May 12, 1942. C. R. BEGOR, JR 2,282,510

MAGNETIC ORE SEPARATOR

Filed March 27, 1940 2 Sheets-Sheet 1

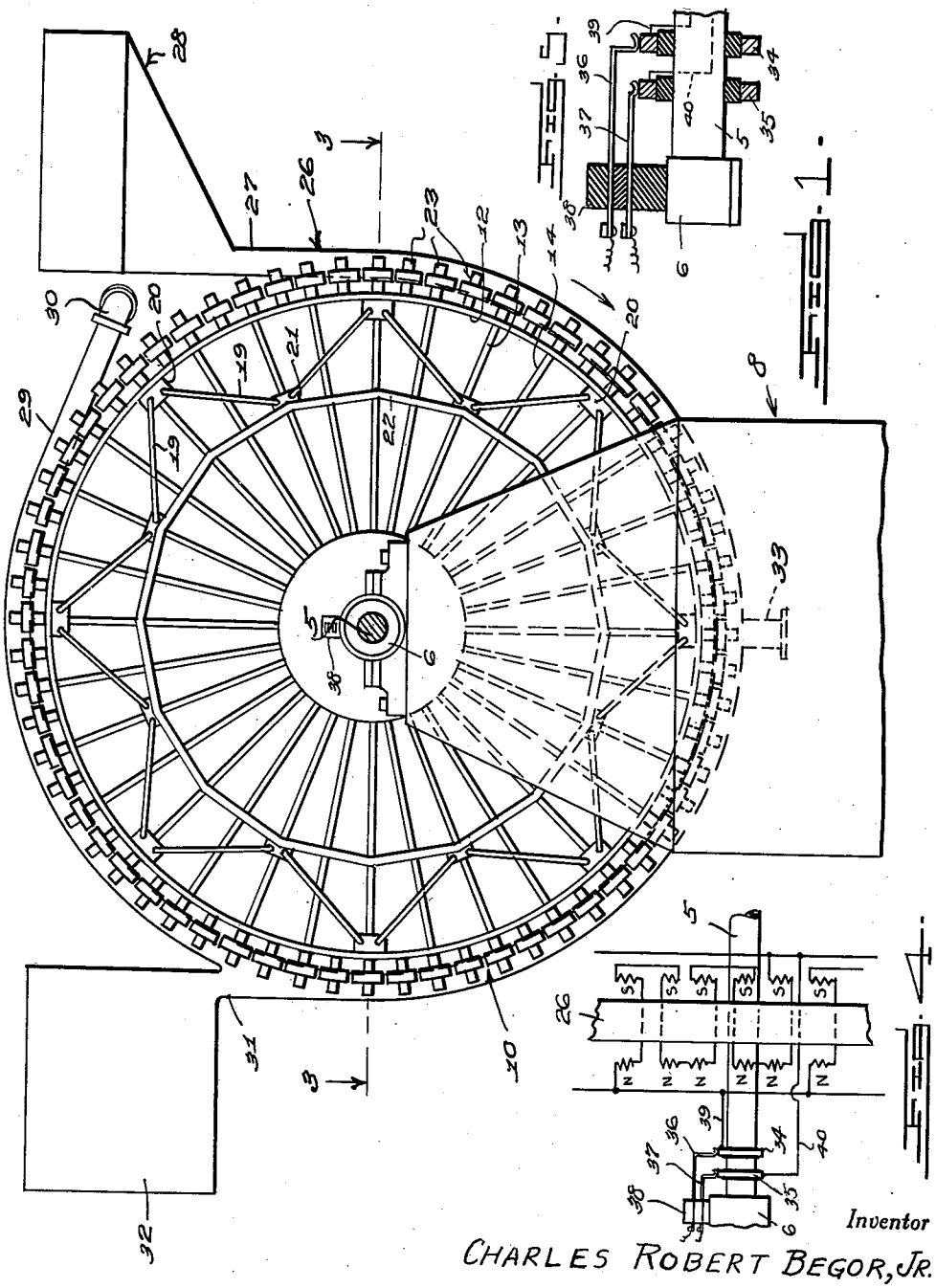


Fig. 1.

Fig. 4.

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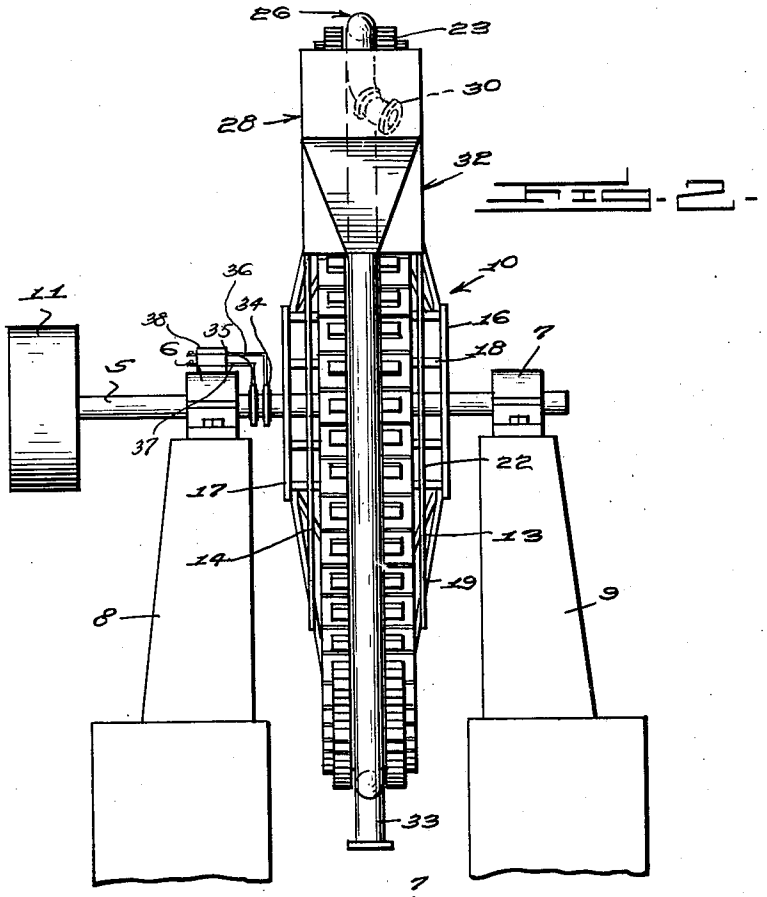


FIG. 2.

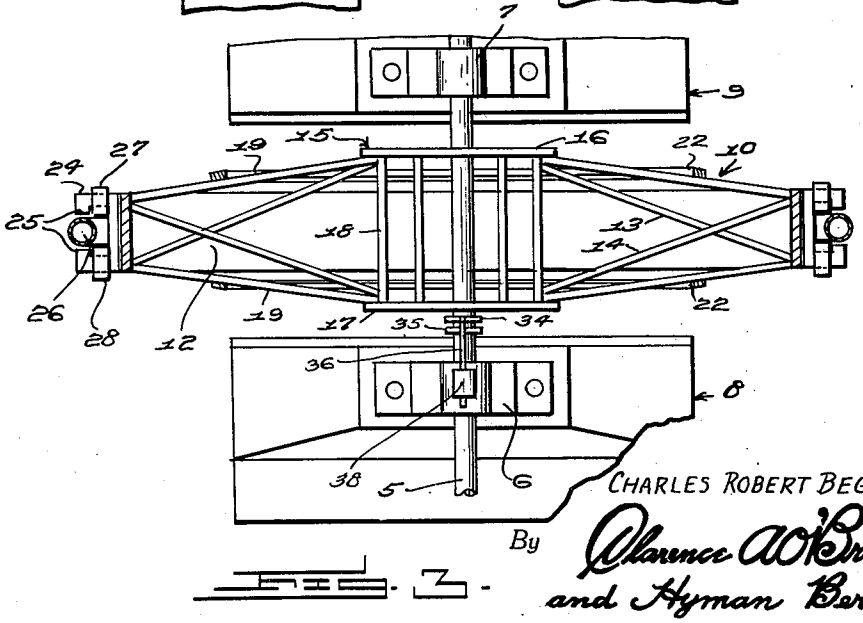


FIG. 1.

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MAGNETIC ORE SEPARATOR

Charles Robert Begor, Jr., Moriah, N. Y.

Application March 27, 1940, Serial No. 326,285

2 Claims. (Cl. 209—222)

My invention relates generally to improvements in ore separators, and particularly to a separator for magnetic ores in which a magnetic means is provided for magnetically drawing the ore through a conduit from the source of the ore, counter-current to ore washing fluid so as to deposit the separated ore in a collecting means, and an important object of my invention is to provide a simple, practical, and efficient arrangement of this character.

Other important objects and advantages of my invention will be apparent from a reading of the following description in connection with the appended drawings, wherein a preferred embodiment of the invention is shown.

In the drawings:

Figure 1 is a general side elevational view of the embodiment.

Figure 2 is an end elevational view of Figure 1 looking from right to left.

Figure 3 is a horizontal sectional view taken through Figure 1 approximately on the line 3—3 and looking downwardly in the direction of the arrows.

Figure 4 is a wiring diagram showing the arrangement and direction of winding of the magnet poles.

Figure 5 is a longitudinal vertical sectional view showing the arrangement of the conductive rings on the shaft and the brushes for these rings.

Referring in detail to the drawings, the numeral 5 generally designates a horizontal rotary shaft which is mounted in respective bearings 6 and 7 supported by respective standards 8 and 9 which are spaced on opposite sides of the magnetic wheel which is generally designated 10. A pulley or other suitable power connection 11 is fixed on the shaft 5 to drive the wheel at an appropriate speed.

The wheel 10 comprises an annulus 12 suitably of cylindrical form which is connected by alternating crossed spokes 13, 14, with a hub 15 which consists of disks 16 and 17 fixed on the shaft 5 and spaced and connected by means of rods 18 circumferentially arranged. Axially outwardly of the crossed spokes 13 and 14 are tangentially arranged braces 19 which are arranged in pairs as illustrated in Figure 1 with the outer ends of each pair engaged in a block 20 secured to the annulus 12 and with the inner ends of adjacent pairs engaged with blocks 21 on a ring 22 which is connected to the outer sides of the spokes 13 and 14.

Secured to the radially outward side of the annulus 12 in closely spaced circumferential positions are the magnets 23 which have U-shaped cores 24 the free ends of whose legs have laterally inwardly directed portions 25 which closely but spacedly approach the opposite sides of a non-magnetic pipe 26. Each leg of each core is provided with a respective winding 27, 28, with the bight portion of the core engaged with the annulus 12 as shown in Figure 3.

The non-magnetic pipe 26 extends tangentially from the point 27 at one side of the wheel, where it depends from one end of a hopper 28 in which the ore is deposited for separation along with water, and the tube follows the contour of the wheel in a position between the poles of the electro-magnets to a point designated by the numeral 29 which is just short of a complete circuit of the wheel, and which insures a downward projection of the pipe, from which point 29 the pipe becomes tangential to the wheel and terminates in a lateral discharge 30 which is connected to suitable separated ore collecting means.

At a point opposite the part 27 of the pipe 26, namely, at the point 31, the tube 26 is connected with a tank or other suitable supply 32 of washing fluid, such as water. At the lowest point the tube 26 is provided with a discharge 33 through which the wash fluid and non-magnetic material separated from the ore is discharged.

To operate the device of the invention, the wheel 10 is rotated clockwise in the direction of the arrow in Figure 1 at the proper speed, and the ore material to be separated is moved out of the hopper 28 into the tube 26, at the same time that washing fluid is released from the hopper 32. By reason of this the ore to be separated and the washing fluid are moving in opposite directions through the tube 26. The electromagnets 22 on the wheel having been energized, the magnetic portions of the ore coming down the pipe 26 from the hopper 28 will be orientated in the pipe 26 by the attractive force of the magnets adjacent thereto and carried downwardly toward the discharge 33, at which point fluid components of the ore to be separated, and the non-magnetic portions of the ore will pass out of the discharge 33, while the magnetic portions of the ore will be carried upwardly countercurrent to the washing fluid coming down the left hand side of the pipe from the tank 32. In this way the magnetic portions and the ore aggregate are freed of the non-magnetic portions and washed. As the wheel moves beyond the point 31 on the pipe 26 the washed magnetic particles of ore are carried around by the wheel until they reach the depressed portion 29 of the pipe

26, in which they move by a combination of the force of gravity and the direction of movement of the magnet on the wheel to the discharge 30, into a suitable ore collecting agency (not shown).

As shown in Figure 5 of the drawings, current is led to the electro-magnets on the wheel by brushes 36 and 37, respectively, mounted on an insulated block 38 on the bearing 6, and engaging the conductive rings 34 and 35, respectively. These rings are insulated from the shaft 5 on which they are circumposed, and have respective wires 39 and 40 leading to opposite sides of the circuit energizing the series of electro-magnets on the wheel as shown in Figure 4.

As shown in Figure 4 the electro-magnets are arranged transversely of the wheel 10 with their opposite poles on opposite sides of the pipe 26 and the windings thereof connected together in parallel in groups with the terminals of the groups connected to the respective wires 39 and 40 which run around the rim of the wheel. As shown the windings of the electro-magnets in each group are also connected in parallel.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not intend to limit the application of my invention thereto, except as may be required by the scope of the subjoined claims.

Having described the invention, what is claimed as new is:

1. In a magnetic ore separator, a non-magnetic ore conducting conduit forming the greater part of an annulus vertically disposed and having contiguous discharge and intake ends, the latter upstanding at one side thereof for gravity feed of ore thereinto, a rotatably mounted circular field of electromagnets circumferentially spaced and having cores partially surrounding said conduit transversely in closely spaced relation thereto whereby under rotation of said field in one direction magnetic ore in said conduit is caused to travel around the same toward the discharge end thereof, a gravity feed discharge at the bottom of said conduit for the escape of non-magnetic ore gravitating to said bottom, and gravity feed means for introducing washing fluid into said conduit in a direction opposite to the direction of travel of the magnetic ore.

2. In a magnetic ore separator, a non-magnetic ore conducting conduit forming the greater part of an annulus vertically disposed and having an intake end upstanding at one side thereof for gravity feed of ore thereinto, a rotatably mounted circular field of electromagnets circumferentially spaced and having cores partially surrounding said conduit transversely in closely spaced relation thereto whereby under rotation of said field in one direction magnetic ore in said conduit is caused to travel around the same, a gravity feed discharge at the bottom of said conduit for the escape of non-magnetic ore gravitating to said bottom, and gravity feed means for introducing washing fluid into said conduit in a direction opposite to the direction of travel of the magnetic ore.

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