

The invention relates to a screening drum according to the preamble of claim 1.

Screening drums of this kind are known (EP-A-0 131 162) and are used e.g. to prepare road surfacing material by using bitumen or asphalt and stone chips of various sizes. Coarse chips are used for building a supporting structure, whereas smaller-sized chips are used for partly filling the cavities in the supporting structure and the bitumen, which penetrates into the remaining cavities and binds together the other constituents of the surfacing. A screening drum according to the invention can be used to mix the individual constituents in the right proportions and more particularly to prepare them by heat treatment in the heated mixing drum, if the individual components of the road surfacing have to be simultaneously laid on the road bed.

The aim of the invention is to improve a device according to the preamble so that the individual annular screen portions can be associated with the drum in particularly advantageous manner. "Most advantageous manner" means more particularly that the annular screen portions can be assembled and dismantled very quickly and with minimum tools, and that the assembled annular screens, when in the assembled state, are reliably associated with the drum.

This problem is solved more particularly by the features in claim 1, and advantageous other features of this solution are the subject of sub-claims.

According to another feature of the invention, the aim is additionally to improve the preparation of the mixed material, and this part of the problem is solved in that the entire drum including the screens is disposed with their longitudinal axis at an angle to the horizontal.

The invention will now be explained in detail with reference to the accompanying drawings, in which:

Fig. 1 is a diagram in side view of a mixing drum which is supplied with waste asphalt for preparing street surfacing material, though this is not essential to the invention;

Fig. 2 shows a part of Fig. 1 with more details;

Fig. 3 is a section along line III-III of Fig. 4, and Fig. 4 is a view in the direction of arrow C in Fig. 3.

A drum 2 is disposed in a stationary casing 1 so that the longitudinal axis 3 of the drum is mounted for rotation around the longitudinal axis of the casing. A burner 4 extends into the drum 2 from the left end thereof, as seen in the drawing, and the longitudinal axis of the flame coincides with the longitudinal axis 3 of the drum. The burner can in principle be of any kind and can operate on gas or oil. The drum 2 is driven by a motor (not shown) via a transmission system including a ball race 5 which surrounds the drum and is permanently connected thereto. A number of "hot silos" 6 following one another in the longitudinal direction of the drum are disposed under the casing 1. The hot silos are funnel-shaped containers, substantially insulated from heat radiation, and receiving stone chips of various sizes with bitumen or asphalt coming from the drum 1 and delivering it to a conveyor belt for further processing.

In order to sort the material, cylindrical screens 7 following one another in the longitudinal direction of the drum 2 are disposed on the drum so as to leave an annular space 8 between the surface of drum 2 and the cylindrical screens 7. The cylindrical screens have varying mesh widths, the screen 7a having the largest mesh width being at the right end of drum 2 as shown in the drawing whereas the screen 7d having the smallest mesh width is at the left end of the drum. The annular space 8 is connected to the interior of drum 2 via openings 9 which, at the left end of the drum in the drawing, are uniformly distributed over the drum periphery.

During operation of the installation, material of various kinds is delivered to each end of the drum through a delivery device 10 and 11 respectively. New material, more particularly stone chips of various sizes, is delivered when cold through the delivery device 10 to the end of the drum remote from the burner 4, and moves in the opposite direction to the flame of burner 4 and in the process is heated to the desired temperature. Waste asphalt is supplied to the drum through the delivery device 11 at the burner end of the drum. The mixture of waste asphalt and stone chips travels through openings 9 into the annular space 8, is sorted into sizes of stone chips, and is delivered to

the hot silos 6 from where it can be taken for further processing.

Dust and moisture is discharged through a waste-gas chimney at the drum end of the delivery device.

The central cylindrical screens 7 are secured to the drum 2 according to the invention as shown in Figs. 2 - 4.

Pairs of spacer members 22, 23 are disposed in the region on each side of plane 21 and substantially determine the gap width between drum 2 and screens 7. The spacer members 22, 23 are uniformly distributed at wide intervals over the periphery of drum 2. Each spacer member 22, 23 is an extruded section member extending in the longitudinal direction of the drum and having a U-shaped cross-section, each pair of spacer members being separated by a relatively small space and their backs 24 being remote from one another and following one another in the peripheral direction of the drum whereas their radially inner flanges 25 are secured to the drum 2. The length of each spacer member (extruded section member) 22 or 23 is about equal to the length of a cylindrical screen 7. A screen support 26 is disposed between the "first" spacer member 22 of one pair and the "second" spacer member 23 of the next pair in the peripheral direction of the drum. The screen support is a rectangular extruded section member having a flat cross-section and extending in the peripheral direction of the drum and following its contour and is permanently connected at one end, more particularly by welding, to the "first" spacer member of an aforementioned pair of U-shaped spacer members, whereas its other end is connected to the "second" member. The cylindrical screens are placed on the top surface of the flat rectangular cross-section screen supports and on the outer flanges 25a of the spacer members 22, 23. In this position, the cylindrical screens are held at each end by a tension band 27. Each tension band is a spring steel strip which extends in the peripheral direction of drum 2 and is adjustable in length by a tightener between its two ends so that the respective end of the cylindrical screen is held without clearance between the associated tension band and the associated screen support. In the initial state, angular retaining means 28 are uniformly distributed along each tension band. The horizontal limb 28a of each retaining means is permanently connected to the tension band 27 e.g. by

welding. The other limb 28b is a flange-like portion which extends radially inwards and, after attaching and tightening the tension band 27, serves as a part of the annular screens.

An extruded section member 29, likewise with a U-shaped cross-section, extends in the peripheral direction of the drum 2 and is held between a pair of screen supports 26 disposed symmetrically with respect to the plane 21. The section member 29 is permanently connected, more particularly by welding, to the screen supports on each side.

In order to install the cylindrical screens, the spacer members 22, 23 are welded to the drum 2, the screen supports 26 are welded to the spacer members and the extruded section members 29 are welded to the screen supports. After the drum 2 has been thus prepared, a cylindrical screen is inserted on both sides of a section member 29 or between two members 29 following one another in the longitudinal direction of the drum. Next, the tension band 27 is secured and tightened by the retaining means 28 at each end of the respective screen. The radially outwardly extending limbs of the retaining means 28 then abut the sides of the section member 29 substantially without clearance. The retaining means 28 are made of a material such that the ends of the radially outwardly extending limbs 28a which radially project beyond the flanges of the section member 29 (Fig. 3, left) are bent around the top ends of the flanges of the section members 29 (Fig. 3, right) and consequently the tension bands and screens are reliably secured relative to the drum 2.

In the previously-described embodiment according to the invention, the screens can easily be inserted, removed or changed while being reliably secured in position, without special aids.

The operation of a thus-mounted screen drum is improved by two other features of the invention.

Firstly, the entire screening drum is disposed at an angle to the horizontal 30 so as to leave an angle α of about 4° between it and the longitudinal axis 3 of the drum, and so that the outlet end is higher than the delivery end comprising the delivery device 10. This feature facilitates mixing of the material, in that the material stays longer in the drum and is given a radial component of motion.

Secondly, a multi-thread screw 31 is disposed in the annular space between the drum and the screen or between successive screen portions of varying mesh width. Each outlet opening 9 is associated with a channel between two screw threads. This results in a more uniform supply of material to the annular space, thus facilitating sorting and discharge of the sorted material into the hot silos 6. Preferably there are four outlet openings 9 and four screws 31.

At the drum ends, either only one flange of the U-section member 29 is used as described, or the arrangement shown in Fig. 3 is replaced by only the right half or left half of the plane 21, depending on whether the reference is to the left or the right end of the drum in Fig. 1.



C L A I M S

1. A screening drum for conditioning and sorting granular material and having an input device (10) at one end of the drum (2), which rotates around its horizontal longitudinal axis (3), and a device (9) for outputting the conditioned material at the other end of the drum, the output device being connected to an annular chamber formed across the drum and in the longitudinal direction of the drum so as to maintain an axial gap between each successive annular screen portion (7) concentrically surrounding and secured to the drum, the mesh width of the annular screen portions varying so that the portion having the smallest mesh width is nearest to the output device (9) whereas the portion having the greatest mesh width is furthest from the output device, preferably near the input device (10), characterised in that the axial gaps between each pair of annular screen portions (7a, 7b) concentrically surround the drum (2) and each portion contains a channel-like extruded section member (29) having its open side outwards, the outer sides of each section member being adjacent a flanged radially outwardly extending portion (28) of a means (28) for holding the annular screen portions, and after each annular screen has been installed the flanged portion is initially straight and projects beyond the section member, after which the portion projecting beyond the section member is bent around one edge of the section member and placed against the adjacent inner side thereof, so that the annular screen portion forms a hook extending over the section member.

2. A screening drum according to claim 1, characterised in that each annular screen member (7a, 7b), on both sides of a channel-like extruded section member (29), rests on a screen support (26) which surrounds the drum (2) and lies in the same peripheral plane as the web of the section member.

3. A screening drum according to claim 1, characterised in that each annular screen portion (7a, 7b) is secured to its support (26) by a continuous tension band (27).

4. A screening drum according to any of claims 1 to 3, characterised in that hooked retaining means (28) are secured to the tension band (27) and engage in the extruded section member (29).



5. A screening drum according to any of claims 2 to 4, characterised in that the screen supports (26) are permanently secured to both sides of a respective extruded section member (29) and bear on the drum wall with interposition of spacer members (22, 23).
6. A screening drum according to claim 5, characterised in that the spacer members (22, 23) are extruded section members having a channel-like cross-section and an inner flange (25) which bears on the drum (2) and lie in slots between the screen supports (26).
7. A screening drum according to any of claims 1 to 6, characterised in that a multi-thread screw conveyor (31) is disposed in the annular space between the drum (2) and the annular screens (7) and is permanently connected to the drum.
8. A screening drum according to claim 7, characterised in that the drum has an outlet opening (9) for each thread of the screw conveyor.
9. A screening drum according to claims 7 and 8, characterised by four screw threads and four outlet openings (9).
10. A screening drum according to any of claims 1 to 9, characterised in that the longitudinal axis (3) of the drum is somewhat inclined relative to the horizontal plane (30) in which the axis lies at one end of the drum.
11. A screening drum according to claim 10, characterised in that the angle of inclination is about 10°.
12. A screening drum according to claim 10 or 11, characterised in that the apex of the angle of inclination () is near the output end of the drum (2).