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C. E. DOLBEAR.

ELECTROSTATIC SEPARATOR.

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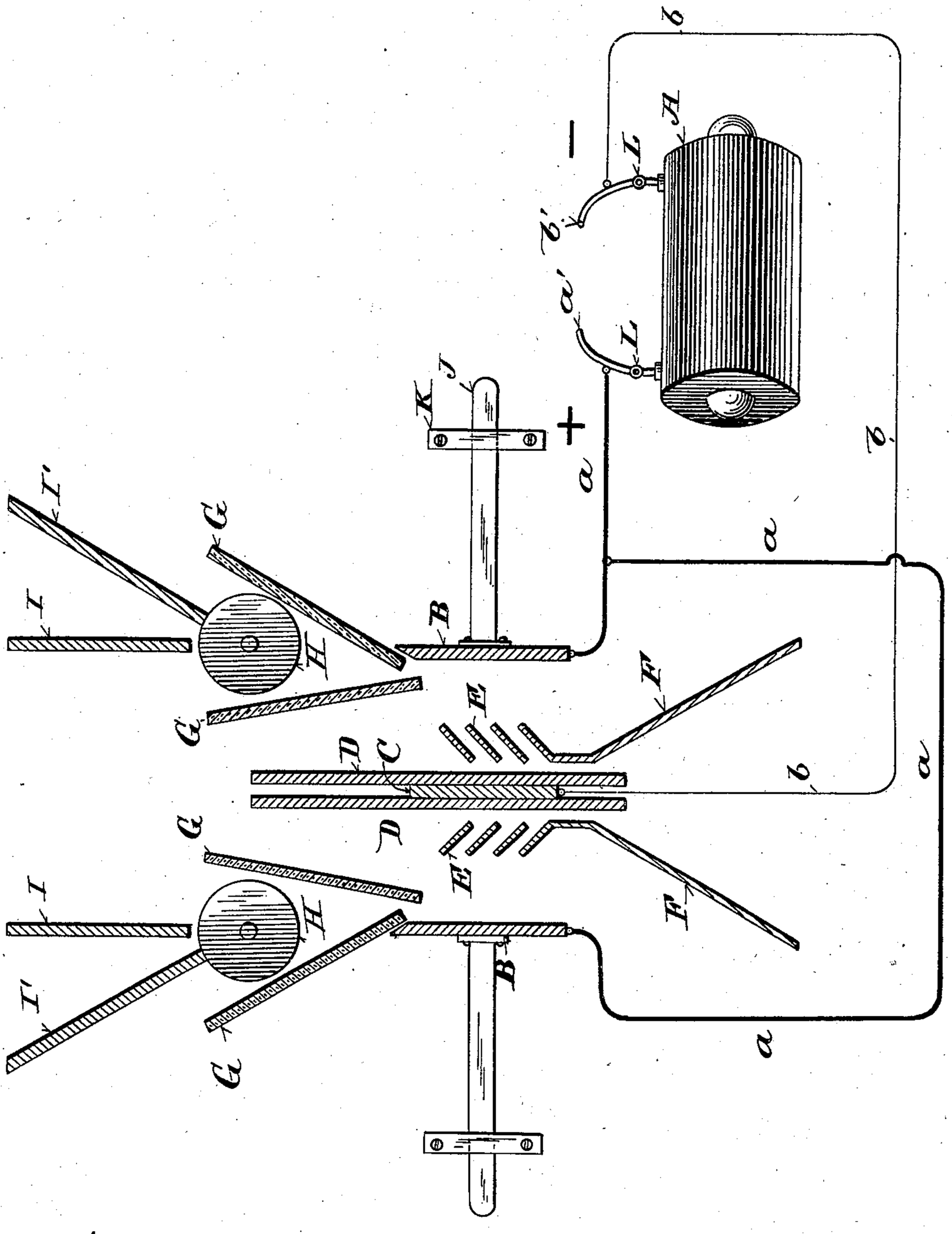
NO MODEL.



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ELECTROSTATIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 724,679, dated April 7, 1903.

Application filed March 25, 1901. Serial No. 52,706. (No model.)

To all whom it may concern:

Be it known that I, CLINTON EMERSON DOLBEAR, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electrostatic Separators, of which the following is a specification.

My invention relates to the separation of valuable metals from metal-bearing materials.

It relates especially to an apparatus for producing such separation by the use of electrostatic charges of electricity.

I have discovered that if a mixture of conducting and non-conducting particles, such as would exist in pulverized or crushed ore, be subjected to the action of a plate or plates highly charged with electricity the conducting particles will be attracted to the charged plate and immediately repelled therefrom, while the non-conducting particles are comparatively unaffected by the electric charge. I have devised an apparatus by which these facts can be taken advantage of and of which the following is a description.

In the drawing hereto attached, and which is a sectional view of my machine, A represents a Ruhmkorff coil or suitable generator of static electricity of high potential.

B represents two insulated metallic or conductive plates.

a and *b* are electric conductors connecting the terminals of the electric source *a' b'* with the plate B B and with a third insulated conducting-plate C.

D represents two non-conducting plates, situated opposite to and in the vicinity of the charged plates B B.

G G are two chutes for receiving the commingled mass of ore and directing it to the plates B. Within the chutes G are the rollers H H for regulating the discharge from the hoppers I I'.

I I' are hopper sides situated above the rollers H, one of them, I', touching the roller H and the other, I, leaving a space between itself and the roller in order to spread out into a comparatively thin sheet the mass of conducting and non-conducting material put into the hopper.

E E are a series of non-conducting shelves or trays arranged to catch and direct in a straight stream downward the mass of conducting particles coming within the influence of the plates B.

F F are a pair of outwardly-projecting chutes for diverting the non-conducting material passing by the plates B. The line *a* in the drawing made heavy is assumed to be the positive-charge conductor; but it is immaterial whether plates B be made positive and C negative, or vice versa.

J is an attachment connected with the plates B for controlling their position; K, an adjustable clamp for retaining J in position.

L L are means for changing the relative position of the terminals of the generator.

The operation of my device is as follows: The electrostatic generator being set in operation, the commingled mass of conductive and non-conducting materials reduced to the proper state of subdivision is put into the hoppers I I'. It there spreads out upon the rollers H into a comparatively thin sheet and drops down through the chutes G, directly in front of the plates B, charged to an opposite potential to that of the plate C. The conductive particles are charged with the same potential as the plate with which they come in contact and at once repelled therefrom, while the non-conducting particles are hardly affected. These repelled conductive particles are caught by the shelves E and directed downwardly along the plates D, where they are collected. The non-conductive material falls under its own weight, meets the chutes F, and is turned aside into separate collectors.

Different kinds of materials need, as I have discovered, different adjustments of the various portions of the apparatus, and this I have accomplished in one manner by providing means whereby the plates B may be brought into different relations to each other or to the plate C. With an arrangement such as shown at J K the plates B may be approached or separated or tilted at various angles to suit

the nature of the material operated upon. Independent thereof or in conjunction therewith I arrange means (shown at L) for varying the relative position of the two generator-terminals. In order to assure a more thorough separation of the conducting and non-conducting particles, I have with certain materials found it advantageous to arrange below the plates B B C D a second series of similar plates connected in the same manner with the generator.

Having thus fully described and illustrated my invention, what I claim is—

1. In an ore-separating apparatus, the combination of a source of high-potential electricity, a pair of similarly-charged plates connected therewith and between which the ore is caused to pass, a third oppositely-charged plate located between the first two, and means for collecting separately the separated materials.

2. In an ore-separating apparatus, the combination of a source of high-potential electricity, a pair of similarly-charged plates connected therewith, a third oppositely-charged plate located between the first two and inclosed by two non-conducting plates, and means for separately collecting the separated materials, substantially as set forth.

3. In an ore-separating apparatus, the combination of a source of high-potential electricity, a pair of plates connected to the same pole of the said electrical source, a third plate intermediate between the said pair of plates, and means arranged adjacent to said third plate for dividing the conducting from the non-conducting materials, substantially as described.

4. In an ore-separating apparatus, the combination of a source of high-potential electricity, a pair of plates charged with electricity of the same potential, a plate oppositely charged situated between the said pair of plates, and a series of shelves arranged on each side of the intermediate plate, and downwardly inclined for dividing the conducting from the non-conducting portions of the ore.

5. In an ore-separating apparatus, the combination with a pair of similarly-charged conducting-plates of an oppositely-charged conducting-plate inclosed between non-conducting plates, substantially as described.

6. In an ore-separating apparatus, the combination with a pair of upright similarly-charged plates, of an upright oppositely-charged plate located between the same, forming two passages between said plates, and means for delivering the ore to said passages, substantially as described.

7. In an ore-separating apparatus, the combination with a source of high electric potential, of two similarly-charged plates, an oppositely-charged plate located between the said plates and means for adjusting the position of the similarly-charged plates with respect to each other and with respect to said oppositely-charged plate for inductively varying the potential of the electric source and the inductive action between the three plates, substantially as described.

8. In an ore-separating apparatus, the combination of a pair of similarly-charged plates, an oppositely-charged plate located between the said pair of plates, means on each side of said oppositely-charged plate for separating the non-conducting from the conducting portions of the ore, and means for delivering the ore in a finely-spread state to the charged plates, substantially as described.

Signed at New York, in the county of New York and State of New York, this 21st day of March, A. D. 1901.

CLINTON EMERSON DOLBEAR.

Witnesses:
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