

G. WEBER.
RECEPTACLE FOR LIQUID AIR.
APPLICATION FILED SEPT. 27, 1919.

1,424,604.

Patented Aug. 1, 1922.

Fig. 1

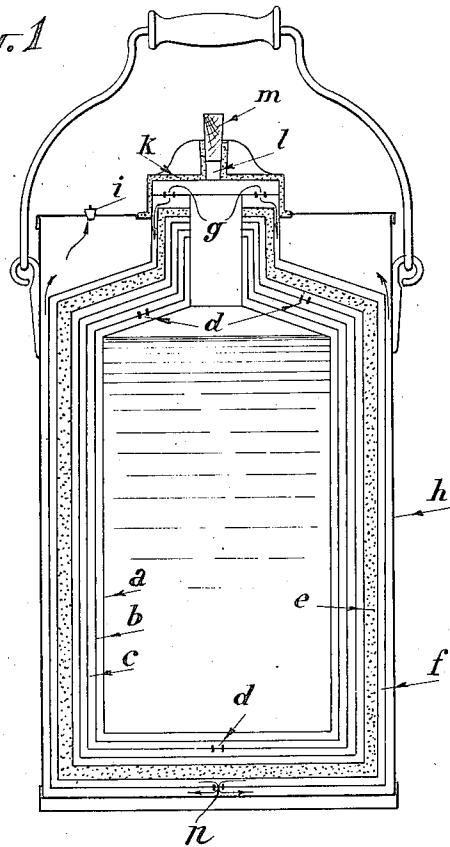
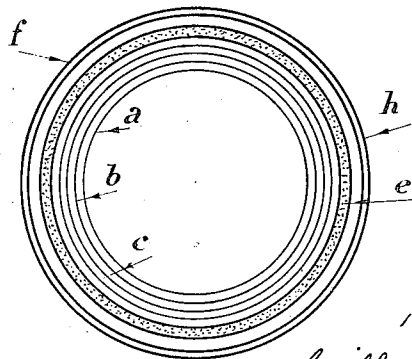


Fig. 2



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UNITED STATES PATENT OFFICE.

GUILLAUME WEBER, OF HAYANGE, FRANCE, ASSIGNOR TO SOCIÉTÉ LES PETITS FILS DE FRANÇOIS DE WENDEL ET CIE., OF PARIS, FRANCE.

RECEPTACLE FOR LIQUID AIR.

1,424,604.

Specification of Letters Patent.

Patented Aug. 1, 1922.

Application filed September 27, 1919. Serial No. 326,978.

To all whom it may concern:

Be it known that I, GUILLAUME WEBER, subject of the Republic of France, residing at Hayange, Lorraine, France, have invented certain new and useful Improvements in Receptacles for Liquid Air (for which I have filed an application in Germany on the 23rd of Nov., 1917), of which the following is a specification.

The receptacles presently in use for transporting or storing liquid air are mostly glass or china vessels with a double wall and an intermediate vacuum space.

Said receptacles are objectionable in that they are expensive to manufacture, are easily broken and often ensure a good insulation only for a short time. Moreover, such receptacles cannot be used to receive cartridges which are to be impregnated with liquid air.

This invention has for its object an improved receptacle for liquefied air or other gases with or without a protecting space more or less completely free from air in which the above disadvantages are eliminated. Said receptacle may be manufactured at a low cost price and in any dimensions. It is very strong and durable and may be also used for receiving cartridges to be impregnated with liquid air.

In the annexed drawing:

Fig. 1 is a longitudinal section of a receptacle for transporting and storing liquefied air or other gases, constructed in accordance with the invention.

Fig. 2 is a corresponding horizontal cross section.

The improved receptacle is composed of an inner reservoir *a*, and a few concentric vessels *b* with intervening spaces *c* filled with atmospheric air or any other gas and in communication with each other by small openings *d*. Around the outer vessel *b* is a casing *e* which is preferably filled with an insulating material and is itself surrounded by one or more chambers *f* which will receive the cool vapors issuing from the liquid air contained in the inner reservoir and passing through openings *g* formed in the upper part of the receptacle. The receptacle comprises also a protecting outer casing *h*, a valve *i* and a cap *k* having a conical passage *l*. The outer wall of the last of said chambers *f* is formed of said casing *h* and the chambers *f* communicate with each other by small openings such as *n* (Figure 1.)

The small openings provided in the concentric vessels have for their purpose to establish a communication between the different vessels for balancing the pressure produced in said vessels when air at a low temperature has been introduced into the reservoir and so prevent said concentric vessels from collapsing. By this means it is no more necessary to strengthen the different vessels by connecting or bracing them to each other, which would interfere with a good insulation of the receptacle.

Experiments have shown that the rate of evaporation of liquid air decreases as the number of the vessels provided with small openings increases but said decrease does not obtain in the same ratio as the increase in the number of concentric vessels.

In the present instance, for the purpose of obtaining a receptacle which is very handy, it is highly desirable to provide only a few vessels filled with atmospheric air for instance four and five and have the walls or envelopes extended as high as possible around the neck of the receptacle in order to obtain a better protection against outer heat.

The evaporated air does not pass, as a rule, through the vessel *e* filled with an insulating material so that the insulating power of the same is not decreased by the moisture in the vapours.

In order to utilize the cold vapours given out in a great quantity during the introduction of the liquid air and cartridges into the inner reservoir, said vapours are forced, upon closing the cap *k* which is only removed for the purpose of introducing the cartridges, to enter the openings *g* and fill the chambers *f*. The small passage *l* provided in the cap is used for introducing the liquid air into the receptacle, said liquid air being either drawn from the liquefying apparatus by means of a pipe or taken from a storage tank by means of a funnel. The passage *l* is closed by means of a conical stopper *m*.

It will be noted that the receptacles heretofore used for transporting and storing liquid air, as well as those used for impregnating liquid air cartridges for mining purposes were so constructed that the cold vapours given off in a great quantity during the introduction of the liquid air into the receptacle and the cooling of the cartridges down to the temperature of the liquid air

were permitted to escape freely and wasted; they were not utilized for cooling the receptacles and the cartridges.

5 If it is desired to provide a vacuum space free from air between two concentric vessels, said vessels will be held apart by spacers made of a material which is a bad conductor of heat.

10 Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A portable receptacle for liquefied gases comprising an inner reservoir, a few concentric vessels arranged around said inner reservoir and in communication with each other by small openings, said concentric vessels being filled with a dead volume of atmospheric air, an intermediate casing surrounding the outer vessel and containing an insulating material, outer casings surrounding the intermediate casing and having their insides in communication with each other, a valve on the outermost casing adapted to open into the outer atmosphere, a passage affording a communication between the inside of the reservoir and the outer atmosphere, the innermost of the outer casings

being in communication with said passage, a closure adapted to close the outlet of said passage and carrying means on the outermost casing.

2. A receptacle for liquefied gases comprising an inner reservoir, insulating envelopes around the same, terminating at their upper part by a narrow portion surrounding a neck, said neck communicating with said inner reservoir and having such a dimension that it allows of introducing blast cartridges into the reservoir and removing the same therefrom, removable means for closing said neck by simple engagement on the top of said narrow portion, a small passage through said cap in communication with the reservoir for introducing or removing the liquefied gas and removable means for closing said passage.

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

GUILLAUME WEBER.

Witnesses:

JEAN DUMORY,
EDOUARD FABER.