(No Model.)

G. CONKLING.

PROCESS OF SEPARATING MAGNETIC PARTICLES.

No. 423,907. Patented Mar. 25, 1890.

Fig. 1

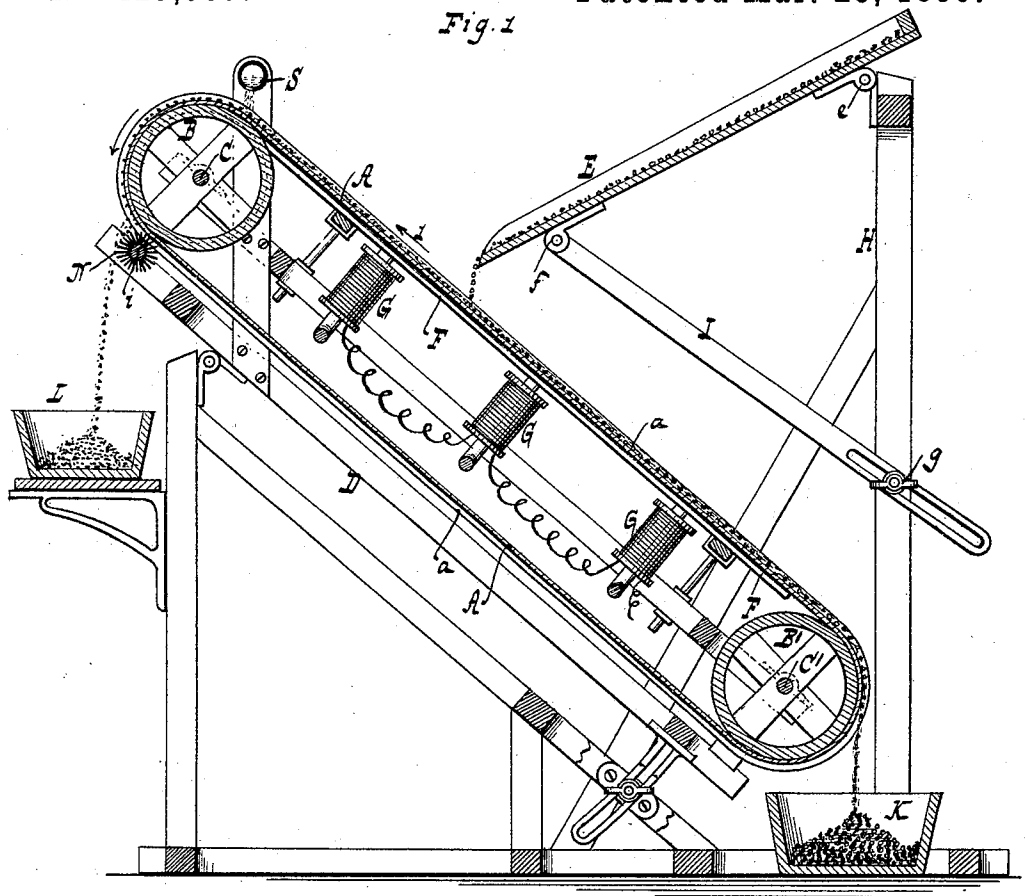
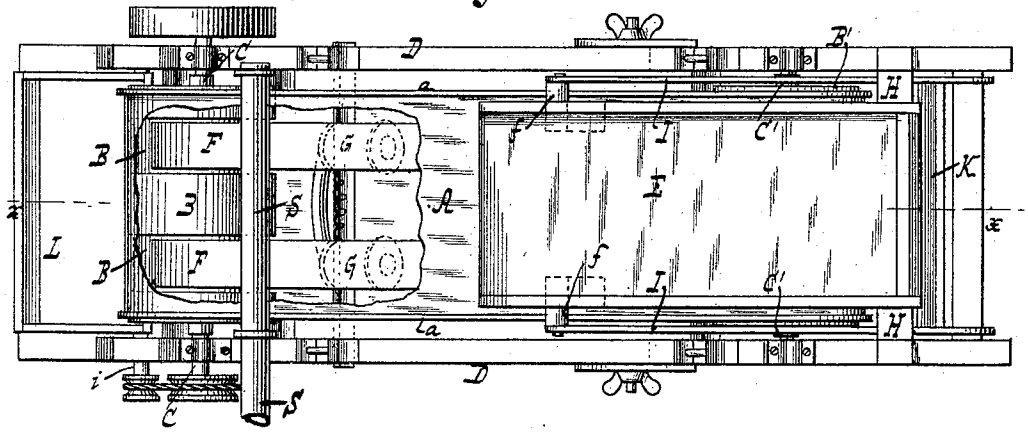


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PROCESS OF SEPARATING MAGNETIC PARTICLES.

SPECIFICATION forming part of Letters Patent No. 423,907, dated March 25, 1890.

Application filed August 7, 1889. Serial No. 320,046. (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 the Process of Separating Magnetic from Non-Magnetic Particles, of which the following is a specification.

This invention relates to a process by means of which the magnetic particles carried by a stream of liquid are separated from the non-magnetic particles mixed in the stream of liquid with the magnetic particles, said process being pointed out in the following specification and claims.

The apparatus which I can use in carrying out my invention is 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.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates an endless belt, which extends around two pulleys B B′, and which is provided with raised rims *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 stream of liquid containing a mixture of magnetic and non-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, and these electro-magnets may be vitalized by a continuous or by an intermittent current. 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 belt 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 the belt A, so that it moves in the direction of arrow 1, Fig. 1. The stream of liquid which carries the magnetic and non-magnetic particles strikes the belt at a point over the magnets F, and the magnetic particles carried by said stream are attracted to the belt A by the magnets and carried away in the direction of arrow 1, while the non-magnetic particles are carried by the stream of liquid in the opposite direction, and are finally collected in the vat K. The magnetic particles which adhere to the belt A are separated from the same either by their own gravity or by the brush N, and they are collected in the vat L. A spray of clear water is introduced by means of the pipes S, so that the gangue adhering to the magnetic particles which are carried by the belt will be washed away. This gangue usually contains phosphorus or titanium or other impurities, which, when mixed with the iron particles, render the same unfit for the manufacture of steel. It is needless to say that the frame D may be so arranged that it permits of adjusting the belt A in a vertical position, or nearly so, without deviating from my invention.

From the foregoing description it will be seen that the stream of liquid which carries the magnetic and the non-magnetic particles is exposed to an uninterrupted action of the magnet or magnets, so that no portion of said stream can pass without being exposed to the action of the magnet or magnets, and consequently the magnetic particles contained in the stream will be carried away in one and the non-magnetic particles in the opposite direction.

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

1. The process herein described of separating magnetic and non-magnetic particles, which consists in causing a liquid stream containing such particles to travel downward from a higher to a lower level, and while so traveling subjecting the stream to the uninterrupted action of a stationary magnet and

moving the magnetic particles upward out of the magnetic field while the liquid stream with the non-magnetic particles is descending, substantially as described.

2. The process herein described of separating magnetic and non-magnetic particles, which consists in causing a liquid stream containing such particles to travel downward over a magnet, and while the liquid is so traveling over such magnet moving the magnetic particles upward in a direction opposite to that in which the liquid with the non-magnetic particles is traveling, and spraying the magnetic particles, substantially as set forth.

3. The process herein described of separating magnetic and non-magnetic particles, which consists in causing a liquid stream containing such particles to travel downward, and while so traveling subjecting the stream to the uninterrupted action of a stationary magnet and moving the magnetic particles upward out of the magnetic field, while the liquid stream with the non-magnetic particles continues to descend, and exposing the moving magnetic particles after they have been carried upward out of the descending liquid, and before they leave the magnetic field, to a descending spray of water, substantially as set forth.

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

GURDON CONKLING.

Witnesses:
J. VAN SANTVOORD,
W. HAUFF.