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CENTRIFUGES FOR GRANULAR MATERIAL FOR CLEANING AND SCALING PLANTS

Filed Jan. 11, 1939

Serial No. 250,446

2 Sheets-Sheet 1

Fig. 1.

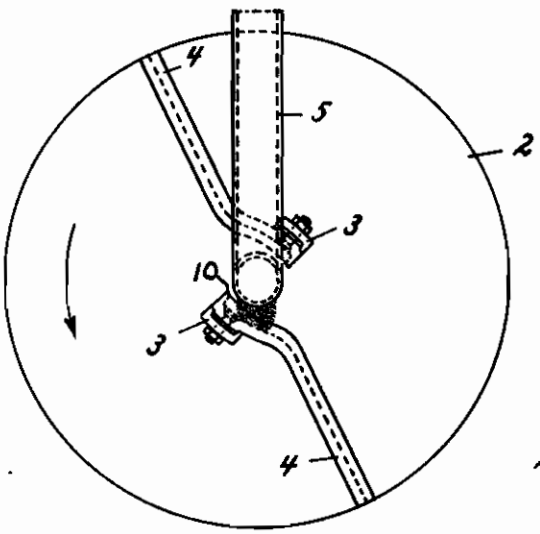

Fig. 7.

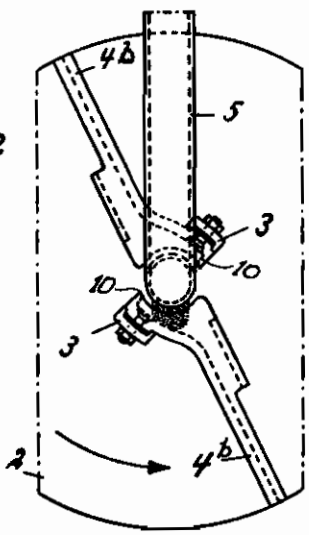

Fig. 2.

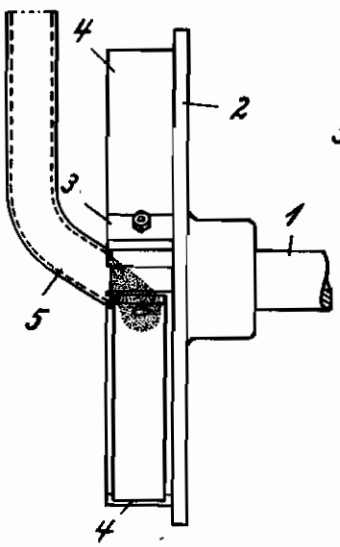

Fig. 3.

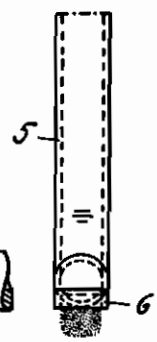

Fig. 4.

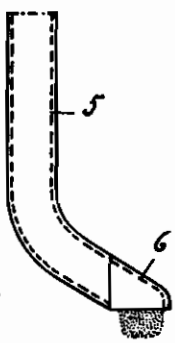

Fig. 5. Fig. 6.

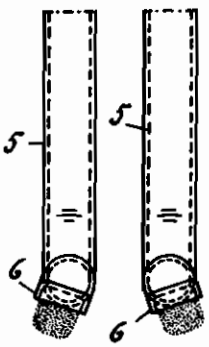

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Fig. 8.

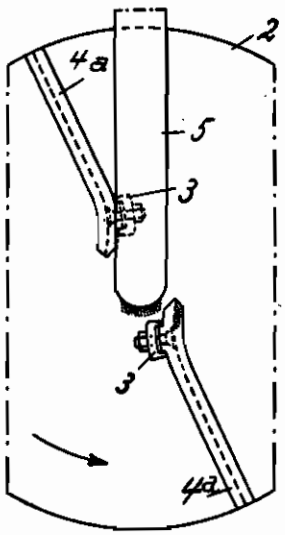


Fig. 9.

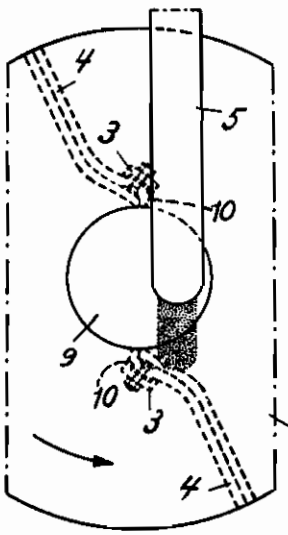


Fig. 10.

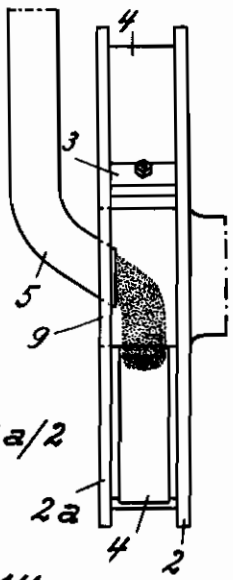


Fig. 11.

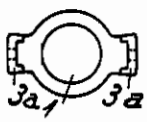


Fig. 12.

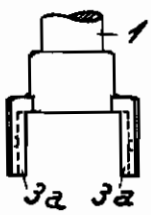


Fig. 16.

Fig. 13.

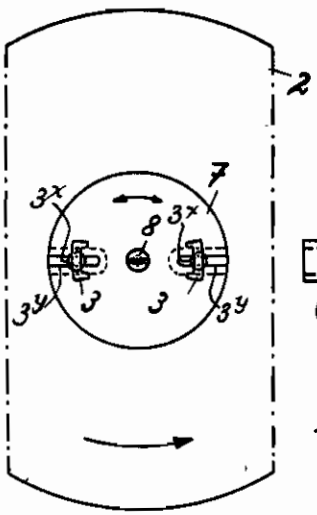


Fig. 14.

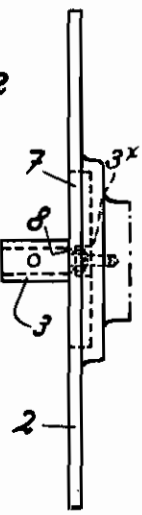
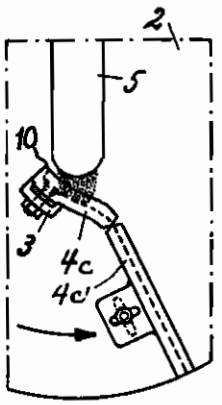


Fig. 15.



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ALIEN PROPERTY CUSTODIAN

CENTRIFUGES FOR GRANULAR MATERIAL FOR CLEANING AND SCALING PLANTS

Karl Grocholl, Brieg-Schusselndorf, Germany; vested in the Alien Property Custodian

Application filed January 11, 1939

The invention relates to a rapidly rotating blade wheel or distributor without a peripheral slide plate, controlling the direction of throw, to be used for centrifuging granular material, such as steel sand, quartz sand or the like, for cleaning and scaling plants. The novelty in this blade wheel consists in the formation or arrangement of the inner part of the centrifugal blades, that is the part adjacent to the wheel centre, with the object of either retarding or accelerating the flow of the sand from the centrifugal blades, depending on the desired direction of throw, the arrangement and formation of the outer part of the centrifugal blades and the nature of the sand. With this formation or arrangement of the inner part of the centrifugal blades the effect is achieved that the sand can be supplied in a simple manner to the centrifugal blades, i. e. without complicated mechanism subject to great wear, in a convenient direction, namely at least substantially radially, and is lightly received by the centrifuging blades—therefore causing little wear both on the blades themselves and on the cleaning sand—and flung off only in one direction (i. e. the particular direction desired at the moment) even when the mouthpiece of the sand supplying device is located in the centre of the plane of rotation.

Known blade wheels which hurl the granular material only in one, viz. in the temporarily desired, direction achieve this end either by means of a segment-like or circular slide plate surrounding the blade track and having an ejection aperture the position of which determines the direction of throw, or by means of a corresponding eccentric position of the mouthpiece of the device supplying the sand, thus dispensing with the provision of a peripheral slide plate. The first type of such blade wheels, in which the mouthpiece of the device supplying the sand can be located either in the centre of, or eccentric to, the plane of rotation and in which the sand is supplied to the rotating centrifuging blades either radially or transversely to their plane of rotation, has above all the great disadvantage that the slide plate is exposed to extremely hard wear, so that these centrifugal devices are completely useless in practice. In the case of the second type of these blade wheels, in which the mouthpiece of the device for supplying the sand is disposed eccentrically to the centrifuging blades and therefore the provision of a peripheral slide plate is superfluous, said mouthpiece is located either close to or at some distance from the axis and the sand is supplied to the rotating centrifuging blades either radially or transversely to their plane of rotation. Blade wheels in which the eccentrically disposed mouthpiece of the sand supplying device is located at a considerable distance from the axis possess above all the defect of great wear on the centrifuging blades and rapid destruction of the sand, which is caused by the high tangential velocity present at that point. In addition, their cleaning performance is only small, so that such forms of construction have also been useless in practice. Known blade wheels of the type in which the eccentrically disposed mouthpiece of the apparatus which supplies the sand to the centrifuging blades either radially or transversely to their plane of rotation lies close to the axis are, finally, relatively complicated. In addition, the reception of the sand, fed only by the force of gravity, by the centrifuging blades sometimes leaves much to be desired in these devices.

All of these defects are obviated by the centrifugal wheel of the present invention, different forms of construction of which are illustrated by way of example in the accompanying drawings in which—

Figure 1 is a front view, and

Figure 2 is a side view of one form of the centrifuging wheel.

Figures 3 and 6 show the sand supply pipe.

Figure 7 is a front view of another form of the centrifuging wheel.

Figure 8 is a front view of a further construction of the centrifuging wheel.

Figure 9 is a front view and

Figure 10 is a side view of still a further construction of the centrifuging wheel in which the blades are mounted between two rotating discs.

Figure 11 is a cross-section and

Figure 12 is a plan view of a construction, in which blade-holders are secured directly on the shaft.

Figure 13 is a front view and

Figure 14 is a side view of adjustable blade-holders.

Figure 15 is a front view of a blade consisting of two parts.

Figure 16 is a cross section through a channel-shaped blade.

The centrifugal wheel consists essentially of the rotating disc 2, mounted on the driving shaft 1, with the holders 3 or 3a mounted thereon carrying the centrifugal blades 4, 4a, 4b, 4c or 4d and the sand supply pipe 5. The number of the blades depends on individual circumstances. As a rule it should be small.

In the example shown in Figures 1 and 2, the inner part of the centrifugal blades 4 and 4a is bent away in the opposite direction to the direction of rotation, i.e. rearwardly, while the outer part of the centrifugal blades 4 and 4a is, for example, radially directed. The position shown in Figure 1 of the inner part of the centrifugal blades 4 and 4a retards the flow of the sand from the centrifugal blades 4 and 4a. This illustrated formation and arrangement of the inner part of the centrifugal blades 4 and 4a and the degree of their curvature towards the rear should be approximately correct when, as is generally the case in practice, it is desired to hurl the cleaning sand downwardly, assuming the latter to be of the normal type and the outer part of the centrifugal blades to be arranged in the radial direction. If the inner part of the centrifugal blades 4 and 4a were not bent towards the rear, but if its shape were like that of the outer part, then, depending on the shape of the centrifugal blades, the sand would be hurled off either radially in all directions or possibly upwardly. If, when the outer part of the centrifugal blades is arranged radially and normal cleaning sand is employed, it is desired to throw the sand off to the left with the blade wheel illustrated in Figures 1 and 2, the inner part of the centrifugal blades 4 and 4a is bent to a smaller extent than when the blade wheel is to throw downwardly. If the cleaning sand is, finally, to be thrown upwardly, the degree of curvature may be even smaller, or it may not be present at all, or it may be made in the opposite direction.

All this is substantially dependent on the shape of the outer part of the centrifugal blades 4 and 4a and the nature of the cleaning sand which is used. How the inner part of the centrifugal blades 4 and 4a is directed and to what extent it is bent in one direction or the other determines the rate of flow of the sand from the centrifugal blades 4 and 4a. Thus, if the inner part of the centrifugal blades 4 and 4a is bent in the opposite direction to that of the rotation, that is to say to the rear (Figures 1 and 2), the flow of sand from the centrifugal blades 4 and 4a is retarded. If, on the other hand, the inner part of the blades is bent in the direction of rotation, i.e. forwardly (Figure 8), the flow of sand from the centrifugal blades 4 and 4a is accelerated. The rate of flow is to be so adjusted that the sand is thrown off by the centrifugal blades 4 and 4a in the desired direction. The exact length and the exact shape of the inner part of the centrifugal blades 4 and 4a which is to be bent away to a varying extent and in varying directions can readily be determined in practice, by means of tests. The wear on this inner part of the centrifugal blades 4 and 4a is only slight, even in the case of the substantial bending thereof illustrated, since at that point the tangential velocity and thus the pressure of the sand on its path are still relatively small. The number and the cross-sectional shapes of the centrifugal blades may also differ from those shown in the drawings. In certain circumstances the blades may even be of tubular cross-section, for instance as shown in figure 7. A second rotating disc, having an aperture 9, may furthermore also be mounted opposite the rotating disc 2, as shown in figure 10, so that the centrifugal blades would thus be mounted between two rotating discs 2 and 2a. Finally, the rotating discs may also be entirely dispensed with in certain circumstances. The holders 3 and 3a are in such a case secured directly on the shaft 1 as shown in figures 11 and 12.

The holders 3 and 3a are mounted on the rotating disc 2 or on the shaft 1 either immovably or adjustably. The holders can be adjustable on an arc of a circle and/or in the radial direction and/or may also be adapted to rotate independently of the disc or shaft. The latter form of adjustability is convenient in order to be able to make small adjustments of the direction of throw when a particular shape of centrifugal blade is provided for a determined direction of throw. According to figures 13 and 14 the holders 3 and 3a are secured by bolts and nuts in radial slots of a disc 7 which after having loosened the screw 8 can be rotated in both directions until the desired position is found.

The disc 7 is mounted in a recess of the disc 2. In this construction the holders 3 and 3a are (by the rotation of the disc 7) adjustable on an arc of a circle and (by means of the slots) adjustable in radial direction. Eventually they are adapted to rotate round their fastening-bolts.

The centrifugal blades 4 and 4a secured to the holders 3 and 3a may also be in two parts, in such a manner that the inner bent part and the outer part each form separate parts (see figure 15). In this case the inner bent part of the centrifugal blades can be independently adjusted about the axes of the holders 3 and 3a, while the outer part of the centrifugal blades may be fixed in a desired direction or may likewise be adapted to be independently adjusted.

Adjustment of the direction of throw, when using centrifugal blades shaped for a determined direction, can also be obtained by providing the sand supply pipe 5 illustrated in Figures 1 and 2, which allows the sand to fall vertically downwards, with a deflector 6 which may be rotatable or fixed in the desired direction, such as that shown by way of example in Figures 3 to 6. Figure 3 shows the deflector 6 viewed from the front and Figure 4 shows it viewed from the side, the sand falling vertically downwards. In Figure 5 the deflector is turned to the left and in Figure 6 to the right, whereby the flow of the sand is correspondingly deflected from the vertical, thus slightly modifying the direction of throw.

In Figures 1 and 2 the mouthpiece of the sand supply pipe 5 lies in the centre of the plane of rotation, but it may naturally also lie eccentrically adjacent the axis as shown in Figures 9 and 10. In this case, although the above described advantages, which are obtained in the case of the mouthpiece of the sand supply pipe 5 being mounted in the centre of the plane of rotation, are not obtainable to the same extent, yet on the other hand, there is the compensation that exact direction of flow can be maintained even in the event of less accurate formation of the centrifugal blades in respect to the otherwise necessary shape of the inner and outer parts thereof and also in the event of a difference in the nature of the cleaning sand.

The striking side of the blades 4 and 4a may be channel shaped (Figure 16) and may be formed with a transverse rib at the inner end. A blade which is not channel-shaped but furnished with a flat striking surface may also be provided at the inner end with a transverse rib or the like, to prevent the cleaning medium from sliding away from the inner end of the blade.

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