

(No Model.)

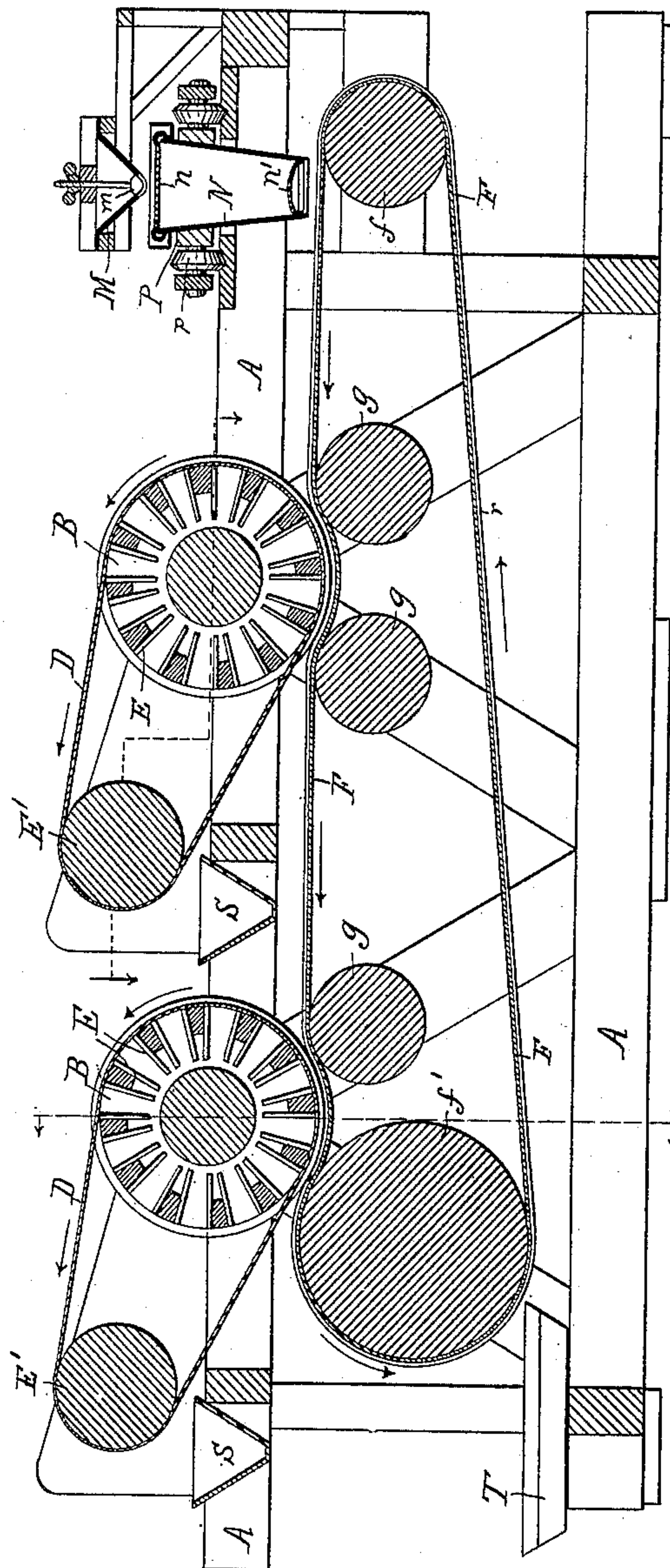
2 Sheets—Sheet 1.

C. C. COATS.
MAGNETIC ORE SEPARATOR.

No. 401,688.

Patented Apr. 16, 1889.

Fig. 1



Witnesses:

E. J. Chiswell
Geo. A. Crane.

Inventor

C. C. Coats.

By his Attorneys.

Howson and Howson

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

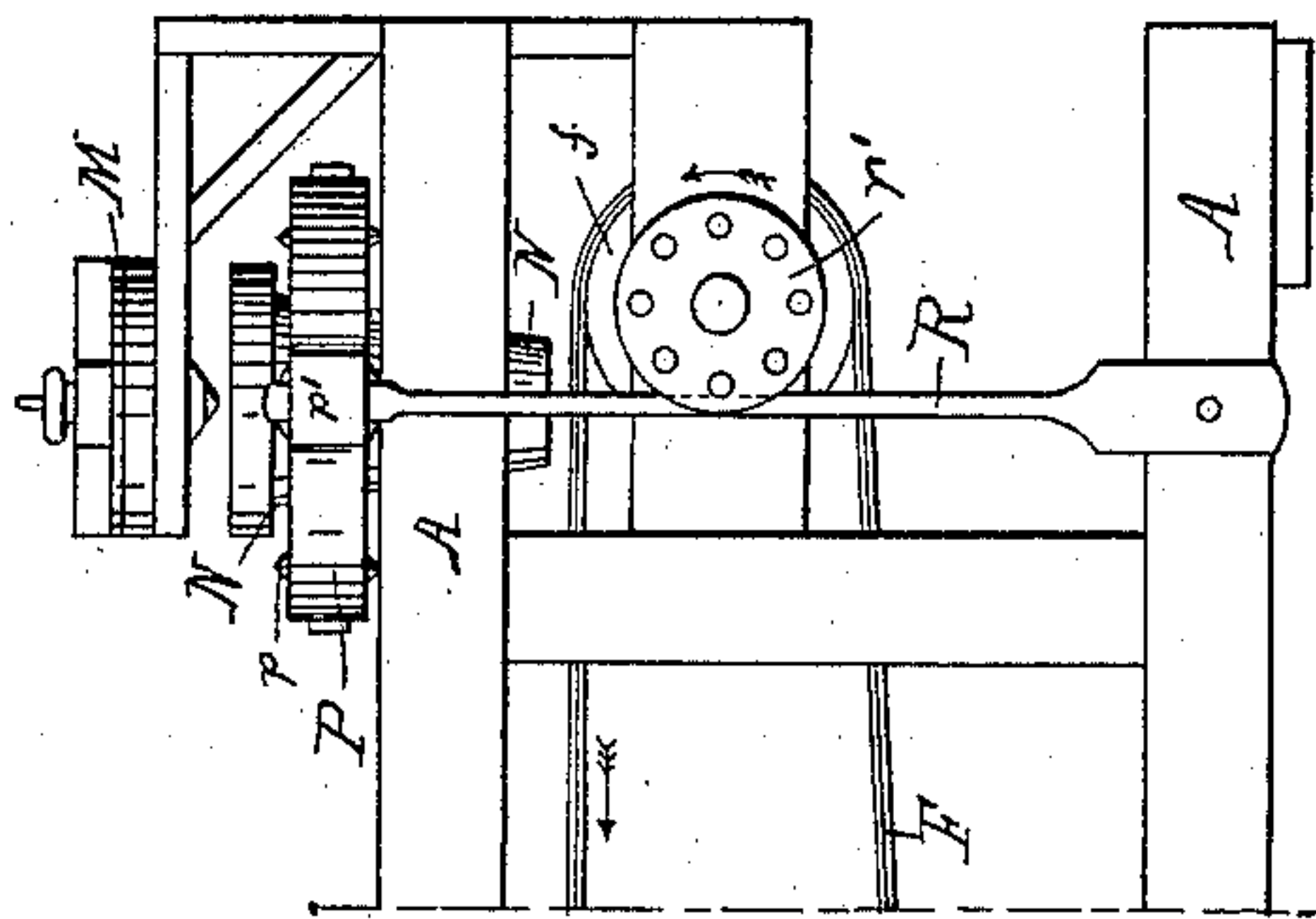


Fig. 3.

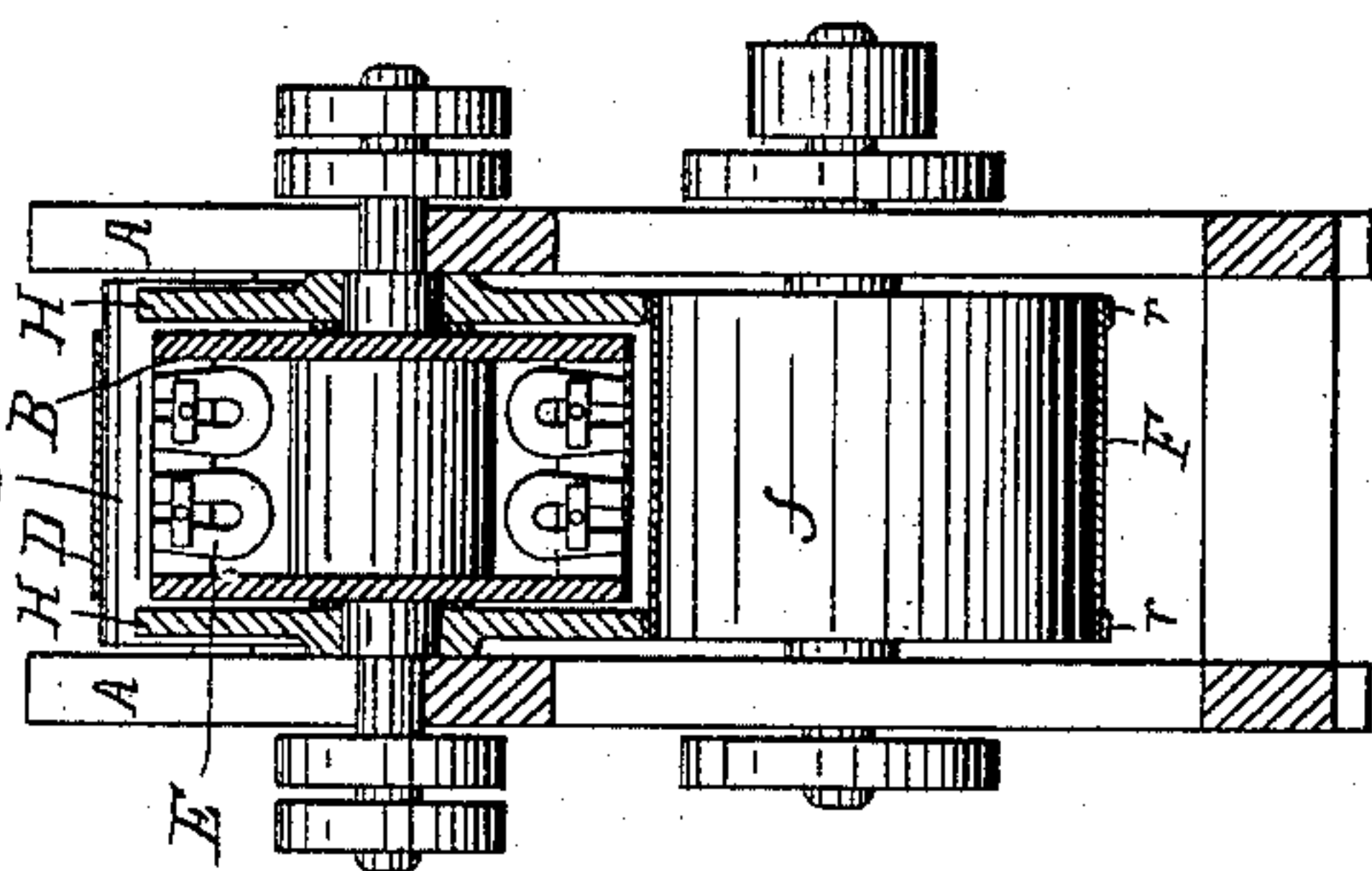
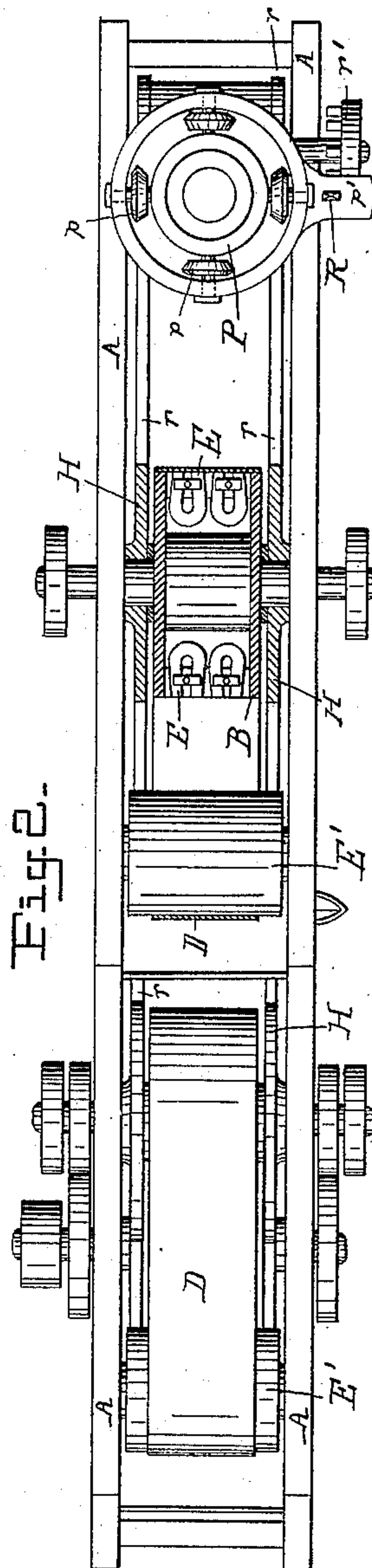


Fig. 2.



Witnesses:

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John Revell.

Inventor:

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by his attorneys,
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UNITED STATES PATENT OFFICE.

CHANDLER C. COATS, OF NEWARK, NEW JERSEY.

MAGNETIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 401,688, dated April 16, 1889.

Application filed July 18, 1888. Serial No. 280,271. (No model.)

To all whom it may concern:

Be it known that I, CHANDLER C. COATS, a citizen of the United States, and a resident of Newark, New Jersey, have invented an Improved Magnetic Ore-Separator, of which the following is a specification.

My invention relates to that class of magnetic ore-separators in which a revolving wheel carrying the magnets or electro-magnets is combined with a belt passing around the wheel and also around another non-magnetic wheel or drum, so that the attracted particles of metal will be carried off.

The main object of my invention is to so construct such an apparatus as to effect the separation of the ore in the most thorough and efficient manner.

My improved apparatus may be used for the separation of particles of iron or steel from ore which is found in comminuted condition in a natural state, or ore which has been ground by machinery, or it may be used for the separation of iron-filings in shops.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the apparatus. Fig. 2 is a plan view, partly in section. Fig. 3 is a vertical transverse section on the line 1 2, Fig. 1, and Fig. 4 is a view of the means for operating the feed-box.

A is the frame of the machine, and B B are the wheels or drums carrying the magnets and mounted in bearings in the frame. In the present instance I have shown two of these wheels or drums, although one or even more than two may be used where preferred. Each wheel or drum carries a series of rows of radiating-magnets or electro-magnets, E, set with their poles as close to each other as convenience of construction will permit, the individual magnets of one transverse row being preferably out of line with the magnets of the preceding row. I do not confine myself, however, to any particular way of constructing or mounting the magnets. In the drawings I have shown permanent magnets, but electro-magnets may be used.

Around the periphery of each wheel or drum B, and over the polar faces of the magnets, passes a band or belt, D, which also passes around an idler pulley or drum, E', mounted in suitable bearings in the frame.

Underneath each magnet wheel or drum B

passes the traveling feed-belt F, which in the present instance carries the material in a direction the opposite of that taken by the belt passing around the wheel or drum B, as indicated by the arrows in Fig. 1. This feed-belt passes over a drum, *f*, at one end of the machine, and a drum, *f'*, at the other, and in order to have a sufficient extent of surface of the feed-belt in proper juxtaposition with the periphery of the magnet-wheel at all times, two drums or rollers, *g*, are arranged on opposite sides of the magnet-wheel with their upper edges above the lower edge of the magnet-wheel, so that the feed-belt in passing over these rollers is caused to take a curved path around a considerable portion of the circumference of the wheel B. In the case of the second wheel B, the drum *f'* serves in place of a roller, *g*. The feed-belt is kept out of contact with the drum and in proper relation thereto by means of disks H on opposite sides of each wheel B, Figs. 2 and 3, and free to turn on the shaft of the wheel. These disks are of a diameter slightly larger than that of the wheel B, and as they bear on the face of the feed-belt at or near its outer edges the belt is thereby maintained at a distance from the belt on the magnet-wheel. I also form upon or attach to the face of the feed-belt strips or ribs *r*, Figs. 2 and 3, near the opposite edges in the same planes with the disks H, for the double purpose of assisting in the maintenance of the feed-belt in proper relation to the wheel and of preventing any of the material on the belt from falling off it on either side.

Any suitable devices may be employed for feeding the ore to be separated onto the feed-belt. In the drawings I have shown devices which may be used for this purpose, but I do not wish to confine myself thereto.

M is a fixed hopper mounted upon a suitable framing and having at its lower small end an opening closed by an adjustable plug, *m*, to regulate the flow of the material to the vibratory feed-box N below. This feed-box preferably has a perforated wire-gage diaphragm, *n*, near its upper end, and another, *n'*, at its lower end, and the box itself is mounted in a carriage, P, having anti-friction rollers *p* to travel in a circular path in the frame, Figs. 1 and 2. This carriage has an

arm, p' , Figs. 2 and 4, through which passes the upper end of a spring rod or bar, R , fastened at its lower end to the frame. A cam or pin wheel, r' , Fig. 4, driven by some moving part of the apparatus, acts on this spring-rod R , so that by the action of the inherent spring of the rod a rapid vibrating movement is obtained and imparted to the carriage, which moves about a central vertical axial line.

10 The action of the apparatus is as follows: The particles of ore and sand or other material to be separated are spread out in a thin uniform layer upon the feed-belt, which, traveling in the direction of the arrow, carries the material below the first magnet-wheel B . The principal part of the iron and steel is attracted to and picked up by the belt passing around the magnet-wheel, while the remaining material passes onto the second magnet-wheel, (or to the discharge, if only one such wheel is used.) The magnet-wheel B , turning in the direction of the arrow, carries the attracted particles of ore up over the wheel and toward the pulley E' . By the time the particles reach 25 the pulley E' they will have been carried entirely out of the influence of the magnets and will drop over into a suitable receptacle, S .

If the second magnet-wheel is used, any particles of iron or steel which have escaped the influence of the first wheel will be picked up 30 by the second, while the sand or other refuse will fall down into a suitable receptacle, T .

I claim as my invention—

1. The combination of the magnet-wheel of an ore-separator and a belt passing around it, with a traveling feed-belt, substantially as described. 35
2. The combination of the magnet-wheel of an ore-separator and a belt passing around it, with a feed-belt traveling in a curved path around a portion of the circumference of the magnet-wheel and adjacent thereto. 40
3. The combination of the magnet-wheel and its belt with a traveling feed-belt and disks to keep the feed-belt in proper relation to the magnet-wheel. 45
4. The combination of the magnet-wheel of an ore-separator with a traveling feed-belt having on its face, near each edge, a rib or strip, as and for the purpose set forth. 50
5. The combination of the magnet-wheel of an ore-separator with a traveling feed-belt having on its face, near each edge, a rib or strips, and rotary disks to bear on the ribs or strips to keep the belt in proper relation to the wheel. 55

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

CHANDLER C. COATS.

Witnesses:

JOHN REVELL,
GEO. A. CRANE.