

Sieve Drum

The invention relates to a type of sieve drum for conditioning and sorting granular materials in which the drum is rotatable about its longitudinal axis with that axis substantially horizontal and having an input device at at least one end of the drum, into the inner ring sieve sections of the drum being a drum concentrically surrounded by longitudinally consecutive inner ring sieve sections, with the meshes of those sections increasing from one to the next whereby the section with the smallest mesh is the one axially closest to the input device and the section with the largest mesh is the one axially furthest from the input device, outlet means for the conditioned and sifted particles at the bottom of the drum outer ring sieve sections and with means situated between outer ring sieve sections and silos at the underside of the drum to accept sifted material of different particle sizes.

Sieve drums are used, for instance, to prepare material for road surfaces using bitumen and old asphalt or grit. Grit with coarse grains is used for forming a supporting matrix and grit with fine grains is used for the partial filling of cavities in the matrix; the bitumen penetrates the remaining cavities and serves to bond together the surface components. For this purpose a sieve drum of appropriate type can be utilised to obtain correct proportions of the separate components, and especially to prepare components by bringing them to the right temperature in a heated mixing drum, if the separate road surface components are to be applied onto the road foundation simultaneously.

In a known sieve drum (described in German Patent Specification no. 38 01 383) originating from the same inventor as the present invention three ring sieve sections with different meshes are provided, and the sieve with the smallest mesh is charged with all the material to be sifted, i.e. this fine sieve is loaded with the largest particles as well as the others, and this leads to rapid wear of the sieve with the smallest mesh. What is more, the efficiency of the sifting process is not at an optimum level because, for instance, the larger particles can quite easily so carry smaller particles that at least some of the smaller particles do not pass through the appropriate sieve.

A purpose behind the present invention was to develop a suitable device such that separate ring sieve sections of the drum are provided in a particularly satisfactory manner. In particular it is advantageous that the ring sieve sections may be assembled and dismantled as quickly as possible and with minimum tool usage, and that the fitted ring sieves are reliably fastened onto the drum. Additionally it is advantageous that the ring sieve sections are arranged relative to each other such that the sieves are charged with regard to their meshes, appropriate to the particle distribution within the material to be sifted.

According to the present invention a sieve drum, by means of which advantages indicated above can be achieved, is as described in the first paragraph of this specification but additionally comprises further, namely, outer, ring sieve sections, with meshes of smaller sizes to those inner ring sections to which each is radially adjacent, concentrically surrounding the drum and radially outwards of the other inner ring sieve sections, the outer section with the smallest mesh being axially closest to the input device and the outer section with the largest mesh being axially furthest from the input device.

In a sieve drum according to the invention the use of the outer ring sieve sections, in addition to the other, i.e. inner, ring sieve sections, with separate different meshes suitably chosen permits directing only a portion, say 50 to 60%, of the material to be sifted to the finest sieve. This can be achieved by having positioned before the ring sieve section with the smallest mesh an associated sieve with a larger mesh.

The outer ring sieve sections are preferably shaped as windows, frames or apertures into which the separate sieves are fastened. It is sufficient merely to place the sieves into the frames and to fasten them onto these frames, with the frames being additionally equipped with guiding parts which project radially inwards once placed upon the sieve drum; they further provide for the material to be sifted to carry out the desired axial movement within the outer intermediate ring chamber.

The invention is further described with reference to the drawings in which:-

Figure 1 is a diagrammatic side view of a sieve drum according to the invention, with outer ring sieve sections removed

Figure 2 is a view corresponding to Figure 1 but with the outer ring sieve sections present and

Figure 3 is a diagrammatic representation of the sifting principle forming a basis of the present invention.

A drum 2 is mounted for rotation about its longitudinal axis 3 within a stationary housing 1. From the left-hand end of the drum as shown in the drawing a burner 40, whose longitudinal flame axis coincides with the drum's longitudinal axis, projects into the drum 2. The burner 40 may be operated by gas or oil. The drum 2 is drivable by means of a motor (not shown) via a gearbox which incorporates a moving ring 5 firmly linked with the drum it envelops. At the underside of the housing 1 several so-called hot silos 6 are arranged consecutively and longitudinally along the drum. These hot silos are funnel-shaped vessels largely insulated to prevent heat radiation, and can accept sifted materials or grit of different particle sizes discharging from the drum 2.

To enable materials charged to the drum to be sorted, inner ring sieves NW10, NW25 and NW32, consecutively formed from partial segments in the drum's longitudinal direction, are arranged on the drum 2 such that there is an inner ring chamber 8 between the casing of drum 2 and the ring sieves. The ring sieves have different meshes, e.g. the ring sieves NW10 have a 10 mesh and the ring sieves NW32 have a 32 mesh. The ring chamber 8 is linked with the interior of drum 2 via openings distributed evenly on the drum's circumference, as shown at the left-hand end of the drum in the drawing (Fig. 2).

In operating the sieve drum, different materials may be supplied to the drum 2 via respective input devices 100 and 11 at either end of the drum. For instance, at the right-hand end of the drum pointing away from

the burner 40, new material in a cold condition can be input into the drum 2 via input device 100 e.g. grit of different grain sizes, and this material will move towards the flame of the burner 40 and will be thus heated to the desired temperature. Also, for example, old asphalt can be input into the drum 2 at the end of the drum having the burner 40, via the input device 11. The mixture of old asphalt and grit passes through openings 9 into the ring chamber and from there into the hot silos 6, sorted into the respective grit sizes.

Dust and moisture extraction is achievable by means of an exhaust flue 19 at the right-hand end of the drum.

Figure 2 not only shows the radially inner sieves NW10, NW25 and NW32, but also the outer sieves NW4, NW18 and NW25 positioned at a larger radial distance. The outer sieves are separated from the inner sieves by an intermediate ring chamber 108.

Figure 2 shows the separate hot silos 6, where the numbers in the separate silos refer to the particle size. It can be seen that a collecting device G32 for oversized particles has been provided at the right-hand end of the drum, where the oversized particles can be directed into the neighbouring silo by a change-over flap, which in fact is intended for granular sizes between NW25 and NW32.

The sifting diagram of Figure 3 is provided as a sketch to assist representation of an idea upon which the invention is based.

The separate ring sieve sections have been given reference numbers corresponding to the mesh of the relevant sieve. Thus, the sieve NW32 correspondingly has a 32 mesh and therefore is the sieve with the largest mesh. The sieve NW4 is the sieve with the smallest mesh and so forth.

100% denotes the entire material to be sifted arriving at the left-hand end of the drum 2 and passing into the radially inner ring chamber 8 through the openings 9.

The material to be sifted reaches the ring sieve section NW10, and all particles larger than 10 mesh move further in the sieves NW25 and NW32, in an axial direction.

Particles passing through the sieve 10 reach the outer ring chamber 108. The smaller particles fall through the sieve NW4. Experience shows that the possible material for sifting at this stage amounts to at least 40% of the entire material to be sifted. Particles of a size between 10 mesh and 4 mesh move further in an axial direction and are collected at an additional collection section. The proportion of the sifted material at this stage may account for about 20% of the entire material for sifting.

Material larger than mesh 10 reaches the sieve NW32 in an axial direction. The larger particles arrive at a separate collection vessel as quantity G32, and again this accounts for about 20% of the total quantity. The proportion of sifted material falling through inner sieve NW25 reach the outer ring chamber 108 and according to size will pass through sieves NW18 or NW25 and experience shows that the quantities of granular sizes 18-10 and 25-18, may amount to 10% each.

Particles passing through inner sieve NW32 but not passing through outer sieve NW25 will move in an axial direction and fall into an additional collection section, and any particles not passing through inner sieve 32 will fall into a final outlet G32.

It is evident from the selected sieve sizes and the conditions that the sensitive finest sieve NW4 will only be charged with say 60% of the total material to be sifted. Parts of the material to be sifted not falling through the sieve NW4 are parts which are of only slightly larger size than the mesh of the sieve 4 and such particles do not particularly mechanically stress the finest sieve.

It should be noted that in accordance with the invention quantities may be sieved out by means of four sieves, applying the sifting principle, which in turn may be subdivided into five different particle sizes.

- 6 -

The sieve drum 2 may also be operated with an inclined axis, either to one end or the other end, so that the material to be sifted remains on the sieves correspondingly longer.

CLAIMS

1. A sieve drum for conditioning and sorting granular materials in which the drum is rotatable about its longitudinal axis with that axis substantially horizontal and having an input device at at least one end of the drum, into inner ring sieve sections of the drum being a drum concentrically surrounded by longitudinally consecutive inner ring sieve sections, with the meshes of those sections increasing from one to the next whereby the section with the smallest mesh is the one axially closest to the input device and the section with the largest mesh is the one axially furthest from the input device, outer ring sieve sections with meshes of smaller sizes to those inner ring sections to which each is radially adjacent concentrically surrounding the drum and radially outwards of the inner ring sieve sections, the outer section with the smallest mesh being axially closest to the input device and the outer section with the largest mesh being axially furthest from the input device, outlet means for the conditioned and sifted particles at the bottom of the drum outer ring sieve sections and with means situated between outer ring sieve sections and silos at the underside of the drum to accept sifted material of different particle sizes so arranged as to keep separate the different sizes of particles as so sorted, and with a final outlet means to accept particle sizes which have not passed through any of the outer ring sieve sections.

2. A sieve drum, for conditioning and sorting granular materials substantially as hereinbefore described and with reference to the drawings.

