(No Model.)

2 Sheets—Sheet 1.

C. FABER.

MAGNETIC IRON ORE SEPARATOR.

No. 294,021. Patented Feb. 26, 1884.

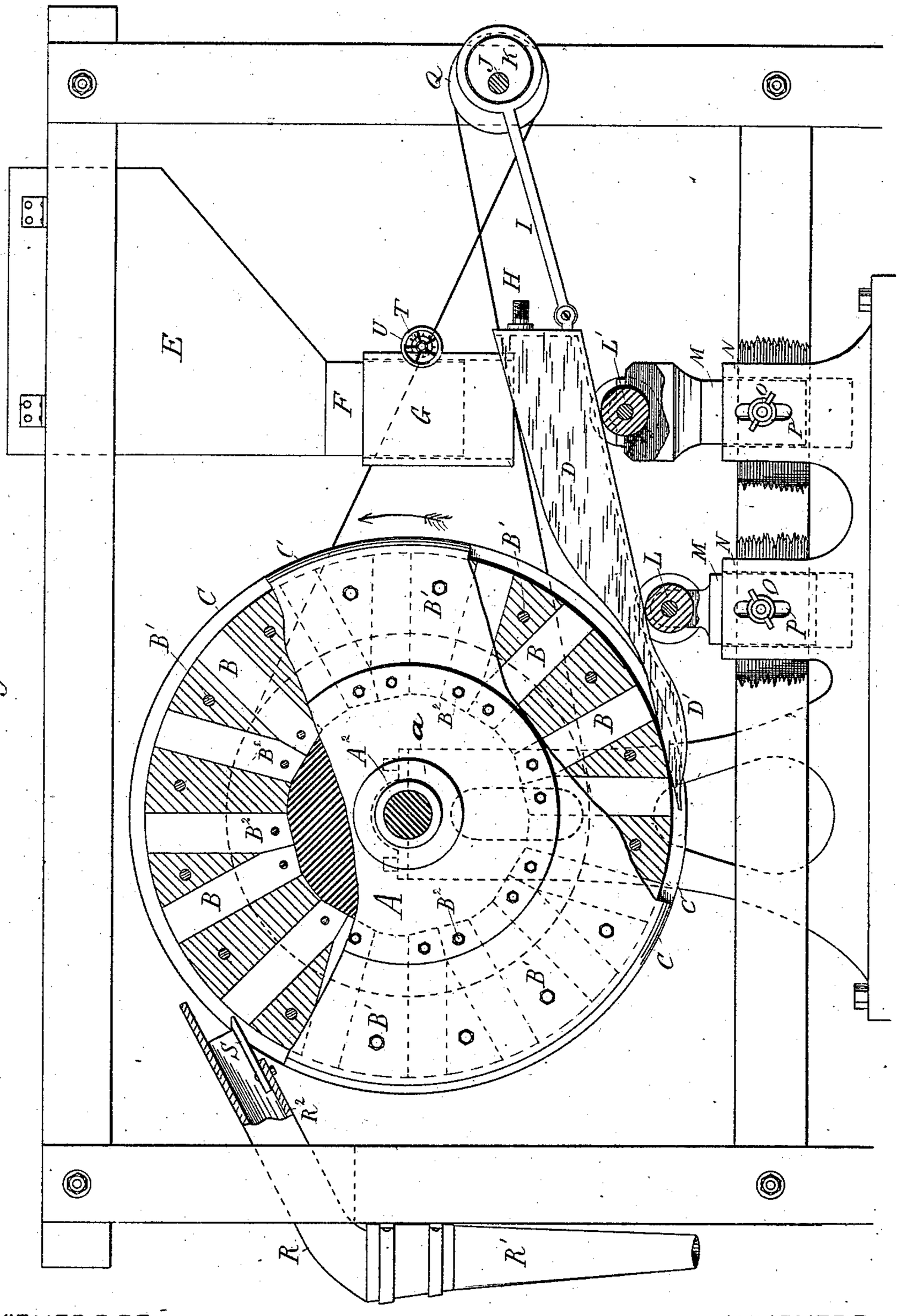

Fig. 1.

WITNESSES
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INVENTOR
Charles Faber
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(No Model.) 2 Sheets—Sheet 2.

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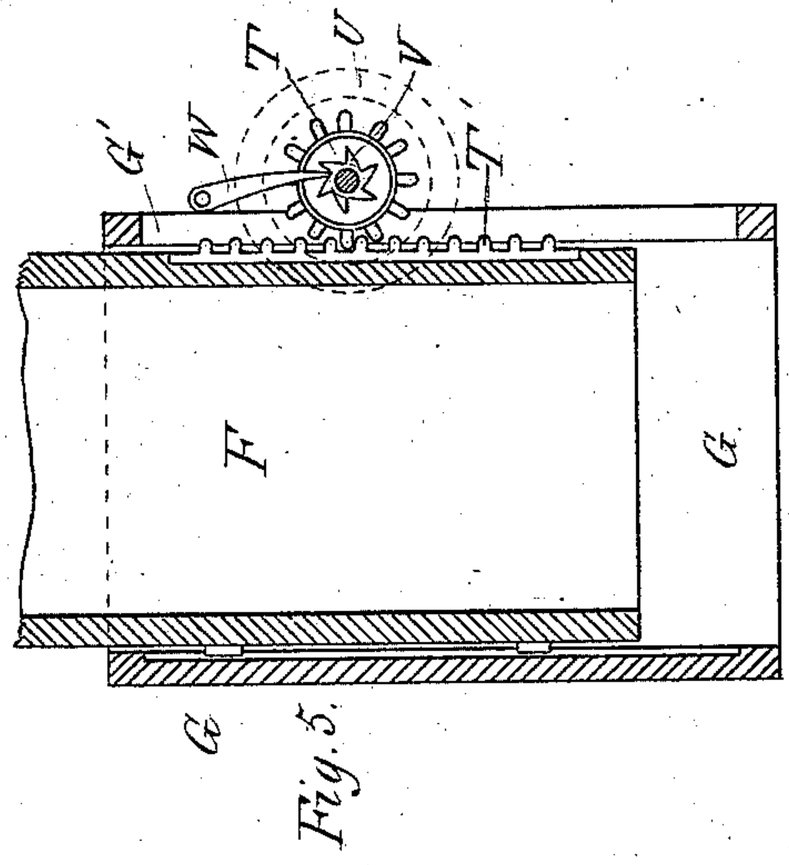

Fig. 5.

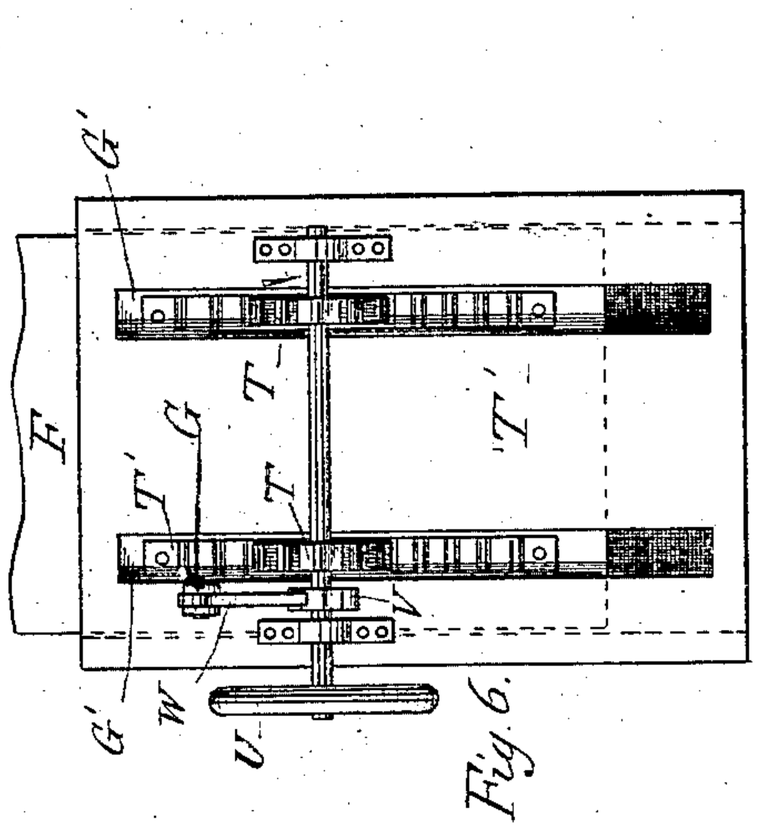

Fig. 6.

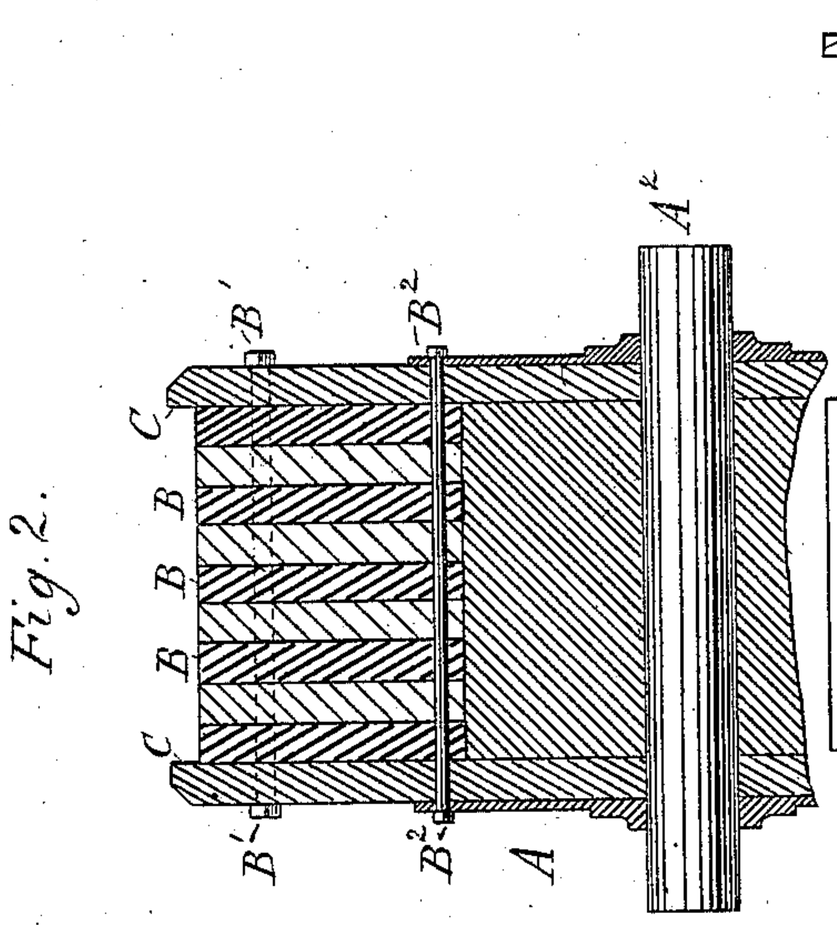

Fig. 2.

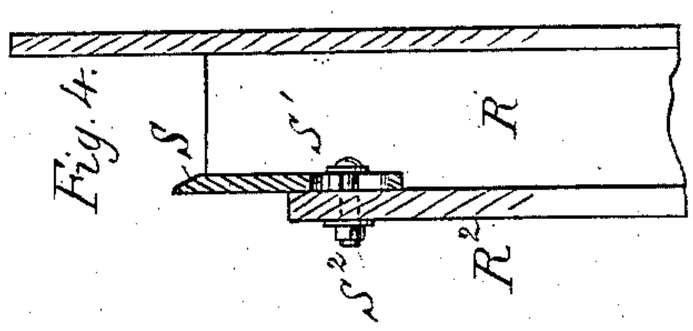

Fig. 4.

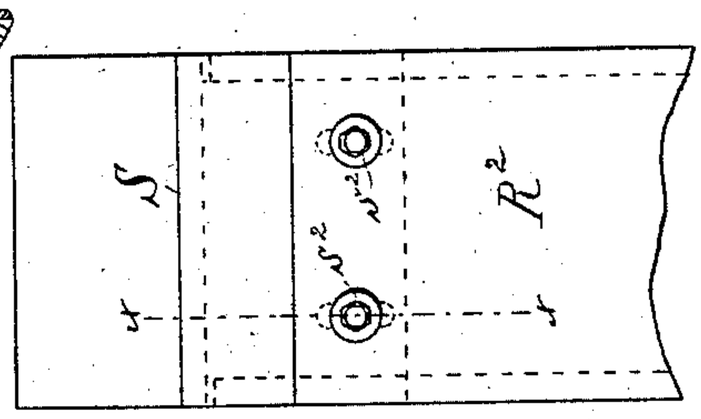

Fig. 3.

WITNESSES

Wm. A. Lowe

Wm. C. G. Faber.

INVENTOR

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UNITED STATES PATENT OFFICE.

CHARLES FABER, OF BROOKLYN, NEW YORK.

MAGNETIC-IRON-ORE SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 294,021, dated February 26, 1884.

Application filed November 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FABER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a new and useful Magnetic-Iron-Ore Separator, of which the following is a specification.

The object of my invention is to provide a new and improved machine for separating pulverized magnetic-iron ore.

In the accompanying drawings, Figure 1 is an elevation of the entire machine, with a part of the outside casing, C, of the wheel A broken away. Fig. 2 is a cross-section of a portion of the wheel A. Fig. 3 is a view of the under side of the end of the trough or chute R. Fig. 4 is a section of a portion of the trough or chute R on the line *x x*, Fig. 3. Fig. 5 is a vertical section of the spout G of the hopper E. Fig. 6 is an elevation of one side of the spout G of the hopper E.

The same letters indicate the same or similar parts throughout the several views.

A is a wheel rigidly mounted on a shaft, A^2, journaled into a suitable frame, as shown in Fig. 1. A driving-pulley, *a*, is rigidly attached to one end of the shaft for the purpose of rotating it, and on the other end of the shaft a band-wheel is rigidly attached, which serves to rotate the small band-wheel Q when connected by a belt. The wheel A is composed of two disks, C, made of suitable non-magnetic metal or of a non-conducting substance, in order that they may not become magnetized so as to attract the particles of iron or interfere with the action of the magnets. These disks C inclose several layers of magnets, B, alternating with layers of some non-conducting substance, as shown by the section in Fig. 2. The outer ends of the magnets B project toward the circumference of the wheel all around its periphery, and the ends of the magnets that are toward the axis of the wheel are brought together in such a manner that each pair will form a **V**, as shown in Fig. 1, and are then held in place between the disks by the bolts B′ and B^2. The wheel or cylinder, formed of the magnets and insulating material, is not as large in diameter as the diameter of the outside disks, C, so that the edges of the disks project beyond the convex face of the cylinder, as shown in Figs. 1 and 2.

Near the wheel A is a hopper, E, held in position by suitable supports, and the delivery end F is encircled by the telescopic part G, which can be raised or lowered by the pinions T and gears T′, which latter are worked by the hand-wheel U and held in position by the pawl and ratchet V W.

Under the spout G is placed one end of a long pan or box, D, having two sides, one end, and a bottom, with a depression, D′, near the open end. The open end of the tray D is placed immediately under the wheel A, and into the other end a tube, H, is inserted, to which a hose may be attached. The tray D is held in place on rollers L L′. The rollers L L′ can be raised or lowered independently of each other by means of the slides M, moving in the sockets or mortises N, and affixed at the right height by the set-screws O, which slide in the slots P. A connecting-rod, I, is attached at one end, by a hinged joint, to the closed end of the tray D, and the other end of the rod I is attached to and encircles an eccentric, which is rigidly affixed on a shaft, J, journaled on the frame, and the shaft J has also rigidly affixed to it the band-wheel Q. A chute or tube, R, is held in position on the frame, with the lower end, R′, made in such a manner that it can be projected over or into a car or other receptacle entirely away from the wheel. This may be effected by making said tube flexible or otherwise movable. The other end of the chute R is extended nearly to the top of wheel A, and has attached thereto, on the under side, a scraper, S, which is held in position by the bolts S^2 and S^2, passing through slots S′ in the scraper. The scraper S, together with the bolts S^2 and S^2, is made of a non-magnetic metal or other material suitable for the purpose.

The operation of the machine is as follows: The hopper E is filled with pulverized magnetic-iron ore, which drops into the tray or agitator D. The supply of the iron ore is regulated by raising or lowering the mouth-piece G of the hopper E. When the telescoping mouth-piece G is raised, a large supply of ore will fall into the tray D, and when the mouth-piece G is lowered down to the bottom of the tray the supply of iron ore can practically be stopped. The wheel A is caused to revolve by a suitable power, and when in motion turns from the agitator D and hopper E toward the chute R, as indicated by arrow,

Fig. 1, so that any iron picked up by the magnets is carried over the top of the wheel A and taken off by the scraper S. The iron then slides over the scraper S into the chute or trough R, and thence through the chute R′ into a receptacle placed to receive it. The scraper S is placed across the face of the wheel A and touches the edges of the disks C, leaving a space between the ends of the magnets B and the edge of the scraper S. The scraper S does not take off all the iron that is picked up by the magnets B, but leaves the ends of the magnets always covered with iron to form an armature for other iron to impinge against, and thus save the ends of the magnets from wearing away, and at the same time helping to retain the magnetic power contained in them longer than would be the case if the ends were always cleaned and left exposed. When the wheel A is in motion, having a band connecting a band-wheel on the shaft A^2 with the band-wheel Q on the shaft J, the eccentric K also revolves and causes the agitator D to move back and forth under the wheel A and hopper E; and as the ore drops from the hopper E into the tray D it is shaken by the motion of the tray under the wheel A. The tray D being slightly inclined, and having two sides and only open at one end, all the ore, by the agitation, passes under the wheel. The iron particles are then picked up by the magnets B and carried over toward the scraper, and the sand slides out of the open end of the tray D. The tray or agitator D is placed in the proper position beneath the wheel by raising or lowering the rollers L L′, and is set at such a distance from the bottom of the wheel A that the pulverized iron ore passing along the bottom of the tray or agitator will in no case come into actual contact with the magnets B, but must be set at such a distance that the attracting power of the magnets will have to lift the ore away from the sand. If a hose is attached to the connection H and a stream of water is forced into the tray D, the water will carry the ore down the incline of the tray until it reaches the depression of the tray D′, when it will eddy and circle, causing all the particles to separate from one another, when the iron will be picked up by the magnets and the sand will pass out of the tray with the water. When water is used, the tray D can be detached from the motive power and remain at rest, thus forming a chute or trough, through which the ore is carried under the wheel by the force of the water.

I am aware that previous to my invention magnetic cylinders, electro-magnetic cylinders, hoppers, troughs, or chutes, scrapers, and agitators have been used for various useful purposes; and I do not claim either; but

What I do claim as my invention is—

1. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A and the scraper S, held by a suitable support, with its operative edge in proximity to the convex surface of the cylinder, whereby collected ore may be removed therefrom and a covering or armature of said ore left for the ends of the magnets, substantially as set forth.

2. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A, having end flanges, C, projecting radially beyond the periphery thereof, and a scraper, S, held above the cylinder by a suitable support, the operative edge of said scraper projecting inwardly toward the cylinder between the flanges C, whereby the material collected by the scraper is confined and its escape over the edges of the cylinder prevented, substantially as set forth.

3. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A, ore-feeding trough or spout D, vertically-adjustable rollers L L′, situated at or near each end of said trough and supporting the same, and mechanism, substantially as described, for reciprocating said trough, as set forth.

4. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A, ore-feeding trough or spout D, situated with one end in proximity to said cylinder, to deliver ore to the same, ore-hopper E, having a spout, F, the casing G, situated above the trough D and forming a conduit between the latter and said spout F, and means, substantially as described, for adjusting said casing G toward or from the bottom of the trough D, as set forth.

5. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A, trough D, situated with its delivery end in proximity to said cylinder, to feed ore thereto, and a water-connection, whereby a stream may be directed through said trough, substantially as set forth.

6. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A, the ore-feeding trough D, situated with its delivery end lower than its receiving end, the former end being beneath the cylinder and in proximity thereto, and having the depression D′ in its bottom, and a water-connection, whereby a stream may be directed through the trough and out at its delivery end, by which devices an interruption to the descending stream of ore and water is caused at the point D′, and said stream diverted upward toward the magnetic surface, to facilitate the separation of the attracted particles, substantially as set forth.

7. In a magnetic-iron-ore separator, the combination of the magnet-carrying cylinder A and scraper S, arranged to remove the attracted particles from said cylinder, the scraper being composed of non-magnetic material incapable of being magnetized, and rendered attractive by the magnet-carrying cylinder, substantially as set forth.

CHARLES FABER.

Witnesses:
CHAS. WREN,
W. C. WREN.