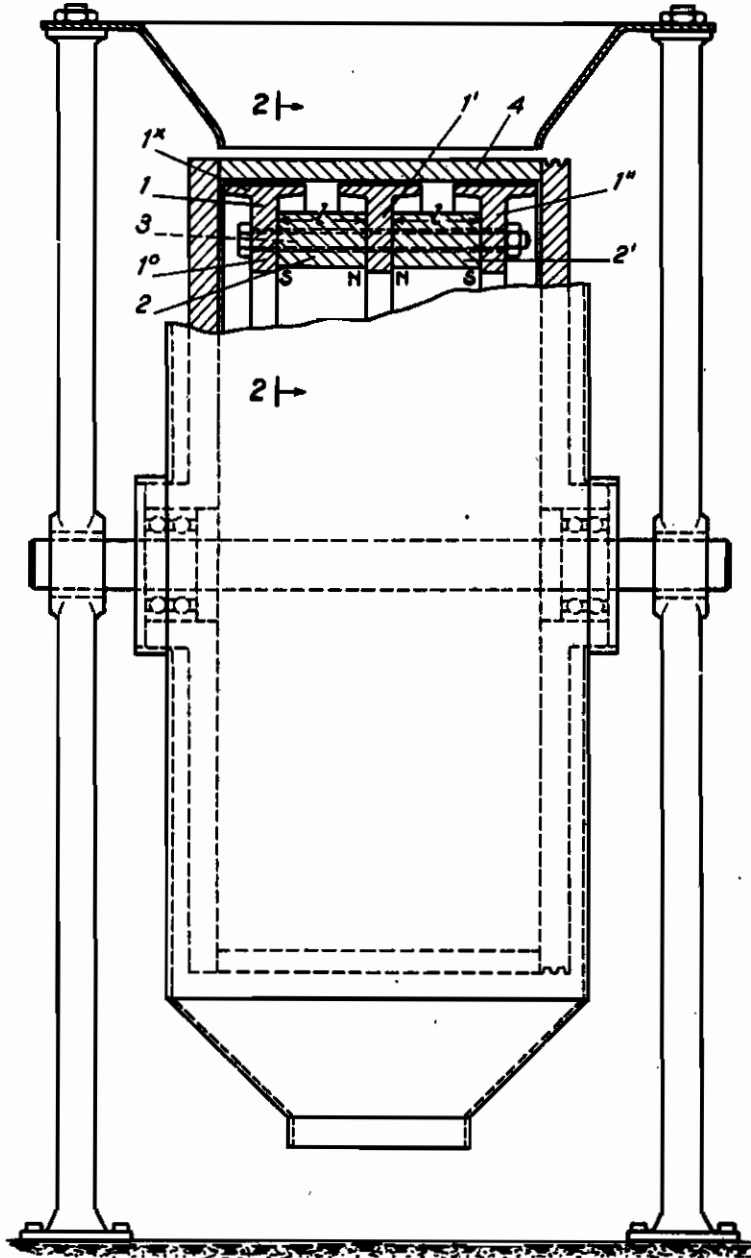


PUBLISHED
MAY 18, 1943.
BY A. P. C.

F. E. VEGLIO
MAGNETIC SEPARATORS
Filed July 12, 1940

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Fig. 1



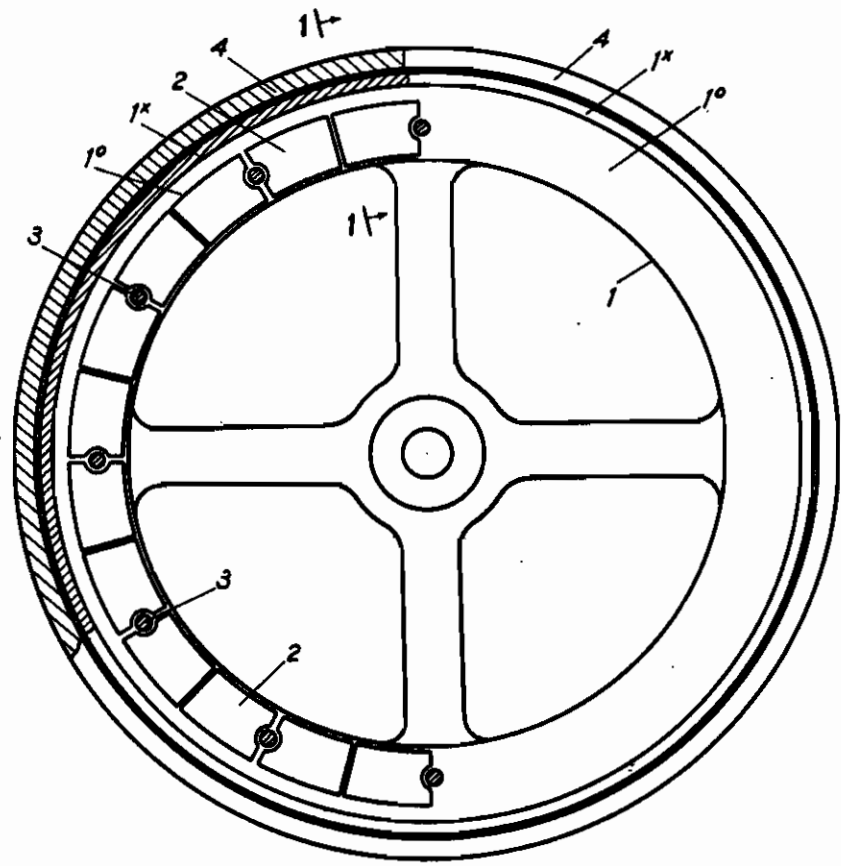
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Fig. 2



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ALIEN PROPERTY CUSTODIAN

MAGNETIC SEPARATORS

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Alien Property Custodian

Application filed July 12, 1940

This invention relates to magnetic separators for ferrous materials mixed with non-magnetic materials, in which the mixed materials to be separated into ferrous material and non-magnetic material is caused to flow over a drum made of non-magnetic material which revolves around an inductor operative on a section of the drum periphery said section being located on one side of a vertical plane passing through the rotary axis of said drum.

In the operation, the non-magnetic material falls down from the drum in register with the vertical plane tangent to the drum section where the inductor is operative while the ferrous material is retained on the drum until it reaches the bottom end of said section and is collected separately at the point where it falls down from the drum.

In the separators of the above stated class the inductor includes rims of magnetic material arranged at the side of and concentric with each other and with said drum, and permanent magnet units having arc shape and each located intermediate two adjacent ones of said rims, and each of said units includes a set of magnets arranged adjacent to each other in the circumferential direction of the inductor with their magnetic axis extending in the direction of the common axis of said rims and units and their pole faces in contact with the cooperating inductor rims.

I have found that to secure an efficient action of the magnets which provide each of said arc-shaped magnet units said magnets must comply with certain requirements as to their size and configuration and that more particularly the ratio of the extent of each magnet in the direction of its magnetic axis to its size in a plane transverse to said direction must substantially be included within certain ranges.

More particularly I have found that satisfactory conditions are secured when said ratio is such as the extent of each magnet in the direction of its magnetic axis is equal to or larger than the square root of the area of the section of said magnet in a direction perpendicular to said axis.

In accordance with this invention each of the magnets providing an arc shaped magnet unit has such a size transverse to its magnetic axis as the square root of the area of the cross section of the magnet in a plane transverse to said magnetic axis is less than the extent said magnet is required to have in the direction of the magnetic axis that is in the direction of the axis of

the inductor rims to comply with structural and operative requirements.

The extent of each magnet in circumferential direction of the respective unit and the extent thereof in the direction of the radius of the unit may vary within certain ranges to comply with structural requirements and the extent of said magnets in the direction of their magnetic axis may be selected to comply with certain requirements.

It is only essential that the above stated ratio exists in each magnet between its several dimensions, said ratio making possible to secure the best efficiency in an inductor of the above stated class.

An embodiment of this invention is illustrated by way of example on the annexed drawing and Fig. 1 is a central section made on line 1—1 of Fig. 2;

Fig. 2 is a fragmentary transverse section on line 2—2 of Fig. 1.

In the illustrated embodiment the inductor comprises a number of rims 1, 1', 1'' made of magnetic material which are arranged at the side of and concentric with each other, and permanent magnets 2, 2' are arranged in arc-shaped units between adjacent rims 1, 1', 1'' and along the periphery thereof, with their respective magnetic axes parallel with the common axis of said rims; the rims 1, 1', 1'' and the magnets 2, 2' are interconnected by bolts 3 of non-magnetic material which extend through holes provided in the rims 1, 1', 1'' and intermediate said magnets 2. Each rim 1, 1', 1'' includes a web 1^o and a flange 1^x as illustrated.

Each arc-shaped magnet unit 2, 2' is located along a semicircular section of said rims 1, 1', 1'' which extends from one to the opposite end of the diameter of said rims which lies vertical when the separator is in operative position, and an outer drum shown at 4 encircles the inductor provided in the described manner and is caused to revolute thereabout.

The magnets 2, 2' are arranged in each unit with their pole faces of similar sign adjacent to and contacting with one and the same rim of the pair of adjacent rims 1, 1', 1'' and the two adjacent units have their pole faces of same sign opposite each other; in other words, as illustrated in Fig. 1, all the magnets of the unit 2 located intermediate the rims 1 and 1' have say their N pole faces in contact with the rim 1' and their S pole faces in contact with the rim 1, while the magnets of the unit 2' have their N

pole faces in contact with the rim 1' and their S pole faces in contact with the rim 1''.

Accordingly the magnetic circuit of each magnet unit 2, 2' has a minimum extent because it closes in the gap intermediate the adjacent rims 1, 1', 1'' of each pair; the magnetic flux on the separator drum 4 is thus availed of in the best possible manner.

In accordance with this invention each magnet 2, 2' has such a size as the square root of the

area of its cross section transverse to the magnetic axis thereof that is of its face in view in Fig. 2 is equal to or less than its extent l (Fig. 1) in the direction of said magnetic axis.

In the above stated conditions each magnet unit generates a magnetic action which is larger than that obtainable by means of magnets whose sizes do not comply with the above stated rule, other conditions being equal.

FELICE ENRICO VEGLIO.