

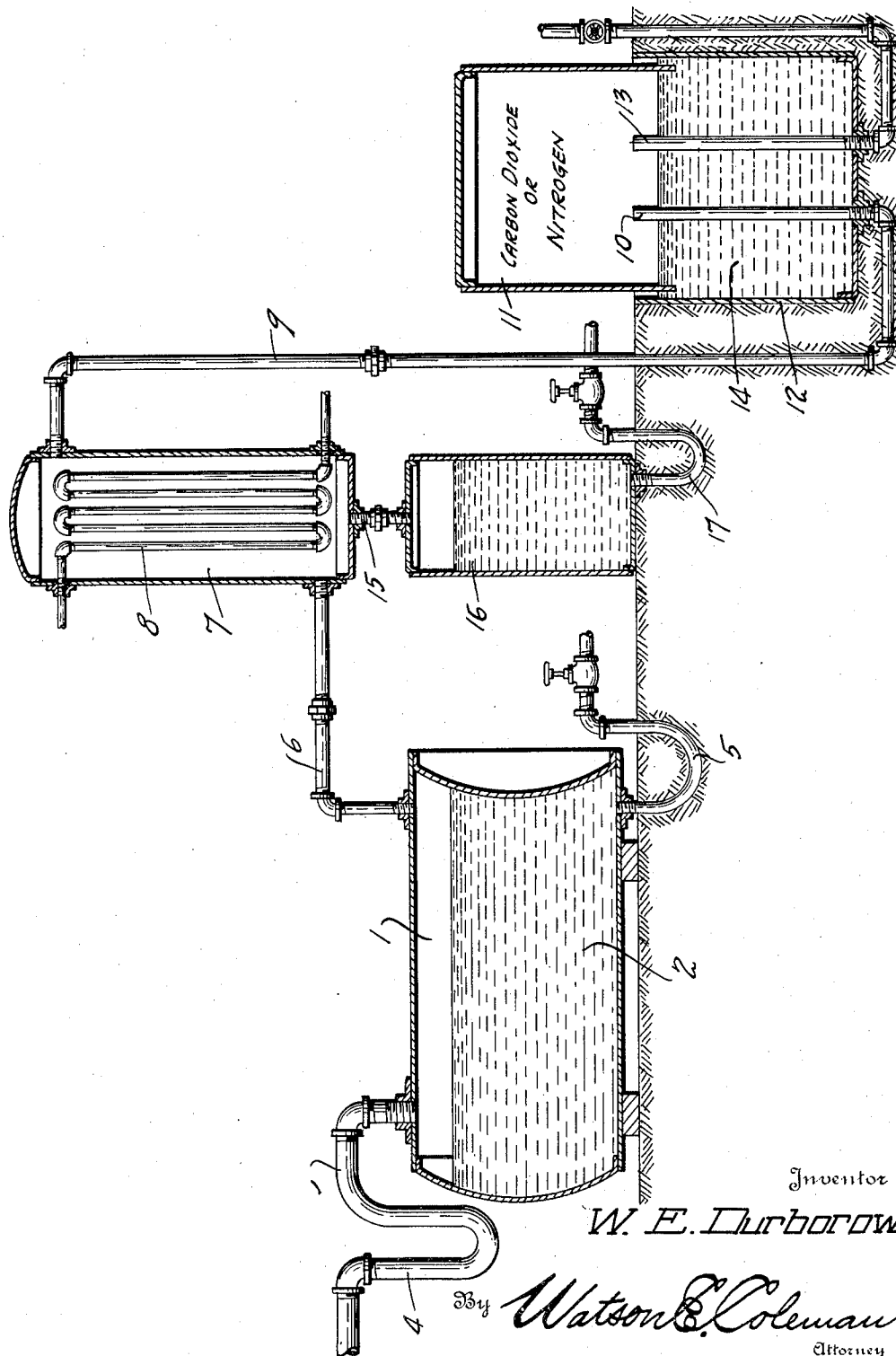
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SAFETY DEVICE FOR GASOLINE STORAGE TANKS

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SAFETY DEVICE FOR GASOLINE STORAGE TANKS.

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To all whom it may concern:

Be it known that WILLIAM E. DURBOROW, a citizen of the United States, residing at Columbia, in the county of Lancaster and State of Pennsylvania, has invented certain new and useful Improvements in Safety Devices for Gasoline Storage Tanks, of which the following is a specification, reference being had to the accompanying drawings.

To those familiar with the handling of gasoline and similar volatile fuels, it is well known that there is a constant source of danger incident to any leakage in the tank as the gasoline is liable to catch fire, and if the fire is communicated to the gasoline storage tank, the presence of air therein forming with the gasoline an explosive mixture, is very liable to cause an explosion, with disastrous results.

With a knowledge of these conditions, it is the primary object of my invention to make the handling of gasoline safe as far as humanly possible, and to this end the invention comprehends that some non-inflammable or non-combustible gas shall be automatically admitted into the storage tank to fill at all times the space therein above the level of the gasoline content whereby the liability of explosions will be positively precluded.

With this object in view, my invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim, reference being had to the accompanying drawing, in which the figure is a vertical elevation and partial section in the nature of a diagram illustrating an apparatus constructed in accordance with my invention.

In the accompanying drawing the numeral 1 designates a storage tank for the gasoline or the like, the body of gasoline in the tank being indicated by the reference numeral 2, 3 designates the inlet or supply pipe for the tank which is preferably provided with a seal 4, and 5 designates the outlet pipe also provided with a seal, as shown, and through which the gasoline is drawn as required for use.

Leading from the top of the tank 1 is a pipe 6 which provides communication between the interior of the tank and the interior of a preferably vertically disposed cylinder or drum 7, which constitutes the shell portion of a condenser, being provided for that purpose with a condensing pipe 8 of

any desired formation through which cold water is intended to be constantly run. The shell 7 is connected to a pipe 9 which leads downwardly preferably into the ground and thence upward as indicated at 10 into the downwardly opening mouth of a bell 11 which is mounted within a water tank 12 and also leading into the bell 11 is a gas supply pipe 13.

The bell 11 is intended to contain some non-inflammable or non-combustible gas such as carbon dioxid, although it is to be understood that my invention is not limited to the use of this particular gas as any other non-inflammable or non-combustible gas may be employed and it is intended that the normal supply of gas within the bell 11 be maintained as required by being fed in through the gas supply pipe 13. It is of course to be understood that the lower edge of the bell 11 is sealed in the water 14 that is contained within the tank 12.

It is to be understood that the bell 11 is to have a capacity such that under all circumstances it will contain sufficient inert gas to meet all conditions of operation in installation and to fully compensate for the addition or removal of even the entire volume of the stored fuel. In other words, this bell must have a capacity equal to the combined capacities of the storage tank 1, the condensing shell 7, and the condensate receptacle 16.

In the practical use of a gasoline storage tank equipped with my safety devices, the non-combustible gas employed will be contained within the bell 11, within the shell 7 of the condenser, within the space above the level of the gasoline 2 in the storage tank 1, and within the upper portion of the condensate-containing tank 16 above the liquid therein such as ordinarily would be occupied by the air that would tend to form with the gasoline an explosive mixture which it is the aim of this invention to prevent, and it will therefore be understood that as the gasoline is drawn from the storage tank 1 and the space above the level of the gasoline in the tank is increased, this space will always be filled with the non-inflammable or non-combustible gas and thus all liability of explosions will be positively precluded, should the tank 1 be punctured or should some other accident occur.

If perchance there should be any gasoline volatilized within the storage tank 1 and

should this collect in the shell 7 of the condenser, it will therein be condensed by means of the cold water flowing through the pipe 8 and condensate will flow downwardly from the shell 7 through the pipe 15 into the preferably cylindrical receptacle 16 from which it may be drawn off from time to time through the gooseneck or sealed pipe 17. The upper portion of this receptacle 16 is, of course, filled with inert or non-combustible gas above the level of the condensate in this tank 16.

It will be seen that the seal 4 prevents the ingress of atmospheric air to the system. During the filling of the storage tank with liquid fuel, as the fuel rises in the tank the non-inflammable gas will be forced back into the floating bell. The particular advantage of this arrangement is that the non-inflammable gas is used over and over again on the alternate emptying and filling of the storage tank with fuel. The gas supply pipe 13 is provided to initially fill the floating bell with non-inflammable gas and to replenish the system with gas to compensate for loss due to leakage.

My invention, it will be seen, affords a system closed at all times to the atmospheric or combustion supporting air, the floating bell compensating for changes in the internal pressure of the system, which changes may be brought about not only by the filling and emptying of the storage tank but which might also be brought about by the volatilization and the condensation of the volatile constituents of the stored fuel. This internal compensation for the internal pressure changes prevents the formation of a combustible or explosive atmosphere surrounding the outside of the storage system and also prevents any bulging and possible rupture of the tanks. In my system there is no diminished internal pressure which would allow combustible gas to enter the system and in the case of an increase in the internal pressure brought about not only by the filling of the storage tank but also by, for instance, a volatilization of the stored fuel, this excess pressure will be compensated for by the discharge of the excess gaseous mixture (non-inflammable gas and especially volatile fuel vapors) into the shell 7 of the condenser where the volatile fuel vapors will be condensed and flow downwardly into the receptacle 16, while the non-inflammable gas will pass on into the bell 11. If these volatile fuel vapors were discharged into the atmosphere they would then constitute a highly dangerous combustible and explosive mixture with the atmosphere which would be practically as dangerous to the system as a similar condition on the inside of the system. My construction and arrangement precludes these conditions and compensates for changes in the internal

pressure of the system by means of a floating bell.

From the foregoing description in connection with the accompanying drawing, it will be seen that I have provided a very simple and efficient apparatus whereby the space above the level of the gasoline in the storage tank will always be kept filled with some non-combustible gas and all liability of an explosion will be thereby obviated.

While the accompanying drawing illustrates what I believe to be the preferred embodiment of my invention, it is to be understood that the invention is not limited thereto but that various changes may be made in the construction and arrangements of the parts without departing from the scope of the invention as defined by the appended claims.

What is claimed, is:

1. An apparatus of the character described, comprising in combination with a gasoline storage tank, a floating bell designed to contain noninflammable gas and having a capacity greater than the capacity of the storage tank, a pipe connection between the bell and the top of the gasoline storage tank, and a condenser interposed in said connection between the bell and tank for the purpose specified.

2. An apparatus of the character described, comprising, in combination with a gasoline storage tank, a floating bell designed to contain noninflammable gas and having a capacity greater than the capacity of the storage tank and a connection between the bell and the top of the gasoline storage tank, a condenser in said connection, and a receptacle connected to said condenser for the purpose specified.

3. The herein-described apparatus comprising, in combination with a gasoline storage tank, an underground water tank, a bell floating therein and adapted to contain noninflammable gas and having a capacity greater than the capacity of the storage tank, means for supplying gas within the bell, a pipe leading out of the bell, a condenser shell connected to said pipe, a condensing coil within said shell, a pipe leading from said shell to the top of the gasoline storage tank, and a receptacle connected to the bottom of the condenser shell for the purpose specified.

4. In combination, a storage tank, a gas bell with a yieldable seal and designed to contain non-inflammable gas, there being a pipe line connection between the gas bell and the storage tank, and means disposed in the pipe line connection between the storage tank and the gas bell to condense vapor in the system, the gas bell having a capacity greater than the combined capacity of the storage tank, the condensing means, and the pipe line.

5. In combination, a storage tank, means
for maintaining an inert gas at constant
pressure within the tank and having a pipe
connection to the storage tank, condensing
means disposed in the pipe connection be-
tween the inert gas pressure maintaining
means and the storage tank and acting to
condense vapor in the system to thereby pre-
vent any increase in pressure on the inert
gas, the means for maintaining the inert
gas at constant pressure having a capacity
greater than the capacity of the storage
tank, the condensing means, and the pipe
connection.

6. In combination, a storage tank, a con- 15
denser having a pipe connection to the upper
portion of the storage tank, a chamber de-
signed to contain inert gas and connected by
a pipe line to the condenser, the chamber
having a capacity greater than the com- 20
bined capacities of the storage tank, the
condenser, and the pipe line, the chamber
being so constructed as to maintain the inert
gas at substantially constant pressure within
the tank, the condenser, and the pipe line. 25

In testimony whereof I hereunto affix my
signature.

WILLIAM E. DURBOROW.