

A. KÜHN.
MAGNETIC SEPARATOR.
APPLICATION FILED MAY 27, 1909.

981,092.

Patented Jan. 10, 1911.

Fig. 1.

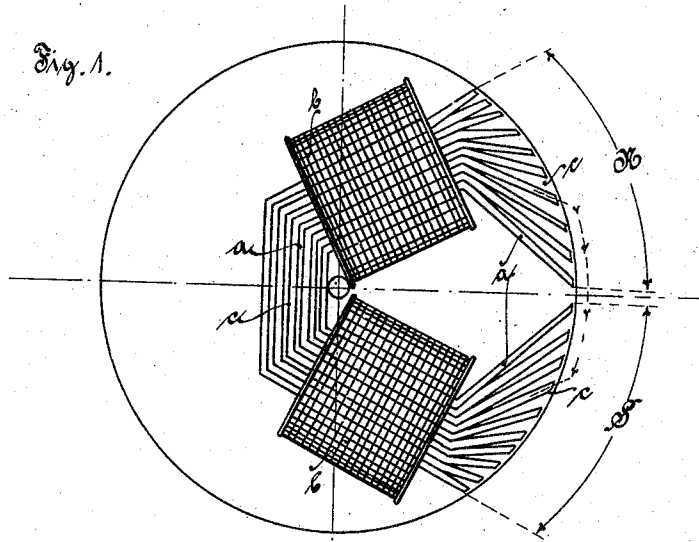


Fig. 2.

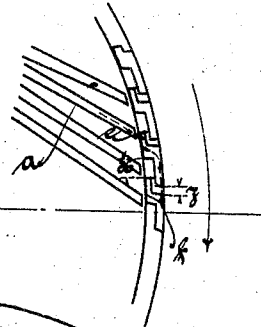


Fig. 3.

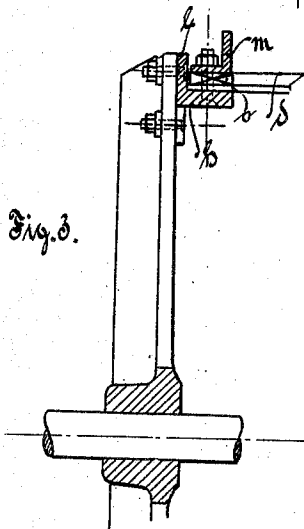
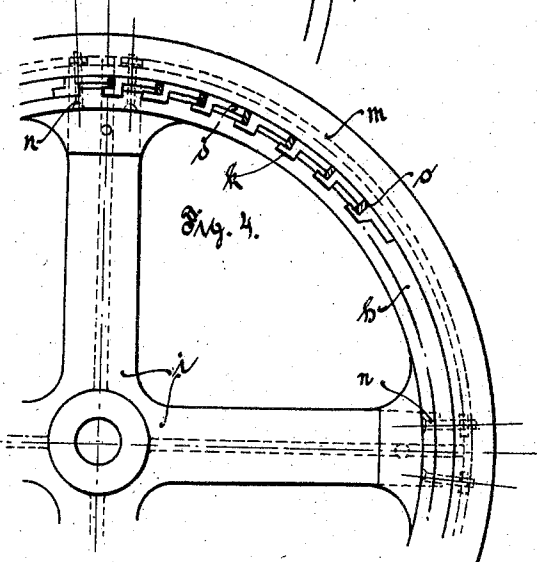


Fig. 4.



Witnesses:
Haltermann
Alfred Poley.

Inventor:
August Kühn

UNITED STATES PATENT OFFICE.

AUGUST KÜHN, OF MARCHEGG, NEAR VIENNA, AUSTRIA-HUNGARY.

MAGNETIC SEPARATOR.

981,092.

Specification of Letters Patent.

Patented Jan. 10, 1911.

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To all whom it may concern:

Be it known that I, AUGUST KÜHN, residing at Marchegg, near Vienna, in Austria-Hungary, have invented certain new and useful Improvements in Magnetic Separators, of which the following is a specification.

This invention relates to electro-magnetic apparatus for separating magnetic substances from non-magnetic substances, and more particularly to apparatus of the type wherein the mixture to be treated is fed to the surface of a drum rotating around an electro-magnet, so that the magnetic constituents of the mixture are attracted and held by the drum until the rotation of the latter has removed them from the magnetic field.

One object of the invention is to improve the efficiency of the electro-magnet in apparatus of this type, the elements of the core being to this end bent apart and spread at the poles so that they severally form secants to the drum.

Another object is to simplify the construction and assemblage of the drum and render it better adapted to magnetically co-act with the magnet, the circumferential part of the drum being to this end built up of parallel bars of approximately Z-shaped cross-section, collectively held in position by means of clamping rings, so that for assembling and disassembling the parts forming the drum it is only necessary to fasten and unfasten a few bolts.

A construction embodying these improvements is shown in the accompanying drawing, in which,

Figure 1 is a side-view of the electro-magnet. Fig. 2 shows a portion of the magnet core and the adjacent part of the drum. Figs. 3 and 4 illustrate the construction of the drum, Fig. 3 being a section in a plane containing the axis and Fig. 4 a partial elevation seen in the direction of the axis.

The core of the magnet consists of iron plates, bars, strips, wires or the like *a*, the ends of which are spread at the poles of the magnet each forming a secant of the drum. Fig. 1 shows the core consisting of plates *a*, parallel and in contact with each other except where they spread after issuing from the coils *b*. Each plate or bar may be regarded as a separate magnet, the magnetic circuit of which is closed as at *c* in Fig. 1. The coils are wound to produce a north pole

at N and a south pole at S, the direction of the lines of force being indicated by the arrows at *c*. The spreading of the core elements at the poles causes a dense, uniform magnetic field to be produced at the circumference of the drum, and more particularly obviates the disadvantage of an area of weak magnetism midway between the poles.

The circumferential part of the drum consists of parallel iron bars *d* which are of approximately Z-shaped cross-section, but of which the inner flanges *i*, *e.* those nearer the axis of the drum, are narrower than the flanges at the outer circumference, and therefore have wider gaps between them. This causes a concentration of line of force at the outer circumference. The lines of force enter at *e* (Fig. 2), traverse the bar as indicated by the arrows, that is to say, at the outer circumference of the drum, and then pass at *f* into the next bar. The magnetic effect is, therefore, most powerful at that part of the drum which faces the stream of mixture to be treated. The special shape of the bars *d* materially increases the efficiency of the apparatus and also renders separate inner and outer drum-walls unnecessary, inasmuch as the bars form a closed jacket and prevent the entrance of particles of the mixture treated. The magnetic permeability is also less than heretofore, so that when the magnetic substance separated from the mixture has been rotated out of the magnetic field it drops more readily from the drum, without requiring the use of a brush or scraper.

The ends of the drum are formed by red brass rings *h*, connected to a shaft by arms *i*. The rings *h* have series of rectangular recesses *k* to receive the smaller flanges of the bars *d*. Lateral displacement of the bars *d* is prevented by flanges *l* of the rings, the bars being held down by clamping rings *m* and bolts *n*. Each clamping ring *m* may consist of two or more parts for example of four, as shown in Fig. 4 of the drawing. To prevent rattling of the bars *d*, wedges *o*, of wood or brass are driven between them in the known manner. Individual bars *d* can be renewed as desired. For assembling and disassembling the parts, only the fastening and unfastening of a few bolts is required.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In a magnetic separator, the combina-

tion with a drum having a circumference composed of overlapping Z-shaped elements the exterior flanges of which are at smaller intervals than the interior ones, of a magnet having laminated pole pieces the laminae of which are spread at the poles to form a continuous set of secants to the drum, substantially as and for the purpose set forth.

2. In a magnetic separator, a drum comprising magnetically permeable elements of Z-shape placed around the circumference,

non-magnetic carrying spiders therefor, segmental annular retaining rings for the permeable elements and means for magnetizing the same, substantially as set forth.

In witness whereof I have signed this specification in the presence of two witnesses.

AUGUST KÜHN.

Witnesses:

ROBERT W. HEINGARTNER,
HANS PAPPENHEIM.