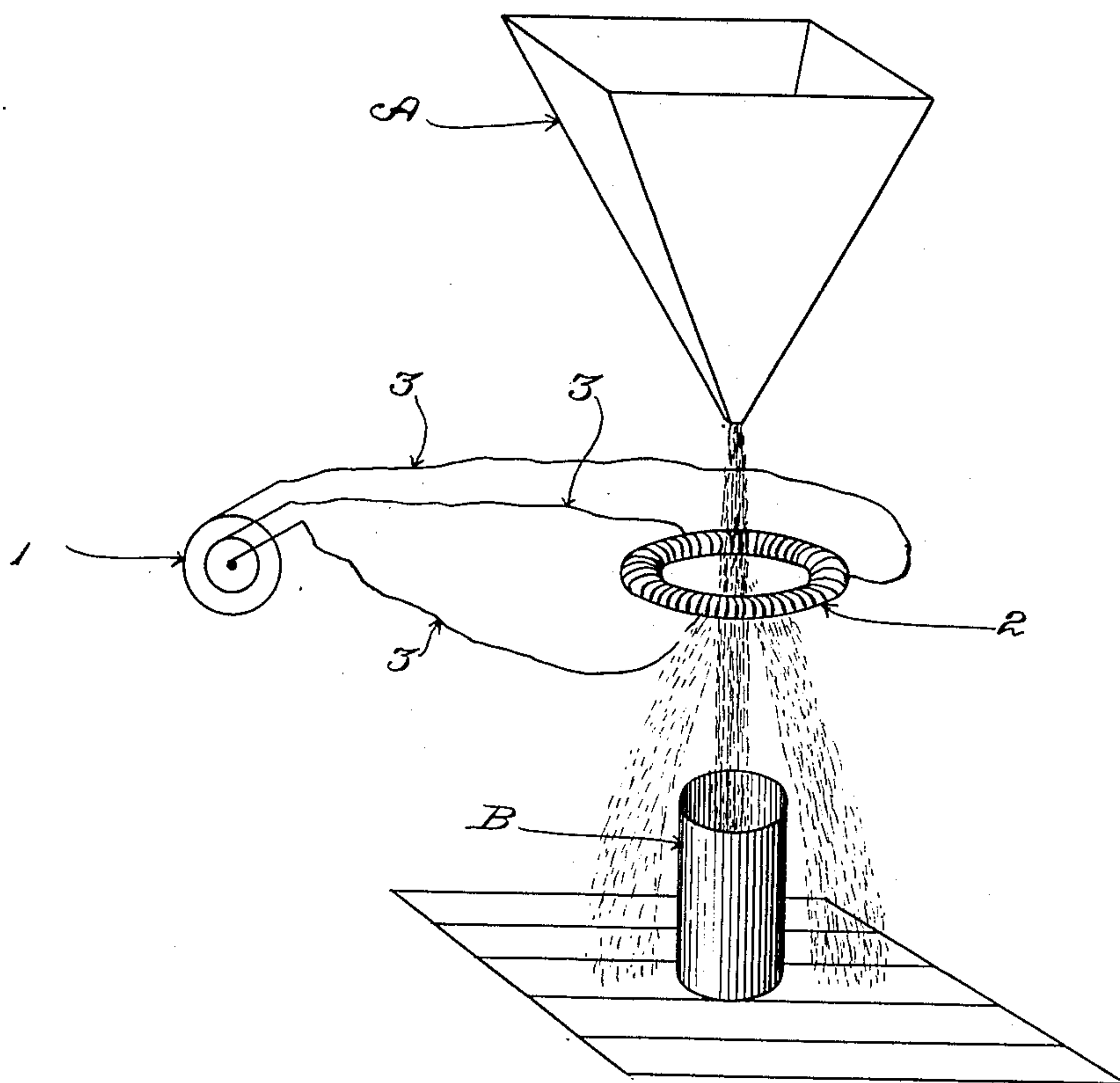


G. D. ROGERS.  
ELECTRIC SEPARATOR.  
APPLICATION FILED DEC. 30, 1905.

940,282.

Patented Nov. 16, 1909.



Witnesses

Oscar F. Hill.  
Edith J. Anderson.

George D. Rogers Inventor.  
by Chas. F. Randall  
Attorney.

# UNITED STATES PATENT OFFICE.

GEORGE D. ROGERS, OF GLOUCESTER, MASSACHUSETTS.

ELECTRIC SEPARATOR.

940,282.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed December 30, 1905. Serial No. 293,872.

*To all whom it may concern:*

Be it known that I, GEORGE D. ROGERS, a citizen of the United States, residing at Gloucester, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Electric Separators, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in novel means of effecting the separation of given substances from mixtures containing the same.

It is known that in working with a polyphase coil a rotating electric field is produced, the coil itself, mechanically or physically considered, remaining stationary. In carrying my invention into effect I utilize this rotating electric field produced by means of a polyphase coil, the latter itself preferably remaining stationary.

The invention is based upon the principle that when a mass of conducting material is subjected to the influence of a rotating electric field produced by a polyphase circuit, eddy or Foucault currents are induced in such mass, tending to produce motion of the latter. I have perceived that when mechanically subdivided substances containing particles of conducting material are exposed properly to the influence of such a field, motion of such particles results in a plane perpendicular to the axis of rotation of the said field.

One especially important application or use of the invention is for the purpose of effecting the separation of metals or metalliferous substances from mixtures containing the same, more especially the separation thereof from non-metalliferous substances with which they are associated, as, for example the separation of the metal or metals of an ore from the gangue. Various forms of apparatus employing electro-magnets have been proposed heretofore for effecting such separation. In certain of these an assemblage of electro-magnets is mounted upon a supporting shaft, the whole being rotated by the application of suitable driving power. So, also, it has been proposed to employ a series of stationary magnets operating to arrest falling magnetic particles and occasion progressive travel of the same toward a receptacle. The mechanically rotating arrangements are cumbrous, complicated, expensive to build, and subject to wear and

tear necessarily involving labor and expenditure in repairs, and are otherwise objectionable. The stationary-magnet arrangements are lacking in simplicity.

The general aim of the invention is to provide a novel effective method of separation, and an efficient apparatus of exceedingly simple construction, mechanically, for carrying such method into effect, in which the function of effecting the separation may be performed by an entirely stationary device; and to thereby avoid the wear and tear to which ordinary working parts are exposed, obviate liability to accidents and breakages, and minimize the cost of maintenance.

Briefly stated, the invention involves the combination of a polyphase coil, and means for bringing within the influence of the rotating electric field produced by such coil the ore or other mixture from which the metal or metals, or other substance or substances, is or are to be separated, the said ore or other mixture being in a more or less finely subdivided state mechanically. The eddy or Foucault currents which are induced in the particles of metal or metalliferous substance, for instance, cause motion of the said particles tending to carry them around the axis of the rotating field. The particles of non-metalliferous substance are not thus affected, and do not partake of such motion. As a result of the motion, the particles of metal or metalliferous substance fly in a direction away from the said axis, thereby separating from the non-metalliferous particles.

In the drawings I have illustrated by a diagram one means of carrying the invention into effect.

Having reference to the drawings,—at 1 is a conventional representation of a three-phase generator, and at 2 is indicated a three-phase bi-polar coil which in practice will be mounted in a suitable support. Such coil is stationary and does not rotate. At 3, 3, 3, are the leads or mains extending from the generator to the coil. As will be understood, the current from the generator 1 will produce an electric rotating field at the coil 2, although the said coil itself will not rotate. The mechanically sub-divided or comminuted ore or other mixture to be dealt with is brought within the influence of the electric rotating field. The manner of making presentation of the said ore or other



mixture may be variously effected in practice. In the present instance it is effected by causing the same to flow in a stream through the central opening of the coil 2.

5 This may be accomplished by arranging the coil to occupy a horizontal or substantially horizontal position, and allowing the ore or other mixture to fall from a hopper A through the opening of the coil from a point

10 located above the coil. As the falling particles enter within the influence of the rotating field, those in which eddy or Foucault currents are induced tend to move around the axis of rotation of the field and as a re-

15 sult are deflected or thrown transversely with reference to the direction of movement of the general stream outside of the cylindrical wall B, while the remaining particles descend within the said wall, so that they

20 may be separately collected.

Various other arrangements of apparatus operating with an electric rotating field are known, and may be employed in the place of the arrangement shown in the drawings

25 and previously described.

The invention not only is intended for the separation of metals or metalliferous substances from non-metalliferous substances, but is adapted to be utilized in effecting separation of metals from each other when such

30 metals have properties causing them to be

differently influenced by the electric rotating field.

What is claimed as the invention is:—

1. The means of separating mixed substances, in a subdivided state, mechanically, comprising a polyphase coil, and means for subjecting the mixture to the influence of the rotating electric field of the said coil. 35

2. A separator comprising a separating element constituted of a normally stationary polyphase coil, and means for conducting through the rotary electric field thereby produced the mixed substances which are to be separated. 40

3. A separator comprising a separating element constituted of a normally stationary polyphase coil, and means for conducting through free space through the rotary electric field thereby produced the mixed substances which are to be separated. 45

4. A separator comprising a separating element constituted of a normally stationary polyphase coil, and means for conducting through the inclosure of such coil the mixed substances which are to be separated. 50

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

GEORGE D. ROGERS.

Witnesses:

CHAS. F. RANDALL,  
EDITH J. ANDERSON.