(No Model.) 2 Sheets—Sheet 1.

T. J. LOVETT.

MAGNETIC SEPARATOR.

No. 487,074. Patented Nov. 29, 1892.

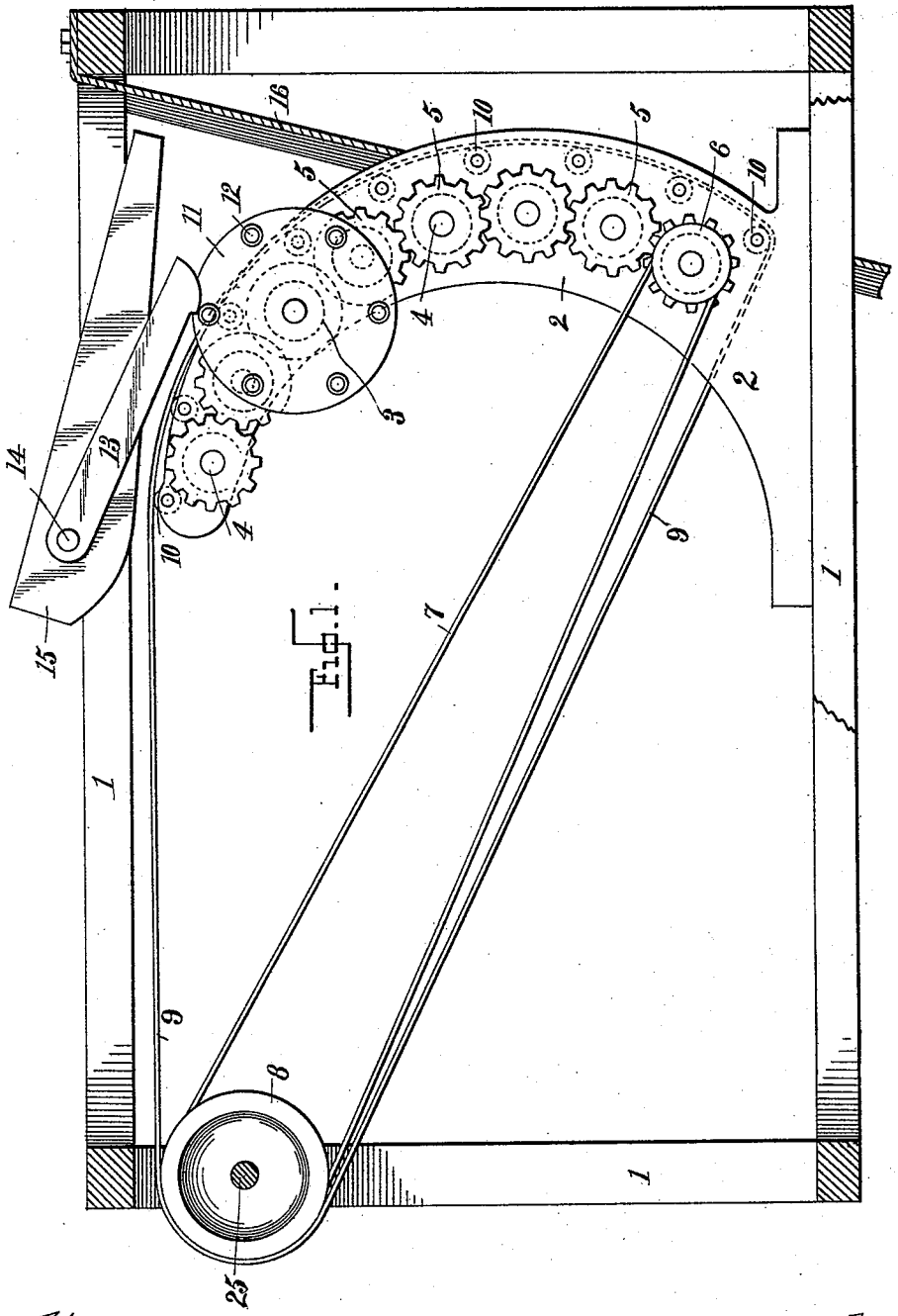

FIG. 1.

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his Atty.

(No Model.) 2 Sheets—Sheet 2.

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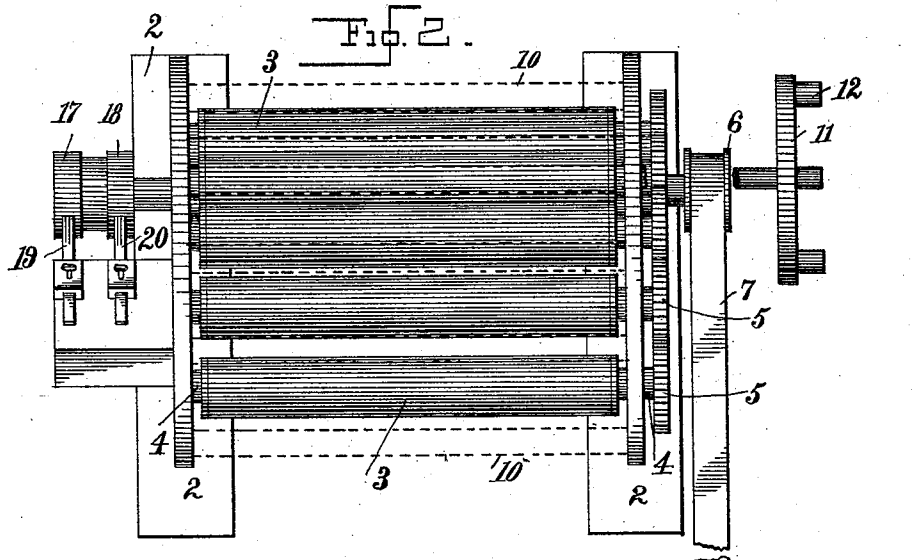
Fig. 2.



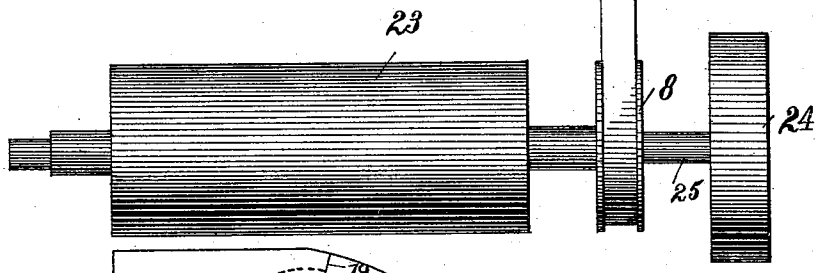
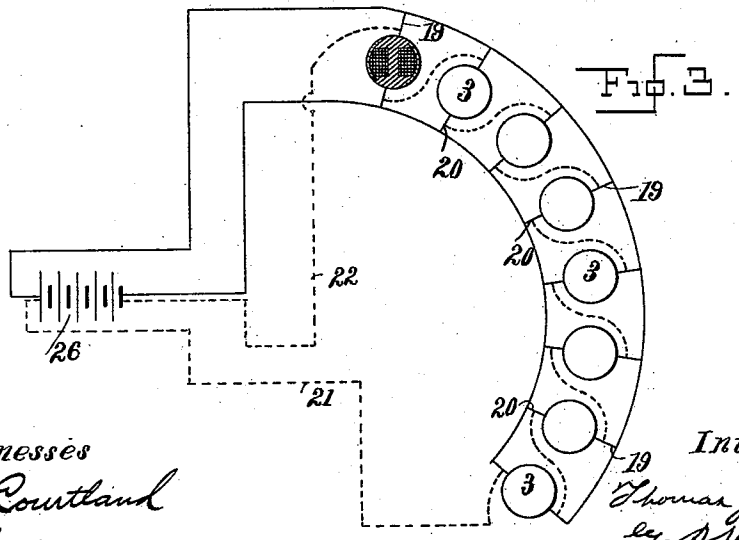


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS J. LOVETT, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE INTERNATIONAL ORE SEPARATING COMPANY, OF NEW JERSEY.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 487,074, dated November 29, 1892.

Application filed February 13, 1892. Serial No. 421,431. (No model.)

To all whom it may concern:

Be it known that I, THOMAS JEFFERSON LOVETT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Magnetic Ore-Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of separators in which a magnet or magnets attract the magnetic portion of the ore passing through the magnet-field to an endless belt, by which the magnetic ore is carried in one direction, while the non-magnetic portion is allowed to pass away in the opposite direction.

The special type of machine herein to be described belongs to the class in which the magnet or magnets rotate independently of the belt, so as to secure rapid reversal of polarity at each point in said belt as it passes over the magnet. For reasons of simplicity and cheapness I prefer to use a two-pole magnet in these machines. When a large machine is built with two-pole magnets, the magnet becomes unwieldly and costly. There is a considerable neutral space upon its circumference, and the speed of revolution necessary to secure the desired number of reversals of polarity becomes too great. To avoid these difficulties, I employ a number of small magnets in place of the one large one. The magnets are journaled in the frame and the belt passes around them. Each magnet rotates around its individual axis, and as the stuff passes along it is subjected to rapid reversals of the magnetic polarity.

The preferred construction is illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a side elevation of the working parts of the machine with the main frame in section. Fig. 2 is a plan view of the working parts with the main frame, the main belt, and certain of the other parts removed. Fig. 3 is a diagram of the electrical connections.

Throughout the drawings the same reference-figure refers to the same part.

1 is the main frame.

2 is the crescent-shaped frame in which the rotating magnetic wheels 3 are journaled, being mounted on the shafts 4, as shown.

5 5, &c., are gears by which motion is transmitted from one of said shafts to another.

6 is a pulley on one of said shafts.

8 is a pulley on the driving-shaft 25. The belt 7 transmits motion from pulley 8 to pulley 6.

10 are idler-rollers mounted in the crescent frame 2, and 23 is a drum on the shaft 25. The main belt 9 runs around this drum 23 and around the idler-rollers 10.

11 is a disk on one of the shafts 4, and has the projections 12 on its face. The projections strike the end of the lever 13, keyed on the shaft 14, on which the shaking-table 15 is mounted.

16 is an inclined feed-chute into which the shaking-table 15 delivers the stuff or ore to be separated.

24 is a pulley on the shaft 25 by which power may be transmitted to the machine.

On each of the shafts 4 are two collecting-rings 17 and 18, though but one such set is shown in Fig. 2. A set of brushes, as 19 and 20, bear on these, and through them current is sent to the coils of the magnetic wheels 3 3 3, one of which is shown in section in Fig. 3.

In the diagram Fig. 3 the source of electric current is indicated by the battery 26. Of course any source of current whatever may be used. The pairs of brushes 19 20, conveying current to each magnet, may be connected up in multiple arc, as shown in full lines, or in series, as shown in dotted lines.

The mode of operation of my invention is easily understood from the foregoing description. Motion being given to the driving-shaft 25, the belt 9 is caused to travel around and over the idlers 10 before the magnets 3. The ore dropping from the shaking-table 15 and dropping down the chute 16 comes within the magnetic field and the magnetite is drawn to the belt and upon the same. The constant rotation of the magnets 3 subjects the ore traveling along on the belt to a rapid succession of changes in the polarity of its magnetism and the particles turn over and over, free-

ing themselves from the non-magnetic impurities, which go on down the chute into the tailings.

The machine may be operated with or without water.

Various changes in details could be made without departing from the principle of the invention. The direction of rotation of the magnets might be changed. Different kinds of gearing and electric connections might be substituted, &c.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a magnetic ore-separator, the combination of a plurality of rotating magnets, each of which has its individual axis of revolution, the curved stationary frame in which said magnets are journaled, an endless belt which passes around said magnets and around said frame, and mechanism for driving said belt and magnets, substantially as described.

2. In a magnetic ore-separator, the combination of a plurality of rotating magnets, each of which has its individual axis of revolution, the curved stationary frame in which said magnets are journaled, an endless belt which passes around said magnets and around said frame, and mechanism for driving said belt and magnets together with an inclined feed-chute which is arranged tangentially to said belt at a point opposite to the rotating magnets, substantially as described.

3. In a magnetic ore-separator, the combination of a plurality of rotating magnets set in a curved stationary frame, connecting gearing which renders their rotation simultaneous, the driving-shaft and gearing by which motion is conveyed to said rotating magnets, the drum on said driving-shaft, and the endless belt which runs around said drum and around the rotating magnets, substantially as described.

4. In a magnetic ore-separator, the combination of a plurality of rotating magnets set in a curved stationary frame, connecting gearing which renders their rotation simultaneous, the driving-shaft and gearing by which motion is conveyed to said rotating magnets, the drum on said driving-shaft, and the endless belt which runs around said drum and around the rotating magnets, together with an inclined feed-chute which is arranged tangentially to said belt at a point opposite to the rotating magnets, substantially as described.

5. In a magnetic ore-separator, the combination of a crescent frame, the rotating magnets journaled in said frame, idler-rollers arranged on the convex side of said crescent frame, the endless belt which runs around said frame upon said idler-rollers, and the driving mechanism for said belt and magnets, substantially as described.

6. In a magnetic ore-separator, the combination of the crescent frame, the rotating magnets journaled in said frame, idler-rollers arranged on the convex side of said crescent frame, the endless belt which runs around said frame upon said idler-rollers, and the driving mechanism for said belt and magnets, together with an inclined feed-chute which is arranged tangentially to said belt at a point opposite to the rotating magnets, substantially as described.

7. In a magnetic ore-separator, the combination of a plurality of rotating magnets, each of which has its individual axis of revolution, the frame in which said magnets are journaled, an endless belt which passes around said magnets, a shaking-table mounted on a shaft over said magnets, a disk with projections thereon mounted on the shaft of one of the magnets, an arm from the shaking-table shaft which engages with said projections, and mechanism for driving said belt and magnets, substantially as described.

8. In a magnetic ore-separator, the combination of a plurality of magnets, the crescent frame in which said magnets are journaled, the idler-rollers arranged on the convex side of said crescent frame, the driving-shaft arranged on the concave side of the crescent frame at a proper distance from the magnets, the drum on said driving-shaft, gearing by which motion is conveyed from said driving-shaft to the rotating magnets, the endless belt which runs around said drum and over the rollers described, and the inclined feed-chute arranged tangentially to said belt at a point opposite said rotating magnets, substantially as described.

9. In a magnetic ore-separator, the combination of a plurality of rotating magnets, the crescent frame in which said magnets are journaled, the idler-rollers arranged on the convex side of said crescent frame, the driving-shaft arranged on the concave side of the crescent frame at a proper distance from the magnets, the drum on said driving-shaft, gearing by which motion is conveyed from said driving-shaft to the rotating magnets, the endless belt which runs around said drum and over the rollers described, and the inclined feed-chute arranged tangentially to said belt at a point opposite said rotating magnets, together with the shaking-table arranged over said magnets, and mechanism by which the rotation of said magnets agitates said table, substantially as described.

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

THOMAS J. LOVETT.

Witnesses:
WARREN W. FOSTER,
A. P. SMITH.