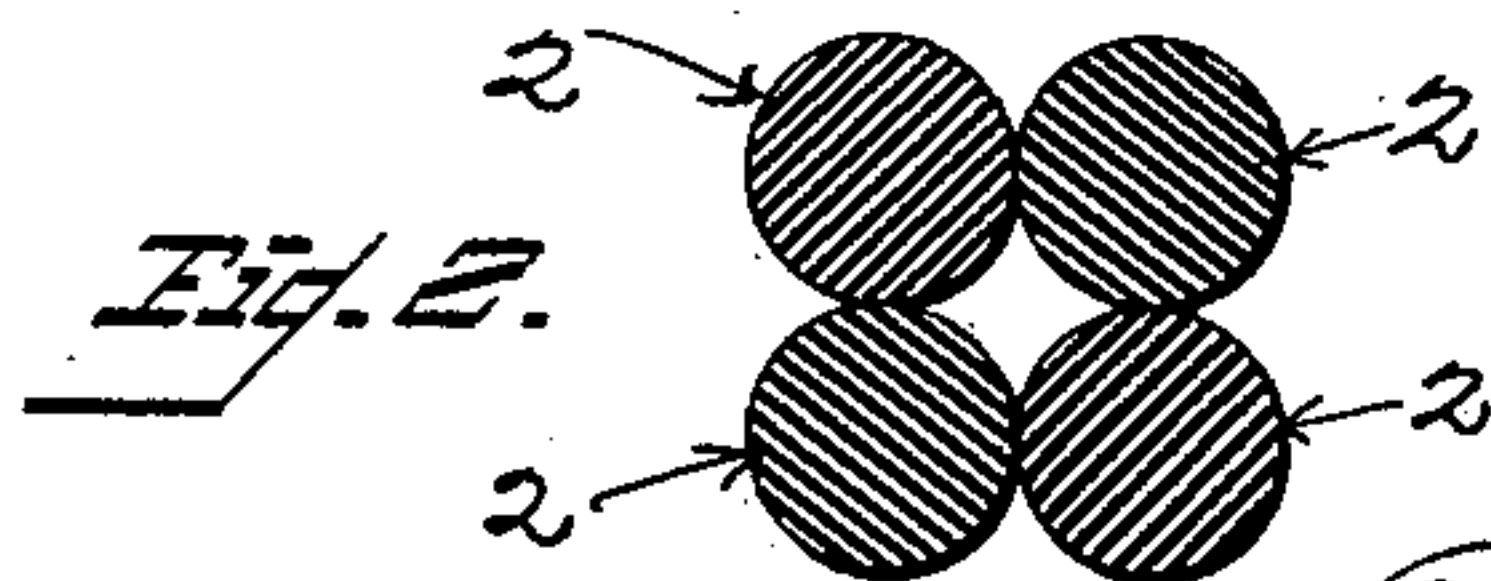
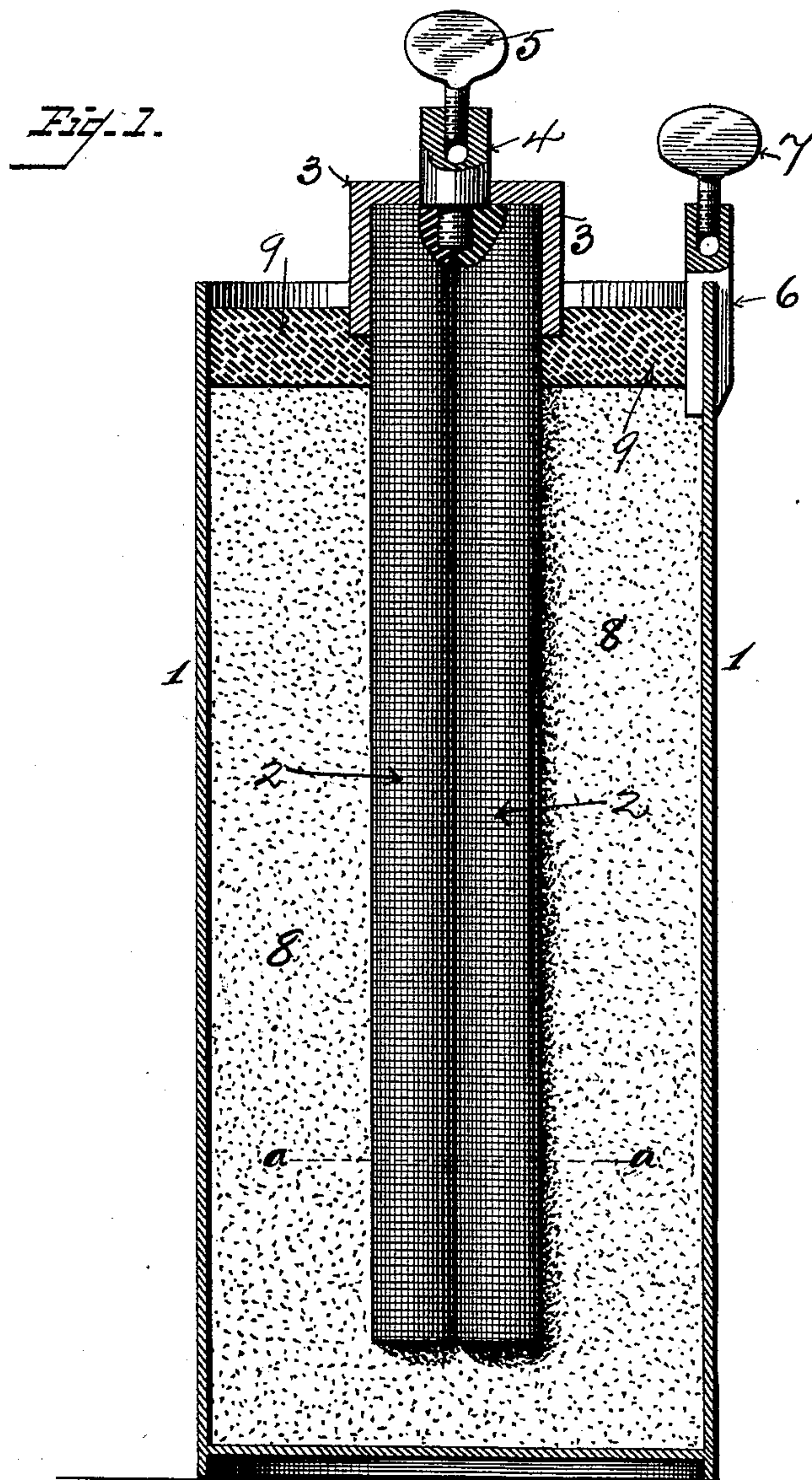


(No Model.)

D. J. ARNOLD.
GALVANIC BATTERY.

No. 403,868.

Patented May 21 1889.



Witnesses,
M. L. Gooch

Inventor
Don J. Arnold
By his Attorney
Chas J. Gooch

UNITED STATES PATENT OFFICE.

DON J. ARNOLD, OF OMAHA, NEBRASKA, ASSIGNOR OF ONE-HALF TO
HARLAN B. CORYELL, OF SAME PLACE.

GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 403,868, dated May 21, 1889.

Application filed January 25, 1889. Serial No. 297,527. (No model.)

To all whom it may concern:

Be it known that I, DON J. ARNOLD, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Galvanic Batteries; and I 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 improved construction of dry galvanic batteries, whereby the freezing of the battery and the escape of the gases generated are prevented.

Within the zinc-cup I arrange a plurality of round carbons, which are bunched together, thereby increasing the operative surface of the carbon over those cases where a single carbon of corresponding size is employed. The space between the carbons and the zinc-cup is then filled with a non-freezing gas-generating composition composed of litharge, chloride of zinc, muriate of ammonia, oxide of mercury, and a body-former composed of either hydraulic cement or plaster-of-paris. These several ingredients are mixed together in a semi-fluid state with water. When this composition has become hardened, the battery is sealed with asphaltum or mineral pitch.

In the accompanying drawings, Figure 1 represents a vertical section of a galvanic battery constructed according to my invention. Fig. 2 represents a transverse section thereof on the line *a a* of Fig. 1.

1 represents a zinc-cup, which may be of any ordinary construction.

2 represents the carbon, which I prefer to construct of a plurality—usually four—of round carbons, each about half an inch thick, and bunched together, as shown in Fig. 2, whereby greater contact-surface is secured for the carbon than where a single carbon of equal diameter is employed. These carbons 2 are at their upper ends clamped together by an inclosing-clamp, 3, to which is attached a metallic strip, 4, with which the contact pin or post 5 is connected.

6 represents another metallic strip attached to the zinc-cup to receive the other contact post or pin, 7.

In lieu of filling the zinc-cup with a fluid or semi-fluid current-excitant, which is liable in cold weather to freeze, I fill the space within the zinc-cup with a current-generating composition, 8, composed of litharge, chloride of zinc, muriate of ammonia, oxide of mercury, and a body-former consisting of either hydraulic cement or plaster-of-paris. These ingredients are intimately mixed together by the aid of a sufficient quantity of water to bring the composition to a semi-fluid state. When so mixed, the composition is poured into the cup, so as to fill the space therein between the carbon and the zinc of the cup. When the composition has become hardened, which will occur in due course owing to the presence of the cement or plaster-of-paris, I then seal it up with asphaltum or mineral pitch, in order to prevent the gases escaping from the cup-filling. 9 represents the sealing of asphaltum or mineral pitch.

While the respective proportions of the several ingredients may be varied in practice without departing from my invention, which consists in the employment of the ingredients named in combination and in sealing them within a jar in a dry and solid state, as described, I have found the following proportions very effective, viz: litharge, one part; chloride of zinc, two parts; muriate of ammonia, three parts; oxide of mercury, one part; hydraulic cement or plaster-of-paris, six parts; water, four parts.

By thus forming a dry battery it can be used in all temperatures without danger of freezing in the coldest weather. It can be roughly handled, shaken and thrown around, or packed in any position and transported without danger of spilling or losing any portion of the excitants, and batteries of this construction can be manufactured complete and ready for use and transported to destination and placed on sale in condition for immediate use.

Other advantages secured by my construction are that this battery longer retains its effectiveness and is longer-lived than fluid or semi-fluid batteries, and is not subject to atmospheric influences or to deterioration by exposure.

What I claim is—

1. A galvanic battery composed of a receiving and retaining jar and a solid filling consisting of litharge, chloride of zinc, muriate
5 of ammonia, oxide of mercury, and a cement, as plaster-of-paris or hydraulic cement, a carbon or carbons, contact-posts, and a sealing-cap of asphaltum or mineral pitch.
2. A galvanic battery composed of a receiving and retaining jar, a solid filling consisting of litharge, chloride of zinc, muriate of
10 ammonia, oxide of mercury, and a cement, as plaster-of-paris or hydraulic cement, a plurality of round carbons, a clamp inclosing and
15 binding the upper ends of said carbons together, contact-posts, and a sealing-cap of asphaltum or mineral pitch.
3. A galvanic battery consisting of a jar, a

plurality of round carbons contained therein, a clamp inclosing and binding said carbons
20 together, contact-posts connected, respectively, to said carbon-clamp and jar, a solid filling surrounding said carbons and filling the spaces between the same and the jar, and
a sealing cap or cover, whereby the battery is
25 rendered incapable of being affected by atmospheric influences and can be readily transported from place to place without injury to or displacement of the current-exciting filling.

In testimony whereof I affix my signature in
30 presence of two witnesses.

DON J. ARNOLD.

Witnesses:

H. B. IREY,

H. B. CORYELL.