

No. 615,369.

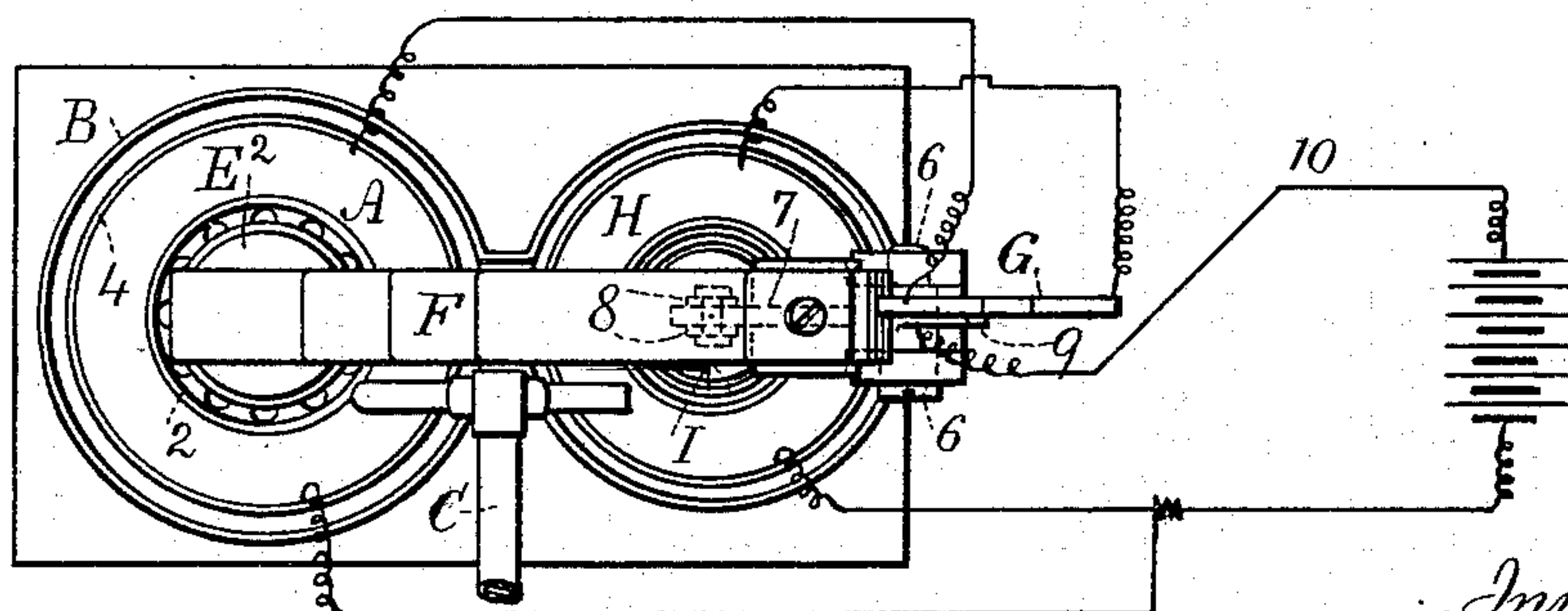
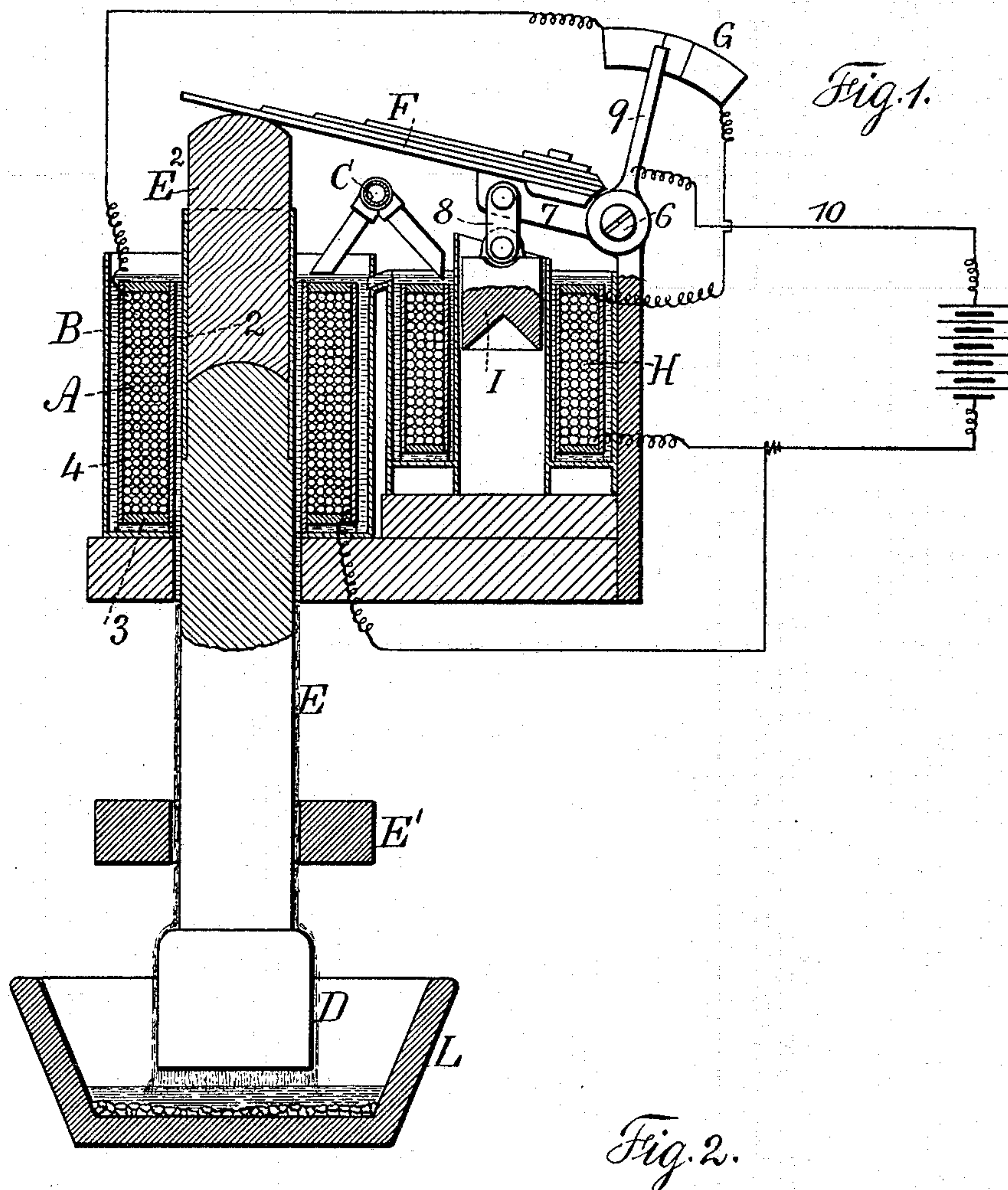
Patented Dec. 6, 1898.

D. M. & J. E. SMYTH.

ORE STAMP.

(Application filed Nov. 29, 1897.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

DAVID M. SMYTH AND JOSEPH E. SMYTH, OF PASADENA, CALIFORNIA.

ORE-STAMP.

SPECIFICATION forming part of Letters Patent No. 615,369, dated December 6, 1898.

Application filed November 29, 1897. Serial No. 660,077. (No model.)

To all whom it may concern:

Be it known that we, DAVID M. SMYTH and JOSEPH ELMER SMYTH, citizens of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented an Improvement in Ore-Stamps, of which the following is a specification.

In stamps for ores a core has been reciprocated by the action of a helix, and in some instances a second helix has been made use of to accelerate the fall of the stamp; but in consequence of the heavy weight of the stamp and the reciprocation of the same and the strength of current required the parts are liable to become heated, and there is difficulty in energizing the core with sufficient rapidity to accelerate the stamp to advantage in its downward movement.

To overcome the foregoing objections, we make use of an electric stamp having a solenoid and helix for raising the stamp and an inclosing vessel for the helix, into which water is allowed to pass, the wire of the helix being insulated with waterproof material, and the water is allowed to overflow and pass down into the mortar or basin of the stamp, and in this manner the water required in the stamp is availed of for keeping the core and helix from becoming heated, and in order to obtain the necessary speed of action to supplement gravity in moving the stamp downward a lever, preferably in the form of a spring, is employed, and a solenoid-core for acting upon the same as soon as the stamp has reached its extreme upward movement.

In the drawings, Figure 1 is a vertical section illustrating the present improvement, and Fig. 2 is a plan view of the same.

The stamp is composed of the bar E, which becomes a core with the shoe or stamp D at the lower end, and any suitable mortar or basin L is provided, into which the ore to be acted upon is introduced as usual, and a guide E' is provided for the stamp, and around the upper end of the bar E a helix A is provided, through which an electric current is passed for raising the bar E as a solenoid-core, and with it the stamp or shoe D, and when the current is turned off the stamp falls by gravitation and is accelerated, as hereinafter described.

The helix A is of wire with an insulating-

covering that is rendered waterproof by asphalt or other resinous material, and there is a vessel for holding this helix, which vessel is advantageously made of brass with a tubular center 2, a bottom 3, and an exterior case or inclosure 4, and a vessel B, suitably supported, receives the helix and its inclosure, and water supplied in any suitable manner, such as from a pipe C, is allowed to flow into the vessel B, so as to keep the helix A cool, and the water overflows and runs into the mortar L, advantageously passing down upon the surface of the bar E, so that the water required in the mortar or basin of the stamp first acts to cool the helix and then to supply the basin of the stamp.

The upper part of the bar E is advantageously made cylindrical to act as a guide and of non-magnetic material. We prefer to use wood incased with a brass tube, and the upper end of the wood projects beyond the tube to come into contact with the spring F, which is pivoted at 6 and provided with an arm 7 and link 8, connecting the spring to the core I within the helix H, and there is an arm 9 projecting from the spring F or arm 7 and acting as a circuit-changer upon the switch G, and one circuit-wire 10 is connected with the arm 9 and the other circuit-wire with the switch G and from there through the helix H to the source of electric energy, so that when the stamp E is raised the upper end thereof acts upon the spring F, lifting such spring and the core I and moving the arm 9, so as to close the circuit through the helix H, and the position of the parts is such that this closure occurs as the bar E is fully elevated and the electric current turned off from the helix A, and in this operation the energizing of the helix H draws down the core I forcefully and through the spring F augments the blow of the stamp by following the same up as it falls by gravity, the spring F in consequence of its leverage having a more rapid movement than the fall of the stamp by gravity. The core I may be cylindrical and of the desired length to act sufficiently as a solenoid within the helix H; but we find that it operates most advantageously when made as a hollow cone, as represented in the drawings.

The circuit-changer that controls the current passing through the helix A may be ac-

tuated in any desired manner. We have, however, illustrated circuit connections through the switch G from the same source of electric energy as that acting in the helix H.

5 It will be apparent that the electromagnet H and the spring F may be employed to act upon the stamp for accelerating the downward movement of the same regardless of the device employed for raising the stamp, and
10 in consequence of the spring and magnet acting with rapidity through the leverage of the pivoted spring a blow can be struck by a light stamp with as much energy as that derived from a heavy stamp when falling by
15 gravity.

The parts of the switch may be so proportioned as to direct the current through the helix H slightly in advance of the stamp, reaching its highest point of elevation in order that the electric energy may be availed
20 of in arresting the upward movement of the stamp and in instantly throwing the same down with an accelerated velocity, and the current can be turned through the helix A by
25 the switch at the moment the stamp strikes in the mortar, so that any rebound of the stamp is augmented by the electric action as the stamp is raised.

It will be apparent that in consequence of
30 the helix A surrounding only the upper end of the iron portion of the bar the magnetism acts to the best advantage in raising the stamp the required distance and that the non-magnetic portion E² of the bar E serves to guide
35 the stamp in its movement and also to move the spring and circuit-changer, and against this wooden portion of the stamp-bar the spring acts in throwing down the stamp.

If desired, the water may flow only upon
40 the outside of the metallic case inclosing the electromagnetic helix, so as to keep the parts cool without coming into contact with the insulating-covering of the wires; but when
45 such insulating-covering is of waterproof material we find it advantageous to allow the water to run into the metallic case inclosing the helix.

In some instances springs have been made use of in throwing down the stamps in ore-
50 mills; but such springs have formed resistances to the upward movement of the stamps and have increased the friction and wear upon the parts, and electromagnets have been employed, as in the patent of D. M. Smyth, No.
55 605,615, for drawing down and accelerating the fall of the stamp in an ore-stamp.

In our present improvement the power is not applied to the spring until the stamp has been raised or nearly so, and for this reason
60 there is little or no resistance of the spring to the upward movement of the stamp, and in consequence of the leverage of the spring as it acts between the electromagnet and the stamp the spring is rendered efficient during
65 the descent of the stamp and with a comparatively small movement of the electromagnet.

We claim as our invention—

1. The combination with the ore-stamp and circuit closing and breaking devices, of a helix with a waterproof insulating-covering
70 and surrounding such stamp, for raising the stamp by the magnetic action, a case surrounding the helix, and means for directing a current of water upon the helix and for conveying such water from the helix to the mortar of
75 the stamp-mill, substantially as set forth.

2. The combination in an ore-stamp with the shoe and iron bar, of an extension to the upper end of the iron bar of non-magnetic material, electric circuit closing and breaking
80 devices, and a helix surrounding the non-magnetic portion of the bar and closely adjacent to the upper end of the iron portion when the stamp rests in the mortar whereby
85 the stamp is guided and the magnetism set up by the helix acts sufficiently upon the iron bar to raise the stamp, substantially as set forth.

3. The combination in an ore-stamp with the shoe and iron bar, of an extension, to the
90 upper end of the iron bar, of non-magnetic material, electric circuit closing and breaking devices, a helix surrounding the non-magnetic portion of the bar and closely adjacent to the upper end of the iron portion
95 when the stamp rests in the mortar, whereby the stamp is guided and the magnetism set up by the helix acts sufficiently upon the iron bar to raise the stamp, a casing surrounding the helix and a pipe supplying water to the
100 casing previous to the same running into the mortar of the stamp for preventing the core or helix becoming heated, substantially as set forth.

4. The combination with the ore-stamp of
105 an electromagnet having a reciprocating core, a spring-lever to which the core is connected and a pivot for the spring, the longer arm of such spring acting upon the ore-stamp and circuit connections to the electromagnet for
110 energizing the same and by the leverage of the spring accelerating the downward movement of the stamp, substantially as set forth.

5. The combination with the stamp and means for raising the same, of an electromagnet and a spring connected with the core of
115 the magnet and having the longer arm acting by leverage upon the stamp for accelerating the downward movement of the stamp by the energy of the electromagnet, substantially as
120 set forth.

6. The combination with the ore-stamp having a vertical bar, of two separate electromagnets, one acting on the bar to raise the
125 stamp and the other electromagnet acting to accelerate the downward movement of the stamp, casings for the helices of the electromagnets, and means for supplying water to such casings for preventing the electromagnets heating, and means for causing the wa-
130 ter to pass from the magnet-casing to the mortar of the stamp-mill, substantially as set forth.

7. The combination with the bar and shoe

in an ore-stamp, of a spring-lever arm and an
electromagnet for acting upon the same, the
longer arm of the lever acting by its leverage
upon the bar of the stamp to accelerate the
5 fall, substantially as set forth.

8. The combination with the vertically-
moving ore-stamp having a bar of magnetic
material, of an upward extension to such bar
of non-magnetic material, a helix surround-
10 ing the non-magnetic material and only the
upper end of the magnetic material when the
stamp rests in the mortar, an electromagnet,

a spring connected to the core or armature of
the electromagnet and acting upon the upper
end of the bar of the stamp, and a switch for 15
directing the electric currents through the re-
spective helices, substantially as set forth.

Signed by us this 27th day of October, 1897.

DAVID M. SMYTH.
JOSEPH E. SMYTH.

Witnesses:

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