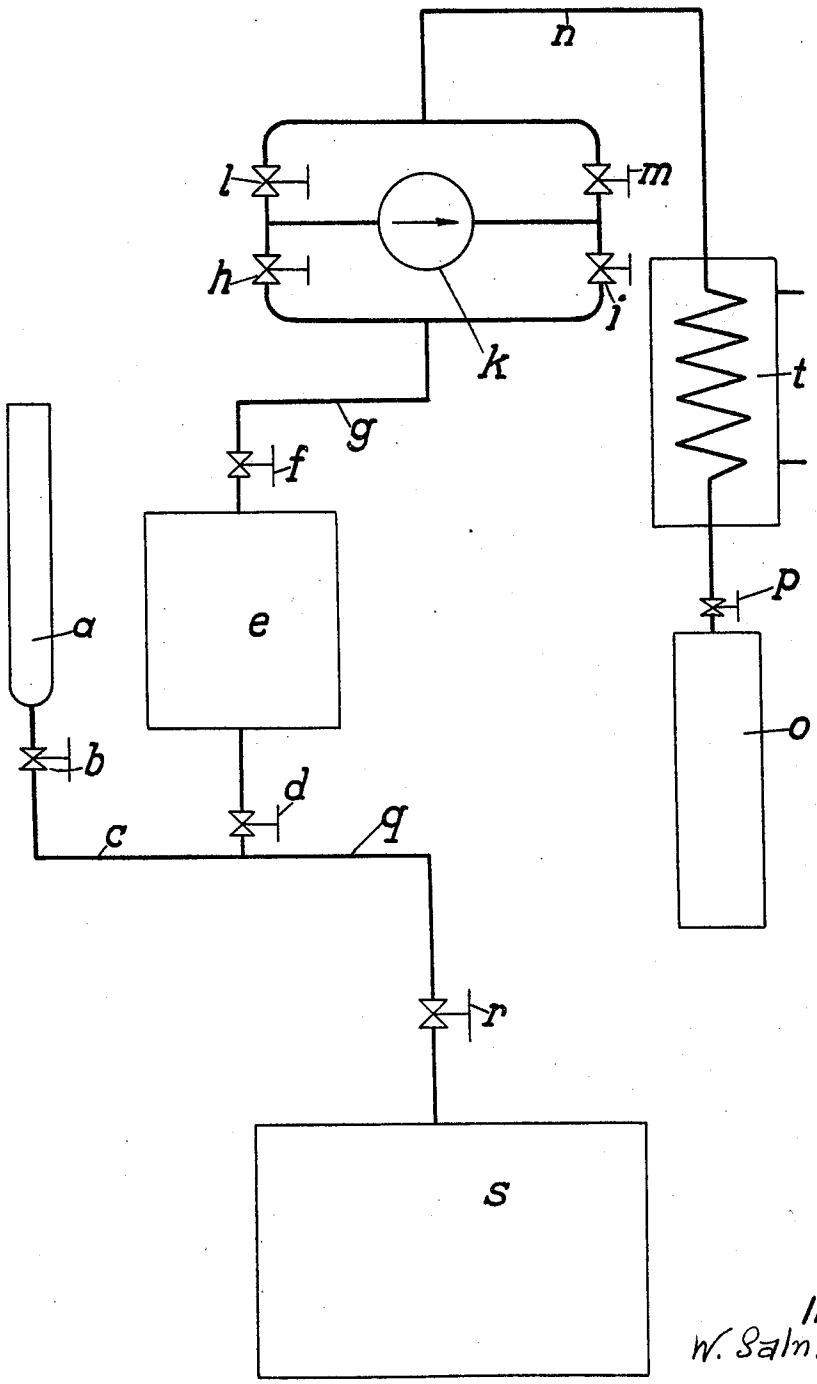
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TRANSFER OF LIQUEFIED GASES

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TRANSFER OF LIQUEFIED GASES

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This invention relates generally to a method of transferring liquefied gases and especially to a method of transferring such gases which are used for operating floating signal systems as in buoys and the like. In such cases it is necessary to effect the transfer of the gas from the usual transportation drums with exclusion of air.

It has already been proposed to effect the transfer in such a manner that the gas from the transportation drum is completely vaporized and then forced by a pump under pressure and cooling into the vessel to be filled. However, this method has the drawback that the entire gas, which is in a liquefied state in the transportation drum as well as in the storage vessel, must be completely vaporized for the purpose of transfer, which results in a great loss of time and is moreover uneconomical.

The present invention solves the problem in question by drawing the liquefied gas out of the transportation drum into the storage vessel whereby only that portion of the gas, which is converted into a gaseous state during the transfer, is forced by pressure and cooling into an empty transportation vessel and is again liquefied. According to this method, the greater portion of the liquefied gas is transferred without change of state which constitutes a much quicker and more economical operation.

In the case, wherein the storage vessel has only one filling opening, the transferring method comprises the following steps:

Connecting the transportation drum with a vessel through a piping, connecting the vessel with a pump for compressing and conveying gas, evacuating the vessel by means of the said piping and the pump, forcing that part of the gas, which is vaporized during the passage of the liquefied gas from the transportation drum into the vessel, through a cooled connection between the vessel and a second transportation drum into the said second transportation drum wherein the gas is again liquefied, connecting the vessel with a storage vessel, connecting the pressure side of the said pump with the vessel, forcing the liquefied gas out of the vessel into the said storage vessel through the said connections by means of the gas pump, the second transportation drum communicating with the suction side of the pump, whereby the gas which is again liquefied in the second transportation drum is vaporized and assists the working of the pump.

The invention will now be described with reference to the drawing.

The figure shows diagrammatically the transfer of the liquefied gas to a vessel having only one opening.

The figure shows how a storage vessel with one filling opening can be filled according to the invention.

a indicates the transportation drum to be transferred. *s* is the vessel to be filled. Vessel *e* plays the role of an intermediate container. There is provided between *a* and *s* a pipe *c* having cocks *b* and *r* and also a branch pipe which latter leads through a valve *d* into the intermediate container *e*. In this branch pipe, the valve *d* is provided. That part of the intermediate container *e*, which is free from liquefied gas under all working conditions, communicates through the pipe *g* with valve *f* and another adjoining pipe having the cocks *h, i, l, m* with the pump *k* and thence through pipe *n* with the cooling coil *t* and second transportation drum *o* through a valved pipe *p*. The pipe with the cocks *h, i, l, m* renders it possible to connect the intermediate container *e* selectively to the suction or pressure side of the pump *k*. If desired, the second transportation drum *o* may be connected in a similar manner to opposite sides of the pump *k*.

The apparatus operates in the following manner:

First of all, the cocks *r, i* and *l* are closed, the cocks *d, f, h, m* and *p* are opened, the pump *k* and the cooling device *t* are set in operation and the apparatus evacuated. The cock *b* is then opened whereupon the liquefied gas is sucked in a liquid state into the intermediate container *e*. The partially vaporized gas is drawn away in front of the pump *k* and forced through the cooling device *t* into the empty transportation drum *o* and the gas is again liquefied. If the intermediate container *e* is full, the cocks *b, h* and *m* will be closed and *r, l* and *i* opened, the cooling device *t* will be disconnected and then the pump will force the liquefied gas out of the intermediate container *e* through the pipe *q* into the storage vessel *s*. Since during this operation, the drum *o* charged with re-liquefied fuel is located on the suction side of the pump *k* and the cooling device *t* is disconnected, the gas in drum *o* is vaporized and assists the action of the pump *k* in forcing the liquefied gas out of *e* into *s*.

I claim:—

1. A plant for transferring from one vessel

to another liquefied gases with exclusion of atmospheric air, such gases being intended for burning or illuminating purposes and having a comparatively high boiling point or a slight over-pressure at room temperature, the gas being stored in a liquefied state; said plant comprising, in combination with supply drum and storage vessel, a valved conduit between said supply drum and storage vessel, a second drum and a second valved conduit between said storage vessel and said second drum, a cooling device and a gas compressing pump in the second conduit, adapted to vaporize the gas and evacuate it from said storage vessel and conveying the vaporized gas to the second drum through said cooling device wherein the gas becomes reliquefied, an intermediary container inserted in the conduit between said storage vessel and the gas pump, and having connection with said first conduit.

2. A method of transferring from a drum to a storage vessel liquefied gases in a substantially liquefied condition with exclusion of air, said gases being intended for burning or illuminating purposes and having a comparatively high boiling point or a slight overpressure at room temperature, the gas being stored in a liquefied state in said storage vessel; the said method consisting in connecting the drum with a vessel through a piping, connecting that part of the vessel which is always free from liquefied gas with a pump for compressing and conveying gas, evacuating the vessel by means of the said piping and the said pump, forcing that part of the gas, which is vaporized during the passage of the liquefied gas from the drum into the vessel, through a cooled connection between the vessel and a second drum into the said second drum wherein the gas is again liquefied, connecting the vessel with a storage vessel, connecting the pressure side of the said pump with that part of the vessel, which is always free from liquefied gases, forcing the liquefied gas out of the said vessel into the said storage vessel through the said connections by means of the said gas pump, the second drum communicating with the suction side of the pump, the piping between the vessel and the second drum being not cooled during this period of operation whereby the gas which is liquefied again in the second drum is vaporized and assists the working of the pump.

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