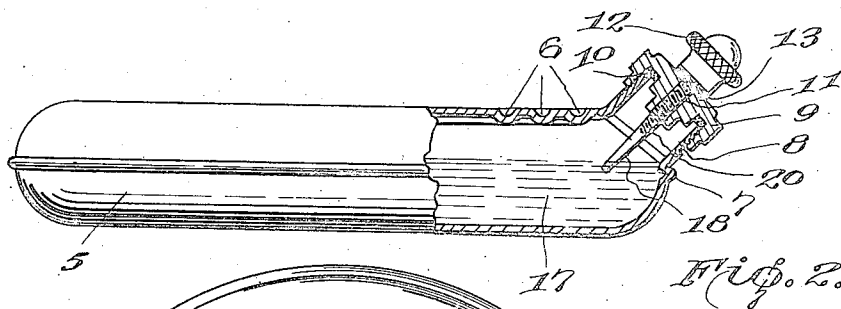
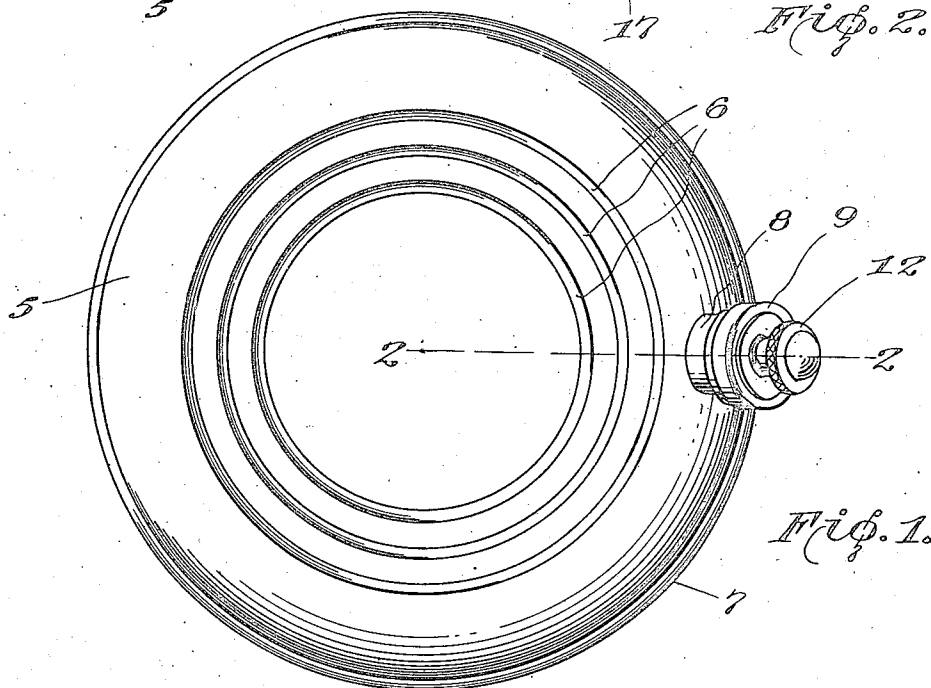
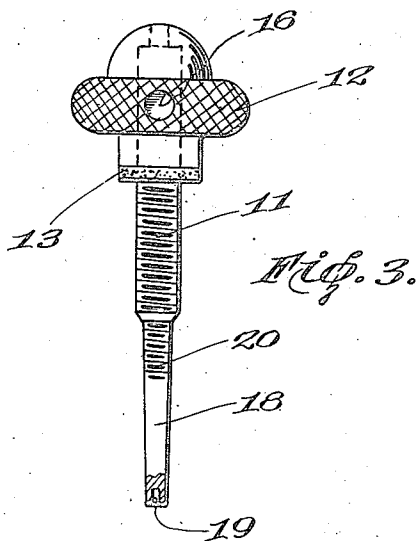
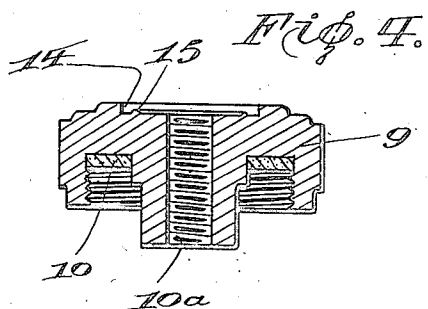


G. L. HOGAN.
HEAT STORAGE BATTERY.
APPLICATION FILED JULY 21, 1921.

1,433,010.

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GEORGE LEWIS HOGAN, OF CHICAGO, ILLINOIS.

HEAT-STORAGE BATTERY.

Application filed July 21, 1921. Serial No. 486,632.

To all whom it may concern:

Be it known that I, GEORGE LEWIS HOGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Heat-Storage Batteries, of which the following is a specification.

This invention relates to devices or batteries for storing heat in which the active medium is a chemical possessing the ability to absorb heat while being reduced from a crystalline condition to a liquid condition, and to give forth heat when returning from a liquid condition to a crystalline condition. This invention has for its object to provide a novel and improved apparatus of the kind stated, and in order that the same may be better understood, reference is had to the accompanying drawing forming a part of this specification.

In the drawing Fig. 1 is a plan view of the apparatus; Fig. 2 is a side elevation thereof, partly in section on the line 2—2 of Fig. 1; Fig. 3 is an enlarged elevation of a rod used in connection with the apparatus, and Fig. 4 is an enlarged section of a cap.

In carrying out the invention there is provided a relatively shallow vessel 5 which may be cylindrical as shown. The vessel is charged with a chemical which releases heat by crystallization. The top of the vessel has annular corrugations 6, its side has one or more encircling corrugations or depressions 7 to obtain some degree of flexibility and thus permit expansion and contraction of the contents as the condition thereof changes, thereby preventing bursting of the vessel and preventing to a great extent the formation of a vacuum when the contents are liquid.

The vessel 5 has a filler neck 8 provided with a closure in the form of a screw cap 9, the same being internally threaded to screw over the outside of the neck, and the latter being externally screw-threaded for this purpose. A gasket 10 is interposed between the neck and the cap to obtain an air-tight seal.

The cap 9 is formed with a threaded central opening 10^a into which is screwed a threaded rod 11 which projects from the cap and has on the outside of the latter a milled head 12 whereby it may be turned for insertion, and removal. In order to make an air-tight seal between the cap 9 and the rod 11, there is interposed between the under side

of the head and the top of the cap a gasket 13, which, when the rod is screwed home is tightly compressed between the top of the cap 9 and the bottom of the head 12. The top of the cap has a recess 14 to accommodate the gasket 13, and inside the recess is an annular rib 15 on which the gasket seats to form an air-tight seal. The head 12 may be provided with a side hole 16 for the application of a key for screwing in and unscrewing the rod 11.

The rod projects from the inside of the cap a sufficient distance so that its inner end may dip into the contents 17 of the vessel, said projecting end 18 being of somewhat reduced diameter and tapered, and its extremity having a recess 19. The rod end 18 also has a few threads, as shown at 20.

In use, the vessel 5 is partly filled with a super-saturated solution of some chemical which evolves heat upon crystallization, and such solution being so sensitive that when a crystal of the same substance is introduced into the solution, crystallization will immediately take place throughout the entire mass. The chemical employed may be sodium acetate or another chemical of like characteristics. When it is desired to use the stored heat, the rod 11 is unscrewed and upon being withdrawn, a portion of the solution will adhere to the part 18 and also the hole 19. This part of the rod is then wiped apparently dry, whereupon evaporation of the solution remaining thereon will form minute crystals on the rod which will connect with the charge in the hole 19 and crystallize the same. The rod is now pushed rapidly through the opening 10^a in the cap 9, but before the threaded upper end reaches the threads of the opening crystallization will in all probability have started in the solution adhering to the threads, but as the lower end 18 of the rod is also threaded it will work its way through the hard crystals so formed until the upper threads of rod 11 engage the threads of the opening 10^a, and the rod can then be screwed down to form an air-tight seal by using a wrench pin or key inserted into the hole 16 of head 12. If the solution in the vessel 5 fails to crystallize, the hole 19 may be filled with a charge of actual crystals upon removal of the rod 11, after which the rod is replaced to introduce such charge into the solution in the vessel.

It will be noted that the lowest point of

the seal formed at the rod 11 is above a line drawn parallel to the top wall of the vessel 5. It will therefore be seen that when liquefying the chemical in the vessel, which is best accomplished by placing the vessel in boiling water so that the water just covers the top of the vessel, the seal will be above the water, as otherwise the suction caused by the vacuum formed due to the contraction of bulk would draw water into the vessel should the slightest leak be in the seal. The vessel 5 is preferably charged with the chemical substance in crystallized form, and it is then heated until liquefaction of the mass takes place.

Referring to the function of the annular corrugations 6, their importance is augmented by the fact that they permit expansion in an added sense, as follows: In order to store the heat in the vessel, it is necessary to immerse the same in boiling water, and as the salt contained in the vessel is anhydrous, the excess water therein would be converted into steam; any pressure therefore exerted by the steam is compensated for by the expansion of the sides of the vessel through the agency of the annular corrugations mentioned.

I claim:

1. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, a rod extending into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel to permit crystallization of the liquid adhering thereto, and a sealing means for the rod located outside the plane of one of the walls of the vessel for permitting immersion of the vessel without immersion of the sealing means.

2. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, and a rod extending into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel to permit crystallization of the liquid adhering thereto, and the inner end of the rod being apertured.

3. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, and a rod extending into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel to permit crystallization of the liquid adhering thereto, that portion of the rod which dips into the liquid being reduced and tapered.

4. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, and a rod extending into the vessel to dip

into the liquid contents thereof, said rod being removable from the vessel to permit crystallization of the liquid adhering thereto, that portion of the rod which dips into the liquid being reduced and tapered, and its extremity being apertured.

5. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, and a rod extending into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel to permit crystallization of the liquid adhering thereto, that portion of the rod which dips into the liquid being tapered and threaded, and its extremity being apertured.

6. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, said vessel having a filled neck, a cap closing said neck and having a threaded opening, and a screw-threaded rod mounted in said opening and passing into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel through the cap without removal of the cap from the filler neck to permit crystallization of the liquid adhering to the rod.

7. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, said vessel having a filler neck, a cap closing said neck and having a threaded opening, a screw-threaded rod mounted in said opening and passing into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel through the cap to permit crystallization of the liquid adhering to the rod, the outer end of the rod being provided with a head located on the outside of the cap, and a compressible sealing member between said rod head and the outside of the cap.

8. A heat storage battery consisting of a vessel charged with a chemical in liquid form which releases heat by crystallization, said vessel having a filler neck, a cap closing said neck and having a threaded opening, a screw-threaded rod mounted in said opening and passing into the vessel to dip into the liquid contents thereof, said rod being removable from the vessel through the cap to permit crystallization of the liquid adhering to the rod, the outer end of the rod being provided with a head located on the outside of the cap, and a compressible sealing member between said rod head and the outside of the cap, the latter having a ribbed recess to seat the sealing member.

In testimony whereof I affix my signature.

GEORGE LEWIS HOGAN.