(No Model.)

G. S. FINNEY.

MAGNETIC SEPARATOR.

No. 443,043. Patented Dec. 16, 1890.

Fig. 1.

A

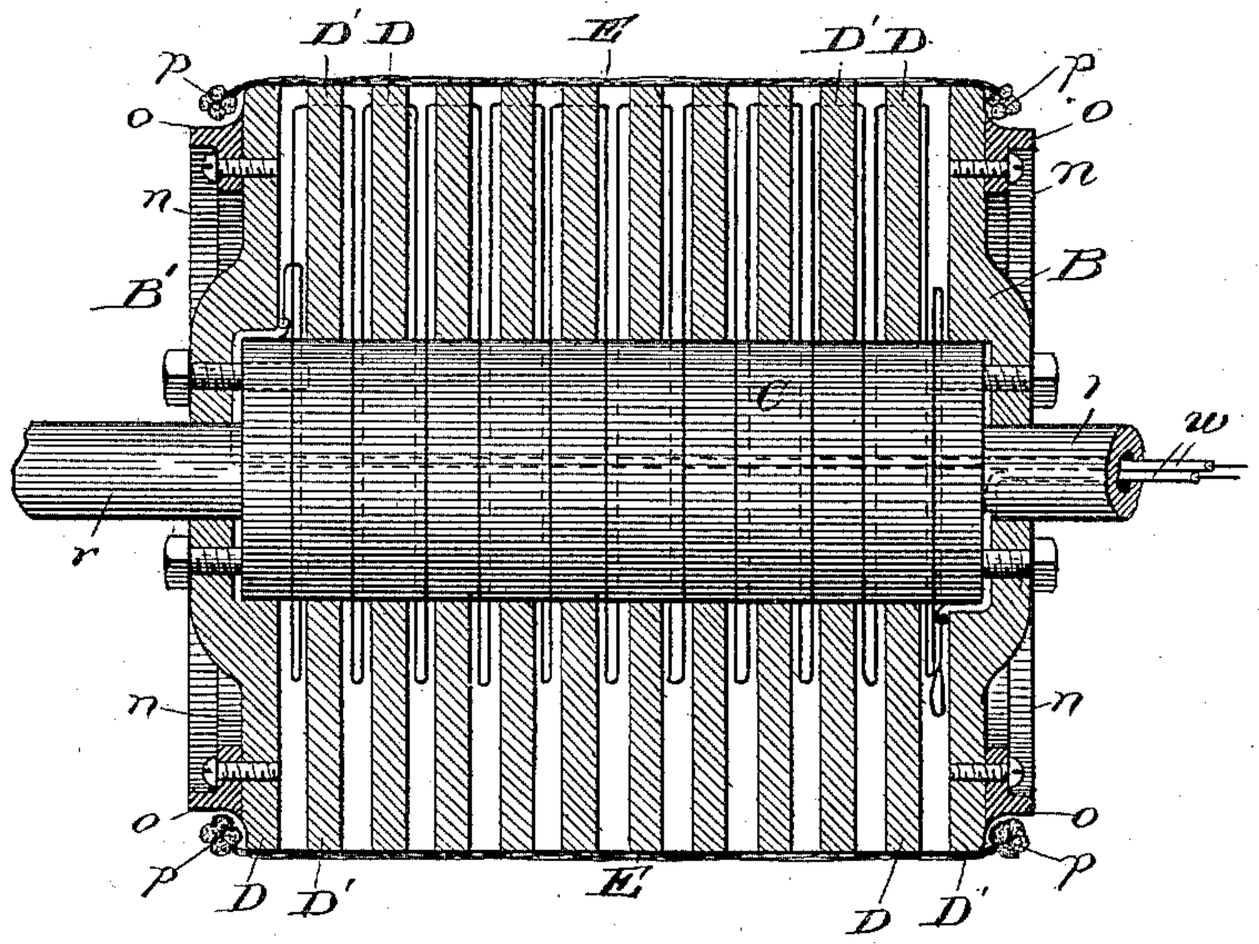
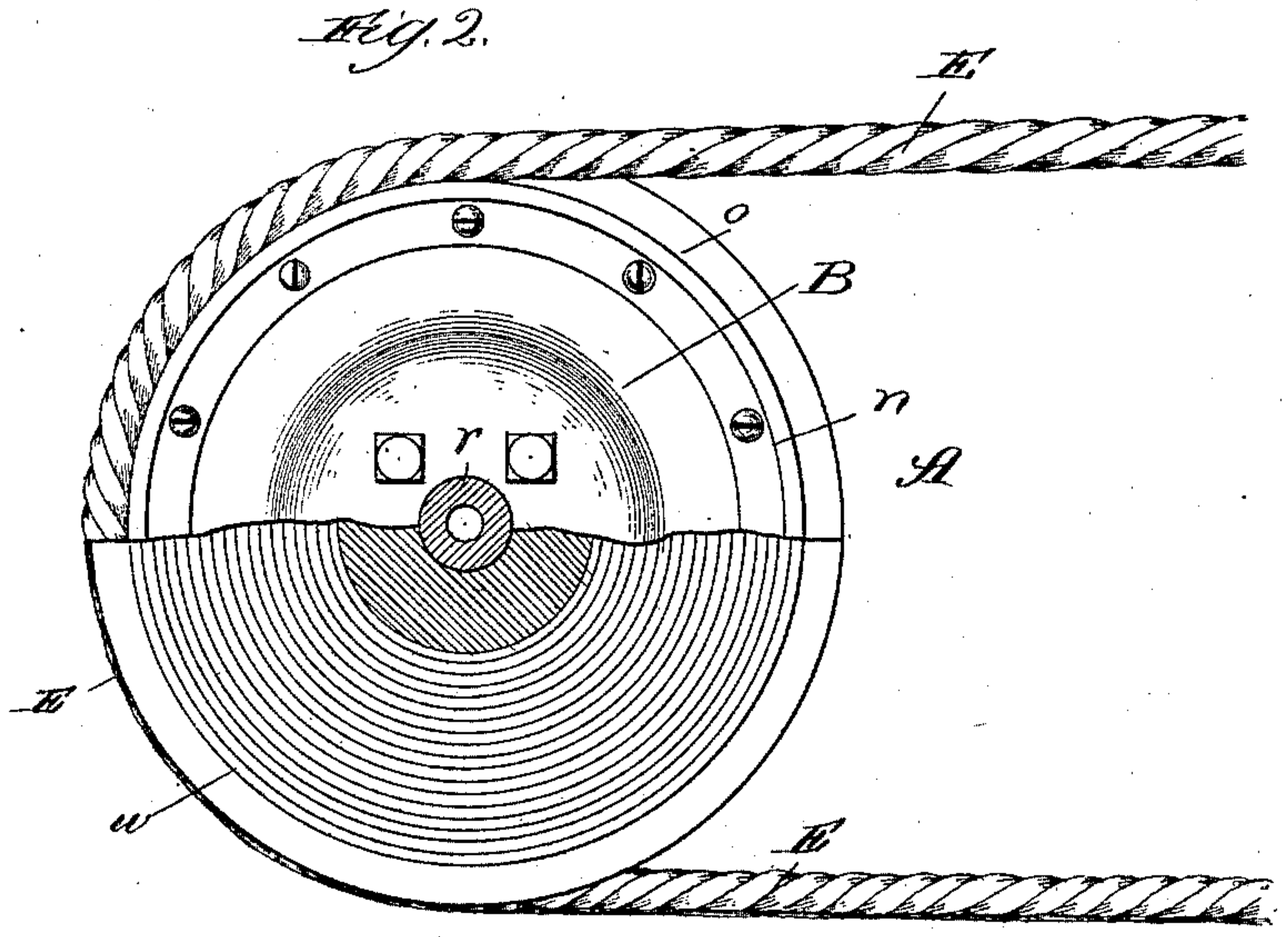


Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE S. FINNEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ROTARY MAGNETIC ORE SEPARATOR COMPANY, OF SAME PLACE.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 443,043, dated December 16, 1890.

Application filed March 25, 1890. Serial No. 345,247. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. FINNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Magnetic Separators, of which the following is a specification.

My invention relates to an improvement in the form of magnetic separators involving a magnetic wheel and a non-magnetic endless belt surrounding the wheel and affording a support and conveyer for the material to be treated.

The objects of my improvement are to provide a construction of the magnetic wheel which, while it will serve for effecting the separation of the metal or mineral from pulverized ores generally, shall be especially serviceable for separating it from ores of coarser granulation, and to provide a construction of the endless belt whereby it will retain its position on the wheel.

In the accompanying drawings, Figure 1 is a view in broken longitudinal sectional elevation of my improved magnetic wheel having my improved construction of endless belt applied to it, and Fig. 2 a view of the same in broken end elevation.

A is the wheel, comprising a shaft *r*, which is preferably hollow, and supports metal (soft iron) heads B and B′, a core C or spool surrounding the shaft between its journal ends, though the shaft may itself form the core, and having the heads secured to its opposite ends, and metal (soft iron) plates or disks D D′ secured at intervals upon the core to form intervening spaces in which insulated wire *w* is wound around the core in opposite directions in the adjacent said spaces to magnetize alternately each disk positively and negatively, being led from one to the other, preferably, as shown, through the plates D D′, and to and from the wheel A (from the generator, not shown) through the hollow shaft.

The heads B and B′ are provided at their outer sides near their peripheries (thus at the opposite ends of the wheel) with suitable guides *o* to receive and retain edge pieces *p*, preferably in the form of rope, secured to the edges of the endless belt E, which may be composed of any suitable non-magnetic material. The guides *o* may be, and are preferably, provided in the form of grooves in collars *n*, secured around the outer sides of the heads B and B′, as shown, though I do not wish to be understood as intending to limit my improvement in this feature of my invention to such particular construction, as it may be variously modified, as for adapting it to different forms of the wheels of magnetic separators, without thereby departing from my invention.

The described construction of wheel affords, as will be readily understood, a series of contiguous magnets having their poles extending around the plane of the circumference of the wheel and forming elements of its cylindrical surface, and wherein the force of the magnetic field is exerted transversely of the axis, and the belt-retaining means effectively prevents displacement of the endless belt E in the operation of the device by holding it taut and smooth across the perimeter of the wheel.

It will be noted that the movement of the traveling belt by the rotation of the wheel does not require frictional contact of the ropes *p* with the surface of the wheel, (or bases of the guide-grooves thereon,) but may depend on the frictional contact of the belt proper with the surface of the wheel, the ropes then merely fulfilling their purpose of preventing buckling of the belt across the wheel. If, however, it be desired that the edge pieces shall extend to the bases of the guide-grooves, in order that the belt and ropes may travel uniformly, and thus avoid slipping of the belt, the diameter of each edge-piece or rope *p* should be such as to cause its under surface to extend to the base of its guide-groove when the rope is secured to the edge of the belt, whereby so much of the belt and edge pieces as are in contact at one time with the wheel shall practically be integral therewith, and thus cause all the parts, (wheel, belt, and edge pieces,) however distant radially from the axis, to move uniformly.

What I claim as new, and desire to secure by Letters Patent, is—

1. A magnetic wheel for a separator, comprising a series of magnets on a common rotary core and alternating as to their polarity, and each having its poles extended continuously around the plane of the wheel's circumference and forming elements of its cylindrical surface, substantially as described.

2. A magnetic wheel A for a separator, comprising, in combination, a rotary core supporting heads B and B′, metal plates D and D′, surrounding and fast upon the core at intervals between the said heads and affording intervening spaces, and wire *w*, wound around the core in opposite directions in adjacent said spaces, substantially as and for the purpose set forth.

3. In combination, a magnetic wheel A, having guides *o* near both of its opposite ends, and an endless belt E on the wheel, having edge pieces *p* to enter the said guides, substantially as and for the purposes set forth.

4. In combination, a magnetic wheel A, having guides *o* in the outer sides of its ends B and B′, and an endless belt E on the wheel, having ropes *p* secured to its edges and entering the guides, substantially as and for the purpose set forth.

5. In combination, a magnetic wheel A, having collars *n* on its heads B and B′ and provided with guide-grooves *o*, and an endless belt E on the wheel, having edge-pieces *p* secured to it and entering the guide-grooves *o*, substantially as and for the purpose set forth.

GEORGE S. FINNEY.

In presence of—
J. W. DYRENFORTH,
M. J. FROST.