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MAGNETIC SEPARATOR

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Fig. 1.

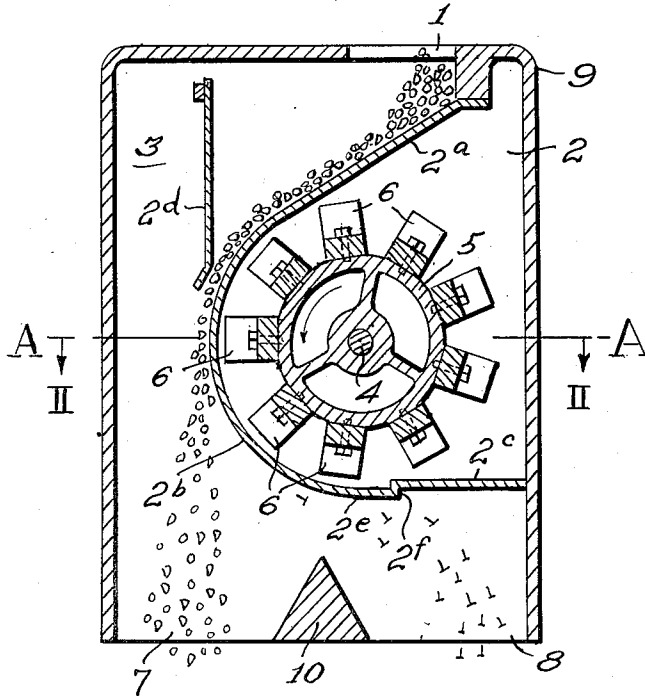
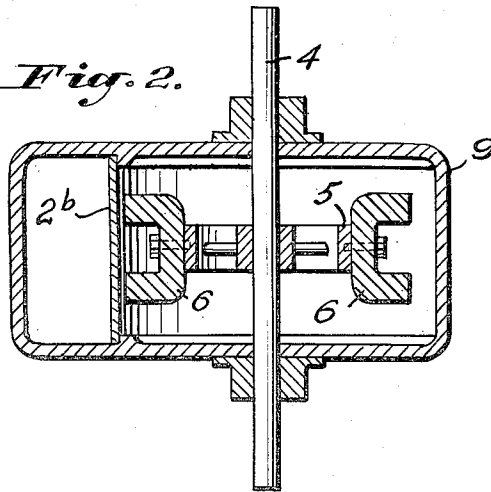


Fig. 2.



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1

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MAGNETIC SEPARATOR

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3 Claims. (Cl. 209--219)

My present invention relates to improved means for separating magnetizable foreign particles and bodies from granular bulk materials, in particular goods intended to be crushed or ground.

In contradistinction to known magnetic sifters the magnetic sifter according to my present invention is distinguished by the fact that it comprises a rotor body mounted on a horizontal shaft, on which rotor are disposed circumferentially spaced magnet means, and that said rotor and magnet means are disposed in a dustproof housing which is made of non-magnetizable material and of which the outside wall serves as chute for the material to be sifted. On one side of said rotor, said wall extends around the magnet bodies in a circular arc which is concentric to the rotor axis and spaced a small distance from said bodies. Said chute in the quadrant situated above the horizontal median plane of the rotor merges into an inclined plane which serves as the chute proper, while in the lower portion of the chute the latter is joined by a portion which gradually recedes from the rotor axis and the magnet bodies.

One form of the invention is shown, by way of example, in the accompany drawing, in which:

Fig. 1 is a vertical section through the sifter at right angles to the rotor axis, and

Fig. 2 is a horizontal section on the line II—II of Fig. 1.

In the embodiment shown, numeral 5 designates a rotor made of non-magnetizable material and mounted on a horizontal shaft 4. On said rotor are mounted circumferentially at uniform spacing a plurality of magnet bodies 6 which may be either electric or permanent magnets. The rotor 5 studded with the magnet bodies 6 is disposed in dusttight manner in a housing 2 which is made of non-magnetizable material and partly serves as gliding track for the bulk goods to be handled and comprises four portions, viz a hopper or chute portion 2a forming an inclined plane above the horizontal median plane A—A, a portion 2b situated on one side of the rotor 5, 6 and from a point 2d extending in a circular arc concentric with rotor shaft 4 at a slight distance from the magnet bodies 6 around the latter, a horizontal lower portion 2e adjoining said concentric portion and being joined in turn by a further horizontal portion 2c.

Below the rotor, spaced vertically from the bottommost magnet body and substantially at the junction of the track portions 2b and 2e is disposed a partition 10 which is wedge-like in cross-section. At the junction of the housing portions 2e and 2c is disposed a vertical step 2f. Rotor 5, 6 and track 2a to 2f are disposed in a casing 9 which is made of antimagnetic material and provided with a hopper opening 1. In that portion of casing 9 which is situated above the horizontal rotor median plane A—A, is disposed a control trap 3 for varying the rate of throughput.

2

The bulk material from which have to be separated magnetizable parts such as pieces of iron, is poured through opening 1 on to chute 2a down which it slides to trap 3 through which passes a certain quantity of the material.

5 Already upstream of trap 3 the material enters the sphere of action of the magnet bodies 6, the magnetizable impurities being drawn against the chute and sliding thereon being effected by the magnet bodies substantially down to point 2f of the track, while the non-magnetizable bulk material components by gravity drop off track portion 2b already within the range of the horizontal median plane A—A and leaves the casing 9 through the opening 7 which on one side is defined by partition 9. Since the track portion 2c is deflected from the track of the magnet bodies at an increasing rate, the magnetizable impurities engaged by the magnet bodies move into gradually weaker zones of the magnetic field and drop off chute 2c as soon as their gravity exceeds the attraction of the magnets, and move out of casing 9 through the opening 8 which at one side again is defined by the partition 10. Step 2f prevents the magnetizable impurities engaged up to this point from being attracted by the next following magnet bodies and from accumulating and returning on housing portion 2e opposed to the direction of rotation of the rotor 5, 6.

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

1. A device for separating magnetizable foreign bodies from bulk material to be ground or crushed, comprising a rotor fixed to a horizontal shaft, a plurality of magnet bodies mounted at uniform distances around the circumference of said rotor, and a dust-tight housing enclosing the rotor and said magnet bodies, said housing comprising a jacket made of non-magnetizable material and serving as a sliding track for the bulk material, said jacket comprising a portion disposed on one side of the rotor on both sides of its horizontal median plane in a circular arc concentric with the rotor shaft and at short distance from the magnet bodies, a straight chute portion proper in one quadrant situated above said plane, a lower horizontal portion in a quadrant below said plane, such latter portion being separated from the rotor shaft and the magnet bodies at a gradually increasing rate and including an upwardly disposed step portion tending to cause magnetizable material moved on the lower horizontal portion to separate therefrom as the magnet bodies rotate away from said step portion.

2. A device as set out in claim 1, in which a partition is disposed vertically below said rotor and the bottommost magnet body substantially at the point where the arportion of said housing merges into said lower horizontal portion.

3. A device as set out in claim 1, in which said rotor and housing are disposed in a casing made of antimagnetic material, said casing being provided with a hopper opening, and a control trap is disposed in that portion of said casing which is situated above the horizontal median rotor plane for the purpose of varying the rate of discharge of the bulk material between said housing and said trap.

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