(No Model.)

H. GREVE.

ELECTRIC ORE SEPARATOR.

No. 282,073. Patented July 31, 1883.

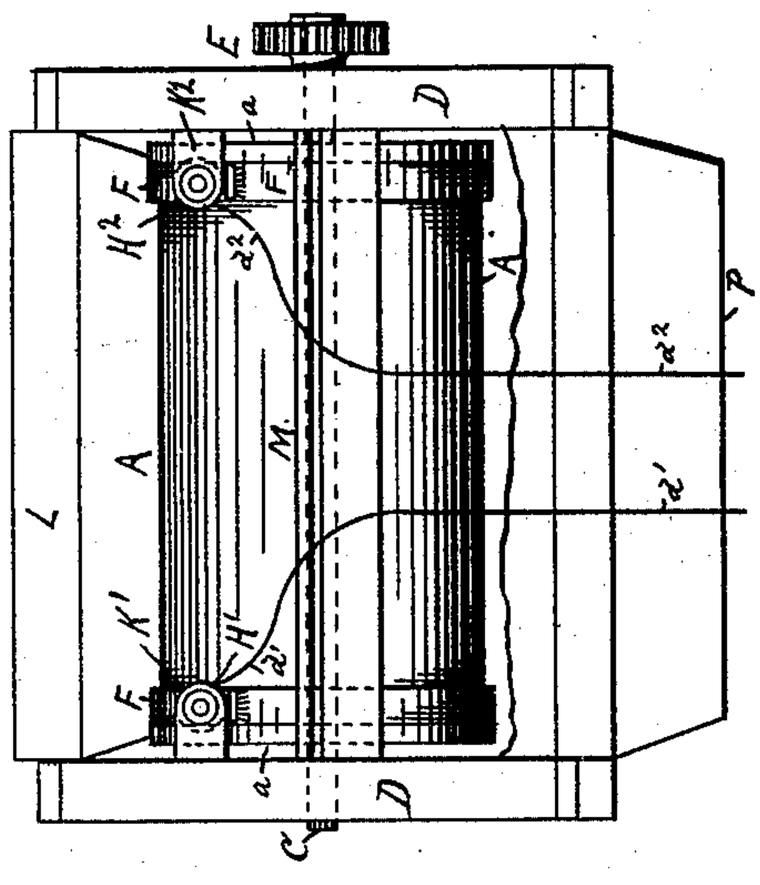

FIG. 3

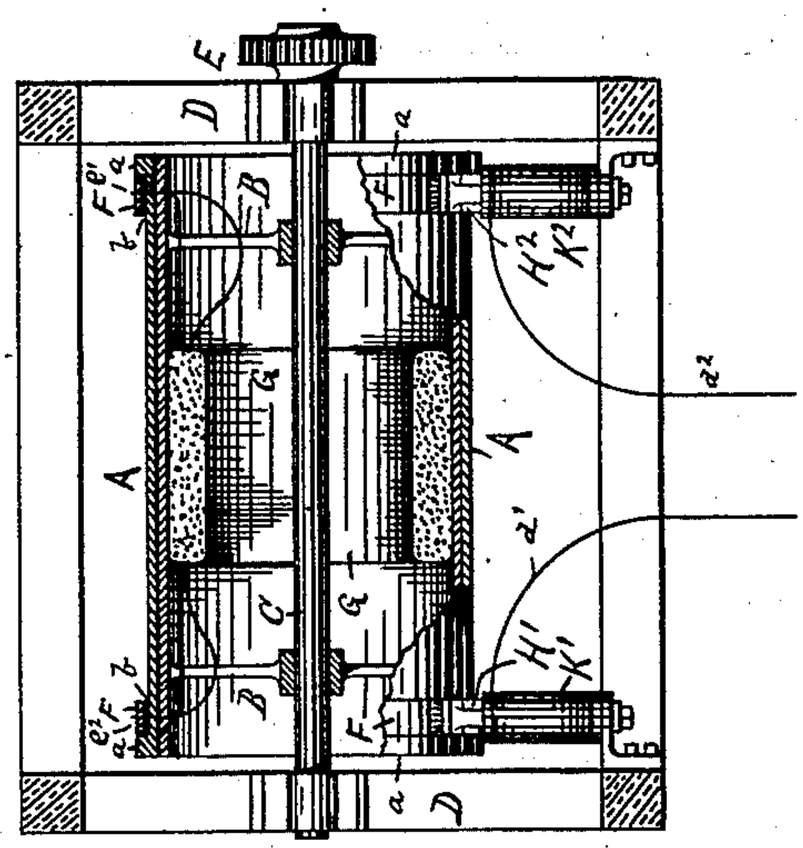

FIG. 4

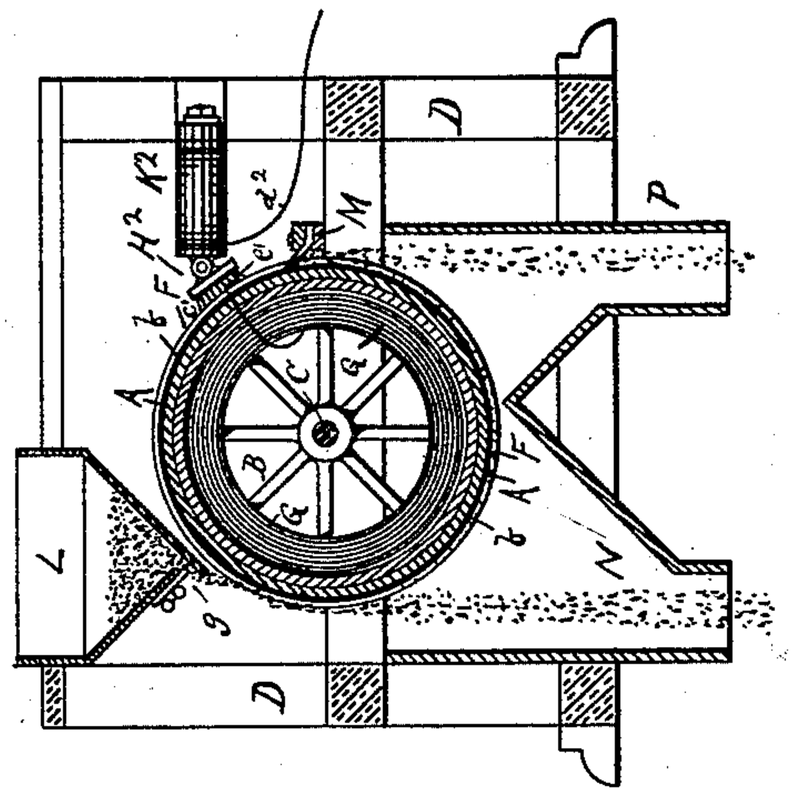

FIG. 2

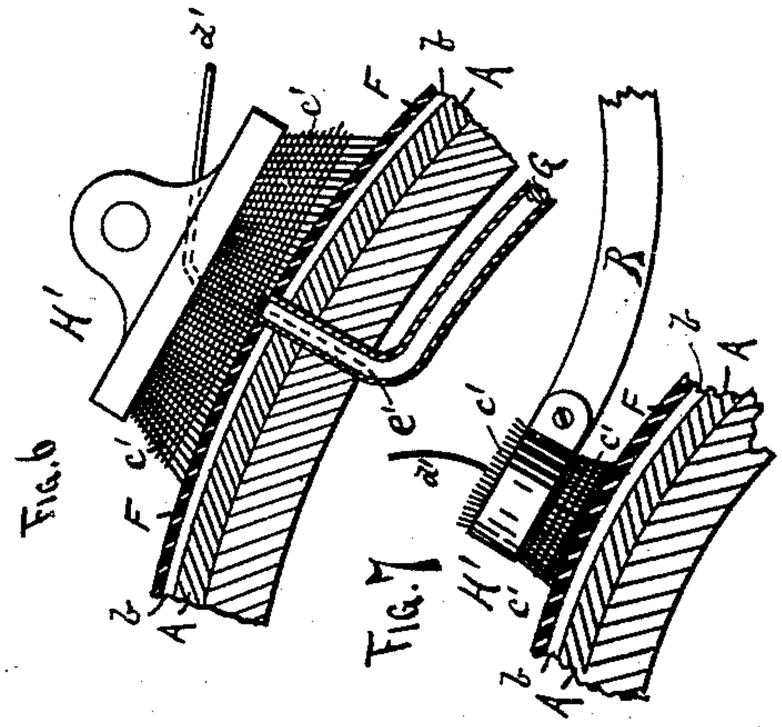

FIG. 6

FIG. 7

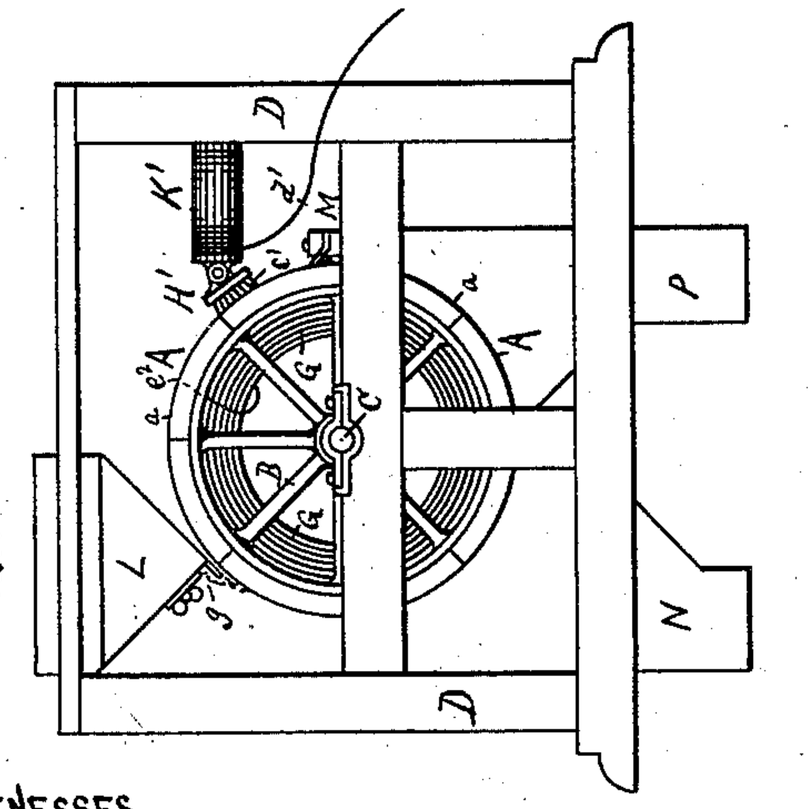

FIG. 1

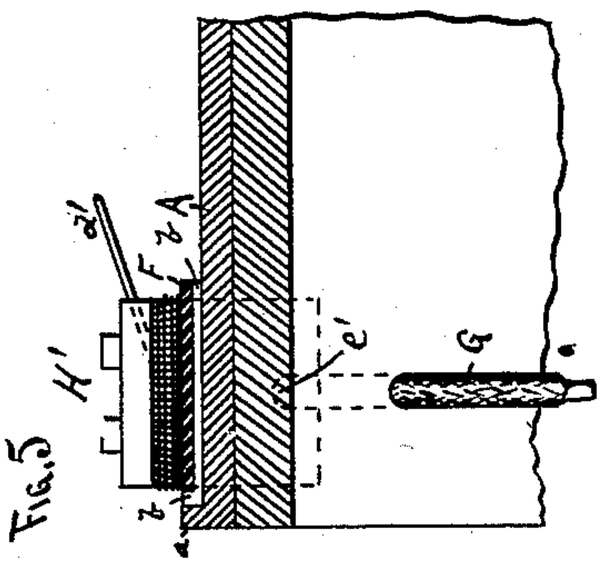

FIG. 5

WITNESSES.
Louis Feeser Jr.
Daniel Murphy.

Herman Greve,
INVENTOR. BY
Louis Feeser & Co
atty's.

UNITED STATES PATENT OFFICE.

HERMAN GREVE, OF ST. PAUL, MINNESOTA.

ELECTRIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 282,073, dated July 31, 1883.

Application filed October 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, HERMAN GREVE, a citizen of the United States, and a resident of St. Paul, in the county of Ramsey, in the State of Minnesota, have invented certain new and useful Improvements in Electric Ore-Separators, of which the following specification is a full, clear, and exact description, reference being also had to the accompanying drawings, in which—

Figure 1 is an end view, Fig. 2 is a cross-sectional view, Fig. 3 is a side view, and Fig. 4 is a sectional plan view, of the separator. Figs. 5, 6, and 7 are enlarged detail views of the brush-formed circuit-closer.

This invention relates to apparatus for separating the magnetic particles of pulverized ores from the non-magnetic particles; and it consists in a revolving magnetized cylinder over which the finely-pulverized ore is fed in a thin stream on one side, and the adhering magnetic particles scraped off from the other side and allowed to fall into a suitable receptacle below, constructed as herein specified, in connection with other parts, all as hereinafter particularly described, and then sought to be specifically defined by the claims.

The cylinder consists of longitudinal segmental sections A, of steel, attached to a suitable circular wood or metal frame, B, mounted upon a shaft, C, as shown. The shaft is journaled in any form of frame D, and adapted to be rapidly revolved in any suitable manner, either by gears E, as shown, or by pulleys, or any other means.

Upon the outer surface of the cylinder, at either end, small flanges *a* are formed, next to which, around the face of the cylinder, small bands *b*, of vulcanized rubber or other non-conducting material, are stretched, and over these non-conducting bands steel hoops or rings F are placed, the non-conducting bands being arranged to completely insulate the steel hoops from the cylinder, whereby the electric current is prevented from short-circuiting through the metal of the cylinder.

Inside the cylinder a coil, G, of silk-covered copper wire, is placed by suspension from the cylinder or otherwise, the outer coils being secured in close contact with the interior of the cylinder. The ends of the coil run in opposite directions and pass outward through the frame B, cylinder A, non-conducting bands *b*, and steel bands or hoops F, the wire, where it passes through the frame, cylinder, and hoops, being insulated therefrom by its silk covering, but with the ends e' e^2 exposed outside the hoop, as shown.

Attached to the frame D at points opposite the hoops F are brush-shaped circuit-closers, consisting of heads or bodies H′ H², in which a number of copper wires, c', are held and bound tightly around central wires, d' d^2, which extend directly to the dynamo-machine, or may first pass through rheostats K′ K²; by which the strength of the electric current may be regulated. By this construction the two brush-shaped devices H′ H² form the ends of the poles of the dynamo-machine, and then, when the cylinder is revolved and the projecting exposed ends e' e^2 of the coil G come in contact with the brushes H′ H², an electric circuit will be formed between the dynamo-machine and the coil G while the brushes are in contact with the ends e' e^2, and the circuit will be broken while the insulated steel bands F are traveling beneath the brushes during the remainder of the revolution of the cylinder on its axis. The coil G being in close contact with the interior of the cylinder A, the latter is magnetized and becomes a revolving electro-magnet, and the cylinder is thus remagnetized once at every revolution.

Being formed of steel, the cylinder retains its magnetic qualities during the lapses between the breaks in the circuit, and by recharging it at every revolution a permanent magnet is secured.

Fig. 7 shows a slight variation in the form of a circuit-closer, consisting of the central wire, d' or d^2, around which the smaller wires c' are tightly bound, and the whole secured by a bracket or brace, R, to the frame D; but the action is the same as when the brush is formed as shown in Fig. 6. Above the cylinder A, on one side, a hopper, L, is suspended, having a narrow adjustable exit, *g*, through which a thin even stream of pulverized iron or other ore is fed over the cylinder. This hopper will be made of zinc or other suitable material that will not affect the magnetic qualities of the cylinder.

Just beneath the circuit-closers H′ H² a stationary scraper or brush, M, of rubber or any other non-conducting material, is arranged to rest against the whole surface of the cylinder lengthwise and scrape off the adhering particles of metal as the cylinder revolves.

Beneath the cylinder A, and in a line below the hopper L, is a trough or spout, N, into which the non-magnetic particles from the ore will fall from the hopper and cylinder, and below the scraper or brush M is a similar spout, P, into which the magnetic particles of the ore fall when scraped from the cylinder by the brush.

The ore, as before stated, is finely pulverized and run in a thin stream upon or in close proximity to the revolving magnetized cylinder A, which attracts the magnetic particles and causes them to adhere to its surface, and carries them around until brushed off by the scraper M and dropped into the trough P, while the non-magnetic particles fall directly into the trough N. By this means the magnetic and non-magnetic particles are easily and quickly separated.

The cylinder can be made of any desired size or form; but I have found that about three feet in diameter and twenty feet long will give the most satisfactory results.

Instead of the coil of insulated wire within the cylinder, an electro-magnet may be used with the ends of the coil extending through the cylinder the same as the ends of the coil of wire, and when the phrase "coil of insulated wire" is used it is to be understood as applying to the insulated coil of an electro-magnet as well as to a coil of insulated wire.

Having described my invention and set forth its merits, what I claim is—

1. In an electro-magnetic ore-separator, the combination of a steel cylinder, A, a magnetizing-coil, G, located inside of the cylinder and having its ends or electrodes arranged for closing an electric circuit, the circuit-closing poles H′ H² of a dynamo-electric machine, and means for closing the electric circuit once in each revolution of the cylinder, substantially as and for the purpose herein specified.

2. The combination of the steel cylinder A, provided with insulated rings F F′, and the interior magnetizing-coil, G, the insulated ends of which project outward through the cylinder and its ring, substantially as and for the purpose herein specified.

3. The combination of the steel cylinder A, provided with insulated rings F F′, the interior magnetizing-coil, G, whose insulated ends project outward through the cylinder and rings, and the metallic-brush poles H′ H², substantially as and for the purpose herein specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERMAN GREVE.

Witnesses:
C. N. WOODWARD,
LOUIS FEESER, SR.