

(No Model.)

H. G. FISKE.
MAGNETIC ORE SEPARATOR.

No. 455,985.

Patented July 14, 1891.

FIG. 1.

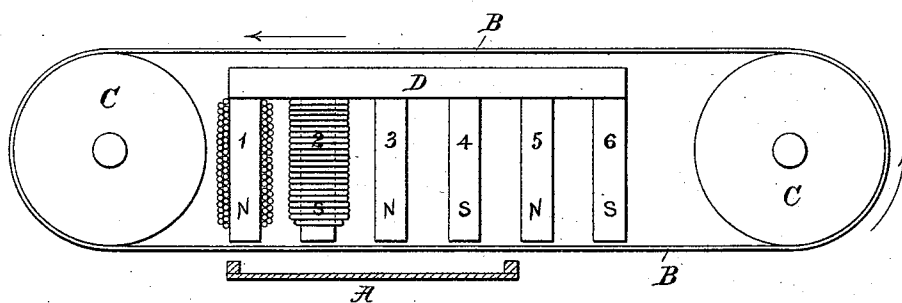
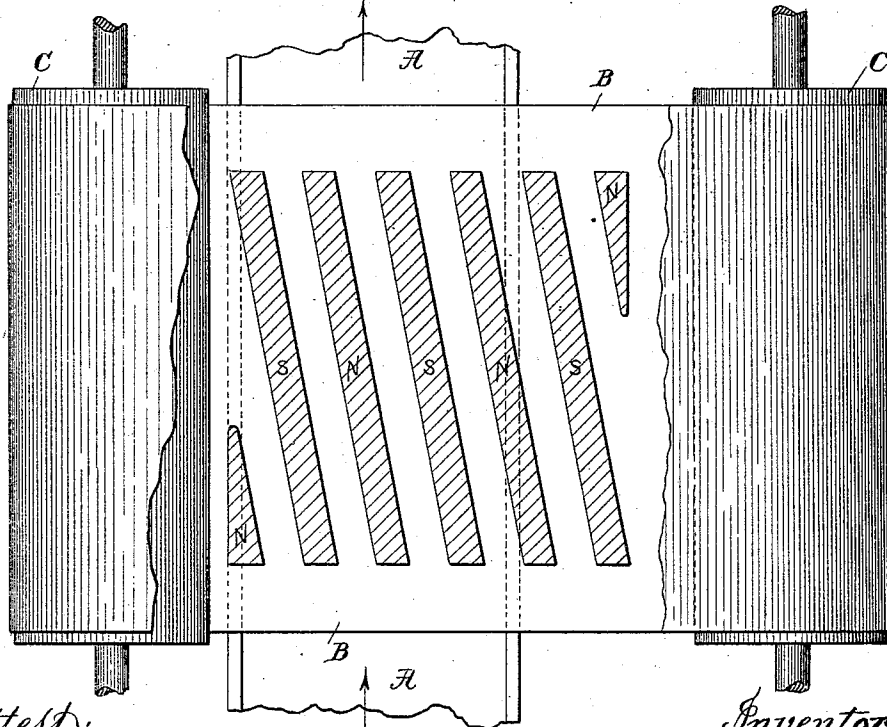


FIG. 2.



Attest:
Geo. T. Smallwood.
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by Robert Mauro
his attorney

UNITED STATES PATENT OFFICE.

HENRY G. FISKE, OF NEW YORK, N. Y., ASSIGNOR TO JOHN D. CHEEVER,
OF SAME PLACE.

MAGNETIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 455,985, dated July 14, 1891.

Application filed March 26, 1891. Serial No. 386,529. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. FISKE, a resident of New York city, county and State of New York, have invented a new and useful
5 Improvement in Magnetic Separators, which improvement is fully set forth in the following specification.

This invention relates to magnetic separators for treating crushed ores and other
10 masses containing magnetic and non-magnetic particles. It has special reference to that form of apparatus in which the ore is fed to the magnets on an endless belt or conveyer, while a transverse belt or separator moves
15 across the path of the feed-belt between the magnetic poles and the stream or sheet of ore. The magnetic particles attach themselves to this transverse belt, being held against the same by the influence of the magnet, and are
20 thereby carried off over one edge of the feed-belt and delivered into a suitable receptacle.

The present invention consists, first, in combining with the two belts moving in lines at right angles to each other a series of magnets arranged so that adjacent poles with reference to the direction of the cross-belt or separator are of opposite polarity. The magnetic poles extend in series transverse to the line of movement of the cross-belt or separator. Heretofore the plates or bars which attract the magnetic particles have been arranged transversely to the line of movement of the feed-belt.

The object of this invention is to increase
35 the efficiency of action of this type of apparatus, and its effect is that all particles adhering to the upper belt are caused to tumble or shift endwise in passing from one pole to the next. It has long been known that a mechanical agitation of the particles could be produced by carrying them past poles alternating in polarity, and I do not claim such principle, broadly.

In the apparatus herein described the particles may pass many times from the upper to the lower belt and back again, and the characteristic feature of the operation of the new combination is that the particles move across the parallel alternating poles during
45 the time they adhere to the upper belt.

The invention consists, further, in arrang-

ing the magnets at an oblique angle to the feed-belt instead of parallel therewith. If arranged parallel, a particle which entered the field under one of the spaces between the
55 magnets would remain in the same position relative thereto during its entire transit through the field. By inclining the magnets slightly from the line of the feed-belt such particle would before advancing far come under one of the poles.

The invention will be more fully understood from the following detailed description, in which reference is made to the drawings accompanying and forming part of this specification.

Figure I represents in elevation, partly in section, an apparatus embodying the principle of the first part of the invention; and Fig. II is a plan, partly in horizontal section, showing particularly the oblique relation of the magnets.

A represents the full belt or conveyer, and B the cross-belt or separator, which passes over the rollers C. The field-magnets consist of a series of cores numbered from 1 to 6 and supported by the yoke or plate D. The cores are arranged transversely to the separator B and are so wound that adjacent poles are of opposite polarity, as indicated by
75 the letters N S. Following the motion of a particle as it enters the magnetic field it will be seen that as long as it remains on the feed-belt A its motion is nearly parallel with the polar faces of the cores; but as soon as it is
85 lifted up against belt B by magnetic attraction it begins to move across the poles, and as it leaves one and approaches the next it shifts endwise, the aggregate motion of the several particles causing a considerable agitation in the entire mass. In the weaker portion of the field the particle may fall to the lower belt and its motion will again be in the line of the feed-belt. It may thus zigzag back and forth and emerge from the field at
95 the diagonally-opposite corner from that at which it entered.

As shown in Fig. II, the plates or bars forming the several cores and poles are inclined slightly from the line of the feed-belt A. Consequently all parts of the layer or sheet of ore
100 carried by belt A pass through the parts of

the field where the magnetic density is greatest. This arrangement of magnets may be usefully employed in separators of a different type from that shown herein.

5 Having now fully described my said invention, what I claim is—

1. In a magnetic separator, the combination of a feed belt or conveyor, a transverse belt or separator crossing the feed-belt a short
10 distance above the same, and a series of magnets having their poles in close proximity to the separator, said poles alternating in polarity in the direction of motion of said separator, substantially as described.

15 2. The combination of the horizontal feed-belt, the transverse belt crossing the feed-belt a short distance above the same, and a series of parallel bar-magnets arranged transversely to the upper or cross belt, adjacent
20 magnets presenting opposite poles to said belt, substantially as described.

3. In a magnetic separator, the combination, with a horizontal feed belt or conveyor

for carrying a layer or stream of ore through the magnetic field, of a series of magnets arranged obliquely to the direction in which
25 said conveyor moves, substantially as described.

4. In a magnetic separator, the combination, with two belts moving in lines at right
30 angles to each other, of a series of magnets inclined slightly from the line of the under belt, substantially as described.

5. The combination of the feed-belt, the cross-belt, and the series of magnets inclined
35 slightly from the line of the feed-belt and presenting alternately-opposite poles in the direction of motion of the cross-belt, substantially as described.

In testimony whereof I have signed this
40 specification in the presence of two subscribing witnesses.

HENRY G. FISKE.

Witnesses:

PHILIP MAURO,
JONA. B. CILLEY.