

No. 832,827.

PATENTED OCT. 9, 1906.

H. H. WAIT.
MAGNETIC ORE SEPARATOR.
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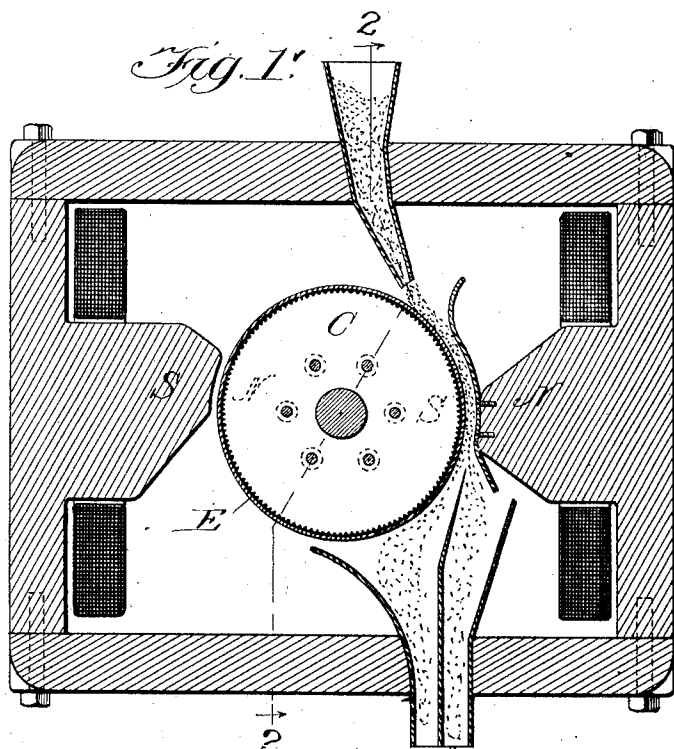
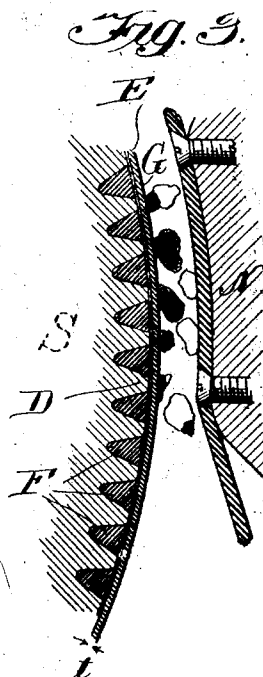
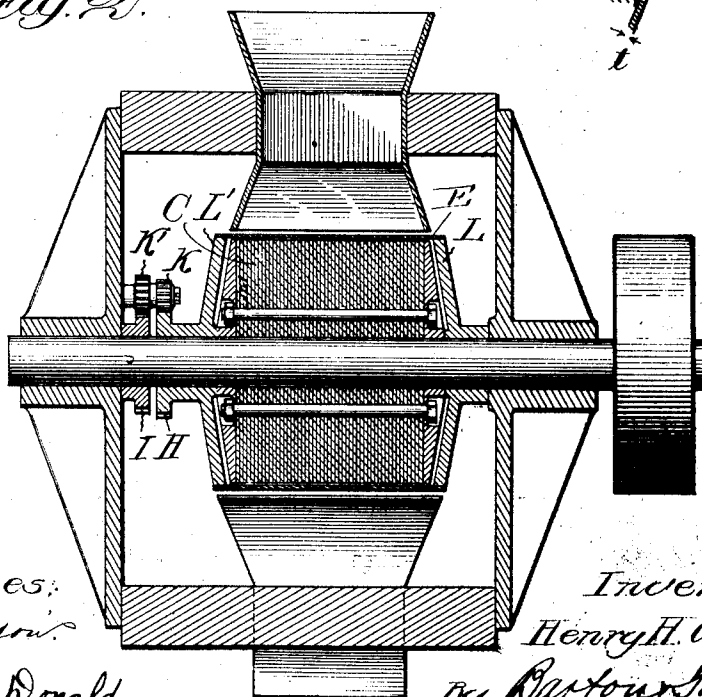


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY H. WAIT, OF CHICAGO, ILLINOIS, ASSIGNOR TO INTERNATIONAL SEPARATOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

MAGNETIC ORE-SEPARATOR.

No. 832,827.

Specification of Letters Patent.

Patented Oct. 9, 1906.

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To all whom it may concern:

Be it known that I, HENRY H. WAIT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Magnetic Ore-Separators, of which the following is a full, clear, concise, and exact description.

My invention relates to a magnetic separator; and its object is to provide an improved simple machine which will make a clean magnetic concentrate.

In some kinds of ore there are small particles of highly-magnetic material attached to or embedded in other less permeable material. The ordinary form of ore-separator having a revolving separating-carrier with magnetic teeth or projections at its surface is not entirely effective to produce a clean magnetic concentrate from the ore above mentioned because the highly-magnetic portions can become attached directly to the teeth or projections, and a large amount of non-magnetic material can thus be carried over into the magnetic product.

In accordance with the present invention an armature or magnetic cylinder provided with teeth or permeable projections at its periphery is arranged to rotate in the field of a magnet. The armature is surrounded by a shield or drum of non-magnetic material, and the material to be separated is fed into contact with said non-magnetic shield and through the space between said shield and one of the magnet-poles. The shield can be arranged to turn with the armature or may be independent thereof. The shield serves to hold the material being treated away from direct contact with the magnetic projections on the armature, so that small magnetic particles attached to larger bodies of non-magnetic material will not be attracted to the drum strongly enough to carry such larger bodies over into the magnetic product.

I will describe my invention more particularly by reference to the accompanying drawings, illustrating the preferred embodiment thereof, and the parts, improvements, or combinations which I regard as novel will be pointed out in the appended claims.

Figure 1 is a longitudinal sectional elevation of the magnetic separator. Fig. 2 is a transverse sectional view thereof on line 2 2 of Fig. 1. Fig. 3 is an enlarged detail view

somewhat diagrammatic in its character, illustrating the construction of the parts on either side of the working gap where separation takes place.

The same letters of reference designate the same parts wherever they are shown.

The machine illustrated comprises in its elements a magnet having two pole-pieces N S of opposite polarity, an armature C, having magnetic teeth or projections at its periphery, arranged to rotate between said pole-pieces, and means for passing material to be separated between said armature and one of said pole-pieces. The projections at the periphery of the armature may be of any suitable form adapted to produce a concentration of the magnetic flux at lines, points, or narrow areas, so that magnetic particles will be drawn along converging lines of force toward the armature rather than toward the stationary pole-piece. The armature should be laminated to allow it to turn in the intense magnetic field without excessive eddy-currents and without requiring an undue expenditure of mechanical energy, and the magnet-poles are preferably located on opposite sides of the armature, so as to balance, so far as practicable, the magnetic pull.

In accordance with my invention the armature C is surrounded by a shield or drum E, of non-magnetic material, such as vulcanized fiber or high-resistance metal, which is comparatively thin and fits closely around the armature. The spaces between the teeth D of the armature are preferably filled with non-magnetic material, such as wax, to give the armature a smooth bearing-surface for the shield. Preferably the shield is mounted to rotate relatively to the armature and may be geared thereto, as indicated in Fig. 2. The shield is shown mounted upon end plates L, L', which are journaled to rotate upon the armature-shaft. The end plate L' carries a gear-wheel H, and the armature-shaft carries a gear-wheel I. These wheels H and I mesh with pinions K K', respectively, carried upon a common shaft, so that the armature in its rotation drives the drum E in the same direction through the medium of the gears I, K', K, and H. The gears, however, are preferably constructed with different ratios, so that the speed of the armature will be different from the speed of the surrounding non-magnetic-drum. The pole-piece N is also

preferably provided with a non-magnetic shield of greater thickness than the shield E of the armature, so that magnetic material in the working gap will be subjected to the greatest attraction toward the surface of the armature rather than toward the stationary pole-piece.

It will be seen that the non-magnetic shield E holds small particles of non-magnetic material out of direct contact with the toothed surface of the armature, so that the teeth do not exert as strong a pull as they otherwise would. With a small particle the pull is very greatly lessened by a slight separation from the magnet-pole, while with a relatively larger particle the same distance of separation from the magnet-pole will not decrease the pull in the same proportion. By my invention therefore the more purely magnetic material only is saved, while the mixed particles, containing mostly non-magnetic material, but having a small amount of permeable material attached thereto, will be rejected. If the shield is given a movement of rotation relatively to the armature, as by the gearing described or by other-suitable means, the smaller mixed particles, which may be held by the magnetic constituent, will have been given a tendency to turn over upon the drum and so to be removed from close proximity to the points of the armature-teeth.

Having thus described my invention, I claim—

1. In a magnetic separator, the combina-

tion with an armature mounted to rotate upon a horizontal axis, of a non-magnetic shield for said armature, said armature being rotatable relatively to said shield, a magnet-pole facing said armature, a non-magnetic shield for said pole of greater thickness than said armature-shield, and means for passing material to be separated between said shields.

2. In a magnetic separator, the combination with an armature, of a shield of non-magnetic material inclosing said armature, said armature being rotatable relative to said shield, a magnet-pole facing said armature, a non-magnetic shield for said pole of greater thickness than said armature-shield, and means for passing material to be separated between said shields.

3. In a magnetic separator, the combination with a magnet having pole-pieces of opposite polarity, of an armature mounted to rotate between said magnet-poles, a shield of non-magnetic material surrounding said armature, a non-magnetic shield for one of said pole-pieces, said shield being of greater thickness than the armature-shield, and means for passing material to be separated between said shields.

In witness whereof I hereunto subscribe my name this 13th day of March, A. D. 1905.

HENRY H. WAIT.

Witnesses:

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