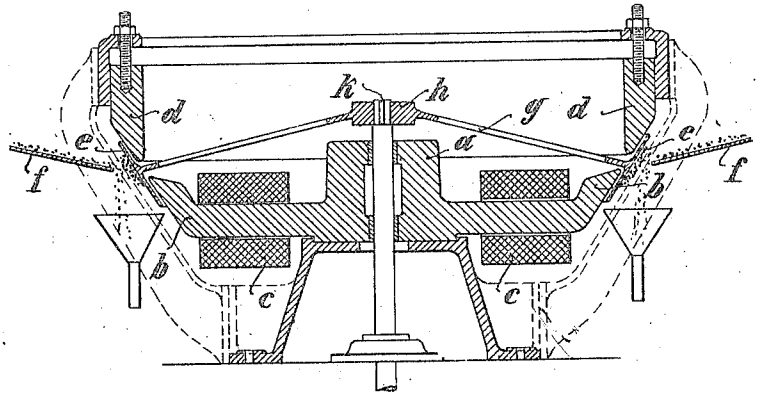
G. ULLRICH.

MAGNETIC SEPARATOR.

APPLICATION FILED JAN. 12, 1912.

1,067,287. Patented July 15, 1913.

FIG. 1.



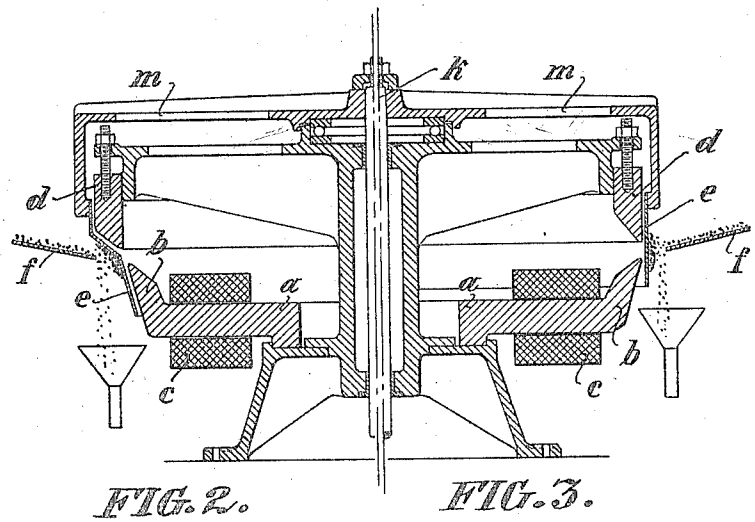


FIG. 2.

FIG. 3.

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GEORG ULLRICH, OF MAGDEBURG, GERMANY.

MAGNETIC SEPARATOR.

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Application filed January 12, 1912. Serial No. 670,938.

To all whom it may concern:

Be it known that I, GEORG ULLRICH, a subject of the King of Bavaria, and resident of Magdeburg, German Empire, have invented certain new and useful Improvements in or Relating to Magnetic Separators, of which the following is a specification.

This invention relates to magnetic separators having a number of magnetic fields *i. e.* operating points arranged in a circle around a vertical axis or shaft.

The present invention consists in the combination with a magnetic separator having two fixed magnets, that is to say two fixed poles, in the magnetic field of each operating place, of a non-magnetizable revoluble carrying member, which protects or shields the magnet poles and the field gaps of each magnetic field from the material under treatment. By this combination the result attained is that both poles of each magnetic field simultaneously furnish positive work.

Constructional forms of the invention are illustrated in vertical section in Figures 1, 2 and 3 of the accompanying drawing.

Several magnets *b* provided with a common core *a* and energized by a coil *c* are fixed around a vertical shaft and above the magnets *b* a magnetizable annular body *d* is arranged, which serves as a common armature and counter pole for the magnets *b*. A non-magnetizable annular revoluble carrying member *e* surrounds the magnet poles *b* and *d* in such a manner that the latter and the field gaps of the several magnetic fields are protected or shielded from the material under treatment. The revoluble carrying member in the construction illustrated in Fig. 1 is connected by arms *g* with a hub *h* which is keyed to a shaft *k*. The shaft *k* can be rotated by means of any convenient gear not shown in the drawing.

In the construction illustrated in Fig. 2 the carrying member *e* is connected with an annular plate or ring *m* which is keyed or otherwise secured to the shaft *k* to rotate with the same.

The construction in Fig. 3 shows directly above each other superposed poles, while that illustrated in Fig. 2 shows the poles arranged obliquely one above the other similarly to Fig. 1.

As shown in the drawing, the position of the supply channels *f* can be selected in such a manner that the path of the material to be treated intersects the path of the separated material in any direction or that both paths run parallel in the same or in opposite directions.

The operation of the apparatus is as follows: The material to be treated is conducted by any convenient apparatus onto the inclined supply tables *f* by which it is conveyed to the several magnetic fields at the lower end of each supply table *f*. The magnetic material is then simultaneously attracted by both poles (magnet pole *b* and counter pole *d*) of each magnetic field. The non-magnetic material falls into a suitable receptacle at the lower end of each supply table while the magnetic material collects on the carrying member *e* which protects the poles *b* and *d* from the supply of material: the material is then carried out of the several magnetic fields and it falls in the space between two adjacent magnetic fields. In order to prevent the magnetic material from being carried to the next magnetic field when the carrying member rotates rapidly, the magnetizable matter may be washed, scraped or brushed away from the carrying member.

The following advantages are obtained by the invention: The non-magnetizable carrying member rotating about a vertical shaft requires but little mechanical force for driving it and further, material in pieces of different sizes can be treated simultaneously in a number of magnetic fields, positive work being furnished simultaneously by both poles of each magnetic field. A further advantage of the separator of this application, lies in the fact that the field gap can be modified by raising or lowering the upper magnet, and the strength of the field can thus be regulated without changing the strength of the current. The poles might thus be set very closely together.

The apparatus is not confined to the examples described above and illustrated in the accompanying drawing: on the contrary there are a large number of possible constructional modifications both of the apparatus as a whole and also of its several parts.

The arrangement of the mounting and guidance and also the form of the carrying member can be modified as desired; it is however essential that the carrying member should protect or shield the magnet poles and the field gaps of the magnetic fields from the material under treatment.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. In a magnetic separating device, a plurality of magnetic poles for producing a series of magnetic fields, symmetrically arranged in a horizontal plane around and equi-distant from a common axis, a rotating annular carrying member intersecting said fields, against which the magnetic material is held by said magnetic poles and which is free from obstruction to downward discharge of material; means for feeding material into contact with said carrier within each field and a stationary element having an unbroken lower edge and constituting a counter pole for the series of magnetic poles also adapted to attract material to said carrier; said device and the carrier being adapted to discharge the attracted material intermediate each field.

2. In a magnetic separating device, a plurality of magnetic poles for producing a series of magnetic fields, symmetrically arranged in a horizontal plane around and equi-distant from a common axis, a rotating annular carrying member intersecting said fields against which the magnetic material is held by said magnetic poles and which is free from obstruction to downward discharge of material; means for feeding material into contact with said carrier within each field and a stationary element having an unbroken lower edge and constituting a counter-pole for the series of magnetic poles also adapted to attract material to said carrier; said device and the carrier being adapted to discharge the attracted material intermediate each field; said annular carrying member overlapping said magnetic poles and said counter-poles.

3. In a magnetic separating device means for producing a plurality of magnetic fields symmetrically arranged in a horizontal plane equi-distant from a common axis, each of said fields comprising a stationary lower pole and a stationary upper pole with an unbroken lower edge and common to all the fields and situated directly above said lower poles, and an annular carrying member situated outside of said poles and means to feed material to be separated into each magnetic field outside the carrier.

4. In a magnetic separating device means for producing a plurality of magnetic fields symmetrically arranged in a horizontal plane equi-distant from a common axis, each of said fields comprising a stationary lower pole and a stationary upper pole with an unbroken lower edge and common to all the fields and situated directly above said lower poles, and an annular carrying member situated outside of said poles and covering the field gap, said carrying member being revoluble around said common axis and means to feed material to be separated into each magnetic field outside the carrier.

5. In a magnetic separating device means for producing a plurality of magnetic fields symmetrically arranged in a horizontal plane equi-distant from a common axis, each of said fields comprising a stationary lower pole and a stationary upper pole with an unbroken lower edge and common to all the fields and situated directly above said lower poles; a rotating annular carrying member against which the matter to be separated is attracted by the poles in a direction toward the common axis; said carrying member being situated adjacent to and outside of said poles and adapted to entirely cover the field gap and means to feed material to be separated into each magnetic field outside the carrier.

6. In a magnetic separating device means for producing a plurality of magnetic fields symmetrically arranged in a horizontal plane equi-distant from a common axis, each of said fields comprising a stationary lower pole and a stationary upper pole with an unbroken lower edge and common to all the fields and situated directly above said lower poles; a rotating annular carrying member against which the matter to be separated is attracted by the poles in a direction toward the common axis; said carrying member being situated adjacent to and outside of said poles and adapted to entirely cover the field gap; said carrying member being non-magnetic and means to feed material to be separated into each magnetic field outside the carrier.

The foregoing specification signed at Magdeburg, this 21st day of December, 1911.

GEORG ULLRICH.

In presence of—

WILHELM FLEISCHHACK,
OSKAR MARKISCH.