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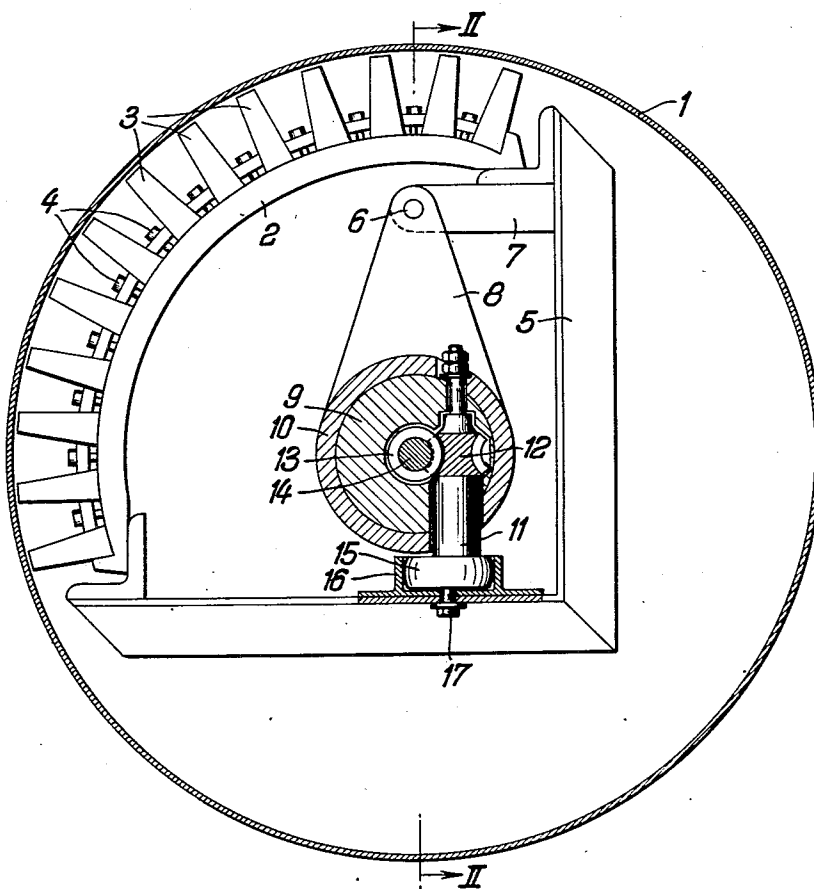
2,785,801

PERMANENT MAGNET SEPARATOR

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2 Sheets-Sheet 1

Fig. 1



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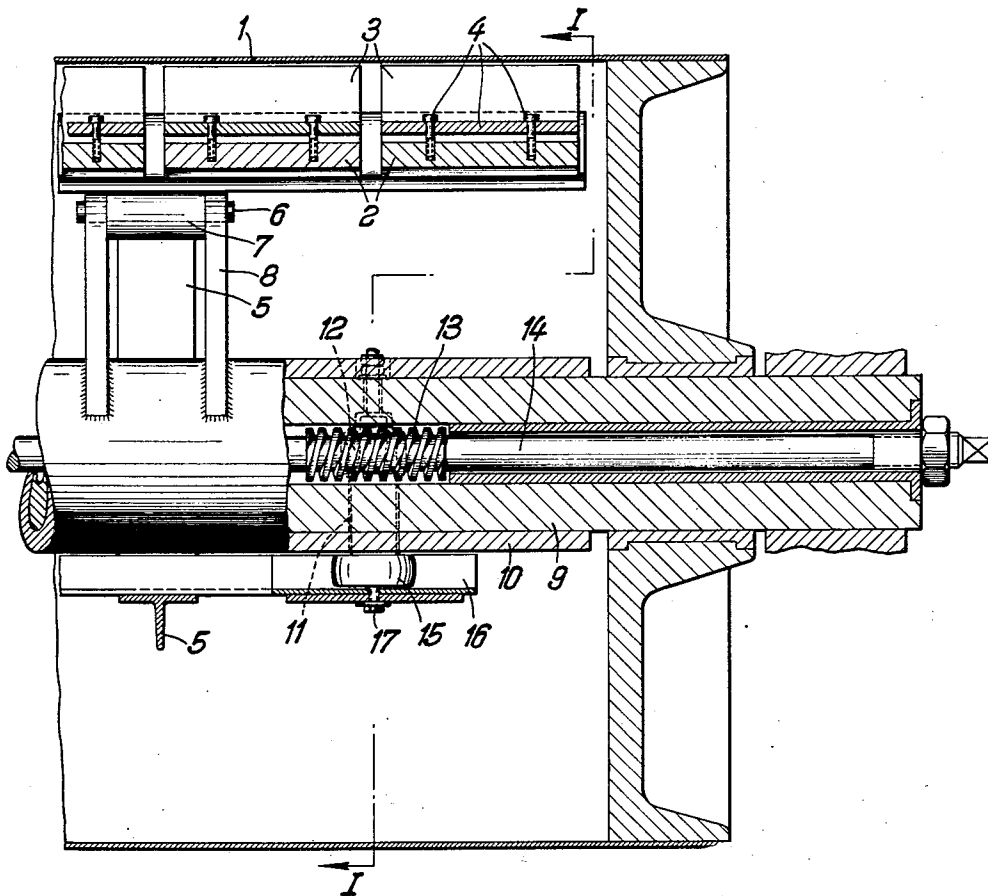
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Fig. 2



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PERMANENT MAGNET SEPARATOR

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Claims priority, application Germany September 27, 1954

4 Claims. (Cl. 209—223)

The present invention relates to a permanent magnet grader, especially drum magnet grader, with fixedly arranged permanent magnet system.

It is known in connection with electromagnet graders to control the field intensity by varying the exciting current. Such a control, however, is not feasible in connection with permanent magnet graders.

It is, therefore, an object of the present invention to provide a permanent magnet grader which will allow a variation in the field intensity in a very simple manner.

It is another object of this invention to provide a permanent magnet grader having a plurality of successively arranged permanent magnets, which will make it possible by purely mechanical means to vary the field intensity of the permanent magnet grader.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

Fig. 1 illustrates in vertical section an embodiment of the invention in form of a drum magnet separator, see line I—I in Fig. 2.

Fig. 2 is a section according to the line II—II in Fig. 1.

The above mentioned objects have been materialized by providing a frame carrying the permanent magnetic pieces and being adjustable during operation in such a way that the distance of the magnetic pieces from that surface of the separator which carries the material to be graded will either increase or decrease when looking in the direction of movement of the said material.

A particularly advantageous embodiment of the invention in connection with drum magnet graders consists in that the mounting strips for the magnetic pieces arranged one behind the other are tiltably suspended on a pivot which is eccentrically located with regard to the axis of rotation of the drum, said mounting strips being movable preferably by a gear system adapted to be operated through a hollow shaft of the grader or separator.

More specifically with reference to the drawings, the grader according to the invention comprises a rotatable drum 1 for receiving the material to be graded. Arranged within said drum there are provided arch-shaped mounting strips 2 which extend over a portion of the circumference of the drum. Permanent magnets or magnetic pieces 3 are connected to said mounting strips 2 by means of clamping devices 4. The mounting strips 2 are arranged in any desired number behind each other when looking in the longitudinal direction of the grader. The ends of the mounting strips 2 are supported by a supporting frame 5 preferably formed of sectional iron. The supporting frame 5 is tiltably journaled about a pivot 6 which is located above the axis of rotation of the grader or separator. The supporting frame 5 is provided with an arm 7 linked to a tiltable arm 8 by means of the pivot 6. The arm 8 is fixedly connected to a sleeve 10 which is non-rotatably mounted on a shaft 9. The drum 1 is rotatably journaled on said shaft 9 at both

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ends thereof while the shaft 9 is stationary when said drum rotates.

Rotatably journaled within the shaft 9 and sleeve 10 is an adjusting shaft 11 which carries a worm wheel 12 having its longitudinal axis located substantially at the level of the central axis of the drum. A drive shaft 14 arranged within the hollow shaft 9 has fixedly connected thereto a worm 13 which meshes with the worm wheel 12 on the adjusting shaft 11. The drive shaft 14 has one end thereof protruding from the shaft 9 which end may be connected with any desired driving means for mechanically or manually rotating the shaft 14. One end of the adjusting shaft 11 is provided with an eccentric portion 15 having a spherical circumferential surface rotatably arranged in guiding bars 16 provided on the frame 5. A bolt 17 is connected to the eccentric so as to prevent the latter from being lifted off the supporting frame 5.

For purposes of adjusting the distance of the magnetic pieces 3 from the inner surface of the drum 1, the drive shaft 14 and the worm 13 and worm wheel 12 are rotated. It will be evident from the drawing that such a rotation causes the eccentric 15 to rotate in the guiding bars 16 with the result that the supporting frame 5 tilts about the pivot 6. Inasmuch as the pivot 6 is located eccentrically with regard to the axis of rotation of drum 1, it will be clear that the tilting movement of the supporting frame 5 brings about a change in the distance of the magnetic pieces 3 from the inner surface of drum 1 in such a manner that the distance of the magnetic pieces 3 from the inner surface of the drum gradually increase or decrease depending on the effected tilting movement of arm 8 toward one side or the other side thereof. In this way it is possible to vary the distance of the magnetic pieces within a wide range and thereby to adapt the influence of the magnets upon the material to be separated to the respective prevailing or desired conditions.

It is, of course, understood that the present invention is, by no means, limited to the particular construction shown in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. In combination with a magnetic separator: a rotatable drum for receiving the material to be separated, pivot means arranged within and eccentrically to said drum, supporting means arranged within said drum and tiltably supported by said pivot means, mounting strip means carried by said supporting means, a plurality of permanent magnets successively arranged on said mounting strip means in the direction of rotation of said drum and spaced from the inner surface of said drum, and adjusting means operatively connected to said tiltable supporting means and operable to tilt the latter about said pivot means to thereby selectively increasingly or decreasingly vary the distance of the respective successively arranged permanent magnets from the inner surface of said drum.

2. In combination with a magnetic separator having a rotatable drum for receiving the material to be separated: a shaft rotatably supporting said drum, supporting arm means tiltably supported by said shaft, supporting means, pivot means eccentrically arranged within said drum and pivotally interconnecting said supporting means and said supporting arm means, a plurality of mounting strip members supported by said supporting means and arranged behind each other when looking in the longitudinal direction of said drum, a plurality of permanent magnets mounted on said strip members in spaced successive relationship to each other, and adjusting means operatively interconnecting said shaft and said arm means

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and operable to bring about tilting movement of the latter for tilting said strip members about said pivot means.

3. In combination with a magnetic separator having a rotatable drum for receiving the material to be separated: a first shaft rotatably supporting said drum, supporting arm means tiltably supported by said first shaft, supporting means, pivot means eccentrically arranged within said drum and pivotally interconnecting said supporting means and said supporting arm means, a plurality of mounting strip members supported by said supporting means and arranged behind each other when looking in the longitudinal direction of said drum, a plurality of permanent magnets mounted on said strip members in spaced successive relationship to each other, a second shaft extending through said first shaft and coaxial therewith, and gear means operatively interconnecting said second shaft and said supporting arm means and operable to tilt the latter about said second shaft to thereby tilt said supporting means about said pivot means for selectively varying the distance between said successively arranged permanent magnets and the inner surface of the drums faced thereby in a progressively increasing or decreasing manner.

4. In combination with a magnetic separator having a rotatable drum for receiving the material to be separated: a first shaft rotatably supporting said drum, said first shaft being tiltably to a certain extent, sleeve means

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mounted on and fixedly connected to said first shaft, arm means fixedly connected to said sleeve means, pivot means, supporting means pivotally connected to said arm means by said pivot means, a plurality of successively arranged permanent magnets spaced from each other in the direction of rotation of said drum and supported by said supporting means, a second shaft coaxially and rotatably arranged within said first shaft, a worm connected to said second shaft, adjusting means including an eccentric operatively connected to said supporting means, a worm wheel connected to said adjusting means and meshing with said worm, said adjusting means extending through said first shaft and said sleeve means, said second shaft being rotatable for rotating said worm and worm wheel to thereby tilt said arm means and said supporting means relative to each other about said pivot means for selectively varying the respective distance of the successively arranged permanent magnets in a decreasing or increasing manner from the inner surface of said drum faced thereby.

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