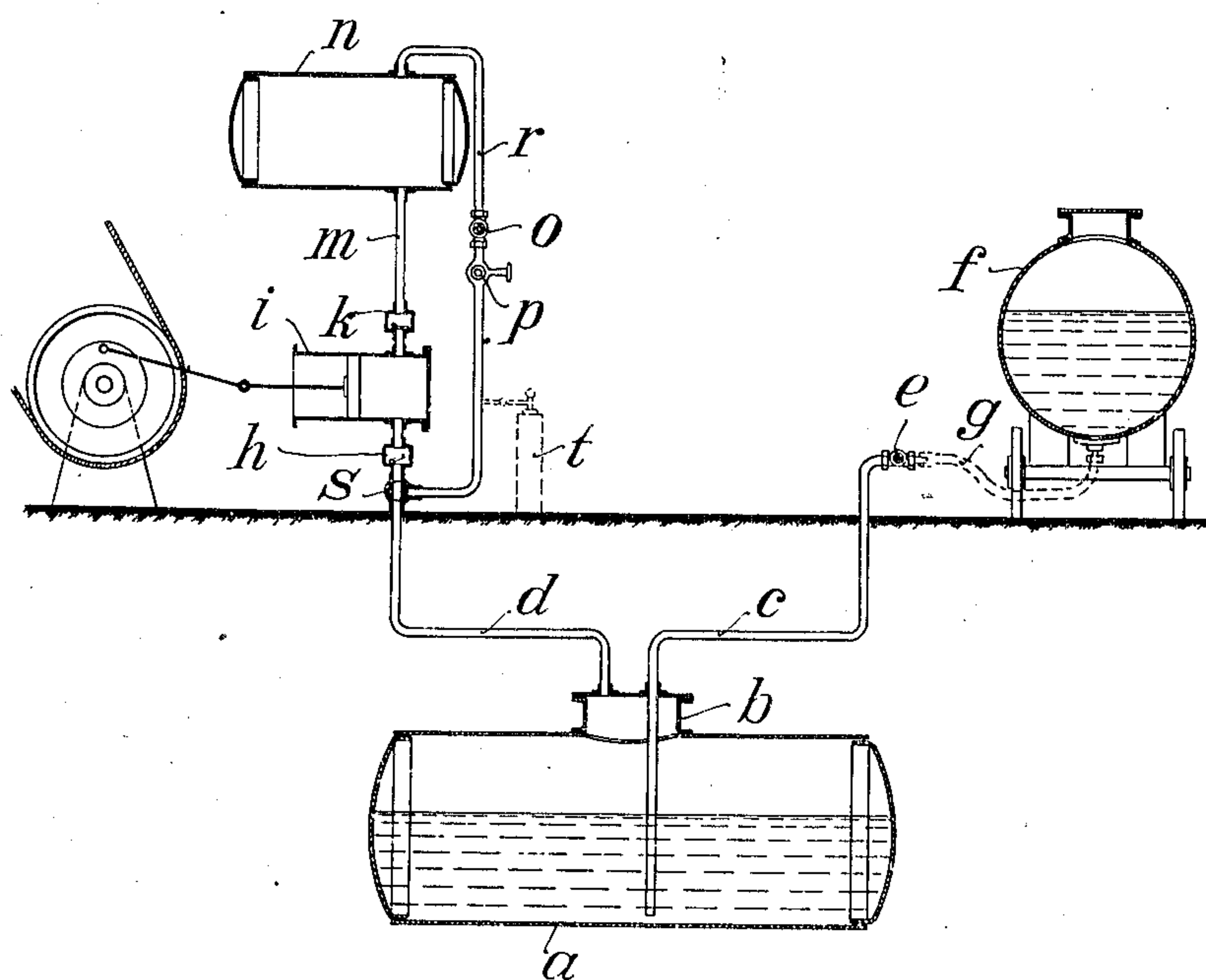


No. 871,353.

PATENTED NOV. 19, 1907.

C. MARTINI & H. HÜNEKE.  
STORAGE AND TRANSFERENCE OF INFLAMMABLE LIQUIDS.  
APPLICATION FILED MAR. 22, 1907.



Witnesses:  
John A. Kellenbeck  
John Lotka

Inventors  
Carl Martini  
Hermann Hüneke  
By Briesen Thum  
Attorneys



# UNITED STATES PATENT OFFICE.

CARL MARTINI AND HERMANN HÜNEKE, OF HANOVER, GERMANY.

## STORAGE AND TRANSFERENCE OF INFLAMMABLE LIQUIDS.

No. 871,353.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed March 22, 1907. Serial No. 363,932.

*To all whom it may concern:*

Be it known that we, CARL MARTINI and HERMANN HÜNEKE, citizens of the German Empire, residing at Hanover, Germany, have invented certain new and useful Improvements in the Storage and Transference of Inflammable Liquids; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus for the storage and transference of inflammable liquids such as benzene for example in which a gas which is non-oxidizing or which acts as a non-oxidizing gas (such as carbonic acid gas) is used for transference of the liquid and for filling the space above it in the tanks.

According to this invention the gas issuing from the storage tank when the inflammable liquid is being transferred thereinto from the transporting vessel, is directly or indirectly drawn or passed by a compressor or the like into a reservoir tank or accumulator, thence it can again be supplied as required to the storage tank, through suitable pipes so that the same gas can be repeatedly used for transference of the liquid.

The object of the invention is chiefly to effect a saving by recovering the gas used for transference of the liquid and using it again. It is therefore only necessary to introduce fresh gas to make up for the comparatively small quantities which may escape owing to leaks in the apparatus and such like losses. It is consequently possible according to this invention to use pure non-oxidizing gases even in large installations.

Owing to the circulation of the gas and its being used repeatedly the loss of a certain quantity of liquid which would be carried away by or otherwise escape with the gas during the transference of the inflammable liquid is avoided. Further owing to the gas contained in the storage tank being drawn out simultaneously with the filling of the liquid into the tank, this filling is considerably accelerated.

The construction of an apparatus embodying our invention is illustrated in the accompanying drawing.

Through the cover *b* of the storage tank *a* pass the gas pipe *d* and the pipe *c* which extends close to the bottom of the tank and serving for filling and discharging the inflam-

mable liquid. The pipe *c* is provided at its outer end with a stop valve *e* to which can be connected a hose pipe *g* serving for transmitting the liquid from the transport vessel *f* into the storage tank *a*. The gas pipe *d* is connected to the suction valve *h* of a compressor *i* or like apparatus the discharge valve *k* of which is connected by a pipe *m* to a reservoir or accumulator *n*. The tank *n* containing the gas under pressure is connected by means of a pipe *r* provided with a reducing valve *o* and a stop valve *p*, to the pipe *d* below the suction valve *h* a three-way cock *s* being arranged at the junction. By means of this three-way cock *s*, communication can be established either between the pipe *d* and the compressor *i*, the pipe *r* being shut off, or between the pipe *r* and the pipe *d*, the compressor *i* being shut off.

The operation of the apparatus is as follows:—When it is desired to transfer the liquid contained in the transport vessel *f* into the storage tank *a*, the three-way cock *s* is turned into such position as shown in the drawing as to establish communication between the pipe *d* and the suction valve *h* of the compressor *i*, the pipe *r* being shut off. While the liquid is flowing through the pipes *g* and *c*, the gas contained space above the liquid in the tank *a* (having been previously introduced in a suitable manner), is drawn off through the pipe *d* and forced into the tank *n* through the pipe *m*. As soon as the storage tank *a* is filled the three-way cock is turned in such manner that the communication between the compressor *i* and the pipe *d* is closed, and the latter is connected to the pipe *r* connected to the tank *n*. Further, the hose pipe *g* is disconnected from the stop valve *e* of the liquid pipe. The liquid contained in the tank *a* can then be discharged through the cock or valve *e* after having opened the valve *p* of the pipe *r*, so that the gas contained under pressure in the reservoir *n*, after passing through the reducing valve *o* can find its way into the tank *a* through the three-way cock *s* and the pipe *d*.

After the storage tank *a* has been emptied it can again be filled in the manner described, the gas contained in the storage tank being drawn off by the compressor *i* and forced into the reservoir *n* while inflammable liquid is flowing or being forced into the tank from a transport vessel. Thus the same quantity of gas is always used and circulated according to this process during the transference or



storage of inflammable liquids. Any loss of gas owing to leakage in the pipes or otherwise may be easily made up for instance by connecting to the pipe *r* a tank *t* filled with a  
 5 non-oxidizing pressure gas, for example a carbonic acid bottle.

It will be understood that the gas drawn from the storage tank may be passed by the compressor, pump or like device into the res-  
 10 ervoir under considerable pressure so as to maintain in the reservoir the full pressure required for the subsequent transference of the liquid from the storage tank.

The details of the apparatus may be varied  
 15 in other ways without departing from the spirit of the invention and the apparatus may obviously be adapted to various circumstances and requirements.

What I claim and desire to secure by Letters Patent is:—

1. In a device of the character described, the combination of a storage receptacle for inflammable liquids located below the level of the ground, a liquid-conveying pipe lead-  
 25 ing from the bottom thereof, a gas pipe leading from the top thereof, and a three-way cock in said pipe above the surface of the ground, the said gas pipe branching from the three-way cock, one branch leading to a suc-  
 30 tion pump and the other to a gas-pressure bottle and a gas-storage receptacle, which latter is also connected directly to the discharge end of the pump, substantially as described.

35 2. In a device of the character described,

the combination of a storage receptacle, a liquid-conveying pipe leading from the lower part of the receptacle, a gas pipe leading from the upper part of the receptacle, a gas-storage tank, a pump having its inlet connected  
 40 with the gas pipe and its outlet with the said tank, a discharge pipe leading from the tank to the gas pipe at a point between the pump and the receptacle, and adjustable means for connecting the gas pipe either with the pump  
 45 inlet or with the discharge pipe of the tank.

3. In a device of the character described, the combination of a storage receptacle, a liquid-conveying pipe leading from the lower part of the receptacle, a gas pipe leading from  
 50 the upper part of the receptacle, a gas-storage tank, a pump having its inlet connected with the gas pipe and its outlet with the said tank, a discharge pipe leading from the tank to the gas pipe at a point between the pump,  
 55 and the receptacle, a reducing valve in said discharge pipe, and adjustable means for connecting the gas pipe either with the pump, for the withdrawal of gas from the receptacle, or with the discharge pipe of the tank, for the  
 60 passage of compressed gas to the receptacle from the tank.

In testimony whereof we hereunto affix our signature in the presence of two witnesses.

CARL MARTINI.  
 HERMANN HÜNEKE.

Witnesses:

JAMES M. BOWCOCK,  
 MARTA L. THOMPSON.