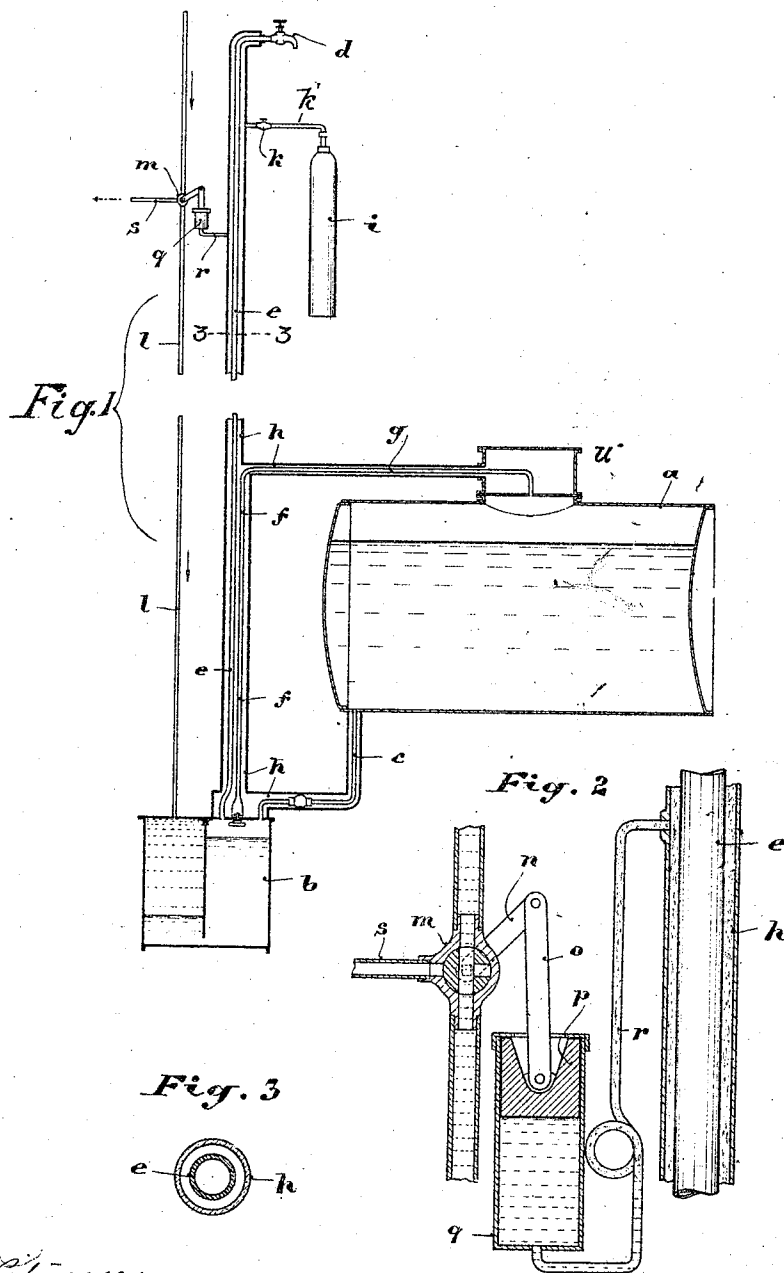


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STORAGE OF LARGE QUANTITIES OF INFLAMMABLE LIQUIDS AND FRACTIONAL DELIVERY THEREOF.
APPLICATION FILED MAY 27, 1909.

1,010,140.

Patented Nov. 28, 1911.



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Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed May 27, 1909. Serial No. 498,743.

To all whom it may concern:

Be it known that I, WILHELM HEER, a citizen of the German Empire, and a resident of Bochum, Germany, have invented certain new and useful Improvements in Storage of Large Quantities of Inflammable Liquids and Fractional Delivery Thereof, of which the following is a specification.

This invention relates to the storage of inflammable liquids, with separate protective gas and pressure medium, and its object is to provide protective means for the pipes and all other endangered parts of the plant, wherein a continuous, closed jacket incloses the pipes and other endangered parts, said jacket being filled with an indifferent gas, at suitable pressure, and being so connected to the mechanism controlling the admission of the pressure-medium that a fall of pressure in the jacket will cause the supply of pressure-medium to be cut off and the working of the apparatus to be stopped.

In the accompanying drawings: Figure 1 is a vertical section, partly broken away, of an apparatus embodying my invention; Fig. 2 an enlarged section through the means for controlling the liquid discharge; and Fig. 3 a cross section on line 3—3, Fig. 1.

The letter *a*, indicates the main storage tank, the bottom of which communicates through pipe *e*, with the top of an auxiliary vessel *b*. From the latter an upright pipe *c*, leads to the discharge faucet *d*, while an elbow pipe *f*, *g*, establishes communication between the top of vessel *b*, and tank *a*, to permit the flow of the protective gas from vessel *b*, into tank *a*, during the discharge of the liquid from the latter into the former. Pipes *e*, *c*, *f* and *g*, are inclosed within a common jacket *h*, that opens in to a compartment *n'*, provided at the top of tank *a*. Where any of the pipes join the respective receptacles the jacket *h* has blind ends. The jacket *h* is charged with protective gas from flask *i* through a pipe *k'* controlled by cock *k*. At a convenient part of the compressed air pipe or conduit *l* the three-way valve *m* is provided, the lever *n* of said valve being connected by rod *o* to weighted or otherwise depressed piston *p*. Piston *p* is movable in cylinder *q* and is placed by means of pipe *r* under pressure of the gas in jacket *h*. By this pressure the piston is held at the upper

end of its travel and holds valve *m* open. To render the piston perfectly tight the cylinder *q* is filled with a sealing liquid (glycerin), so that the gas does not come into direct contact with the piston. Should the pressure in jacket *h* fall, by reason of leakage, the piston moves the lever *n* by gravity and causes valve *m* to cut off the supply of compressed air and place vessel *b* in communication with discharge pipe *s*. Continued working of the apparatus is impossible until the leakage has been found and repaired. The relation between the energy with which piston *p* is lowered and the pressure in the jacket should obviously be such that the piston remains thrust back during normal fluctuations of pressure in the jacket. The possibility of having any desired degree of pressure in the jacket *h* allows of insuring a safe margin of excess over the pressure of the inflammable liquid at all parts of the conduit. It follows that wherever the leakage occurs, a sufficient reduction of pressure to reliably operate the cut-off will take place, and there is no possibility of the liquid entering the jacket and thence finding an issue through some external leak.

Another improvement of the apparatus consists in constructing the pipe, through which the liquid flows, of the strongest available material, but making the surrounding pipe of softer material, which melts more readily. If the conduit is attacked with a hatchet, chisel, saw or blow-pipe, the protective gas pipe is always damaged first, and some time must elapse before the pipe containing the liquid is perforated.

In the drawing the double pipe of the construction first described is shown in cross-section in Fig. 3, forming a safety conduit.

The pipe *e* containing the inflammable liquid is composed of steel or other strong material possessing a high melting point. The jacket *h*, on the other hand, is of lead or other soft, easily melting material, capable of resisting the pressure of the protective gas, and the normal strains imposed in laying the pipes, but yielding at once to abnormal strains, and melting before the pipe *e* in case of abnormal rise of temperature. If, therefore, injury occurs to the pipe *h*, and causes the safety device to be

operated, the liquid has time to flow back through the pipe *e* before the injury can extend to the latter.

What I claim is:

5 1. A device of the character described, comprising a storage tank, an auxiliary vessel, a discharge faucet, pipes connecting the auxiliary vessel with the storage tank and the faucet, a jacket inclosing said pipes
10 and containing a protective gas under pressure, a conduit for admitting a pressure medium to the auxiliary vessel, a cock controlling said conduit, and means actuated by a variation of pressure in the jacket for
15 operating said cock.

2. A device of the character described, comprising a storage tank, an auxiliary vessel, a discharge faucet, pipes connecting the auxiliary vessel with the storage tank and
20 the faucet, a jacket inclosing said pipes and containing a protective gas under pressure, a conduit for admitting a pressure medium to the auxiliary vessel, a valve controlling said conduit, a cylinder communicating with the jacket, and a piston within
25 said cylinder which is operatively connected to the valve.

3. A device of the character described, comprising a storage tank, an auxiliary ves-

sel, a first pipe connecting the top of the 30 tank with the top of the vessel, a compartment inclosing said pipe at the junction thereof with the tank, a discharge faucet, a second pipe connecting the auxiliary vessel with said faucet, a protective gas jacket 35 surrounding both pipes and communicating with the compartment, a pressure medium conduit communicating with the auxiliary vessel, a valve controlling said conduit, and means for operatively connecting the pro- 40 tective gas jacket with said valve.

4. A device of the character described, comprising a storage tank, an auxiliary vessel, a discharge faucet, hard metal pipes connecting the auxiliary vessel with the 45 storage tank and faucet, a soft metal jacket inclosing the pipes and containing a protective gas under pressure, a conduit for admitting a pressure medium to the auxiliary vessel, a cock controlling said conduit, and 50 means actuated by a variation of pressure in the jacket for operating said cock.

Signed by me at Barmen, Germany, this 17th day of May 1909.

WILHELM HEER. [L. S.]

Witnesses:

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