R. COOK.

ELECTROMAGNETIC ORE SEPARATOR.

No. 6,121. Patented Feb. 20, 1849.

Fig. 1.

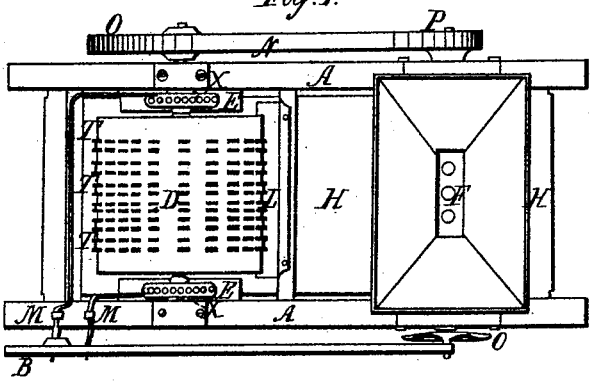


Fig. 2.

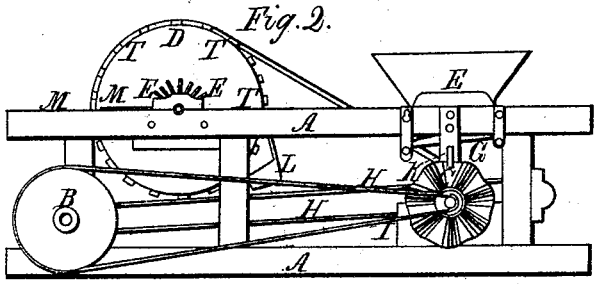
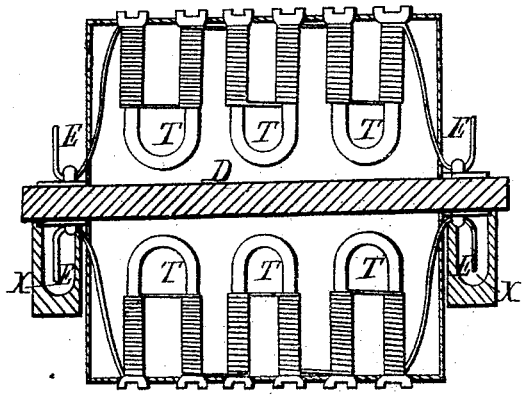


Fig. 3.



UNITED STATES PATENT OFFICE.

RANSOM COOK, OF PLATTSBURG, NEW YORK.

IMPROVEMENT IN ELECTRO-MAGNETIC ORE-SEPARATORS.

Specification forming part of Letters Patent No. **6,121**, dated February 20, 1849.

To all whom it may concern:

Be it known that I, RANSOM COOK, of Plattsburg, in the county of Clinton and State of New York, have invented a new and useful machine or improvement for separating the magnetic oxide of iron from the materials or substances with which it is often found associated, which invention and process is described as follows, reference being had to the annexed drawings as forming a part of this specification.

Figure 1 is a plan of the machine; A A, timbers of the frame; D, the cylinder; T T T, electro-magnets covered by insulated copper-wires E E, which, after being wound around the iron of the magnets, are brought through the heads of the cylinder near the shaft. X X are semicircular troughs containing quicksilver, through which the terminations of the wires covering the magnets are made successively to pass when the machine is in use. M M are conductors for the galvanic fluid or electricity, which conductors commence in separate cups of quicksilver on the frame of the machine, and separately terminate in one of the mercurial troughs; L, the trough in which the ore falls when discharged from the magnets; F, the hopper in which the crushed ore and stone is deposited; H H, an endless apron, on which said ore and stone is spread to be conveyed under the cylinder. B, O, and P are pulleys. N and I are belts. C is a cam for shaking the shoe G, (shown in Fig. 2,) below the hopper.

Fig. 2 is an elevation of the machine, in which the letters refer to the same parts, with the addition of K, which refers to the clasp or embrace of the cam, which clasp is connected with the shoe G.

Fig. 3 is a sectional view of the cylinder, with the same references, except that the letters X X here refer to the quicksilver in the semicircular troughs.

In building this machine for use I make the cylinder about thirty inches in diameter, and in length proportioned to the quantity of ore the purchaser wishes to separate in a day. The bodies of the magnets are made of round iron about five-eighths of an inch in diameter, and the magnets, when finished, are about five inches long, having four polar terminations, two at each pole, as shown in Fig. 3. Between these terminations, as well as between the opposite poles, a space of about three-fourths of an inch is left. These bodies are then covered and wound with insulated copper wire, in the usual manner of making electro-magnets. A sufficient number of these electro-magnets to form a row extending from one head of the cylinder to the other are then secured to a board resembling the bucket of a paddle-wheel, the copper windings of the row of magnets being connected together, and continuing at each end through the cylinder-heads, as shown in Fig. 3. The terminations of these windings for immersion in the semicircular troughs of quicksilver are made of iron in a machine for use. These terminations of the copper wires do not pass through the heads of the cylinders in a direct line from the magnets to which they long to the center of the shaft, but pass through the cylinder-heads in the third hole back of said supposed line. This arrangement is by no means essential to the efficient working of the machine, but is adopted to avoid charging the magnets on the descending side of the cylinder until they reach nearly to the ore on the apron. It thus effects a saving of the galvanic fluid. This arrangement also enables the magnets on the ascending side of the cylinder to carry the ore (when it is desirable) above the level of the quicksilver in the troughs before losing their magnetism by breaking their connection with the battery. From thirty to forty rows of these magnets are thus placed in the cylinder, the periphery of which is filled with the magnets and intervening wood, the polar projections of the magnets extending outwardly beyond the wood.

In use a sufficient quantity of quicksilver is poured into the semicircular troughs to enable about one-fourth of the magnets in the cylinder to be charged at a time, these being the rows on the under side of the cylinder near the apron, and those extending upward over the receiving trough L. Leaders or conductors from the two poles of a galvanic battery being separately placed in the mercurial cups near M M, Fig. 1, all the electro-magnets whose insulated wire windings terminate at the time in the quicksilver of the semicircular troughs are thus brought in connection with the bat-

tery. The hopper being supplied with the crushed ore, stone, &c., these materials pass through the perforations in the bottom of the hopper into the shoe beneath, which, being shaken by the cam when the machine is in motion, spreads the ore upon the endless apron, the upper half of which is moving toward the cylinder and carrying the ore, &c., beneath it. The cylinder revolving in the same direction as the apron, but above it, the ore is met by a continuous succession of magnets, each row of which has become charged by the immersion of its terminal points in the mercury of the semicircular troughs. The polar terminations of the electro-magnets, passing through the crushed mass upon the apron, take up the particles of magnetic ore and carry them upward until the terminal points of the wires with which they were wound emerge from the quicksilver in the troughs, when the electro-magnets, thus losing their connection with the battery, drop the ore into the receiving-trough L. The foreign substances from which the ore has been thus abstracted pass on under the cylinder and fall from the apron as it passes around the drum or pulley which moves it.

What I claim as my invention, and which I desire to secure by Letters Patent, is—

1. The use and application of a revolving cylinder or drum, with the poles of electro-magnets on its periphery, for and to the purpose of separating the magnetic oxide of iron from the substances with which said oxide may be found associated, by causing the said electro-magnets, when revolving as component parts of such cylinder, to be successively charged to take up the ore, and subsequently discharged to part with it, the charging being effected by bringing the windings of such electro-magnets in connection with an acting galvanic battery, and the discharging by breaking or leaving such connection.

2. For the purpose of separating such ore, the use and application of four or more terminations to the poles of electro-magnets, as shown in Fig. 3.

RANSOM COOK.

Witnesses:
CHAS. A. COOK,
C. C. FITCH.