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VIBRATORY CLASSIFIER

Filed March 1, 1968

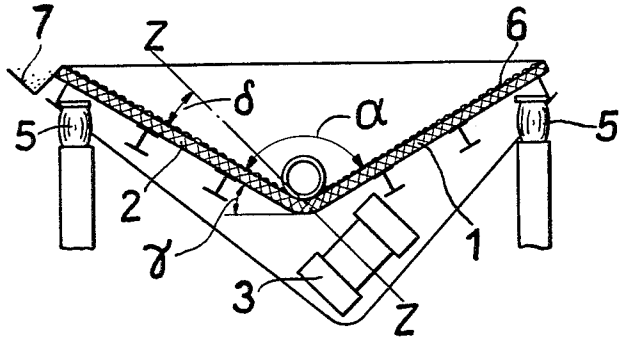

Fig. 1

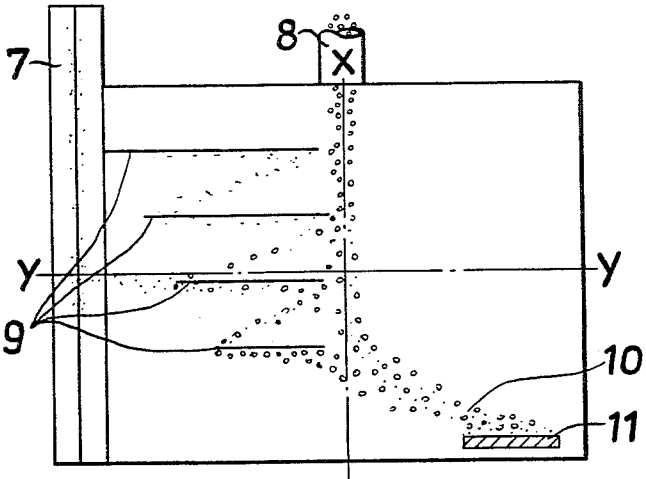

Fig. 2

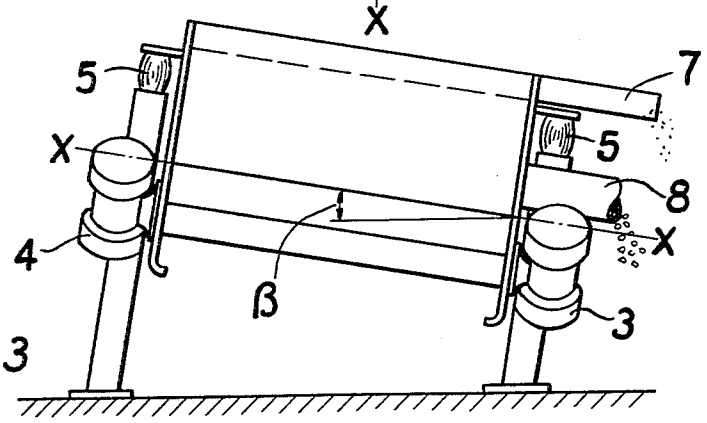

Fig. 3

MAX GRAF,
GOTTFRIED KOTZ AND :Inventor:
HELMUT ROTH

by Wenderoth, Lind & Ponack, Attorneys

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VIBRATORY CLASSIFIER

Max Graf, Gottfried Kotz, and Helmut Roth, Karlsruhe-Durlach, Germany, assignors to Badische Maschinenfabrik GmbH, Karlsruhe-Durlach, Germany, a limited company of Germany

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Int. Cl. B07b *13/10*
U.S. Cl. 209—117 8 Claims

ABSTRACT OF THE DISCLOSURE

A vibratory classifier comprises two relatively inclined plane surfaces, a feeding surface for receiving granular materials and a separating surface on which the granular material is separated. The surfaces are arranged to intersect to form a trough, the line of intersection being at an acute angle to the horizontal. Vibratory generators are provided such that their impulse direction is at an acute angle with the separating surface and the direction of vibration is normal to the line of intersection. The surfaces may be coated, for example, with rubber and the separating surface may be provided with slats. A supplementary trough may be attached to the upper edge of the separating surface.

BACKGROUND OF INVENTION

The invention relates to vibratory classifiers for classifying a granular material.

As is known, the separation of different grain sizes can be effected on screens or in air separators. It is also known that sloping "separating plates" can be made to vibrate by the action of vibrators in such a way that coarser particles will descend the slope contrary to the vibratory impulses, whereas finer particles are driven up the slope by the vibratory thrust. However, conventional forms of construction either do not provide sufficient classification or difficulties arise in the design of larger size devices and in ensuring operating reliability.

It is therefore the object of the present invention to eliminate the drawbacks of the conventional method of vibratory size classification by providing a vibratory classifier of special construction.

SUMMARY OF INVENTION

The invention consists in a vibratory classifier for classifying granular materials comprising a planar feeding surface for receiving material to be classified or separated, a planar separating surface inclined to the feeding surface for separating the material, the two planar surfaces intersecting to form a trough, the line of intersection of the planar surfaces being at an acute angle to the horizontal, and at least one vibration generator connected to the trough and arranged such that the impulse direction is at an acute angle to the planar separating surface and the direction of impulse is normal to the line of intersection of the planar surfaces.

The mixture of materials that are to be separated is thus fed onto the vibrating trough on the elevated side of a feeding or receiving surface, whence the mixture is first conveyed downwards and distributed, to be exposed on the separating surface to the effect of the component of gravity which corresponds to the angle of inclination of said separating surface about the inclined line of intersection, i.e. to the direction of vibration on the one hand, and to the thrust which tends to drive the material upwards in the direction of the vibrator impulse on the other hand. A further improvement may possibly be achieved if the face of the two plane surfaces is provided

with a coating having a high coefficient of friction, such as rubber of low Shore hardness. Such a coating may also preferably have a profiled surface for making contact with the material.

It may also be useful if a supplementary trough which likewise participates in the vibrations is attached to the upper edge of the surface which functions as the separating surface. Moreover, according to another useful feature transverse slats extending in the direction of the vibrations are attached to the plane surface that functions as the separating surface, said slats preferably increasing in length in conveying direction. In a preferred embodiment of the invention the two relatively inclined surfaces form an angle α of about 120° and the line of intersection itself is inclined to the horizontal at an angle β of about 10°. The acute angle δ between the impulsing direction and the surface functioning as the separating surface may be about 15°, and the angle γ between the two plane surfaces and a horizontal plane may be about 30°.

An embodiment of the invention is schematically shown, by way of example, in the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a cross section of a vibratory classifier according to the invention,

FIGURE 2 is a plan view of the vibratory classifier shown in FIGURE 1, and

FIGURE 3 is a side elevational view of the classifier shown in FIGURE 1.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring first to FIGURE 1 a trough is formed by two surfaces **1** and **2** which are relatively inclined at a dihedral angle α and intersect on a line X—X which is itself inclined to the horizontal at an angle β. Two vibrators **3**, **4** of conventional construction generate a vibration, the direction of the vibratory impulses Z—Z being at an acute angle δ in relation to the plane surface **2** which functions as the separating surface. Moreover, the direction of impulses **2**—**2** is parallel to the direction Y—Y, which is normal to the line of intersection X—X. In the illustrated embodiment the trough is supported on rubber springs **5**. The upper sides of the two surfaces **1**, **2** are provided with a coating which has a high coefficient of friction, for example, a rubber of low Shore hardness which has a profiled surface **6**. One of the components is collected and carried away in a supplementary trough **7**, whereas the other component leaves through a discharge **8** at the bottom of the main trough. The surface **2** which functions as the separating surface is provided with transverse slats **9** of different lengths extending in the direction of vibration. The lengths of these slats **9** progressively increase in conveying direction. The feed is deposited on surface **1** at **10**, preferably in such a way that the area on which the feed is deposited is a small rectangle **11**.

When this trough is vibrated in the manner described and a feed consisting for instance of a mixture of small shot for use as a blasting medium and quartz sand, the grain size of the shot being between 0.2 and 1.5 mm. and that of the quartz sand between 0.05 and 0.4 mm., the quartz sand will creep up the separating surface at an angle which is more or less steep according to the size of its grain and pass over the elevated edge of the seperating surface **2** into the supplementary trough **7** at some point preceding the bottom end of the main trough. On the other hand, a shot of useful size, consisting for instance of metal, is incapable of climbing up the slope of the separating surface set at an angle γ to the horizontal and therefore leaves the main trough through the discharge at **8**.

What is claimed is:

1. A vibratory classifier for classifying granular mate-

rials comprising a planar feeding surface for receiving material to be classified or separated, a planar separating surface inclined to the feeding surface for separating the material, the two planar surfaces intersecting to form a trough, the line of intersection of the planar surfaces being at an acute angle to the horizontal, and at least one vibration generator connected to the trough and arranged such that the impulse direction is at an acute angle to the planar separating surface and the direction of impulse is normal to the line of intersection of the planar surfaces.

2. A vibratory classifier according to claim 1 comprising a coating which has a high coefficient of friction provided on the planar surfaces.

3. A vibratory classifier according to claim 2 wherein the coating consists of a rubber of low Shore hardness.

4. A vibratory classifier according to claim 2 wherein the coating has a profiled surface.

5. A vibratory classifier according to claim 1 comprising a supplementary trough attached to the upper edge

of the planar separating surface, the supplementary trough participating in the vibrations.

6. A vibratory classifier according to claim 1 comprising slats affixed to the planar separating surface transverse to the line of intersection.

7. A vibratory classifier according to claim 6 wherein the transverse slats increase in length in the conveying direction.

8. A vibratory classifier according to claim 1 wherein the angle between the relatively inclined planar surfaces is 120° and the angle of inclination of the line of intersection to the horizontal is 10°, and the impulsing direction of the vibration generator is at an angle of 15° to the planar separating surface.

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