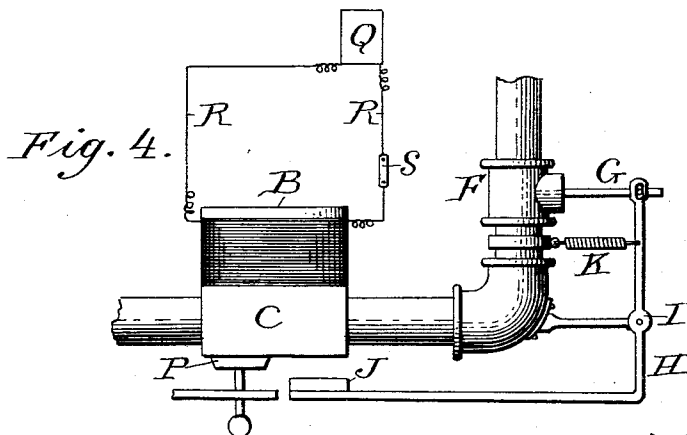
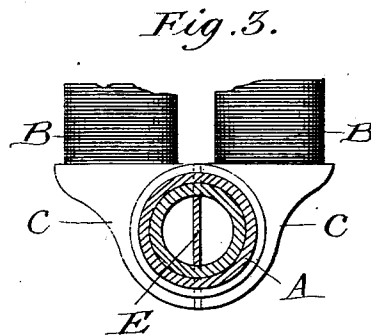
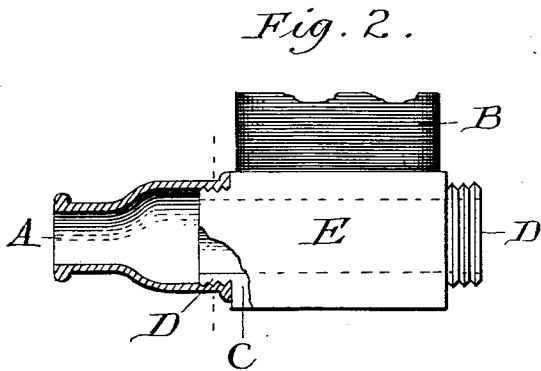
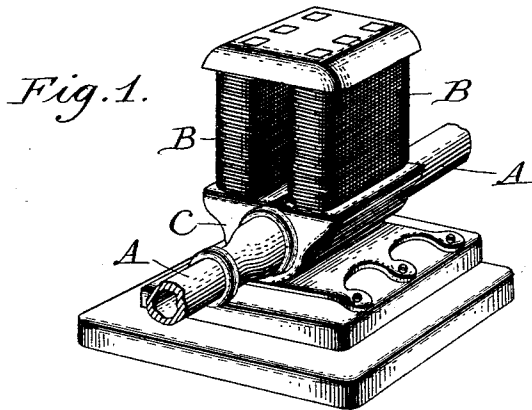


(No Model.)

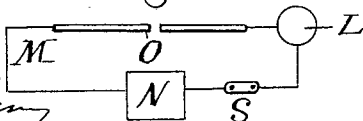
H. H. WHITACRE & A. C. WOLFE.
ELECTRIC METAL SEPARATOR.

No. 573,741.

Patented Dec. 22, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

HARVEY HILLARD WHITACRE AND ANDREW CURTIN WOLFE, OF
WELLSVILLE, OHIO.

ELECTRIC METAL SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 573,741, dated December 22, 1896.

Application filed November 8, 1895. Serial No. 568,325. (No model.)

To all whom it may concern:

Be it known that we, HARVEY HILLARD WHITACRE and ANDREW CURTIN WOLFE, citizens of the United States, residing at Wellsville, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Electric Metal Separators, (Case A;) and we do 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, reference being had to the letters of reference marked on the accompanying drawings, which form a part of this specification.

Our invention relates to electric metal separators.

The object of our invention is to separate iron or steel particles which may be incorporated in any fluids, fluid solutions, or any materials, such as in pottery clays, &c., that contain metal particles which interfere in the process of molding and which discolor the product.

The invention consists in the following combination and arrangement of mechanical and electrical devices, the features of which will first be fully described and the points of novelty then set forth and claimed.

Figure 1 is a perspective view of a magnetic apparatus to which we have applied our improvements. Fig. 2 is a partial elevation and longitudinal section, partly broken away, of another form of our invention. Fig. 3 is a detail transverse elevation and partial section, partly broken away, of the magnetic device shown in Fig. 2. Fig. 4 is a partial diagrammatic and partial elevation of an apparatus embodying our invention, showing the electrical connections.

Any fluid mass of whatever description containing iron or steel particles therein is adapted to be acted upon by our apparatus for the purpose of eliminating such particles.

In Fig. 1, A represents a pipe which may be indefinitely prolonged and provided with suitable inlets and outlets controlled by suitable valves. B is an electromagnet, the poles C of which are concaved about their opposing pole-faces, of a conformation suitable to embrace the pipe A, which passes between the

same. In Fig. 1 the pipe A immediately in contact with the pole C is of any suitable diamagnetic metal, such as brass.

In the form shown in Figs. 2 and 3 the pipe A does not extend along the pole-faces of the magnet. The poles are extended at either end sufficiently to form a screw-thread D thereon, to which the pipe A is attached on either side. The fluid itself comes in contact with the opposing pole-faces of the magnet B.

E is a diaphragm of diamagnetic metal, such as brass, which is interposed between the pole-faces of the magnet and brazed thereto or otherwise made fluid-tight. The opposite end of this diaphragm, which is coextensive with the pole-faces, is also formed with a screw-thread corresponding with the thread D, upon which the pipe A at either end of the magnet B is screwed.

By placing the diamagnetic plate E across the conduit the current of material is divided longitudinally and deflected toward the poles of the magnet, thereby materially facilitating the action of the latter in attracting and retaining the metallic particles.

For the purpose either of regulating the inflow of the fluid to the electric separator or controlling the discharge therefrom we provide a valve F, arranged to be electrically operated by the same current which energizes the magnet B. In Fig. 4 we have shown such a valve F provided with a stem G and a lever device H, pivoted at I, for actuating the valve. J is an armature carried on one end of the lever, which when the magnet B is excited is attracted to the magnet, thereby actuating the valve F.

K is a spring for withdrawing the armature from the magnet when the current has been shut off.

L is an automatic signal device which may be either visual or audible and is included within an electric circuit M, having a source of electrical energy N, as a battery or dynamo, and normally broken or open at O.

P is an armature weighted to any sufficient degree and arranged to be attracted to the magnet B whenever the electric separator device is in operation. In the event of the separator getting out of order by the current being shut off from the magnet B the weighted

armature P will fall and close the circuit through the signal L, thereby calling attention to the inoperative condition of the device.

Q is a source of electrical energy, as a dynamo or battery, and R are the wires placing the magnet B in connection with the source of energy Q.

S is a switch within the circuit for the purpose of breaking the current whenever desired.

By the employment of the diamagnetic diaphragm E the efficiency of the electromagnet D is largely augmented. It is also highly desirable to provide an electrically operative valve for controlling the admission or discharge of the fluid through the separator, said valve to be operated by the same current which energizes the magnet of the separator. It is further highly desirable to provide a signal device by means of which immediate attention may be called to any failure of the apparatus to perform its function.

Any number of magnets B may be used and connected in series with the source of electrical energy Q and wire connections R. The pipe A within the magnet B may be caused to revolve, if desired.

We file of even date herewith cases relating to similar subject-matter. (Marked B and C, Serial Nos. 568,326 and 568,327.)

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a magnet having the faces of its oppositely-placed poles recessed to form a passage or conduit, and a mass of diamagnetic metal embraced between the opposite faces of the poles and extending longitudinally of said passage and adapted to divide the current and deflect the material toward the poles, substantially as described.

2. The combination of a magnet having the faces of its oppositely-disposed poles recessed to form a passage or conduit, and a partition of diamagnetic metal, extending longitudinally of said passage and embraced between the faces of the oppositely-placed poles, whereby the conduit or passage is divided longitudinally and the efficiency of the magnet greatly increased, substantially as described.

3. The combination with a magnet having poles in proximity to each other and recessed along their opposing faces to form a conduit, and a plate of diamagnetic metal interposed between the pole-faces and projecting within said conduit, and adapted to divide the current and deflect the material toward the poles.

4. The combination with a polar-magnet and a cylinder or conduit pipe of diamagnetic metal embraced by the poles of said magnet, of a normally-closed valve in said cylinder or pipe, and means connected to said valve and operated by said magnet when the same is energized, whereby the valve is open only when the magnet is energized, substantially as described.

5. The combination of a magnetic separator, pipe connections leading to and from the same, a valve in the pipe connections, a source of electrical energy, means for electrically operating the valve and wire connections, whereby when the magnetic separator is energized the valve is operated.

6. In a magnetic separator, the combination of a magnet which, when energized, serves to make the separator operative, with a signaling device comprising an electric circuit and a signal adapted to be actuated by said circuit, and an armature normally closing said circuit to actuate said alarm, but in a position to be attracted by said magnet and break the signal-circuit when the magnet is energized, whereby the alarm is sounded when the magnet is not operative, substantially as described.

7. In a magnetic separator, a magnet in operative relation with the conduit of the separator, a normally-closed valve in said conduit, and a normally-closed signal-operating electrical circuit, and means operated by said magnet for opening said valve and breaking said electrical circuit when the magnet is energized, substantially as described.

In testimony whereof we affix our signatures in the presence of two witnesses.

HARVEY HILLARD WHITACRE.
ANDREW CURTIN WOLFE.

Witnesses:

WILLIS JORDAN,
NELLIE J. WELLS.