(No Model.)

G. CONKLING.

MAGNETIC SEPARATOR.

No. 410,877. Patented Sept. 10, 1889.

Fig. 1.

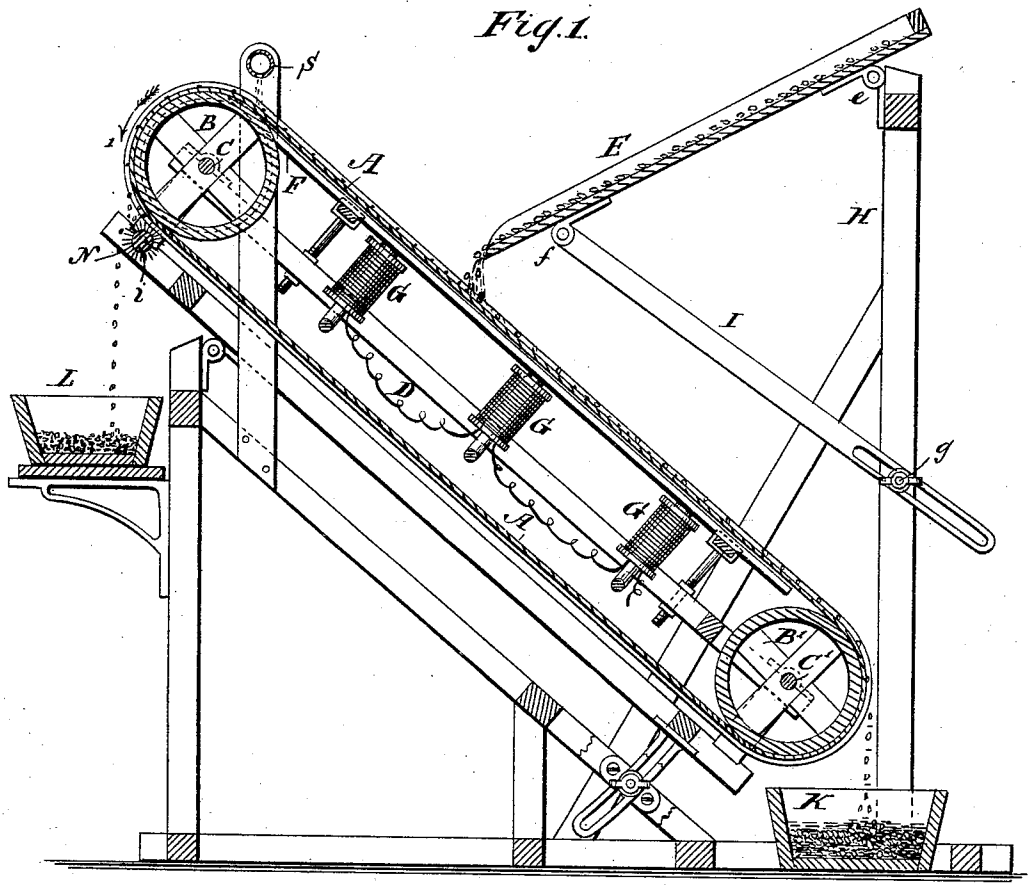


Fig. 2.

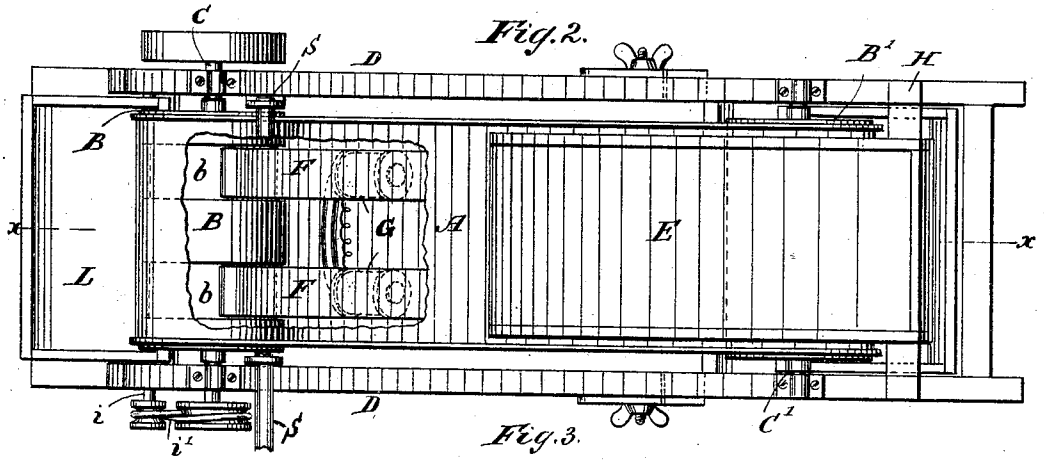
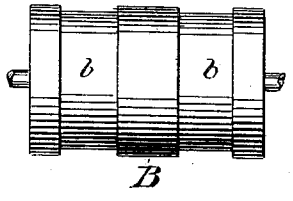


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GURDON CONKLING, OF GLENS FALLS, ASSIGNOR TO THE CONKLING ORE DEPHOSPHORIZING COMPANY, OF NEW YORK, N. Y.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 410,877, dated September 10, 1889.

Application filed January 31, 1889. Serial No. 298,244. (No model.)

To all whom it may concern:

Be it known that I, GURDON CONKLING, a citizen of the United States, residing at Glens Falls, in the county of Warren and State of New York, have invented new and useful Improvements in Magnetic Separators, of which the following is a specification.

The object of this invention is to eliminate and collect the magnetic particles contained in and carried by a moving mass of crushed ore. The apparatus which I use for this purpose, and which forms the subject-matter of my present invention, is described in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section in the plane *x x*, Fig. 2. Fig. 2 is a plan or top view. Fig. 3 is a side elevation of one of the rollers detached.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates an endless belt, which extends round two pulleys B B′, and which is provided with raised rims or ribs *a a* at its edges. The shafts C C′ of the pulleys B B′ are mounted in a frame D, which is inclined, and the inclination of which can be adjusted by any suitable means—such, for instance, as those shown in the drawings.

E is a trough, which is placed over the belt A in an inclined position, and over which a mass of crushed ore containing magnetic particles is conducted to the endless belt A. In the interior of said endless belt are situated one or more magnets F, which are secured to the frame D, so that when the inclination of this frame is changed the magnets will retain their relative position toward the belt A. These magnets may be made in the form of permanent magnets or in the form of soft-iron bars which are rendered magnetic by electro-magnets G G G, as indicated in the drawings. The trough E is connected at or near its upper end by means of hinge-joints *e* to a frame H, and from this frame extends a rod I, which is connected to the trough at one end by a hinge-joint *f*, while its opposite end is slotted to receive a set-screw *g*. By means of this bar and set-screw the inclination of the trough can be adjusted.

Beneath the endless apron A is situated a brush or scraper N, which is mounted on a shaft *i*, to which a revolving motion is imparted from the shaft C by means of a belt *i′*, Fig. 2. Motion is imparted to belt A, so that it moves in the direction of arrow 1, Fig. 1. The mass of crushed ore which carries the magnetic particles strikes the belt at a point over the magnets F, and the magnetic particles contained in said mass are attracted to the belt A by the magnets and are carried upward, while that portion which contains the non-magnetic particles is carried downward over the belt and discharges into a vat K. The magnetic particles which adhere to the belt C are separated from the same either by their own gravity or by the brush N, and they are collected in the vat L.

In order to insure the action above stated, it is necessary that the magnets F be placed close beneath the upper strand of the belt A, and that they extend in the direction of said belt up to the highest point of said upper strand.

The pulley B may be provided with grooves *b b*, Fig. 3, into which the ends of the magnets F extend, so that the magnetic particles which are attracted to the belt by said magnets will not be liable to become detached before they have been carried by said belt over the highest portion of the pulley B, or so that if the magnetic particles have a tendency to accumulate on the belt at the end of the magnetic bars the bars may be carried so far around the pulley as to cause such accumulation to make no serious difficulty, as gravitation would help to overcome the magnetic force.

A spray of clean water can be introduced by means of the pipe S, so that the dust adhering to the magnetic particles which are attracted by the magnets and carried upward by the belt will be washed away.

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

1. The combination, in a magnetic separator, of an endless belt A, a magnet F, situated within said belt close to its upper strand and extending in the direction of the belt up to the highest point of said upper strand, or

nearly so, a frame constructed to retain said belt and magnet in an inclined position, and a trough situated above the belt and the magnet, substantially as described.

2. The combination, in a magnetic separator, of a frame hinged at one end and movable into different positions to vary its angle of inclination, an endless belt supported and retained by said frame, a magnet located within said belt and secured to and movable with the frame, whereby the magnet preserves its position relative to the belt when the inclination of the frame is changed, means for adjusting and holding the belt and magnet carrying frame, and a trough arranged over said frame to deposit the mass to be separated on the belt over the magnet, substantially as described.

3. The combination, in a magnetic separator, of an inclined frame having two opposite rollers, one of which is provided with annular grooves in its external surface, the endless belt passing round the pulleys, and the magnets supported by the frame within the belt and made to extend into said annular grooves, substantially as described.

4. The combination, in a magnetic separator, of an endless belt A, a magnet situated within said belt close to its upper strand and extending in the direction of the belt, a frame constructed to retain said belt and magnet in an inclined position, a trough situated above the belt and the magnet, and a spray-pipe S, extended across the highest portion of the belt, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

GURDON CONKLING. [L. S.]

Witnesses:

WM. G. CONKLING,

EUGENE L. ASHLEY.