

P. KESSELER.
 APPARATUS FOR STORING AND DISCHARGING INFLAMMABLE LIQUIDS.
 APPLICATION FILED JULY 23, 1912.

1,047,075.

Patented Dec. 10, 1912.

Fig. 1.

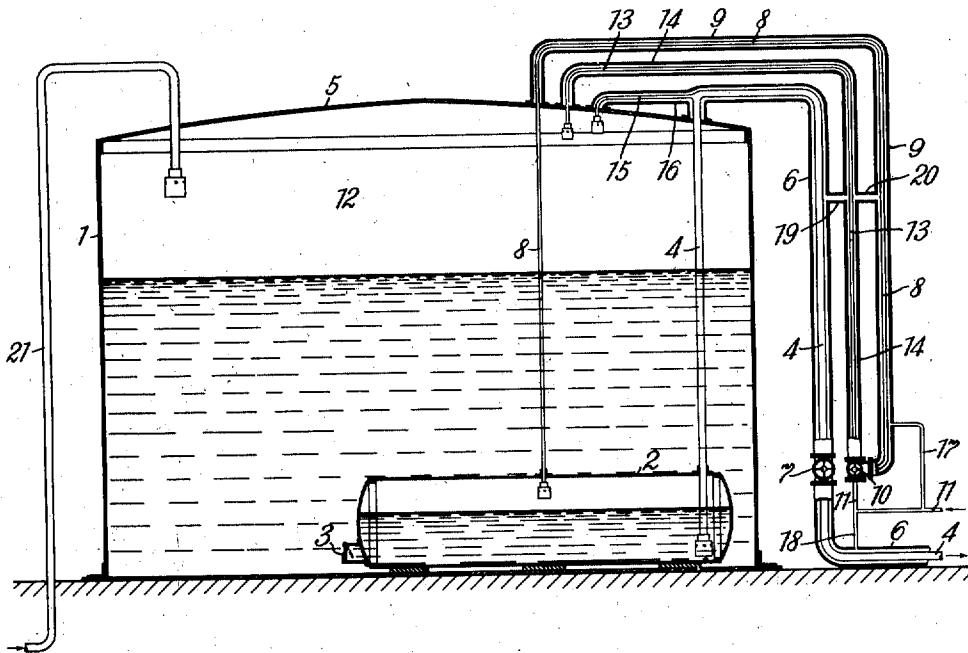


Fig. 2.

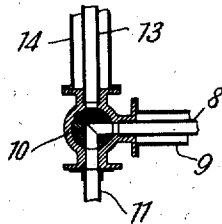
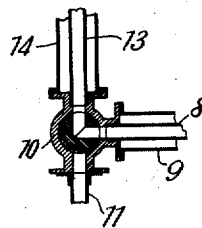


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR STORING AND DISCHARGING INFLAMMABLE LIQUIDS.

1,047,075.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed July 23, 1912. Serial No. 711,184.

To all whom it may concern:

Be it known that I, PAUL KESSELER, engineer, a citizen of the Empire of Germany, residing at Steglitz, near Berlin, Germany, have invented certain new and useful Improvements in Apparatus for Storing and Discharging Inflammable Liquids, of which the following is a full, clear, and exact description.

This invention relates to apparatus for discharging inflammable liquids from surface or above ground tanks by means of a non-oxidizing protective gas under pressure and particularly to apparatus of the kind in which an intermediate tank having a draw-off pipe and compressed gas supply pipe communicates with the main tank by means of a non-return valve.

In discharging or drawing off inflammable liquids from surface tanks by means of a protective gas under pressure, care must be taken to insure positive introduction of the protective gas into the tank during the whole time of working, and also to stop the conveying of liquid automatically in case of the piping becoming leaky or breaking. More particularly, in the latter case the liquid must not be able to escape from the tank by siphon action when such action occurs in the discharge piping but on the contrary means must be provided to stop the siphon action automatically as soon as it starts. These requirements are fulfilled by the apparatus in accordance with this invention in which the intermediate tank is disposed within the main tank and the gas-supply pipe is so arranged that it can communicate either with the gas-space in the main tank when the intermediate tank is being filled or with the source of the compressed gas when the liquid is to be discharged.

One way of carrying out the invention is shown by way of example in the accompanying drawing in which,

Figure 1 is a vertical section shown diagrammatically, and Figs. 2 and 3 are detail views in horizontal section.

Within the main tank 1 is arranged a smaller liquid tank 2 connected by a check or non-return valve 3 to the liquid chamber of the main tank. To the inner tank 2 is connected a discharge or draw-off pipe 4 ex-

tending to within a short distance of its base and carried outward through the cover 5 of the main tank, a jacket 6 surrounding the exterior portion of the pipe. In the discharge pipe 4 is formed a stop cock 7 of some well known safety type which is not liable to break. A compressed gas supply pipe 8 opens into the cover of the inner tank 2 this pipe extending outward through the main tank cover 5 and having its exterior portion surrounded by a jacket pipe 9. The portion of the compressed gas pipe 8 situated outside the tank 1 is connected by means of a three way cock 10, to a pipe 11 leading to the source of supply of compressed gas, and also to a pipe 13 connected to the gas space 12 in the tank 1, this cock being also surrounded by a jacket pipe 14.

From the upper part of the discharge pipe 4 is branched off a pipe 15 opening into the gas space 12 of the tank 1, having a considerably smaller cross-section than the discharge pipe, a jacket pipe 16 connected to the jacket pipe 6, surrounding the pipe 15.

The jacket pipe 9 of the compressed gas pipe 8 is connected by a branch pipe 17 to the gas supply pipe 11 and is also connected by a branch pipe 18 to the lower portion of the jacket pipe 6. The jacket pipe 6 of the discharge pipe 4 communicates by means of a pipe 19, with the jacket 14 of the pipe 13, and by means of a pipe 20 with the jacket pipe 9 of the compressed gas pipe 8, so that the working pressure obtains in all the jacket pipes. The charging pipe 21 of the tank 1 is connected to its cover 5.

The working of the apparatus above described takes place in the following manner:—When there is no pressure, or only a comparatively small pressure, in the inner tank 2, the non-return valve 3 opens under the action of the hydrostatic pressure of the liquid contained in the tank 1, whereby the tank 2 is filled. If any protective gas remains in the tank 2 from the previous discharge period, it escapes, during the re-filling of the inner tank, through the pipe 8, which in that case acts as a gas outlet pipe and owing to the three-way cock 10 being set in the manner shown in Fig. 3 the gas passes through the return pipe 13 into the gas chamber 12 of the tank. In that way, the non-oxidizing compressed gas used for

discharging the inflammable liquid constantly passes from the inner tank 2 into the tank 1. When the liquid is to be drawn off from the inner tank 2, the three-way cock 10 in the compressed gas pipe 8, is brought into the position shown in Fig. 2, and the cock 7 opened, whereupon the compressed gas entering the tank 2 through the pipe 8, will force the liquid out through the pipe 4 and the open cock 7. During that time, comparatively small quantities of the liquid discharged through the pipe 4 from the tank 2, will return into the tank 1 through the pipe 15 branched off from the upper part of the discharge pipe 4. Should the discharge pipe 4 become leaky or break, the escape of the liquid contained in the tank 2, owing to siphon action in the descending part of the discharge pipe 4, cannot take place as, owing to the suction produced thereby in the pipe 4 and in the pipe 15 connected to the latter, gas will be drawn from the gas space 12 of the tank 1 into the discharge pipe 4, and in that way the siphoning action will be automatically stopped as soon as it starts.

Since not only the discharge pipe 4, but also the compressed gas pipe 8, together with the gas return pipe 13 (connected permanently to the gas chamber 12 of the tank and having its connection to the pipe 8 controlled, as by the cock 10) are jacketed by pipes which are in constant communication with the source of supply of the compressed gas, in the event of the gas pipes breaking, the operation will be automatically stopped, owing to the blowing off of the compressed gas then taking place. Moreover in the event of the return pipe 13 breaking, its jacket insures, even in that case, the passage of the protective gas into the tank 1 during the refilling of the inner tank 2, and consequently the passage of the protective gas from the inner tank through the pipes 8 and 13, into the tank 1 is also insured. In refilling the inner tank, the protective gas escapes from said tank through the pipe 8 into the pipe 13 (the cock 10 being at that time in the position shown in Fig. 3), and through the break or leak of the pipe 13 into the jacket pipe 14, thus reaching the gas space of the tank 1. If the jacket pipe 14 were omitted, the gas would escape into the atmosphere during refilling, in case the return pipe 13 should be broken or leak.

What I claim is:—

1. In apparatus for storing and discharging inflammable liquids by means of a non-oxidizing gas under pressure, the combination of a main surface tank adapted to contain inflammable liquid and gas under pressure, an inner tank disposed within the main tank, a non-return valve establishing communication between said inner tank and the liquid contained in the main tank, a

liquid discharge pipe leading from the inner tank to without the main tank, a stop cock in the exterior part of said pipe, a source of compressed gas, a pipe connecting this source with the interior of the inner tank, a gas return pipe connecting the gas chamber of the main tank with a portion of the gas supply pipe exterior of the main tank and means for shutting off such connection between the gas supply and return pipes for the purpose specified.

2. In apparatus for storing and discharging inflammable liquids by means of a non-oxidizing gas under pressure, the combination of a main surface tank adapted to contain inflammable liquid and gas under pressure, an inner tank disposed within the main tank, a non-return valve establishing communication between said inner tank and the liquid contained in the main tank, a source of compressed gas, a liquid discharge pipe leading from the inner tank to without the main tank, a stop-cock in the exterior part of said pipe, a jacket for the exterior portion of said pipe, a pipe connecting the source of compressed gas with the interior of the inner tank, a gas return pipe connecting the gas chamber of the main tank with the portion of gas supply pipe exterior of the main tank, means for shutting off communication between the gas supply and return pipes, jacket pipes inclosing the portions of said supply and return pipes between said means and the main tank, pipes connecting the jackets of the gas return and discharge pipes with the source of compressed gas and pipes establishing communication between these jackets and that of the gas supply pipe.

3. In apparatus for storing and discharging inflammable liquids by means of a non-oxidizing gas under pressure, the combination of a main surface tank adapted to contain inflammable liquid and gas under pressure, an inner tank disposed within the main tank, a non-return valve establishing communication between said inner tank and the liquid contained in the main tank, a siphon-like liquid discharge pipe leading from the inner tank to without the main tank, a stop-cock in the exterior part of said pipe, a branch pipe connecting the upper portion of the discharge pipe with the gas space of the main tank, said branch being of less cross-sectional area than the main discharge pipe and adapted to counteract siphoning action in the main discharge pipe in the event of a leak or break, a jacket for the exterior portions of said main and branch discharge pipes, a source of compressed gas, a pipe connecting this source with the interior of the inner tank, a gas return pipe connecting the gas chamber of the main tank with the portion of the gas supply pipe exterior of the main tank, jacket pipes in-

closing the exterior portions of the gas supply and return pipes, pipes connecting the jacket of the main and branch discharge pipe with the jacket of the gas return pipe,
5 both said jackets communicating with the source of compressed gas, pipes connecting said jackets with that of the compressed gas pipe and a three-way cock for shutting off communication between the gas supply
10 and return pipes and between the jacket of

the latter and the supply of compressed gas during the discharge of the liquid.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PAUL KESSELER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.

Correction in Letters Patent No. 1,047,075.

It is hereby certified that the third word in the name of the assignee in Letters Patent No. 1,047,075, granted December 10, 1912, upon the application of Paul Kessler, of Steglitz, near Berlin, Germany, for an improvement in "Apparatus for Storing and Discharging Inflammable Liquids," was erroneously written and printed "Huneke," whereas said word should have been written and printed Hüneke; 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 28th day of January, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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