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COLLAR MOUNTED DUAL ACTUATED FUEL FEED DEVICE

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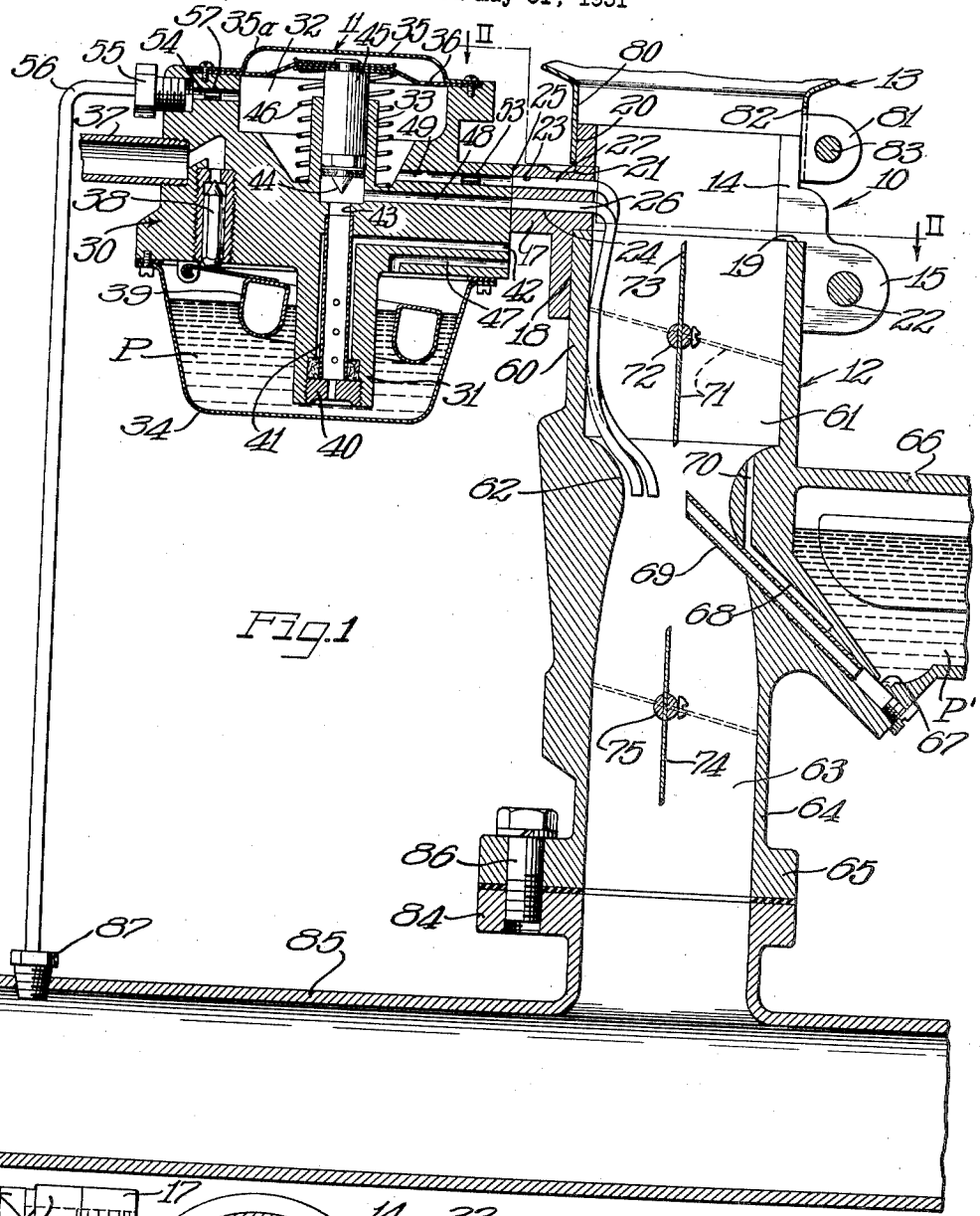


Fig. 1

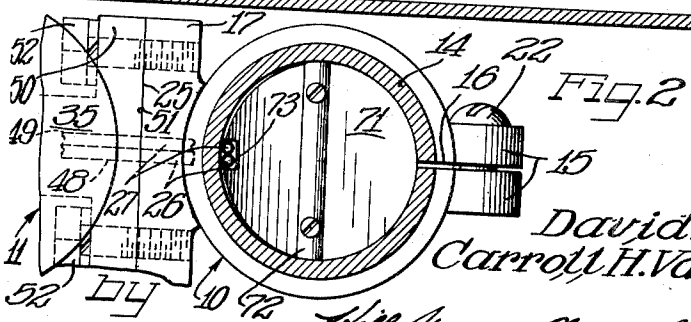


Fig. 2

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COLLAR MOUNTED DUAL ACTUATED FUEL FEED DEVICE

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2 Claims. (Cl. 261—18)

This invention relates to a supplementary fuel feed attachment for a carburetor, and more particularly deals with a mounting collar receivable on the air horn of a carburetor for carrying a supplemental fuel unit and an air filter together with tubes adapted to extend into the carburetor venturi without interfering with the operation of the carburetor.

In accordance with this invention, a float bowl equipped feed unit has a diaphragm actuated valve controlled by a differential vacuum obtained from the carburetor venturi and the intake manifold so as to render the valve sensitive to engine speeds as well as loads on the engine, to thereby cause the unit to feed an anti-detonant fluid to the carburetor as it is needed by the engine. A split mounting collar carries the feed unit on a side flange thereof and is interposed between a carburetor and an air filter supplying air to the carburetor. The collar is conveniently clamped on the air horn of the carburetor and in turn has the outlet neck of the air filter clamped thereon. A pair of tubes project through the flange of the collar and depend from the collar so as to extend through the carburetor air horn and discharge at the carburetor venturi. One of the tubes communicates with the valved passageway in the feed unit for supplying the anti-detonant fluid to the carburetor venturi under the influence of the venturi vacuum. The other tube is vented to the diaphragm for subjecting the diaphragm to venturi vacuum to move the valve in a closing direction. The diaphragm is also vented to intake manifold pressure downstream from the carburetor venturi. The desired differential actuating pressure for the diaphragm is thereby obtained with the carburetor venturi vacuum rendering the valve sensitive to engine speed conditions while the intake manifold vacuum renders the valve sensitive to engine load conditions.

It is, then, an object of this invention to provide a mounting for a suplemental feed unit which conveniently adapts the unit for installation on existing carburetors.

A further object of the invention is to provide a mounting collar carrying feed and vacuum tubes and adapted to receive a supplemental feed unit in communication with the tubes for mounting the unit on a carburetor.

A still further object of the invention is to provide a split collar mounting for quickly installing a supplemental feed unit on the air horn of a carburetor without drilling holes in the carburetor for feeding the supplemental fuel thereto.

Another object of the invention is to provide a dual controlled supplemental feed unit wherein one control is obtained from the carburetor venturi through a tube carried by a device for mounting the unit on the air horn of the carburetor.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheet of drawings which, by way of a preferred example only, illustrates one embodiment of the invention.

On the drawings:

Figure 1 is a vertical cross-sectional view, with parts in elevation, of a collar mounted dual actuated fuel feed device, according to this invention, on the air horn of a carburetor.

Figure 2 is a horizontal cross-sectional view, with parts in plan, taken along the line II—II of Figure 1.

As shown on the drawings:

As shown in Figure 1, the mounting collar **10** of this invention carries a supplemental fuel feed unit **11** on the side thereof, is mounted on top of a carburetor **12**, and carries an air filter **13** on the top thereof.

The collar **10** has a vertically split cylindrical body **14** with opposed external ears **15** on opposite sides of the vertical slot **16** thereof and with a transverse rectangular flange **17** projecting from the other side thereof. The body has a counterbore **18** in its bottom end terminating in a flat internal shoulder **19**. The top of the body has a cylindrical external wall **20** terminating in an outturned shoulder **21**.

A clamping screw **22** has a headed end fitting freely through one ear **15** and a threaded shank screwed into the other ear **15** for contracting the split cylinder. The flange **17** has a pair of lateral bores **23** and **24** therethrough and extending from the flat outer face **25** of the flange to the interior of the body **14** above the shoulder **19** thereof. The bore **24** carries a feed tube **26**. The bore **23** carries a vacuum tube **27**. The tubes **26** and **27** terminate at the end face **25** of the flange and depend through the counterbore **18** of the body in side by side relation.

The supplemental feed unit **11** includes a main body **30** having a depending post **31** on the bottom thereof and a recess **32** in the top thereof with an upstanding tubular guide **33** therein. The body **30** carries a bowl **34** on the bottom thereof around the post **31** and a cover **35** on the top thereof overlies a flexible diaphragm **36** and serves to clamp the diaphragm to the top of the body for covering the recess **32**. The cover **35** is vented to the atmosphere as at **35***a*.

A feed tube **37** is secured in a side of the body **30** and supplies anti-detonant fluid such as an alcohol-water-tetraethyl lead solution, preferably composed of 85% methanol, 15% water, and 3 cc. per gallon of tetraethyl lead. A needle valve **38** controlled by a float **39** in the bowl **34** admits the fluid to the bowl for maintaining a pond P in the bowl.

The post **31** carries a metering orifice **40** in the bottom end thereof for feeding fluid from the pond P to an orificed upstanding tube **41** in the post. A passage **42** in the body vents the interior of the post around the tube **41** to the atmosphere so that air is fed through the orifices in the tube for admixture with the fluid from the pond P as it flows upwardly in the tube. A valve seat **43** is provided in the body **30** above the tube **41** and is controlled by a metering valve **44** on a plunger **45** which is slidable in the guide **33** and anchored at its upper end to the diaphragm **36**. A spring **46** urges the valve **44** away from its seat. In order to maintain the pond P in the float bowl **34** under atmospheric pressure, a vent **47** is also provided in the body **30** communicating with the top of the pond.

Fluid flowing past the valve seat **43** is discharged laterally out of the body through a passage **48**. A passage **49** is also provided adjacent the passage **48** in the body **30** and communicates with the recess **32** in the body.

As best shown in Figure 2, the body has a rectangular mounting flange **50** on the side thereof receiving the passages **48** and **49** therethrough. This mounting flange has a flat outer face **51** adapted to mate with the face **25** of the flange **17** on the collar body **14**. Mounting screws **52** have headed ends fitting freely through the flange **50** and threaded shanks screwed into threaded holes in the flange **17** for drawing the faces **25** and **51** into abutting sealed relation. A gasket (not shown) can be interposed between these faces **25** and **51**.

The passageway **48** registers with the end of the tube **26** at the face **25** of the flange **17** as shown in Figure 1. The passage **49** registers with the tube **27**. An orifice plug **53** is provided in the passage **49** for a purpose to be hereinafter described.

The upper end of the body **30** has a passage **54** therethrough communicating with the recess **32** and receiving a tube fitting **55** which connects the tube **56** therewith. A metering orifice plug **57** is provided in the passage **54** for a purpose to be hereinafter described.

The carburetor **12** has a cylindrical air horn or tubular boss **60** on the top end thereof providing an air inlet passage **61** to the top of a venturi throat **62** which diverges to an outlet passage **63** in a tubular boss **64** having an outturned flange **65** around the bottom end thereof. A float bowl chamber **66** is formed on one side of the

carburetor body and has an outlet **67** in the bottom end thereof communicating with an upwardly sloping passage **68** receiving a fuel metering tube **69** projecting into the venturi throat **62**. An air vent **70** extends from the upstream side of the venturi throat into the passage **68** for supplying air through the orifices in the tube **67** for admixing air with the main fuel flowing through the tube from the pond P' in the float chamber **66**.

A butterfly choke valve **71** is mounted in the air inlet passage **61** on a transverse rotatable rod **72** carried by the air horn **60**. This valve **71** is adapted to swing from the fully opened position shown in solid lines to the closed dotted line position. A notch **73** is provided in the periphery of the valve **71** to receive the tubes **26** and **27**, as best shown in Figure 2.

As shown in Figure 1, the tubes **26** and **27** depend from the body **14** of the mounting **10** through the passage **61** of the air horn **60** and are disposed close to the side wall of the air horn in the region of operation of the valve **71** so as to not interfere with free opening and closing movements of the valve. The lower ends of the tubes project into the venturi throat **62** and terminate at the throat in full open communication therewith in a downstream direction.

As shown in Figure 1, the counterbore **18** of the mounting body **14** receives the air horn **60** snugly therein and the top of the air horn is bottomed on the shoulder **19** to automatically position the terminal ends of the tubes **26** and **27** in the venturi throat **62**, while holding the tubes along the side wall of the air horn in the vicinity of the choke valve **71** so that the valve can operate freely and receive the tubes in the notch **73** thereof. Since the tubes are of relatively small diameter, the notch need only be of very small size so as not to interfere with proper control of the air flow through the air horn.

A throttle valve **74** is mounted on a rotatable rod **75** extending transversely across the outlet passage **63** and carried by the outlet boss **64**. The throttle valve controls flow of the air and fuel mixture created in the venturi throat **62** from air flowing past the choke valve **71**, from main fuel flowing through the tube **67**, and from supplemental fuel flowing through the tube **26**.

The air fed to the valve **71** is filtered by the filter **13** which has a split mounting collar **80** on the bottom end thereof snugly surrounding the cylindrical wall **20** of the mounting body **14** and adapted to be bottomed on the shoulder **21** of the body. The collar **80** has outturned ears such as **81** on opposite sides of the vertical slot **82** therein and a draw bolt **83** is adapted to pull the ears toward each other for contracting the collar into clamped engagement on the wall **20** of the mounting collar.

The bottom flange **65** of the carburetor is mounted on the mounting pad **84** of an intake manifold **85** for the engine (not shown). Bolts such as **86** secure the carburetor on the manifold. A plug **87** anchored in the manifold **85** joins the tube **56** from the feed device **11** to the interior of the manifold.

Operation

Anti-detonant fuel from the pond P in the float bowl of the feed decive **11** is sucked through the tube **26** under the influence of carburetor venturi vacuum for admixture with the main fuel from the pond P' and air from the air filter **13** to supply a non-detonating combustible mixture to the throttle valve **74** and thence to the intake manifold **85**. In order for the anti-detonant fuel to enter the tube **26**, however, the valve **44** must be open and the valve can only open when vacuum acting on the diaphragm **36** is insufficient to overcome the opening force of the spring **46**. The vacuum actuating the diaphragm **36** is obtained from two sources and the valve is thereby dual controlled. Carburetor venturi vacuum obtained through the tube **27** as metered by the orifice plug **53** renders the valve sensitive to the speed of the engine as determined by the rate of air flow through the carburetor venturi. A rapid air flow will create more of a suction pull through the tube **27** than a slow air flow. The tube **56**, however, also pulls a vacuum on the valve **36**. This vacuum is created by the intake manifold pressure as metered by the orifice **57**. Therefore, the diaphragm **36** is pulled downwardly against the load of the spring **46** to close the valve **44** under the influence of a differential vacuum obtained from the carburetor venturi and the intake manifold. Since the intake manifold pressure is responsive

to loads on the engine, and, as explained above, since the venturi vacuum is responsive to engine speeds, the differential vacuum control of the valve **45** is sensitive to both engine loads and engine speed conditions. This control is highly desirable.

The dual control is readily obtained through the use of the collar **10** which when mounted on a carburetor automatically positions tubes from the feed device **11** in the venturi throat of the carburetor so that one tube will supply the anti-detonant under the influence of the pull exerted in the throat while the other tube will apply this pull to create a closing force on the metering valve for the fluid.

In installations for dual carburetors having two venturi throats, the collar **10** carries a third tube for feeding the anti-detonant from a passage **48** of the device **11** to the second throat. The two other tubes terminate in the first venturi throat as shown in Figure 1, so that both feed tubes are controlled from one vacuum tube **27**.

From the above descriptions it will be understood that this invention provides a convenient carburetor mounting for a dual vacuum controlled supplemental fuel feed device which does not interfere with carburetor operation and does not require modification of carburetor structures.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

We claim as our invention:

1. A dual actuated anti-detonant fuel feed device for mounting on the air horn of a conventional carburetor or the like at the junction thereof with an air cleaner, said carburetor having a venturi throat, a notched choke valve plate in an air passage upstream from the venturi throat, and a throttle valve plate in a fuel and air passage downstream from the venturi throat communicating with an intake manifold, and for operative combination with the carburetor substantially without modification of the construction of the carburetor and without modification of the operational characteristics of the carburetor, comprising, a collar, a split in said collar, a counterbore in said split collar to mate with the air horn of the carburetor, contracting means to securely clamp said collar on the air horn, a flange projecting from said collar at an area thereof oppositely disposed from said split, a feed unit body secured to said flange, an anti-detonant pond-carrying bowl secured to said body, a recess in said body, a bore in said body extending from said bowl to said recess, a pair of passages extending through said body and through said flange and communicating with an interior surface of said collar beyond said air horn, one of said passages communicating with said bore and the other of said passages communicating with said recess, open ended tubes extending from said passages at said collar and along an interior surface of said air horn at said venturi throat, the tube extending from the passage communicating with said recess being formed to terminate in the region of the center of the venturi throat, a third passage extending through said body to said recess to communicate with the intake manifold, and a differential vacuum operated valve in said recess to open and close the passage communicating with said bore in accordance with venturi throat vacuum and intake manifold vacuum thereby providing a speed responsive and load responsive anti-detonant feed mechanism.

2. In an anti-detonant fuel feed device for combination with a carburetor having an air horn, a butterfly type choke valve in said air horn, a venturi throat downstream from said air horn, a fuel inlet tube opening into said venturi throat, a throttle valve downstream from said venturi throat, an intake manifold downstream from said throttle valve, and an air cleaner having a split collar normally secured to said air horn upstream from said choke valve by said split collar, said choke valve including a disc mounted for rotation; a split collar member to clamp onto said air horn, said collar member having a counter bore to bottom on said air horn, a portion of said collar member having substantially the same external dimensions as said air horn to mate with the split collar of said air cleaner without modification thereof, a flange on said collar member, an anti-detonant feed unit having a flange thereon to register with the flange on said collar and secured thereto, a differential pressure responsive diaphragm valve in said feed unit, an anti-detonant container in said unit in flow communication with said valve, means to vent one side of the diaphragms

of said valve to the atmosphere, means to vent the other side of the diaphragm of said valve to the intake manifold and to the venturi throat of said carburetor, said last mentioned means including a tube and a passage communicating therewith to extend from said other side of the diaphragm of the valve through said flange of said unit, through the flange on said collar member, through the collar member, and along the inner wall of said air horn past said choke valve to open in a downstream direction at said venturi throat and an anti-detonant tube and a passage communicating therewith to extend from said container through said flange of said unit, through the flange on said collar member, through the collar member, and along the inner wall of said air horn past said choke valve to open in a downstream direction at said venturi throat, said valve being operatively arranged to selectively open and close communication between the container and the anti-detonant tubes and passage upon

differential pressure actuation from the venturi throat and from the intake manifold.

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