June 21, 1938. L. J. WHITE 2,121,675

COMBINATION FITTING FOR GAS DISPENSING SYSTEMS

Filed Oct. 18, 1937 3 Sheets-Sheet 1

Fig. 1

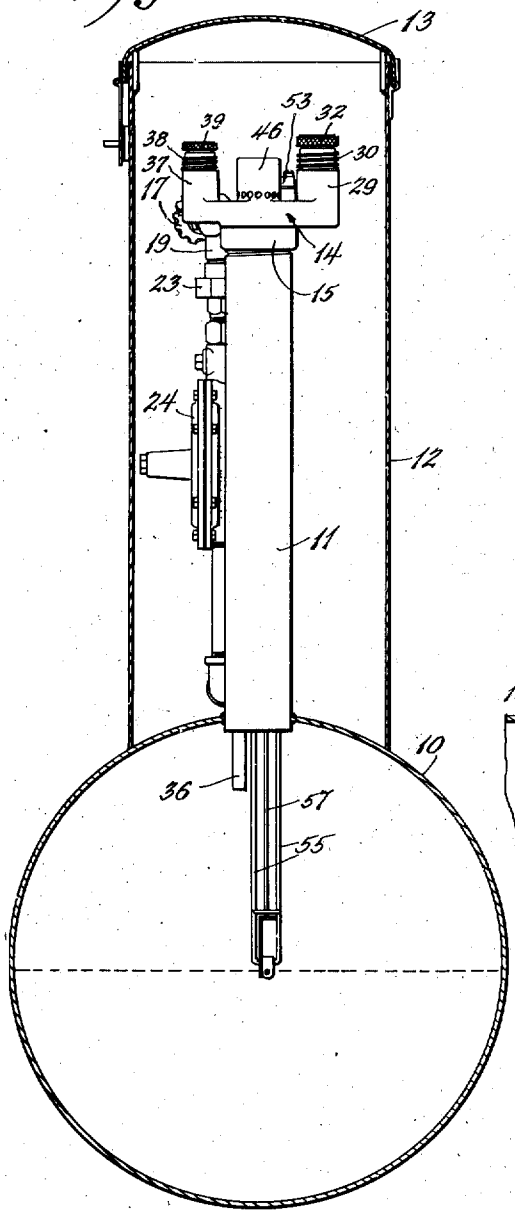
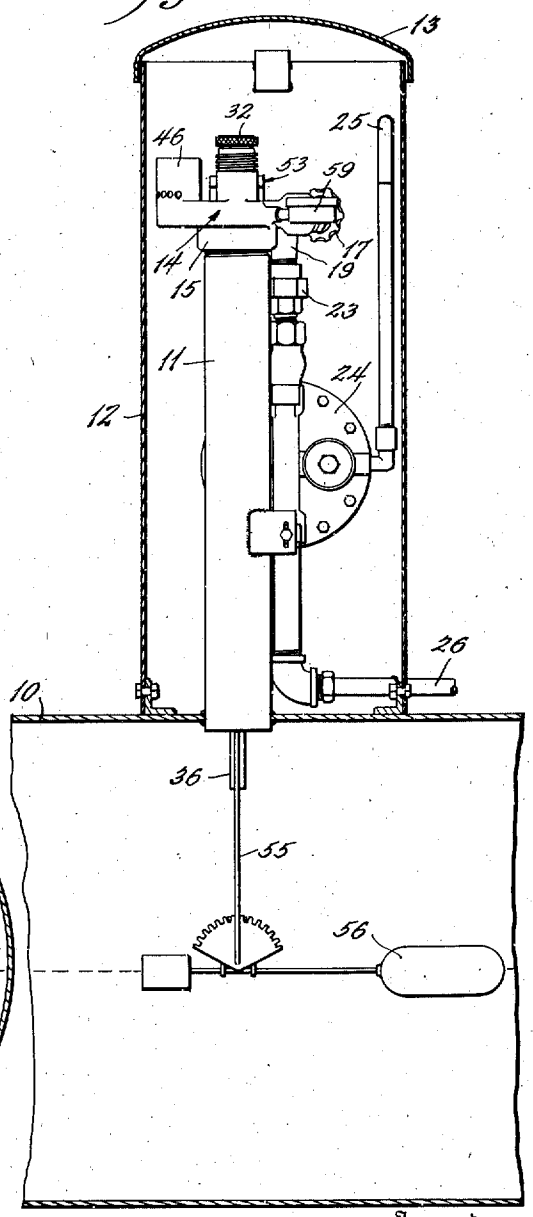


Fig. 2



Inventor
L. J. White

By A. D. Adams

Attorney

June 21, 1938. L. J. WHITE 2,121,675

COMBINATION FITTING FOR GAS DISPENSING SYSTEMS

Filed Oct. 18, 1937 3 Sheets-Sheet 2

Fig. 3

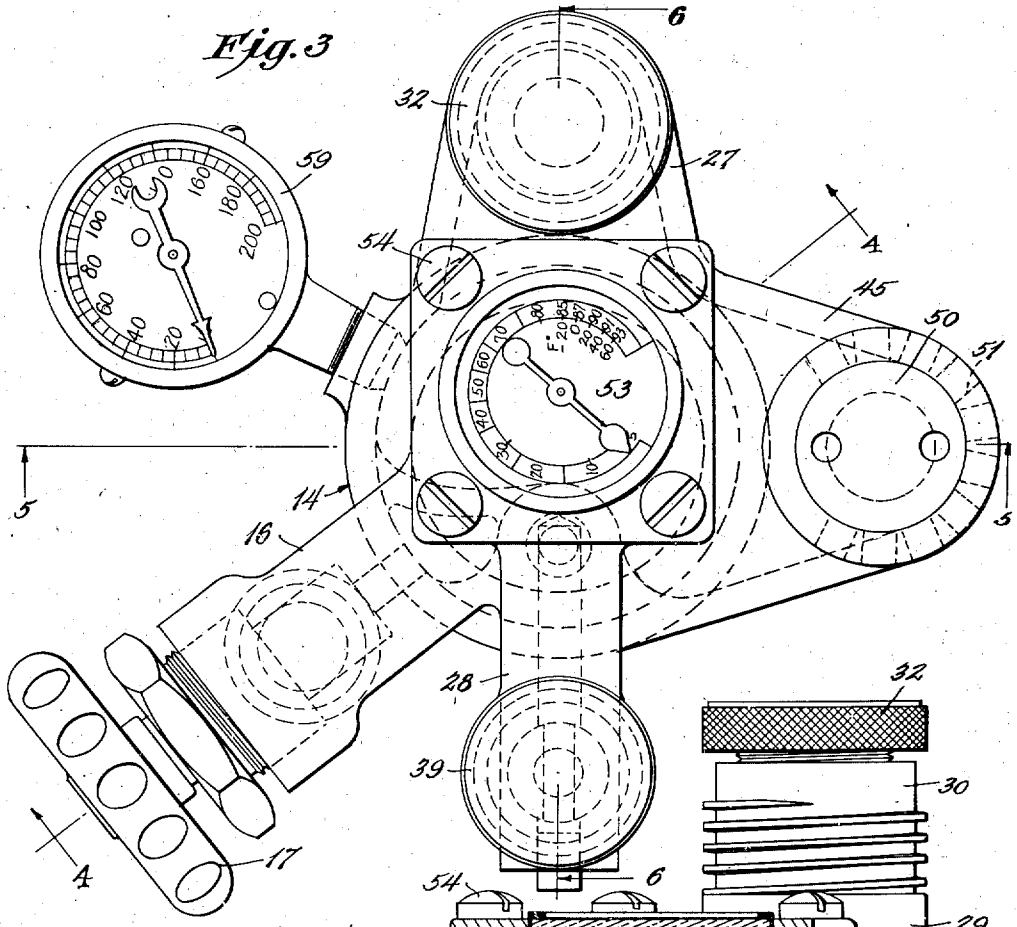
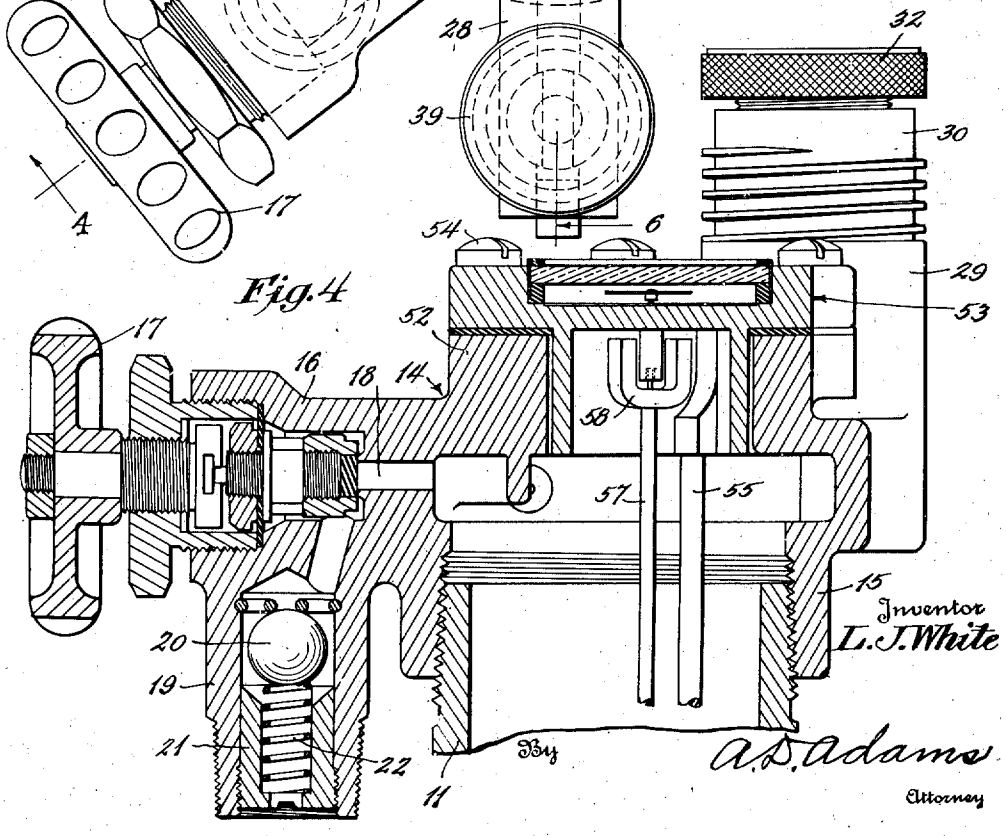


Fig. 4



Inventor
L. J. White

By A. S. Adams
Attorney

June 21, 1938. L. J. WHITE 2,121,675

COMBINATION FITTING FOR GAS DISPENSING SYSTEMS

Filed Oct. 18, 1937 3 Sheets-Sheet 3

Fig. 5

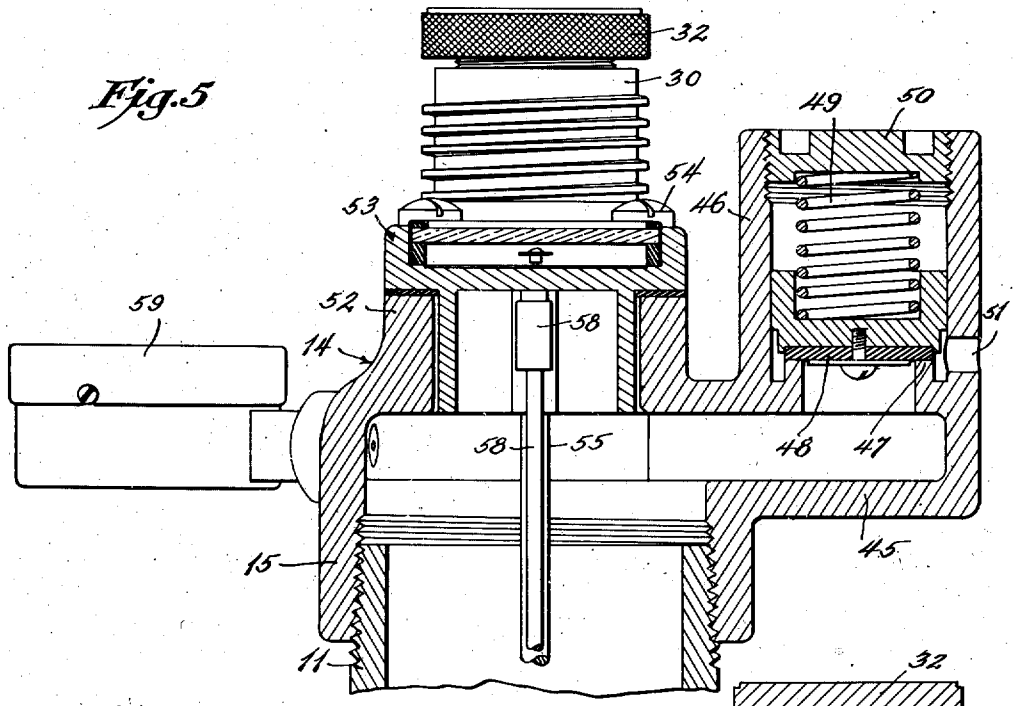
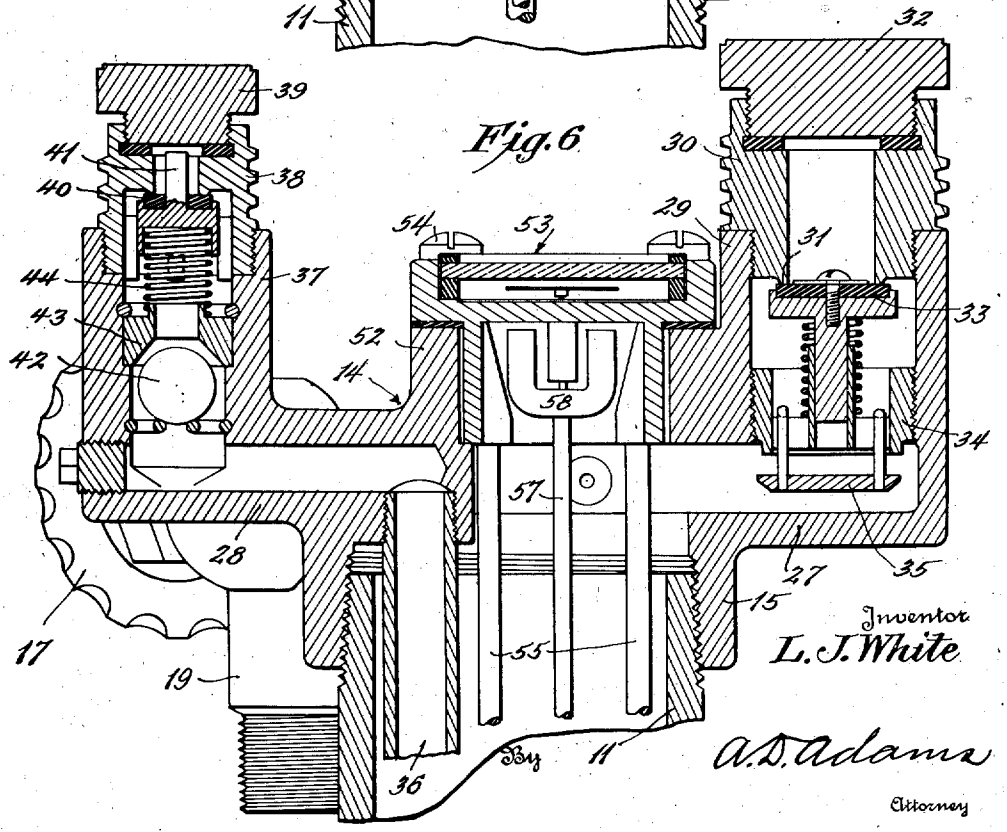


Fig. 6



Inventor
L. J. White

By A. D. Adams

Attorney

Patented June 21, 1938 2,121,675

UNITED STATES PATENT OFFICE

2,121,675

COMBINATION FITTING FOR GAS DISPENSING SYSTEMS

Loyd J. White, San Antonio, Tex., assignor to Southern Steel Company, a corporation of Texas

Application October 18, 1937, Serial No. 169,699

17 Claims. (Cl. 62—1)

This invention relates to fittings for use in gas dispensing systems and, among other objects, aims to provide a greatly simplified, unitary multiple valve and gauge unit or fitting capable of being connected to a vertical conduit or stand pipe on a gas storage and generating tank to deliver the generated gas through the usual pressure reducing regulator to a gas service main. The main idea is to combine all of the necessary valves, gauges and other safety appliances in a single, easily accessible unit, eliminating the necessity of assembling many separate appurtenances and the possibility of installing the various valves in the wrong order or relation to each other. A further aim is to provide a unit of this type which will meet the most rigid requirements of the underwriters when used in systems for dispensing highly inflammable gases. This application involves important improvements in the apparatus disclosed in my copending applications Ser. No. 98,048, filed August 26, 1936 and Ser. No. 106,461, filed October 19, 1936.

Other aims and advantages of the invention will appear in the specification, when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a vertical sectional view showing the preferred form of fitting applied to a liquefied gas dispensing system;

Fig. 2 is a fragmentary sectional view taken at right angles to Fig. 1;

Fig. 3 is a top plan view on an enlarged scale of the fitting shown in Figs. 1 and 2; and

Figs. 4, 5 and 6 are sectional views taken on the lines 4—4; 5—5 and 6—6, respectively, of Fig. 4.

Referring particularly to the drawings, the improved valve and gauge unit is shown as being applied to a gas dispensing system of the general type disclosed in the aforesaid application Ser. No. 98,048, wherein a mixture of highly volatile liquefied petroleum gases is vaporized in an underground tank or container and delivered to a pressure reducing regulator through a series of appliances or appurtenances arranged in a protecting casing above the tank and, thence, to a house service pipe or main. The numerous appliances necessary for filling the tank and dispensing the generated gas as shown in that application comprise a liquid level gauge, a pressure gauge, filling and vapor return valves with hose connections, a safety relief valve, a manually operable cut-off valve, an excess flow check valve in the house service line, and other appliances, including a dip tube and the like. It has been customary in the past to connect the various valves and other parts separately to a stand pipe and the service pipe and, in some cases, they are not easily accessible when arranged in a protecting housing. Moreover, there is always danger of leakage through the joints of the various fittings. Moreover, there is a possibility of applying some of the valves either in the wrong way or in the wrong order so that the system will not function properly and might cause an explosion or fire. It is therefore the main purpose of this invention to provide a greatly simplified unit or fitting which embodies all of the necessary valves and connections as well as the filling appliances for the tank with the parts so arranged that they are easily accessible within a protecting housing. Also, the idea is to provide a unit which can easily be installed or removed for repairs and/or replacement.

In the present example, the improved fitting is applied to a system having the usual liquefied gas storage and generating tank 10 to which is connected a stand pipe 11, similar to those shown in the aforesaid applications. The stand pipe serves the double purpose of filling the tank and dispensing the generated gas. It is shown as being arranged within a protecting housing 12 so that the appliances connected thereto are accessible through a hinged cover 13. The fitting is shown as having a cast metal casing 14 connected by a screw threaded extension 15 to the top of the stand pipe and it has branches for the various valves and appliances hereinafter described.

The casing is shown as having a service branch 16 carrying a manual cut-off valve 17 cooperating with an outlet conduit 18. This valve is like that shown in the aforesaid application Ser. No. 106,461. From the conduit 18 the gas passes through a nipple extension 19 carrying an excess flow ball valve 20 adapted to be adjusted by a screw threaded sleeve fitting and seat 21 carrying a compression spring 22 to regulate the flow in accordance with the maximum demand for gas, the arrangement being such that the valve will close in case the service pipe breaks or the flow is excessive for any reason. The nipple extension 19 is connected by an ordinary union coupling 23 to the usual pressure reducing regulator 24 which is shown as being vented by a vent pipe 25 extending upwardly in the protecting casing 12. The pressure reducing regulator delivers gas to the house service pipe 26 passing through one side of the casing near the bottom.

Instead of providing separate filling and gas return conduits on the stand pipe or the storage tank, these connections are made, in the present

example, by providing separate gas filling and gas venting branches 27 and 28, respectively, shown as extending from opposite sides of the casing, as best shown in Fig. 6. The filling branch is shown as having an upstanding extension 29 within which is screwed a hose fitting 30 having a valve seat 31 in its lower end. It is adapted to be closed by an ordinary plug or cap 32. An ordinary spring check valve or filling valve 33 cooperates with the valve seat and is supported by a screw threaded thimble 34 in the lower portion of the extension 29. When the filling cap 32 is removed and the filling hose is connected, the hydrostatic pressure of the liquefied gas in a service truck tank opens the check valve 33. Cooperating with the thimble fitting 34 is a back flow check valve 35 suspended from a spider within the thimble and adapted to be closed by the pressure of the gas in the storage tank when the hose fitting 30 is removed to repair or replace the filling valve 33.

Referring to the vapor return or gas venting branch 28, a dip tube 36 is shown as being connected to the inner end of the branch conduit and extends through the stand pipe to the maximum level of the liquefied gas in the storage tank to prevent overfilling the tank and provide an adequate vapor space above the maximum liquid level. This branch likewise has an upstanding extension 37 carrying a hose fitting 38 closed by a cap or plug 39. In the upper end of the conduit and within the fitting there is shown the usual spring urged vapor return valve 40 having a stem 41 adapted to be engaged by the hose when it is screwed on the fitting automatically to open the valve and it will close to prevent escape of gas vapor when the hose is disconnected. To prevent escape of gas through the vapor venting hose in case the hose is broken, there is shown an excess flow ball check valve 42 in the lower portion of the vertical extension 37 cooperating with a seat 43 inserted in the vertical branch and serving also to carry the spring 44 for the valve 40.

Another branch 45 shown as extending radially from the casing 14 carries a safety relief valve. In this instance, it also has a vertical branch or extension 46 and is provided with a seat 47 having a valve 48 normally held closed by a coil spring 49, the compression of which may be varied by an adjustable plug 50 so that the pressure at which the valve will open may be regulated in accordance with the requirements. The vertical extension is shown as having a vapor discharge opening or outlet 51 adjacent to the valve 48 so that the vapor can escape into the protecting housing 12 and, thence, to the atmosphere through a space between the cover flange and the housing.

Instead of providing a separate fitting for the usual type of liquid level gauge used in such systems, the casing is provided with a central, upstanding branch 52 to which is secured a well known type of magnetic gauge 53 preferably by means of machine screws 54. The gauge head carries a pair of suspension rods 55 projecting downwardly into the tank and supporting the float 56 with its operating gears which are connected to the gauge operating rod 57 carrying a horseshoe magnet 58.

An ordinary pressure gauge 59 is shown as being connected to one side of the fitting between the filling branch and the gas delivering branch. It is arranged, face upwardly, so that it may be easily read when the cover 13 of the protecting casing is opened.

From the foregoing description, the utility and advantages of the novel multiple valve and gauge fitting will be readily apparent to those skilled in the art. It is practically foolproof and prevents any possibility of an explosion. It is rugged, compact and simple in its design and construction. It reduces the number of possible weak or leaky joints to an absolute minimum. All of the parts are readily and easily accessible within a protecting housing. Moreover, the units can be assembled and tested at the factory.

Obviously, the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all of the features of the invention be used conjointly, since they may be employed advantageously in various combinations and sub-combinations.

What is claimed is:

1. In a liquefied gas dispensing system having a gas generating and storage tank and a standpipe connected thereto, a single fitting removably connected to the upper end of said pipe and having a conduit connected to deliver the generated gas to a service pipe, said fitting comprising a unitary hollow body having filling and vapor return branches; and filling and vapor return valves in the respective branches accessible from the above the fitting.

2. In a liquefied petroleum gas dispensing system having a gas generating and storage tank and a standpipe connected thereto, a unitary fitting comprising a hollow body having a depending portion removably connected to the upper end of said standpipe; an integral outlet conduit on the fitting having means connecting it to a service pipe; a pair of integral upstanding branches on the body; a filling valve and a vapor return valve removably carried in the respective branches; and a depending pipe carried by the fitting and communicating with the vapor return branch extending through the standpipe into the tank to the maximum liquid level therein.

3. In a liquefied petroleum gas dispensing system having a gas generating and storage tank and a standpipe connected thereto, a unitary fitting comprising a hollow body having a depending portion removably connected to the upper end of said standpipe; a pair of integral upstanding branches on the body; a filling valve and a vapor return valve removably carried in the respective branches; a liquid level gauge removably mounted in the top portion of the fitting and having a portion extending through the standpipe into the tank.

4. In a liquefied petroleum gas dispensing system having a gas generating and storage tank and a standpipe connected thereto, a unitary fitting comprising a hollow body having a depending sleeve portion removably connected to the upper end of said standpipe; a pair of integral upstanding branches on the body; a filling valve and a vapor return valve removably carried in the respective branches; a service branch conduit integral with the body and having means removably connecting it to a service pipe; an excess flow check valve built into said conduit; and a manually operable control valve also mounted in said conduit between the excess flow check valve and the body.

5. In a liquefied petroleum gas dispensing system having a gas generating and storage tank and a standpipe connected thereto, a unitary fit-

ting comprising a hollow body having a depending sleeve portion removably connected to the upper end of said standpipe; a pair of integral upstanding branches on the body; a filling valve and a vapor return valve removably mounted in the respective branches; an automatic check valve in each branch below the filling and vapor return valves arranged to prevent the escape of gas or liquid through the branches when the filling and vapor return valves are removed for repairs.

6. In a liquefied petroleum gas dispensing system having a standpipe connected to a gas generating and storage tank, a unitary fitting removably connected to said pipe and having an integral conduit connected to a service pipe carrying a pressure regulator; a manually operable cut-off valve in said conduit; a valved filling branch on the fitting having a hose connection; a back flow check valve in said branch to prevent escape of liquid or gas when the filling valve is removed or if the filling conduit develops a major leak or is broken; a valved vapor return branch also on the fitting and having a hose connection; an excess flow check valve in said vapor return branch; and a safety relief valve removably mounted in the fitting and communicating with the standpipe.

7. In a liquefied gas dispensing system of the type having an underground storage and generating tank, a single standpipe in a protecting housing, a multiple valve fitting connected to the top of the standpipe to deliver gas to a service pipe and having filling and vapor return valves and hose fittings, a back flow check valve in the filling connection, an excess flow check valve in the vapor return conduit to prevent an excess of vapor from escaping if the vapor return conduit develops a major leak or breaks, an excess flow check valve to prevent an excess of vapor from escaping in case of a major leak or a break in the service pipe, a manually operable cut-off valve, a safety relief valve, a liquid level gauge, and a pressure gauge; integral branch conduits in the fitting for all of said valves communicating with the standpipe; and a dip pipe communicating with the vapor return conduit and extending through the standpipe into the tank to the maximum liquid filling level for the purpose of trapping vapor under pressure above said maximum filling level to prevent overfilling the tank.

8. In a liquefied petroleum gas dispensing system having a pressure storage tank and a standpipe connected thereto, a unitary fitting on the upper end of the standpipe having an outlet communicating with a service pipe; means to fill the tank through said fitting; and gauge means also carried by said fitting connected to determine both the level of the liquid and the vapor pressure in the tank while the tank is being filled.

9. In a liquefied petroleum gas dispensing system having a pressure storage tank and a standpipe connected thereto, a unitary fitting on the upper end portion of the standpipe having an outlet conduit; a service pipe communicating with said outlet conduit; means to fill the tank through said fitting; a liquid level gauge on said fitting having a portion projecting through the standpipe into the tank; and a pressure relief valve in the fitting having a conduit communicating with the standpipe.

10. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a unitary hollow body adapted to be connected to a standpipe; a service outlet conduit in the body adapted to be connected to a gas service pipe; valved filling means in the body adapted to communicate with the interior of the standpipe; a liquid level gauge removably connected to the body and having a portion projecting therethrough adapted to extend through the standpipe; and a pressure relief valve in the body having a conduit extending from the hollow portion thereof and adapted to communicate with the tank through the standpipe.

11. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a unitary hollow body; means on the bottom of the body to secure it to a standpipe; branches on the body having filling and vapor return valves accessible from above the fitting; and a service outlet conduit also connected to the body and adapted to be connected to a service pipe.

12. As an article of manufacture, a unitary valved fitting for liquefied gas dispensing systems comprising a hollow body; means on the bottom of the body to secure it to a standpipe; branches on the body having removably mounted filling and vapor return valves accessible from above the fitting; a liquid level gauge removably secured to the top of said body and having a portion adapted to project through the standpipe into a storage tank; and a service outlet conduit also connected to the body adapted to be connected to a service pipe.

13. As an article of manufacture, a unitary valved fitting for liquefied gas dispensing systems comprising a cast metal hollow body; integral depending means to secure it to a standpipe; a plurality of integral lateral branches on the body; upstanding integral hollow branches on some of said lateral branches; filling, vapor return and pressure relief valve mechanisms removably secured in the upstanding branches; an integral depending branch conduit on the other lateral branch; excess flow valve mechanism in the depending branch conduit; and a manually operable control valve built into said last named lateral branch between the excess flow valve mechanism and the body.

14. As an article of manufacture, a unitary fitting for liquefied gas dispensing systems comprising a cast metal hollow body adapted to be connected to a gas dispensing standpipe leading from a pressure storage tank; an integral outlet conduit adapted to be connected to a service pipe; a manually operable cut-off valve in said vapor outlet conduit; an excess flow check valve also in said conduit adjacent to said manually operable valve; separate valved filling and vapor return branches in said body presenting hose connections; a back flow check valve in the filling branch; an excess flow check valve in the vapor return branch; a depending dip tube connected to the vapor return branch; a separate branch carrying a safety relief valve; a liquid level gauge secured to the top of the fitting and having a portion projecting therethrough; and a pressure gauge also connected to the hollow part of the body.

15. In a liquefied petroleum gas dispensing system having a pressure storage tank, a unitary valved fitting comprising a hollow body having an opening communicating with said tank; a gas outlet conduit in the body communicating with the tank; a gas service pipe connected to said outlet conduit; valved filling means in the body communicating with the tank; a pressure relief valve in the body also communicating with the tank; and means connected to the body and pro-

jecting through said opening into the tank to prevent overfilling the tank.

16. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a hollow body having an opening adapted to communicate with a pressure storage tank; a gas outlet conduit in the body communicating with the hollow portion thereof and adapted to be connected to a service pipe; valved filling means in the body also communicating with the hollow portion thereof; a pressure relief valve in the body also communicating with the hollow portion thereof; and means connected to the body and projecting through said opening adapted to extend into the tank to prevent overfilling the tank.

17. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a hollow body having an opening adapted to communicate with a pressure storage tank; a gas outlet conduit in the body communicating with the hollow portion thereof and adapted to be connected to a service pipe; valved filling and vapor return conduits in the body communicating with the hollow portion thereof; and means in the hollow body having a portion projecting through said opening and adapted to extend into the tank to determine the liquid level in the tank.

LOYD J. WHITE.

CERTIFICATE OF CORRECTION.

Patent No. 2,121,675. June 21, 1938.

LOYD J. WHITE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 31, claim 1, strike out the word "the" first occurrence; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of July, A. D. 1939.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

DISCLAIMER

2,121,675.—*Loyd J. White*, San Antonio, Tex. COMBINATION FITTING FOR GAS DISPENSING SYSTEMS. Patent dated June 21, 1938. Disclaimer filed May 6, 1943, by the assignee, *Southern Steel Company*.

Hereby enters this disclaimer to claims 1, 3, 5, 11, 12, and 17 of said patent.

[*Official Gazette June 1, 1943.*]

jecting through said opening into the tank to prevent overfilling the tank.

16. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a hollow body having an opening adapted to communicate with a pressure storage tank; a gas outlet conduit in the body communicating with the hollow portion thereof and adapted to be connected to a service pipe; valved filling means in the body also communicating with the hollow portion thereof; a pressure relief valve in the body also communicating with the hollow portion thereof; and means connected to the body and projecting through said opening adapted to extend into the tank to prevent overfilling the tank.

17. As an article of manufacture, a valved fitting for liquefied gas dispensing systems comprising a hollow body having an opening adapted to communicate with a pressure storage tank; a gas outlet conduit in the body communicating with the hollow portion thereof and adapted to be connected to a service pipe; valved filling and vapor return conduits in the body communicating with the hollow portion thereof; and means in the hollow body having a portion projecting through said opening and adapted to extend into the tank to determine the liquid level in the tank.

LOYD J. WHITE.

CERTIFICATE OF CORRECTION.

Patent No. 2,121,675. June 21, 1938.

LOYD J. WHITE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 31, claim 1, strike out the word "the" first occurrence; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of July, A. D. 1939.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

DISCLAIMER

2,121,675.—*Loyd J. White*, San Antonio, Tex. COMBINATION FITTING FOR GAS DISPENSING SYSTEMS. Patent dated June 21, 1938. Disclaimer filed May 6, 1943, by the assignee, *Southern Steel Company*.

Hereby enters this disclaimer to claims 1, 3, 5, 11, 12, and 17 of said patent.

[*Official Gazette June 1, 1943.*]