

No. 731,045.

PATENTED JUNE 16, 1903.

E. GATES.

DIAMAGNETIC SEPARATOR.

APPLICATION FILED APR. 14, 1900. RENEWED JAN. 13, 1903.

NO MODEL.

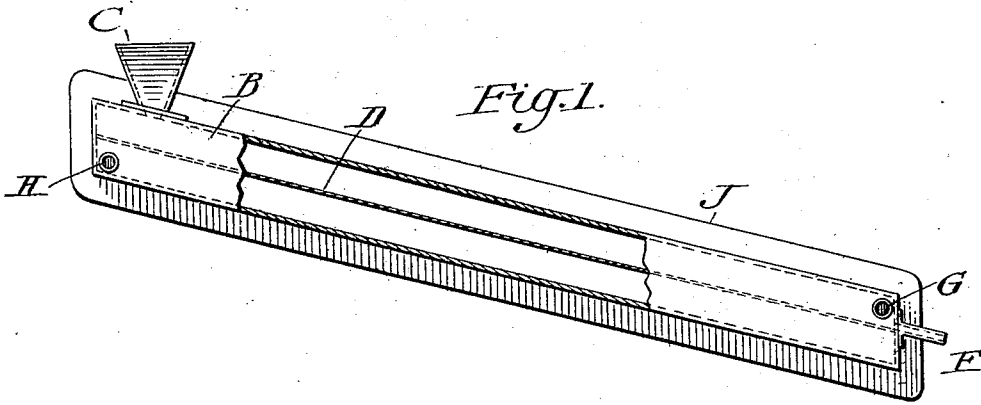


Fig. 1.

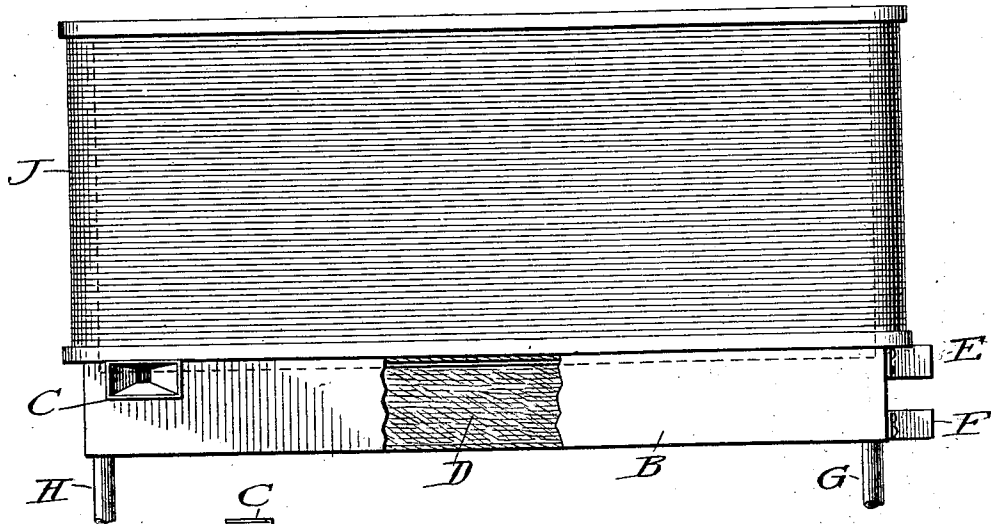


Fig. 2.

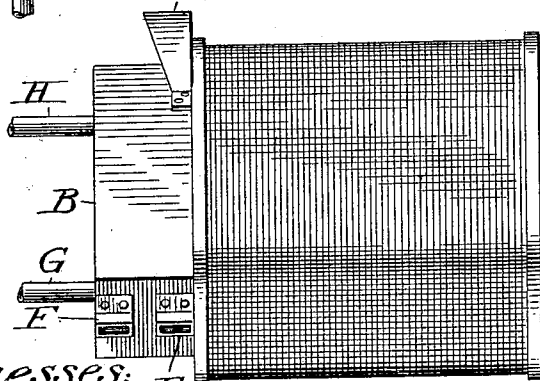


Fig. 3.

Witnesses:

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# UNITED STATES PATENT OFFICE.

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## DIAMAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 731,045, dated June 16, 1903.

Application filed April 14, 1900. Renewed January 13, 1903. Serial No. 138,827. (No model.)

*To all whom it may concern:*

5 B it known that I, ELMER GATES, a citizen of the United States, residing at Chevy Chase, county of Montgomery, State of Maryland, have invented certain new and useful Improvements in Diamagnetic Separators; 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.

10 My invention relates to certain new and useful improvements in diamagnetic separators of the type disclosed in prior applications for Letters Patent of the United States filed by me wherein particles of free gold or other diamagnetic metal are separated from mixtures containing them by the expedient of feeding the mixture into a relatively intense part of a magnetic field and continuing it therein until the diamagnetic metal particles have moved into a relatively less intense portion of the field, from which they are collected separately.

15 In the accompanying drawings, Figure 1 represents a side elevation of a diamagnetic separator embodying my present invention, partly in section. Fig. 2 represents a top plan view thereof, partly in section. Fig. 3 represents an end elevation.

20 Referring to the drawings, J indicates the energizing-coil of an electromagnet, arranged at an incline, as shown, and whose core (indicated in dotted lines in Fig. 2) projects slightly into the inner side of a box or casing B, which is inclosed at its sides and ends. A hopper C communicates with the upper portion of the casing and is adapted to discharge the material to be separated upon an incline D, extending longitudinally in front of the core or pole piece of the magnet. The incline D consists of tightly-stretched fabric permeable to water and suitably framed and supported at appropriate intervals. At the bottom of the incline are located the discharge-chutes E F. A water-supply pipe H enters the casing at the top of the incline, and a water-discharge pipe G issues from the

casing at the lower portion thereof, said pipes being respectively below and above the surface of the incline.

The mode of operation of the apparatus is as follows: The material to be separated passes from the hopper C and drops upon the upper portion of the incline in near proximity to the edge of the core or pole piece of the magnet and begins to fall by gravity down the incline, aided by the flow of water which passes up through the fabric and flows down the incline. The magnet being energized, the tendency of the particles of free gold or the like is to move away from the magnet-face. In this endeavor they are assisted by the flow of water, the water serving to give freedom of motion to the particles and keeping them in suspension, so that they are subjected to greater advantage to the action of the magnetic field. Accordingly the particles of free gold move outwardly toward the outer edge of the incline and finally issue through the chute F, where they are collected, while the particles of sand, being unaffected by the magnetic field, continue in their descent along the inner side of the incline and pass out through the chute E.

25 Having thus described my invention, what I claim is—

A diamagnetic separator, comprising a magnet having an inclined pole-piece, a casing arranged in front of the magnet-pole, an incline also arranged in front of the magnet-pole and permeable to water, means for feeding the material to be separated upon the upper surface of the incline and for leaving off the separated products at the lower portion thereof, means for admitting a flow of water beneath the incline near the upper portion thereof, and means for conducting off the surplus water at the lower part of the incline; substantially as described.

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

ELMER GATES.

Witnesses:

J. E. HUTCHINSON, Jr.,  
A. E. GRANT.