

Specification doth certain Improvements
Galvanic Batteries invented by Edwin
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Page 1. 4 My invention relates to that
form of galvanic batteries wherein
the zinc or positive element is
placed ~~at~~ in the upper
portion of the containing vessel, and
the exciting metallic salt at
the bottom of the said vessel,
in order that the action of gravity
may be made available in
preventing assist in the separation
of the solutions in the battery, -
and it consists in forming the
outer containing vessel of some
suitable metallic conducting substance
preferably of lead or copper, so that
it shall also serve as the
negative element of the battery.
By this means the internal
resistance of a battery of given
size is much less than when a
vessel of glass or other ~~vessel~~ of non-
conducting material is employed

~~and the battery is also free from~~
 and ~~the~~ ^{liability} ~~danger~~ of fracture, is
 avoided.

19 In the accompanying diag.

Figure 1²⁰ is a plan view
 of a single cell of my improved
 21 battery.

Figure 2 is a transverse vertical
 section²² of the same, taken along the
 line X X in Figure 1.

23. C is the containing vessel, preferably
 Page 2 rectangular in form, and composed
 2 of copper, lead or ^{some} other suitable metal.
 3 It is provided with a bridging screw
 S, ⁴ for the attachment of a wire. The
 lower part⁵ of this vessel is filled,
 with crystals, of ^{some negative} sulphate of ^{such metal as} copper
 V, which may be covered with a
 8 diaphragm of leather, cloth, or other
 porous material **E F A**. Above this is
 placed a ¹⁰ layer of sand, sawdust,
 or other suitable porous substance.
 D. The zinc or positive element
 12 Z, (preferably rectangular in
 form) ¹³ is ^{placed} ~~laid~~ upon the top
 of the porous material ¹⁴ D. and
 is supported thereby. A wire
 or ¹⁵ is inserted into the zinc
 element and forms ¹⁶ the negative
 pole of the battery.

17 The battery, ^{thus constructed} is ~~set~~ in action by filling the containing ^{19 vessel C.} ~~jar~~, with a solution of sulphate of zinc ^{20 or} with ^{diluted} sulphuric acid, ~~diluted~~ ²¹ to a point above the upper surface of the ²² zinc element Z.

Page 3. I do not claim in general ^{2 the employment of} the use of a metallic containing vessel for a galvanic battery so arranged ⁴ as to form ^{also} the negative element of ^{5 said} battery. — neither do I claim the arrangement of the zinc ⁷ element in relation to a layer of porous ⁸ material, separating it from the negative ⁹ exciting salt.

¹⁰ I claim as my invention.

¹¹ The arrangement, ¹² in a galvanic battery, ~~substant~~ of a layer of negative salt V, ¹³ a layer of porous material D, and a ¹⁴ zinc or pointed element Z, arranged ^{15 necessarily} as ^{16 described} above and ~~as~~ ^{as} herein ~~described~~ specified in combination with ~~the~~ a metallic containing vessel C. forming ¹⁷ the negative element of the battery ¹⁸ substantially as specified.

Claim 1.

Horwood. No 28 1860. ^(Nov) Circuit closed by extra rail ~~and~~ beside track and metal pendant on engine. Galvanometer needle on engine, for indicator, retained by small magnet.

Claim 2. Objections probably well taken. (?)

Claim 3.

Johnson. 446 1858. Battery carried on train, making spring contact on metal bar, and sending current to ~~the~~ this and last signal at same time. Semaphore on post worked by magnet. (See drawing)

(Baker 1858. 747). Semaphore worked by weight. Passing train releases mechanically, and turns to "danger". Working of semaphore breaks circuit & lets off last one.

(Barr. ^{Nov} 1860 1080) Train sets signal at danger, mechanically. Let off by electric current from next station acting on magnet. No reference to circuit closer or name in which it is operated.

(Claim. 6, see claim 1.)

(" 9 & 10, see 3)

Claim 11, let it go.