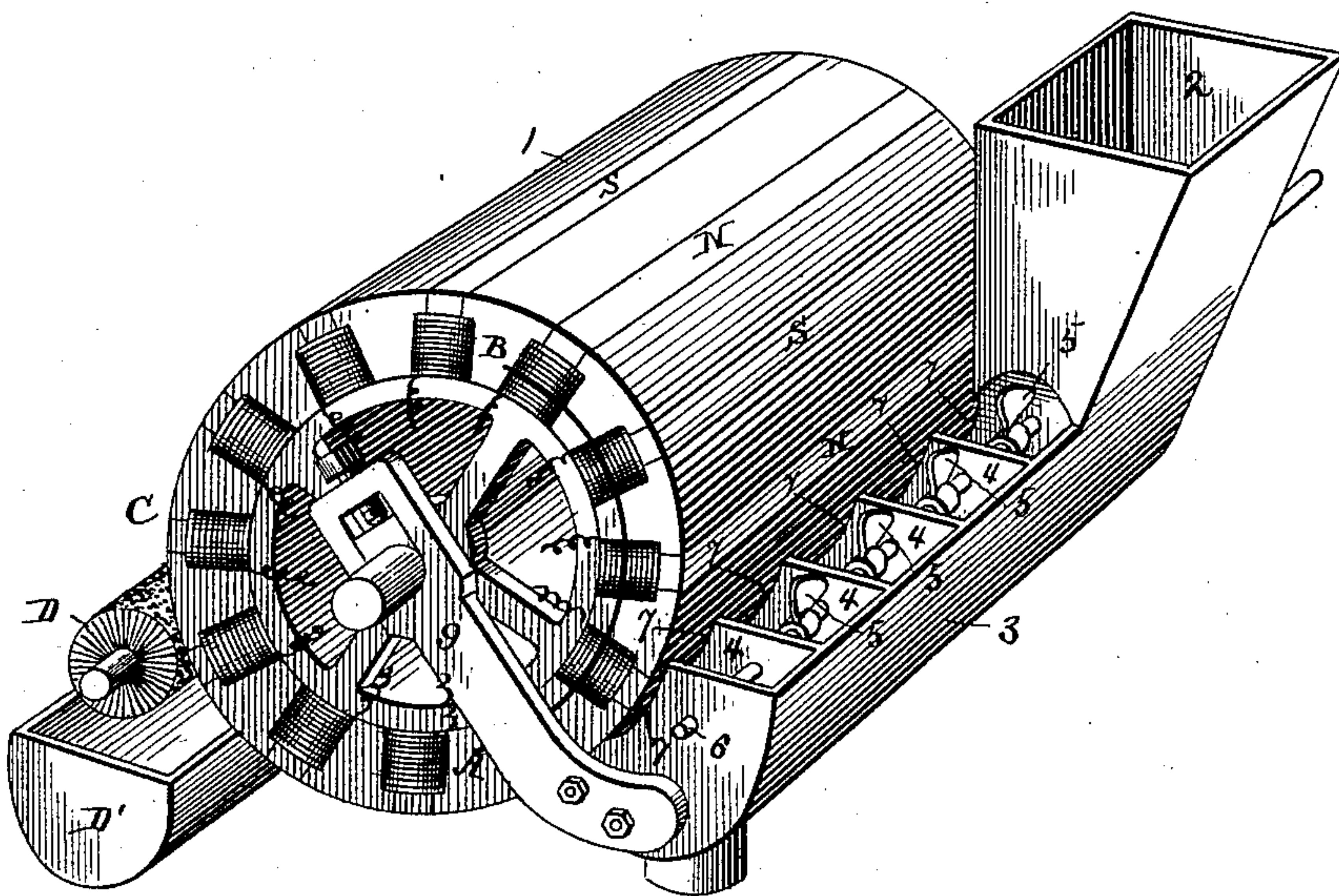


(No Model.)

M. H. SMITH.
MAGNETIC SEPARATOR.

No. 384,645.

Patented June 19, 1888.



Witnesses.

Geo. G. Hinkel, Jr.
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UNITED STATES PATENT OFFICE.

MICHAEL HOLROYD SMITH, OF HALIFAX, COUNTY OF YORK, ENGLAND.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 384,645, dated June 19, 1888.

Application filed October 29, 1887. Serial No. 253,765. (No model.) Patented in England August 9, 1887, No. 10,893.

To all whom it may concern:

Be it known that I, MICHAEL HOLROYD SMITH, a subject of the Queen of Great Britain, residing at Halifax, in the county of York, England, have invented certain new and useful Improvements in Magnetic Separators, (for which application for patent has been filed in Great Britain, August 9, 1887, No. 10,893,) of which the following is a specification.

The object of this invention is the separation of iron or any metal susceptible of magnetic action from other substances, and is specially applicable to such substances when in the form of an impalpable powder. For this purpose I employ a cylinder whose periphery is composed of a series of electro-magnets, the terminals of which are so arranged that as the cylinder revolves one-half or any desirable number upon one side of the cylinder may be magnetized and the remainder demagnetized. Near the under side of the cylinder I place a trough divided into a number of partitions, each fitted with a vane or screw-propeller and actuated by a shaft lying parallel with the axle of the cylinder. The material to be treated is fed into a hopper at one end of the trough, and by the vanes or propellers is carried across the face of the cylinder and out at the farther end of the trough. The revolving cylinder, attracting the iron particles, lifts them out and carries them over, allowing them to fall on the farther side.

In the drawing, the figure is a perspective illustrating the operative parts of the machine.

1 is the cylinder, carrying a number of electro-magnets round its periphery.

2 is the supply-hopper; 3, the trough passing across the face of the cylinder; 4 4 4, the partitions; 5, the vanes or screw-propellers actuated by the shaft 6. The partitions are either made high enough or covered by a lid to prevent the material passing from one to the other, except by the narrow spaces 7 between the partitions and the surface of the cylinder. It is obvious, therefore, that all the material passing along the trough from partition to partition must be repeatedly brought in close proximity to the poles of the magnets on the surface of the cylinder. The trough may be approached nearer to or withdrawn farther from the cylinder, and so regulate the space between the edge of the partitions and

the surface of the cylinder; or the partitions may each have an adjustable edge. The trough is hinged upon arms 9, centered on the shaft forming the axle of the cylinder, and may thus be swung to take any desired position round the cylinder.

The magnets on the cylinder are only excited while in the position indicated by the line A B. The iron particles that have been extracted from the material are free to fall from the side C; but in order to further insure their removal a revolving brush is placed at D. The bristles of this brush rub against the cylinder and carry off any remaining particles of iron, and again strike against the edge of the trough D', which removes the iron from the brush.

The magnets on the surface of the cylinder are preferably electro-magnets, excited from an external source, and the terminals of the helices surrounding and exciting these magnets may be so arranged that the magnets can be worked either in "parallel" or in "series," and by suitable commutator-connections more or less of the magnets may be energized at once, as desired.

From the above the general principles of my invention will be understood, and it is obvious that they may be embodied in various constructions, and that the elements may be used together or separately, or in combination with other equivalent devices.

What I claim is—

1. In a magnetic separator, the combination of a magnetic cylinder and a trough provided with propellers, whereby the material to be separated is successively brought into contact with the cylinder, substantially as described.

2. In a magnetic separator, the combination of a rotating cylinder having its face made up of a series of magnets, a trough arranged along the face of the cylinder, and a series of propellers in said trough, substantially as described.

3. In a magnetic separator, the combination of a rotating cylinder the face of which is made up of electro-magnets, a trough arranged along the face of the cylinder and having a series of partitions, and a propeller-shaft carrying a series of vanes in said trough and operating to bring the material to be separated in successive contact with the magnets and propel it through the trough, substantially as described.

4. In a magnetic separator, the combination,

with a magnetic cylinder, of a distributor-trough having propellers arranged to bring the material repeatedly in contact with different portions of the magnetic cylinder, substantially as described.

5. In a magnetic separator, the combination of a rotating magnetic cylinder and a trough arranged along the surface thereof, the trough being hinged to the shaft of the cylinder, substantially as described.

6. In a magnetic separator, the combination of a rotating magnetic cylinder, a trough having propellers arranged parallel with the axle of the cylinder, supplying material thereto and causing it to traverse the face of the cylinder, and a brush arranged to discharge from the cylinder the iron extracted from the material, substantially as described.

7. In a magnetic separator, the combination, with a magnetic cylinder, of a trough arranged along the face thereof, the said trough being divided into compartments by partitions, the edges of which are cut away adjacent to the cylinder to admit of the passage of the material through the successive compartments and in contact with the cylinder, substantially as described.

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

M. HOLROYD SMITH.

Witnesses:

F. L. FREEMAN,

J. S. BARKER.