, and will maintain good engine performance under difficult operating conditions. Moreover, the booster device will permit the introduction of varying amounts of boosting agent into the engine during its operation, and it further makes possible the adaptation of a number of such substances which heretofore could not be readily and effectively employed for boosting purposes.

It is therefore an object of this invention to provide a device effecting the delivery of substances, separately from the motor fuel proper, into an internal combustion engine, and the delivery and vaporization of said substances within the intake assembly of an internal combustion engine.

A further object of this invention is to employ said substances as boosting agents and to reduce or eliminate engine knock.

Another object is to employ, together with the booster device, substances that will act to reduce the content of the more highly toxic constituents of present common engine exhaust gases.

Still another object is to provide for the introducing of varying quantities of the aforesaid substances into the engine during its operation, in response to the various operating requirements and by means of the booster device of the invention.

Still other objects will appear as presented hereinbelow.

These objects are accomplished by the following invention:

First, by the simple construction and arrangement of a booster device and parts thereof, and by their several or individual combination with the assembly of an internal combustion engine,

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such as described hereinafter and presented, in principle, in the accompanying drawing forming part hereof; and

Second, by providing substances, and means and processes for delivering them into an internal combustion engine, and further means for vaporizing said substances within the air-intake assembly of an internal combustion engine.

In the figure of the drawing forming part hereof, a partly cross-sectional and partly diagrammatic front elevation of a basic form of the device of the invention is shown in combination with an air filter and an air-intake conduit of an internal combustion engine.

Referring to the figure of the drawing, tank 1, provided for the boosting agent fluid, has an outlet 2, which is joined to a delivery tube 3 with a flow control mechanism 4. Extension 5 of delivery tube 3 is secured to container 6 of air-intake filter 7, passes through the filter housing 6 into the intake conduit 8, its outlet 11 terminating above a non-absorbent screen 9, which may also take the form of a permeable pad or filter pack, held in place by support 10.

Concentrically spaced and arranged with tube 3 is tube 12 provided for the delivery of a second booster fluid into the engine. The outlet 13 of tube 12, together with the outlet 11 of tube 5, forms a jet or spray-type atomizing nozzle which terminates above screen 9. Tube 12, as shown, represents the terminal delivery section of a second booster assembly, the construction of which is composed of elements similar or equivalent to those employed for the delivery into the engine of the boosting agent fluid contained in tank 1; for this reason, the additional elements of this second booster assembly are not shown.

In practicing the invention in accordance with the device, arrangement and combination shown in the figure of the aforesaid drawing, the boosting agent fluid in tank 1 is permitted to flow by gravity or forced action through outlet 2 and delivery tube 3 and its outlet 11 of extension 5 upon screen 9 into the engine intake conduit 8. Passage of the boosting agent through screen 9 aids in further dispersing and vaporizing the boosting agent and admixing it with the intake air and the intake fuel charge. The intake air is drawn into conduit 8 through filter elements 6 and 7. Pad, screen or filter 9 in conduit 8 is preferably made of a nonabsorbent and noncorroding material, of open mesh, offering only slight resistance to the passage of the boosting agent and intake charge. By actuating in known manner control mechanism 4, the rate of flow of the

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boosting agent is adjusted in conformance with engine operating requirements. Delivery tube 3 and its extension 5 can be connected by means of a coupling, which is not shown. Screen 9 is held in place in conduit 8 by means of support element 10.

A second booster component, complementary to that introduced into the engine through booster outlet 11, can be introduced into the engine through tube 12 and its outlet 13, which together with outlet 11 of tube 5 forms a jet-type assembly for dispersing, atomizing and admixing the injected boosting agent in the intake air and the fuel charge, although other types of spray pieces and atomizing mechanisms may be employed for this purpose. The process of dispersing, admixing and vaporizing the intake mixture is further aided by screen 9. The flow of the second booster component is regulated either by means of a separate flow control mechanism, not shown, or by means of the flow control mechanism 4. In the latter case, tube 12 and its connection with the respective booster fluid supply tank are joined to the said mechanism 4. The boosting agent component delivered through the tube 12 may, if required, be preheated in known manner.

Boosting agents employed generally comprise aliphatic and aromatic substances, solutions and mixtures of such, and anhydrous and aqueous components thereof, which are readily dispersed and volatilized in the engine intake system in combination with the booster device and which, individually or in given combination, possess antiknock, or antiknock and oxidizing properties, such as further described in a divisional application, Serial No. 318,730, filed November 4, 1952.

In modified forms of the device and process of the invention, and in accordance therewith, the delivery tube extension assemblies and outlets thereof of the booster device may be introduced through the wall of the air-intake shaft of the engine at a point below the air-intake filter container 6 and above screen 9.

In other modified forms of the device of the invention, and in accordance therewith, two or more booster assemblies as herein described may be combined to produce the effect and results of the invention, the flow control being effected either separately or jointly by mechanisms 4.

In another combination, the outlets of two or more delivery tubes, controlled either separately or jointly by mechanisms 4 and provided with an atomizer jet assembly, may be introduced at a given angle through an opening in the wall of the air-intake shaft. Furthermore, in accordance with the invention, instead of introducing the booster charge into the intake air at a point prior to its mixing with the fuel proper, the boosting agent may also be introduced directly into the air-fuel mixture either at a given point in a pre-combustion chamber, or at the point and jointly with the entry of the air-fuel mixture into the combustion chamber, or given booster charges may be simultaneously introduced at all of the said points.

In still further combinations and modifications of the device of the invention, the booster device may be connected to cooperate with superchargers as such, and the boosting agents may be forcibly injected into the assembly of the internal combustion engine.

In its simplest form, a further modification of the booster device of the invention may consist

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of a supply tank, a feed-line outlet thereof, a flow control mechanism for said feed-line, a spray or atomizing mechanism for the terminal outlet of the said feed-line, and a screen element for the further dispersal of the boosting agent in the engine intake assembly, the said terminal feed-line outlet being introduced into the engine at any of the points indicated hereinbefore.

I claim:

1. In the auxiliary control of the performance of internal combustion engines by the separate application of boosting agents, the dispersal of said boosting agents in the intake air within the air-intake assembly attained by a combination ahead of the carburetor comprising a shaped feed-line outlet, a flange in the air-intake shaft, a meshed screen upon that flange, a nonabsorbent and non-retaining filter pad provided upon said screen.

2. In the auxiliary control of the performance of internal combustion engines by the separate application of boosting agents, the dispersal of said boosting agents in the intake air within the air-intake assembly attained by a combination ahead of the carburetor comprising a shaped feed-line outlet, a flange in the air-intake shaft, a nonabsorbent, meshed, and nonretaining corrugated screen upon said flange.

3. In the auxiliary control of the performance of an internal combustion engine by the separate application of boosting agents, the dispersal of said boosting agents in the intake air within the air-intake assembly, attained by a combination comprising a shaped feed-line outlet, concentrically spaced and arranged therewith a supplementary tube, a flared opening thereof, a constriction near the lower end of said tube, an outlet thereof, a shaped clearance between said constriction and the feed-line outlet.

4. In the auxiliary control of the performance of an internal combustion engine by the separate application of boosting agents, the dispersal of said boosting agents in the intake air within the air-intake assembly, attained by a combination ahead of the carburetor comprising a shaped feed-line outlet, concentrically spaced and arranged therewith a supplementary tube, a constriction near the lower end of said tube, an outlet thereof, a shaped clearance between said constriction and the feed-line outlet.

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