July 30, 1957 H. D. WOODMANSEE 2,800,776

WATER COOLER ATTACHMENT

Filed Aug. 15, 1955

FIG. 1.

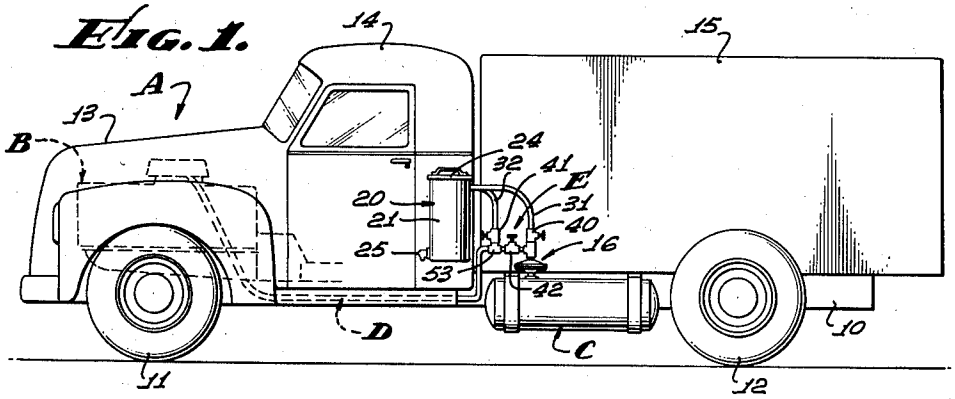


FIG. 2.

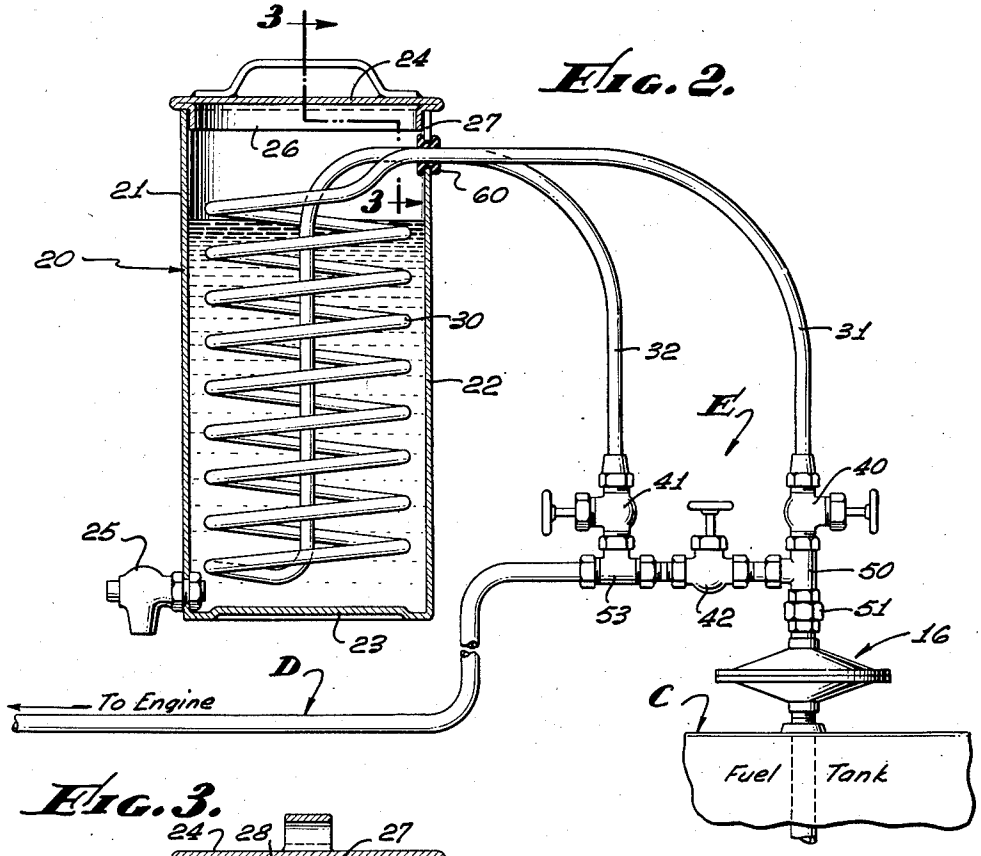
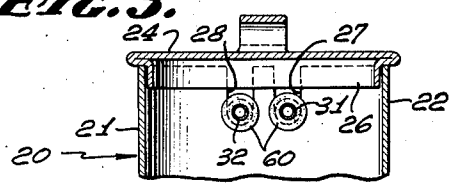


FIG. 3.



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AGENTS.

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WATER COOLER ATTACHMENT

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1 Claim. (Cl. 62—141)

This invention has to do with a cooler for drinking water and is more particularly concerned with a water cooler attachment applicable to a vehicle, such as a truck, to be related to the fuel line thereof and adapted to handle compressed gaseous fuel such as butane, or the like.

In many places where work is being carried on, as for instance at an oil well drilling site, or an area where roads and/or highways are under construction, drinking water must be provided for the workman. Drinking water at such locations is ordinarily brought to the site or location in large metal containers or cans. During the summer, or in hot arid country, the drinking water in the cans becomes warm and very unpleasant to drink. Heretofore, the persons having to drink water handled in the manner above set forth, have attempted to keep the water as cool and pleasant to drink as possible, by covering the water cans with wet burlap sacks, or the like, to, in effect establish an evaporative cooler, or have, when possible, imported ice to be placed in the cans.

At such sites, many of the trucks and heavy power operated machines, such as bulldozers and compressors, use butane, propane, or certain of the other so-called bottled gas fuels, which fuels are carried in tanks at extremely high pressures and in a liquid state, and are fed into the fuel lines to the power plants or engines, under control of suitable pressure regulator valves at or near the tanks, or engines, or both. As the compressed fuel enters the fuel lines, it is permitted to expand slightly or to a degree that it becomes gaseous. As the fuel expands in the fuel line and changes form, that is, from a liquid state to a gaseous state, the temperature thereof drops considerably, with the result that the fuel line becomes chilled.

It is a general object of the present invention to provide a drinking water cooler attachment applicable to the fuel line of a power operated vehicle or the like, and through which expanded compressed gas fuel is conducted, and an attachment which utilizes the cooling effect of the expanding fuel to cool the drinking water.

It is another object of the present invention to provide a tubular coil adapted to be engaged in a fuel line handling expanding compressed gas fuel and engageable in a drinking water container to cool the water.

Another object of the present invention is to provide a water cooler attachment of the general character referred to which is both easy and economical of manufacture and which requires no special skill or tools to install and to operate.

A further object of the present invention is to provide control means for my water cooler attachment whereby the cooler can be put into or taken out of operation without interrupting the fuel supply to the engine or power plant to which the structure is related.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevational view of a truck, it being a truck having a compressed gas fuel supply and showing the attachment provided by the present invention related thereto. Fig. 2 is an enlarged view of the attachment that I provide and showing it applied to the fuel line of the truck, the container being shown in section. Fig. 3 is a transverse sectional view of a portion of the attachment provided by the present invention, it being a view taken substantially as indicated by line 3—3 on Fig. 2.

The water cooler attachment provided by the present invention is shown as being related to a vehicle or truck A. The truck A is shown as a typical utility vehicle having an elongate frame **10**, front and rear wheels **11** and **12** at the ends of the frame, an internal combustion engine B at the forward end of the frame and adapted to drive the truck, a suitable housing or hood **13** covering the engine, a cab **14** rearward of the engine and the hood, and a work bed or suitable work carrier **15** rearward of the cab. The truck A is shown as further including a fuel tank C secured to the frame **10** rearward of the cab **14** beneath the work carrier **15**, and a suitable fuel line D extending between and connected with the engine B and the fuel tank C.

The fuel line D is adapted to carry and conduct a compressed gas fuel, such as butane or the like. The fuel is carried in the tank C under considerable pressure and so that it is in a liquid state therein. The fuel, to be burned or consumed by the engine B, must be reduced in pressure and let to return to its gaseous state. To accomplish the above, I have provided a suitable pressure regulator valve **16**, which valve is engaged in the fuel line D adjacent the tank C. The regulator valve **16** reduces the pressure on the fuel as it enters the fuel line D and flows to the engine B, and allows it to expand into a gaseous state. As the fuel expands in the fuel line D, after passing pressure regulator valve **16**, it absorbs heat with the result that the fuel line D is chilled.

It is to be understood that a second pressure regulator valve could, if desired, be engaged at the end of the fuel line adjacent the engine and set relative to the valve **16** so that the fuel flowing through the line is only allowed to partially expand and so that it is still in a substantially liquid state when it is delivered to the engine.

The water cooler attachment provided by the present invention includes, a water container **20**, a cooling coil **30** engaged in the container and connected with the fuel line D, and control means E related to the coil **30** and the fuel line D and controlling the flow of fuel through the coil.

The container **20** provided by the present invention is shown as including a simple cylindrical can-like body **21** having straight, vertically disposed side walls **22** and a flat bottom **23**, a closure or lid **24** engaged in and closing the top of the container body, and a suitable faucet **25** at the lower end portion of the body and operable to drain or draw the water therefrom. In the case illustrated, the cover of the lid **24** of the container **20** is a flat plate-like

part overlying the upper open end of the body **21** and is shown with an annular depending flange **26**, which flange is adapted to be slidably engaged in the body at the upper end thereof and to prevent the cover **24** from shifting out of engagement with or falling off of the body.

It is to be understood that in practice, any suitable water container could be employed in carrying out the present invention and that the particular container shown and described is only one of several types of containers contemplated.

The cooling coil **30** of the present invention is a simple elongate vertically disposed coil formed of a length of tubing. The coil **30** is of such size and shape that it can be freely engaged in the container from the open upper end thereof.

The end of the length of tubing at the top of the coil **30** is turned or bent to extend laterally through a suitable opening **27** provided in the side wall **22** of the container body **21** and continues outwardly therefrom to establish an inlet duct **31** for the coil **30**. The end of tubing at the bottom of the coil **30** is of substantial length and is turned radially inwardly and then upwardly so that it extends upwardly through the center of the coil to the upper end portion thereof whereupon it is turned radially outwardly to extend through a suitable opening **28** in the side walls **22** of the container body **21**, and then continues outwardly therefrom to establish an outlet duct **32** for the coil **30**.

The inlet duct **31** for the cooling coil **30** is connected with the fuel line D adjacent the pressure regulator valve **16**. The outlet duct **32** of the cooling coil **30** is connected with the fuel line D at a point spaced downstream from the point where the inlet duct is connected with the fuel line.

In practice, the ends of the tubing establishing the coil **30** could terminate where they project through the openings **27** and **28** in the sides of the container body **21** and the supply ducts **31** and **32** connecting the coil with the fuel line D could be connected therewith by means of suitable tubing couplings, or the like. It has been found, however, that by forming the coil **30** and the ducts **31** and **32** integrally with each other, eliminates the expense of the couplings that would otherwise have to be provided and applied and also minimizes the chances of leaks forming in the construction.

The control means E related to the coil **20** and the fuel line D, to control the flow of fuel through the coil, is shown as including a suitable inlet valve **40** in the inlet duct **31**, an outlet valve **41** in the outlet duct **32**, and a shut-off valve **42** in the fuel line D intermediate, or between the points where the inlet and outlet ducts join the fuel line.

With the above relationship of parts, it will be apparent that by opening the inlet and outlet valves **40** and **41** in the inlet and outlet ducts **31** and **32**, and by closing the shut-off valve **42** in the fuel line D, the flow of fuel from the fuel tank C to the engine B bypasses the shut-off valve **42** and flows through the cooling coil **30** of my attachment. As the fuel flows through the coil **30**, it expands, chilling the coil and thereby cooling the water in the container **20** in which the coil is engaged.

It will also be apparent that by opening the shut-off valve **42** in the fuel line D and by closing one or the other of both of the inlet and outlet valves **40** and **41** in the inlet and outlet ducts **31** and **32**, the flow of fuel through the fuel line D, between the points where the ducts **31** and **32** connect therewith, can be established and the flow of fuel through the coil **30** can be shut-off.

In practice, one or the other of the valves **40** or **41** can be eliminated from the control means E. However, by providing the two valves **40** and **41**, removal or disconnection of the cooler attachment provided by the present invention, for the purpose of servicing or repairs, is greatly facilitated.

In the form of the invention illustrated, the tubing establishing the coil **30** and the ducts **31** and **32** is the same size as the fuel line D so that the attachment does not restrict or interfere with the flow of fuel line to the engine B. In practice, however, the tubing establishing the coil **31** could be substantially larger than the fuel line D so that a greater part or amount of expansion of the fuel will take place in the coil.

It will be apparent that since the fuel starts to expand in the fuel line D as soon as it leaves the pressure regulator valve **16**, and since it is fully expanded and in a gaseous state by the time it reaches the engine B, the greatest cooling effect created or obtained by the expanding fuel is in the portion of the fuel line D nearest the pressure regulator valve **16**. For the above reasons, the attachment provided by the present invention is preferably connected with the fuel line D as close to the pressure regulator valve **16** as possible. In the case illustrated, a suitable T-fitting **50** is shown secured to the outlet side of the regulator valve **16** by means of a suitable union **51**. The fuel line D is connected with one of the openings of the T-fitting **50** and the inlet duct **31** of my cooler attachment is shown connected to the other opening of the T-fitting **50**. With the above structure, it will be apparent that when the cooler provided by the present invention is put into operation, the fuel flows directly into the inlet duct **31** of the attachment and does not enter or flow through the fuel line D until it has passed through the coil **30** and expanded whereupon it is conducted into the fuel line D by the outlet duct **32**. The outlet duct **32** of my invention is shown connected with the fuel line D by means of a suitable T-fitting **53** engaged in the fuel line D downstream of the pressure regulator valve **16** and shut-off valve **42** therein.

In the preferred carrying out of the invention, the inlet and outlet valves **40** and **41** of the control means E are arranged between and as coupling the ducts **31** and **32** with the T-fittings **50** and **53**. With this relationship of parts, it will be seen that the number of pipe or tubing connections that are required to make up the structure is materially reduced.

In the form of the invention illustrated, the openings **27** and **28** in the body **21** of the container **20** are slot-like openings extending into the body from its upper end. The openings extend downwardly a sufficient distance in the body so that when the ends of the coils are seated therein they occur below the flange **26** on the cover **24** and are not subject to being damaged thereby or interfering therewith.

In the particular case under consideration, I have shown rubber grommets **60** engaged in the openings **27** and **28** and passing the ends of the cooling coil **30**. The grommets **60** serve to hold the coil in fixed position in the container and also prevent rattling and wearing of the coil in the container.

It is to be understood that the attachment that I provide need not be applied to a truck such as is shown and described, but can be advantageously employed where ever bottled or compressed gas fuel, such as butane, is employed, and where it is desired to provide cool drinking water.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claim:

Having described my invention, I claim:

A water cooler attachment applicable to a fuel line conducting expanding butane gas from a fuel tank to an engine including, an elongate vertically disposed water container having an open top, a lid engaged with and closing the top of the container, an elongate vertically disposed cooling coil engaged in the container, notch-like

openings in the container about the upper peripheral edge thereof and receiving the ends of the coil, an elongate inlet duct integrally joined to and extending from one end of the coil, an elongate outlet duct integrally joined to and extending from the other end of the coil, a T-fitting in the fuel line adjacent the tank and connected with the inlet duct, a second T-fitting in the fuel line downstream from the first mentioned fuel line and connected with the outlet duct, and means controlling the flow of expanding gas through the coil including, an inlet valve between and connecting the first T-fitting and the inlet duct, an outlet valve between and connecting the said second T-fitting and the outlet duct, and a shut-off valve in the fuel line between the said T-fittings.

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