

W. B. MOORE.
MAGNETIC SEPARATOR.
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940,266.

Patented Nov. 16, 1909.

Fig. 1.

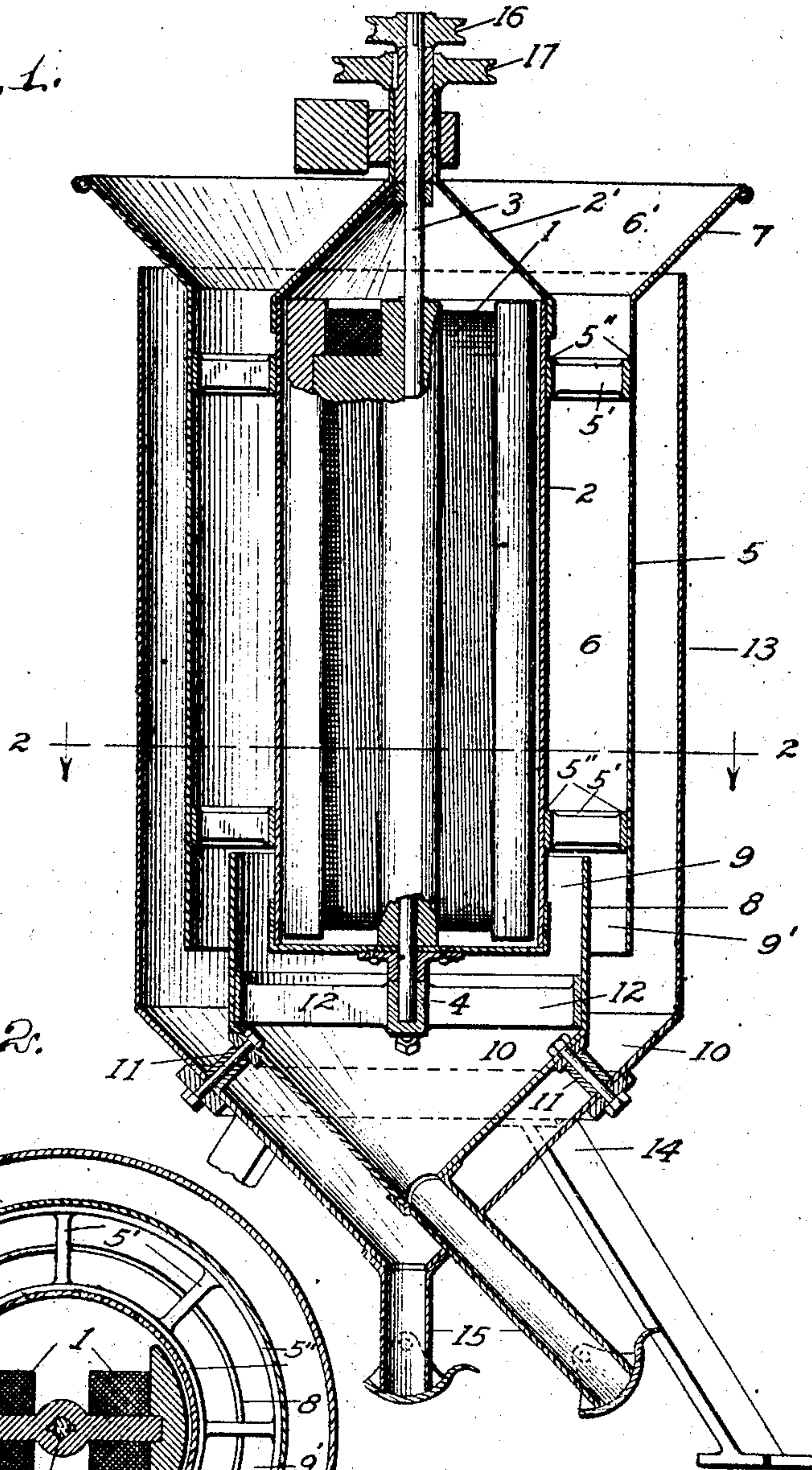
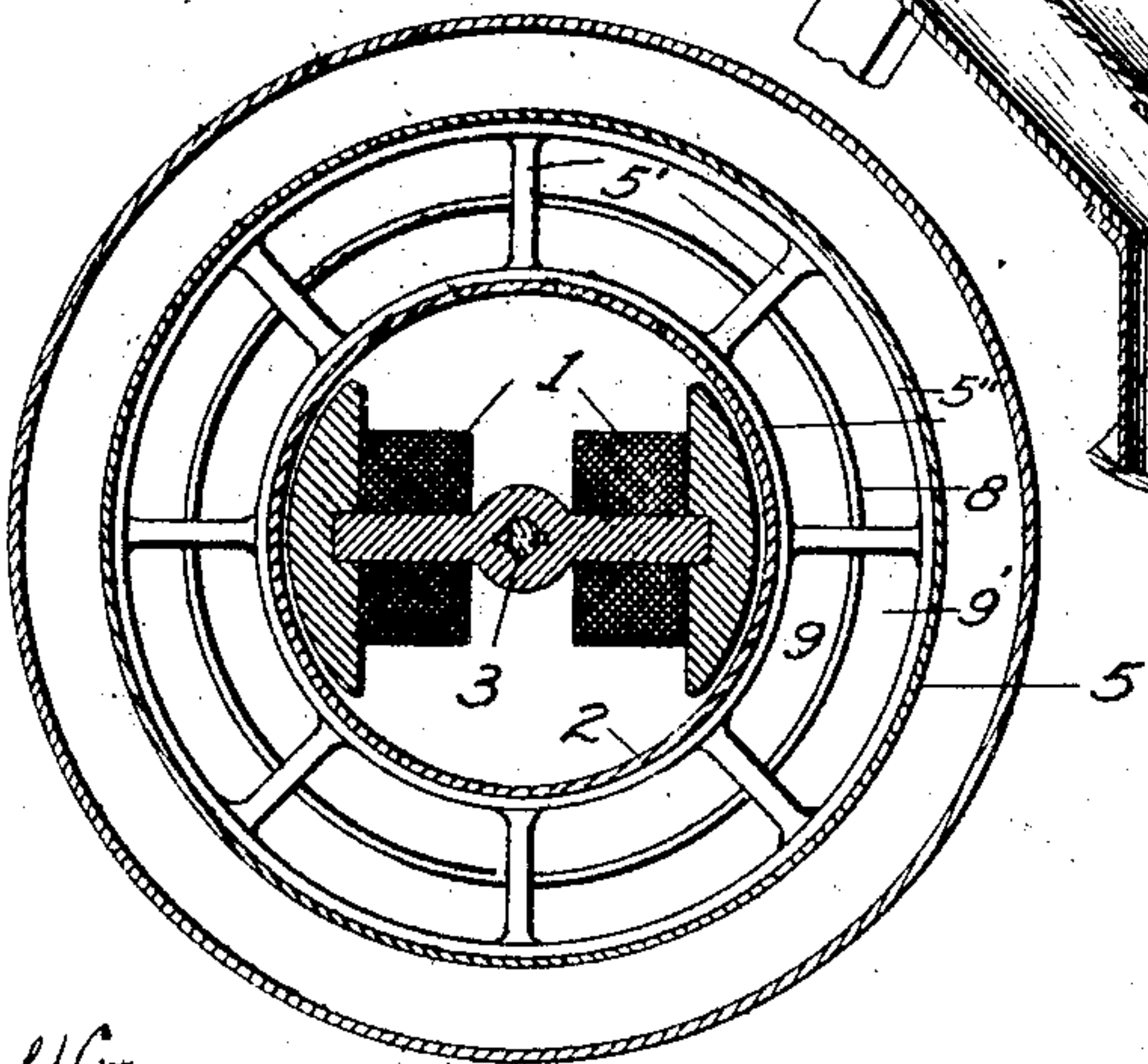


Fig. 2.



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MAGNETIC SEPARATOR.

940,266.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALTER B. MOORE, a citizen of the United States of America, and a resident of the city of Walla Walla, in the county of Walla Walla and State of Washington, have invented certain new and useful Improvements in Magnetic Separators, of which the following is a specification.

My invention has for its primary object the provision of an apparatus for treating materials containing metals which are susceptible to magnetic action, and separating by suitable magnetic means the magnetic particles from the non-magnetic particles, such magnetic means when operating, rotating at a sufficient rate of speed to by centrifugal action throw the non-magnetic particles outwardly therefrom.

Further objects will be set forth as the description progresses and those features of construction upon which I desire protection, succinctly defined in the appended claims.

Referring now to the accompanying drawing in which like numerals of reference indicate like parts throughout: Figure 1 is a vertical section of an apparatus constructed in accordance with my invention, and Fig. 2 is a section taken on line 2—2 thereof.

In carrying out my invention I provide a magnetic separating means conveniently consisting of a bi-polar electro-magnet 1, and a shield 2 in the form of a water proof casing having a conical upper portion 2'. Magnet is secured to a vertical shaft 3 whose lower portion is rotatably supported in a bearing 4. The shield 2 rests on bearing 4 and is supported for rotation at its upper portion in any desired manner.

Reference numeral 5 indicates a suitable continuous wall secured by arms 5' and 5'' to shield 2 so as to rotate therewith and being spaced therefrom to provide a chamber, as 6, for the materials to be separated. Wall 5 has a flared upper portion 7 disposed opposite the conical upper portion of shield 2, so as to serve therewith as a hopper 6' for chamber 6 in which the materials are placed as will be hereinafter described. A partition 8 projects upwardly into the lower portion of chamber 6, thereby dividing the same and providing passages 9, 9' communicating with receiving hoppers 10, 10' for the separated magnetic and non-magnetic materials respectively. These hoppers are arranged one within the other, being spaced apart by suitable spacing blocks 11, and pro-

vided with suitable discharge chutes 15. Bearing 4 is fixed to spider arms 12 secured to partition 8. Hopper 10', as now considered, forms the bottom wall of a tank B in which the parts hereinbefore described are arranged.

Reference numeral 14 indicates a suitable stand in which casing 12 is supported.

In operation, assuming that the tank has been filled with water, power is applied, as by belts (not shown) to pulleys 16 and 17 to rotate shaft 3 with its magnet and shield 2 in relatively opposite directions, the shaft 3 being rotated at a greater speed than the shield 2, then the material is fed into hopper 6' with water. This material falls into the swirling water in chamber 6 and by centrifugal action the non-magnetic particles are thrown outwardly against wall 5, while the magnetic particles attracted by magnet 1 are caused to cling to shield 2, and by reason of said magnet rotating at a greater speed than said shield; the magnetic particles clinging to shield 2 move end over end in a staggering fashion, they gradually working downwardly by gravity and finally walking across the bottom wall of shield 2 until they are at a neutral point between the poles of magnet 1; when they drop into hopper 10. The non-magnetic particles pass through passage 9' into hopper 10'. By reason of wall 5 rotating, the non-magnetic particles thrown outwardly thereagainst will be permitted to move in a whirling condition without friction between the mass of non-magnetic material and said wall, as contradistinguished from a structure wherein the material is moved over the face of a stationary wall, thereby preventing agitation of the material thrown outwardly and insuring of a more perfect separation. The top of tank 13 is sufficiently below the upper portion of hopper 6' to permit of surplus water flowing thereover.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is:—

1. In a magnetic separator, the combination of a tank, a rotating magnetic means in said tank, and a wall fixed to rotate with said magnetic means and being spaced therefrom to provide a passage-way for the material to be separated, the upper portion of said wall being flared outwardly.

2. In a magnetic separator the combina-

tion of a tank, a magnet therein, a rotating shield inclosing said magnet and having a conical upper portion, and a wall spaced from and fixed to rotate with said shield, the upper portion of said wall being flared and arranged about the conical upper portion of said shield to provide a hopper.

3. A magnetic separator comprising a cylindrical casing, means supporting the same for rotation, a wall extending entirely around said casing and being spaced therefrom to provide a passage-way for the materials to be separated, means for feeding the materials into the passage-way provided between said casing and said wall, means connecting said wall to said casing for rotation therewith, and magnetic means supported in said casing for rotation independently thereof.

4. In a magnetic separator, a tank, a rotatable magnetic means for catching the magnetic particles, and a vertically arranged rotatably supported wall surrounding said magnetic means having its lower end spaced from the bottom wall of said tank and being spaced from said magnetic means to provide a passage-way for the materials to be separated, said magnetic means comprising a magnet and a shield therefor each supported for independent rotation.

5. In a magnetic separator, a tank, a rotatably supported magnetic means for catching the magnetic particles, a rotatably supported wall surrounding said magnetic means and being spaced therefrom to provide a passage-way for reception of the materials to be separated, the upper portion of said wall being flared to form a hopper, as specified.

6. In a magnetic separator, a tank, a ro-

tatably supported magnet, a rotatably supported shield in which said magnet is arranged, a wall surrounding said shield and being secured thereto, said wall being spaced from said shield to provide a chamber for reception of the materials to be separated, and means forming separate passages leading from the lower portion of said chamber for the separated magnetic and non-magnetic materials.

7. In a magnetic separator, a rotatably supported magnet, a shield in which said magnet is arranged supported for rotation independent thereof, a wall surrounding said shield and being secured thereto, said wall being spaced from said shield to provide a chamber for reception of the materials to be separated, and a partition projecting upwardly into the lower portion of said chamber, whereby separate passages for the separated materials are provided.

8. In a magnetic separator, a magnet, a shield inclosing the same, said magnet and shield being supported for independent rotation, a wall secured to said shield and being spaced therefrom thereby providing a chamber for reception of the materials to be separated, a tank adapted to contain water in which said magnet, shield and wall are arranged, a hopper arranged to receive the separated magnetic particles, and a partition extending from said hopper upwardly into said chamber, for the purpose specified.

Signed at Seattle, Washington this 12th day of September 1907.

WALTER B. MOORE.

Witnesses:

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