(No Model.)

L. G. ROWAND.

MAGNECTIC ORE SEPARATOR.

No. 596,720. Patented Jan. 4, 1898.

Fig. 1.

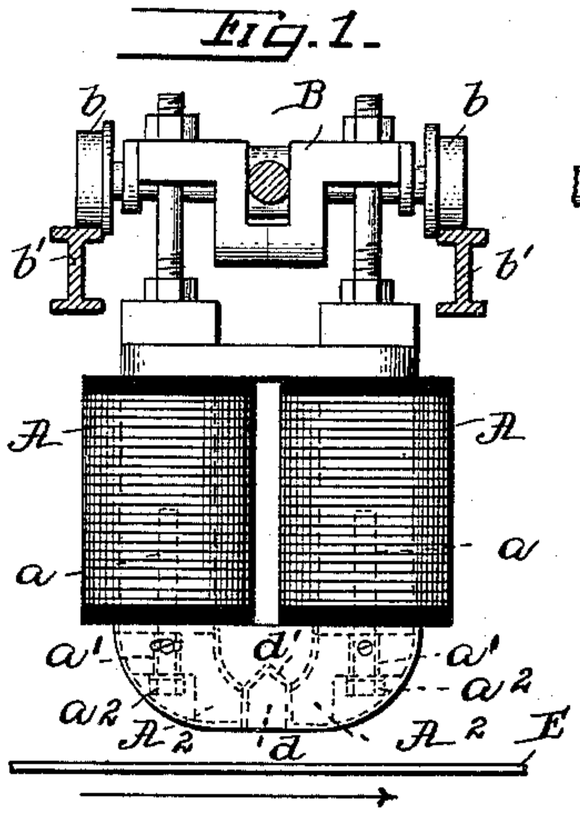


Fig. 2.

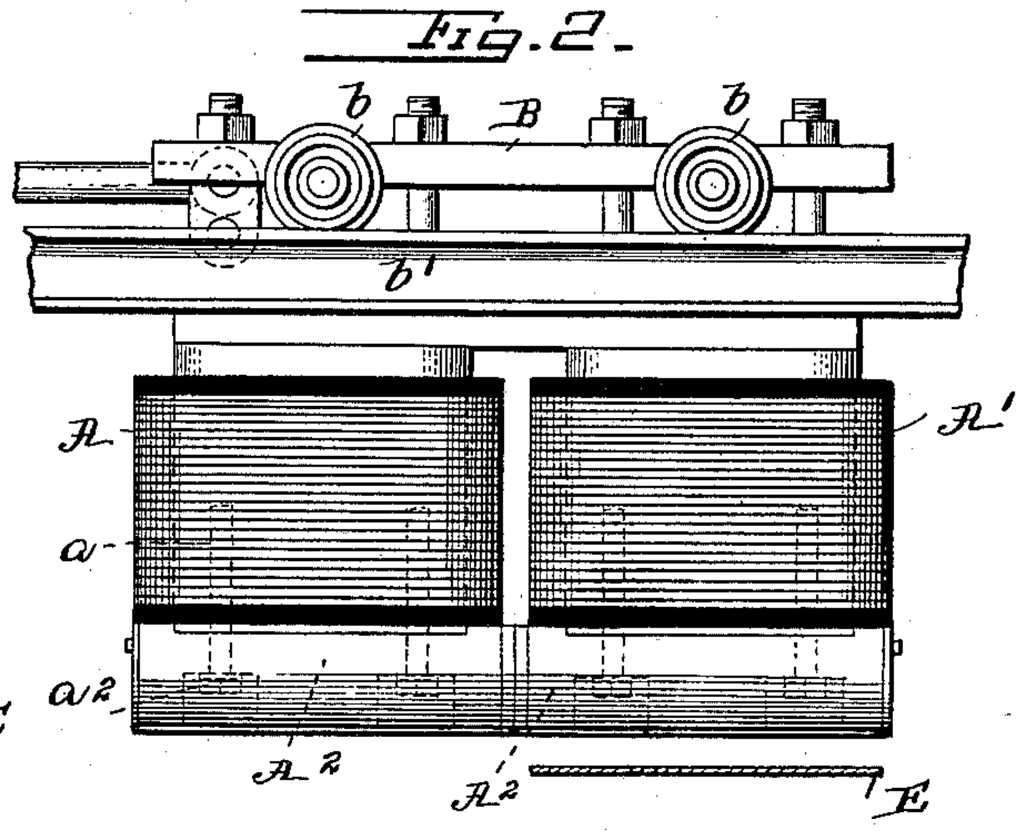


Fig. 3.

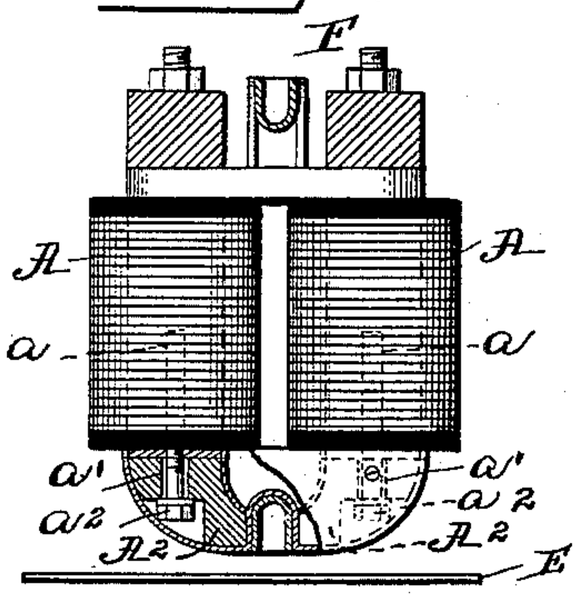
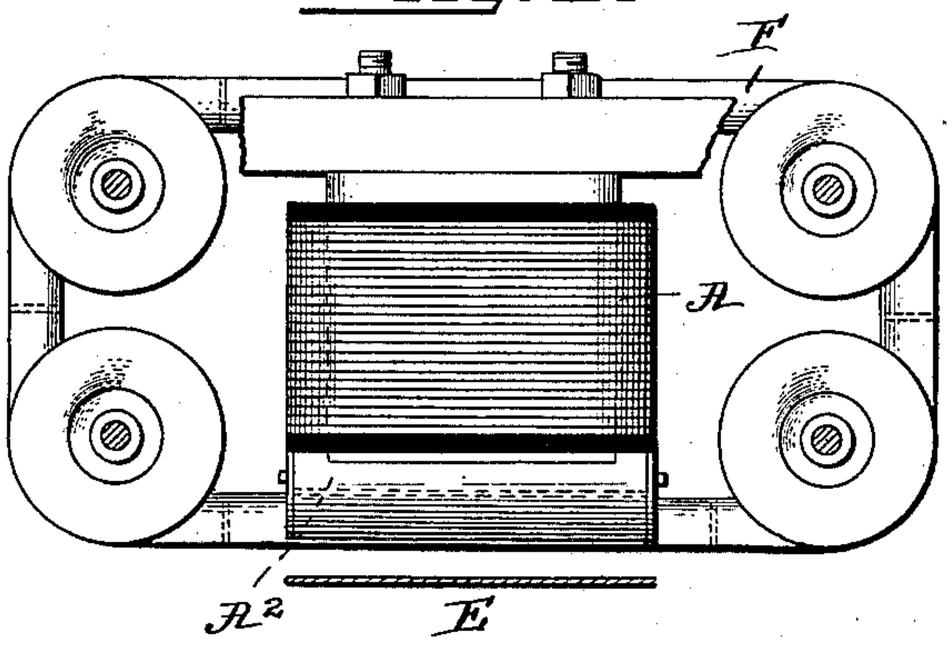


Fig. 4.



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MAGNETIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 596,720, dated January 4, 1898.

Application filed April 15, 1897. Serial No. 632,212. (No model.)

To all whom it may concern:

Be it known that I, LEWIS G. ROWAND, a citizen of the United States, residing at Camden, county of Camden, and State of New Jersey, have invented a new and useful Improvement in Magnetic Ore-Separators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

In the construction of magnets for magnetic ore-separators if the pole-pieces are symmetrical with the core and the same distance apart beyond the core as they are at the core the attractive force is lessened and the substantial magnetic field is coincident with or below the end of the pole-pieces. Where the pole-pieces are pointed at their ends and turned toward each other, so as to be in closer proximity at their ends than at the core portion, the magnetic force is largely increased. This increased magnetic force, however, produces this defect: that the ore is caught between the pole-pieces, and such ore as is so caught when the magnet is deënergized will still have a tendency to remain there on account of the excessive residual magnetism. This defect has been sought to be overcome in this character of magnets—that is, magnets having pointed pole-pieces—by insulating the pole-pieces in such a manner that the space between the pole-pieces adjacent to the conveyer-belt is inclosed, the space being covered by insulating material, which connects the two pole-pieces and forms a surface coincident with the lower surface of the pole-pieces. With this construction, however, when the ore is attracted by the magnet in large quantities sufficient ore is often attracted to bridge the space between the magnet and the belt, so that the conveyer-belt will touch the material on the magnet and in its movement brush off some of the magnetic material and thus create a readmixture of non-magnetic material, preventing the proper action of the machine.

I have discovered that with a magnet having pointed-ended pole-pieces if the ends of the pole-pieces be covered with non-magnetic material and the space between the two magnets be bridged with non-magnetic material above the pole-pieces there will be formed an open-bottomed space between the pole-pieces, which while the magnet is energized will attract the material, so as to fill this pocket, yet when the magnet is deënergized the non-magnetic surface will not, as in the previous cases, hold the magnetic material, and it will thus fall off. By this construction I am thus enabled to prevent such an accumulation of magnetic material upon the magnets that said material will extend to the belt and be brushed off thereby, and, further, by this construction the magnet is enabled at each action to remove a greater quantity of magnetic material from the belt, and I also am enabled to use every line of magnetic force of the magnet, many of which would be lost in the construction where the pointed magnet was covered at the bottom.

I will now describe the embodiment of my invention as shown in the drawings.

In the drawings, Figure 1 is a front view of a pair of magnets mounted upon a truck on the body of my invention. Fig. 2 is a side elevation. Fig. 3 is a front elevation of a pair of these magnets fixed in position. Fig. 4 is a side elevation of the same.

In Figs. 1 and 2 I have shown my construction as applied to that character of ore-separators in which the magnets are caused to move to and fro across the belt, in which case the magnets are electromagnets and are so connected with the source of current-supply that in their movement toward the belt they become energized, while in their movement away from the belt they become deënergized. As this forms no part of my invention, I have not illustrated the means and mechanism by which the magnets are caused to reciprocate to and from the belt, nor have I shown the means for cutting out the current.

In Figs. 3 and 4 the construction is one in which the magnet is stationary, there being a main conveyer-belt, and the discharging-belt operating at an angle to the conveyer-belt and crossing the same at a crossing-point, over which the magnet is placed, which draws

the magnetic ore from the conveyer-belt to the discharging-belt, from which it falls by gravity.

In Figs. 1 and 2, A are the magnets, A′ their cores, and A^2 the pole-pieces, the ends of the pole-pieces being bent toward each other.

B is a truck to which the magnets are connected, the wheels *b* of which ride upon the tracks *b′*.

The pole-pieces are connected to the cores in the following manner: The lower portion of the core is tapped, forming the orifice *a*. The pole-pieces at the points where they connect with the cores are provided with a vertical slot *a′*. a^2 is a belt adapted to pass from the vertical-slot pole-pieces and into the tapped portion of the core A′. The pole having the threaded end and the orifice *a* being also threaded, the position of the pole-piece with relation to the core may be adjusted. As this is true with both of the pole-pieces, by adjusting they may be brought nearer or farther away from each other, thereby changing the distance between the pole-pieces and thus their intensity.

The pole-pieces adjacent to the belt are covered with an insulating-piece, which covers the end of the pole-piece, leaving the space *d* free between the pole-pieces. This space is bridged above the ends of the pole-pieces either by the angular piece *d′* or the curved piece d^2, Fig. 3, thus forming the pocket *d*, which is equal in width to the distance between the pole-pieces and in altitude extends up to the under surface of the bridging-pieces *d′*, forming a pocket of considerable size.

In Figs. 3 and 4 the construction is substantially the same as that in Fig. 1, the difference being that in place of the magnets moving there is a main conveyer-belt E, as there is in Fig. 1, but there is a cross-belt F, corresponding to the upper surface of the pocket *d*, interposed between it and the conveyer-belt E, by means of which, under the action of mechanism, the magnetic material is taken from the conveyer-belt E and deposited upon the under surface of the discharging-belt.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a magnetic separator, the combination with a conveyer adapted to carry the material to be treated, of a magnet above said conveyer and adjacent thereto, the pole-pieces of said magnet extending toward each other at their ends and provided with an open-bottomed space between the free ends of the pole-pieces, the ends of the two pole-pieces being covered with non-magnetic material extending above their upper surfaces.

2. In a magnetic separator, the combination with a conveyer adapted to carry the material to be treated, of a magnet above said conveyer and adjacent thereto, the pole-pieces of said magnet extending toward each other at their ends and provided with an open-bottomed space between the free ends of the pole-pieces, the ends of the two pole-pieces being covered with non-magnetic material and connected by an angular bridge-piece of non-magnetic material extending above their upper surfaces.

3. In a magnetic separator, the combination with a conveyer adapted to carry the material to be treated, of a magnet above said conveyer and adjacent thereto, the pole-pieces of the magnet extending toward each other at their free ends, and a discharge-belt crossing the conveyer-belt between said belt and the magnet and passing between the free ends of the pole-pieces.

In testimony of which invention I have hereunto set my hand.

LEWIS G. ROWAND.

Witnesses:
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