

Description

The invention relates to a screen cleaner, more particularly for the screen frames of plansifters such as are used in mill operations for the screening (sifting) of the products ground in the mill.

From actual practice a so-called square plansifter is known wherein the individual screen frames stacked one above the other have a substantially square outline form. Each screen frame comprises a rectangular insert frame which is provided with a screening cover or fabric. At a side^{at} which the material being sifted is supplied the insert frame directly adjoins the outer screen frame, whereas at the three other sides product ducts are formed for discharging the screen oversize and the screen throughs into the outer screen frame. Further differentiation of the products being sifted is made possible by the forming of additional product ducts between the outer periphery of the screen frames and a box-shaped screen casing which accommodates the entire screen stack. The entire screen part, i.e. the screen casing with one or more screen stacks, is given a horizontal circular vibratory movement during the sifting operation.

Each screen frame has a smooth bottom on which bears a freely movable bottom clearer. A corrugated grid is situated between the bottom and the screening fabric for the supporting of screen cleaning members. The screen cleaning members are constituted for example by short pieces of braided belt material which are provided at the underside with a metal button and in their random movements over the corrugated grid are stimulated to vibrate, so that they readily strike against the screening fabric. This construction of screen cleaner causes the production of considerable noise, and contributes to the screen frames having a relatively high total weight.

From US-A-2 086 199 a screen cleaner according to the pre-characterising part of claim 1 is known which is in the form, in plan view, of a equilateral triangle and is supported with its knob-type foot tiltably on the corrugated grid of the screen frame.

The invention has as its object to provide a screen cleaner which allows a weight-saving and simple construction of the screen frame and yet with which a good cleaning effect can be achieved.

According to the invention this object is achieved by screen cleaners having the features indicated in claim 1.

Advantageous further features are shown in the subordinate claims.

A plansifter with the screen cleaners according to the invention is the subject of claim 11.

The screen cleaners according to the invention are formed by projecting arms.

With this construction of screen cleaner the corrugated grids of the conventional screen frames can be dispensed with. Yet here also the cleaning of the screen can be assisted by impacts against the screening fabric, since the screen cleaning members in their movement have continually the tendency to tilt about the ^{lower end of their} shank-type foot and as a result strike with their outer upper edges on the screening fabric. Tests have shown that the cleaning effect attainable in this way is at least of equal quality to the effect of conventional screen cleaning members on corrugated grids.

Preferably the screen cleaning member is in the form of a three-pointed star. Because of the far-projecting arms of the star there is a relatively low total weight and yet a high inertia moment is achieved in the tilting movement, so that sufficiently strong impacts are exerted on the screening fabric.

The star-shaped formation also has the advantage that the arms of the screen cleaning member can penetrate well into the corners of the screen, so that in those regions also the screening fabric can be cleaned effectively. Whereas conventional screen cleaning members made of belt material become rounded at the corners after a time, so that they can no longer penetrate into the corners of the screen, the star-shaped screen cleaning member retains its star-shaped form even when partial wear has occurred. Preferably the screen cleaning member is made of an elastomeric synthetic plastic material, so that at most a very small amount of wear occurs. Due to the elastic action of the arms of the star when there is impact on the walls of the screen frame, the screen cleaning member is also excited to perform violent movements, so that the cleaning effect is intensified, whereas on the other hand because of the yieldability of the arms over-stressing of the screening fabric is avoided. Because of these properties the star-shaped screen cleaning member is advantageous even in conventional screen frames having corrugated grids.

In the case of screen frames without corrugated grids the screen cleaning member can also be combined with the bottom clearers provided on the screen bottom in any case. This allows shortening of the shank-like foot and thus a saving in weight, as well as shortening the tilting radius. A further advantage is that the engaging of the foot of the screen cleaning member in the bottom clearer prevents the latter from being thrown out of the screen frame through the discharge slot for the screen throughs.

Advantageously a baffle member is arranged on the screen bottom approximately under the centre of the screening fabric. Whereas in conventional screen cleaning members

it can be seen that the screen cleaning members stays mostly in the central region of the screen, the baffle member has the function of driving the screen cleaning member into the edge and corner regions of the screen by frequent collisions.

Preferred constructional examples of the invention are described in more detail hereinafter with reference to the drawings.

In these drawings:

Fig. 1 is a plan view of a screen part of a plansifter;

Fig. 2 is a section through a screen frame taken along the line II-II of Fig. 1; and

Fig. 3 is a plan view of a screen cleaning member.

A screen part 10 of a plansifter comprises, according to Fig. 1, a cylindrical screen casing 12 which accommodates a plurality of screen frames 14, these being stacked one above the other and aligned precisely with one another. The screen frames 14 are held at the corners by vertically situated strips 16 which are of triangular cross-section and are secured to the inner wall of the screen casing 12. The screen casing 12 is formed of two half-shells 18 of sheet aluminium which are releasably screwed to one another via vertically situated flanges 20 in a plane of division extending through two diagonally opposite corners of the screen frames 14. The inserted screen frames 14 are easily removable after the release of one of the half-shells 18.

The segments of the half-shells 18 which are formed between the strips 16 have in each case at the inside a vertically situated approximately trapezoidal reinforcement section member 22 made of sheet aluminium. Those surfaces of the half-shells 18 and of the reinforcement section members 22 and of the strips 16 which face towards the interior of the screen casing are provided with a lining, not shown, made of food-compatible, foamed plastic, felt or the like.

As shown in Fig. 2, the screen frame 14 has a cross-grid 26 which is provided at its topside with a screening fabric 24 and which is formed of outer wooden frame members 28, 30 and central webs 32, 34. At the underside the cross-grid 26 is closed by a smooth continuous bottom 36 which at two opposite edges is provided with spacer strips 38 for support on the next-lower screen frame. The wooden frame members 30 and the central web 32 extend at a spacing from the bottom 36, so that discharge slots 40 are formed for the screen throughs. The screen frame 14 constructed in this way consists of only a relatively small number of variously shaped wooden members, so that efficient mass production is made possible.

Four product ducts 42, 44, 46, 48 sealed off from one another are formed for supplying and discharging the material being sifted, between the outer wooden frame members 28, 30 of the screen frames 14 and the opposite segments of the screen casing 12. If necessary, the hollow spaces of the reinforcement section members 22 may be used as additional product ducts 50.

At one of the wooden frame members 28 of the screen frame 14 a supply plate 52 is arranged which projects horizontally into the product duct 42 and whose outer edge abuts in sealing-tight manner on the lining of the screen casing 12. The material being sifted, fed through the product duct 42, is conducted on to the screening fabric 24 via this supply plate 52. The entire screen part 10 carries out a circular vibratory motion in the drawing plane of Fig. 1, so that the material for sifting is distributed over the screening fabric²⁴ and screened. The screen throughs are discharged through the discharge slots 40 into the product ducts 46 and 48, whilst the screen oversize is conducted via the product duct 44 to a supply plate 54, hinted at with broken lines in Fig. 2, of the next-lower screen frame.

The product guidance system described hereinbefore can be altered in a simple manner by inserting the screen frames 14 in varying orientations, and/or arranging the supply plates 52, 54 at other sides of the screen frame. It is also possible optionally to provide the bottom 36 with perforations so that the screen throughs are conducted directly on to the screen situated therebelow.

It is also possible to shorten the supply plate 52, as indicated by a broken line 56 in Fig. 1. In this case only a portion of the flow of material is collected by the supply plate 52 and conducted on to the screening fabric 24, whereas another part-flow of material falls through the apertures remaining in the product duct 42 and is processed in a lower station in parallel, using another screen.

Fig. 2 shows two different constructional forms of screen cleaning members 58 and 60 each of which has a shank-type foot 62. In the screen cleaning member 58 the foot 62 engages in an aperture of a disc-shaped bottom clearer 64 lying flat on the bottom 36, so that the bottom clearer 64 and the screen cleaning member 58 move jointly over the bottom surface during the shaking movements of the screen. In the case of the screen cleaning member 60 the foot 62 on the other hand bears directly on the bottom 36. In both cases the lower end of the foot 62 is somewhat rounded, so that the screen cleaning member has the tendency to tip over until it strikes with its outer edge on the screening fabric and rebounds therefrom. The screen cleaning members are provided at the top with ^{small} lumps or brushes 66 for gently cleaning the screening fabric. Through friction with the bottom 36 and more particularly through collisions with the wooden frame members and central webs of the oscillating screen frame, the screen cleaning members are kept continually in an irregular wobbling movement, so that on the random principle they gradually travel over the entire screening fabric 24.

The cleaning effect is assisted by the fact that the screen cleaning members carry out wobbling movements and consequently make the screening fabric vibrate. In the middle of the individual bays of the screening fabric there are provided baffle members 68 which are secured firmly on the bottom 36, and the bottom clearer 64 or the foot 62 additionally strikes against these baffle members, so that the screen cleaning member is frequently thrown into the edge regions and corners of the screen frame.

As is shown in Fig. 3, the screen cleaning member 60 has the shape of a three-pointed star, with relatively long slender arms 70 which penetrate well into the corners of the screening fabric. The screen cleaning member 60 is made from an elastomeric material so that the arms 70, on colliding with the wooden frame members of the screen frame, act like elastic springs and excite the screen cleaning member to carry out strong translational and rotational movements. The elastic cushioning of shocks also results in reducing noise. The thickness of the screen cleaning member is so dimensioned that the arms have a relatively soft spring characteristic when subjected to vertical deflection. In this way good physical contact with the screening fabric is guaranteed, and over-stressing of the fine screen gauze is obviated.

C l a i m s

1. Screen cleaner, more particularly for screen frames (14) of a plansifter which, set off by means of a foot (62), are insertable in freely movable manner in the screen frame below the screening fabric (24) and carry out a wobbling movement when the screen vibrates, characterised in that the screen cleaning members are constructed as projecting arms (70) and engage in a bottom cleaner.
2. Screen cleaner according to claim 1, characterised



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2. Screen cleaner according to claim 1, characterised



in that the projecting arms (7)) are provided on their upper surfaces with small lumps or brushes (66).

3. Screen cleaner according to claim 1 or 2, characterised in that the screen cleaner is supported via a projecting foot (62).

4. Screen cleaner according to one of claims 1 to 3, characterised in that the shank-type foot (62) is constructed to bear directly on the smooth bottom (26).

5. Screen cleaner according to one of claims 1 to 4, characterised in that the projecting arms (7)) are constructed as feet.

6. Screen cleaner according to one of claims 1 to 5, characterised in that the bottom cleaner (64) is constructed as a disc-shaped bottom clearing device, for bearing directly on a smooth screen bottom (36).

7. Screen cleaner according to one of claims 1 to 6, characterised in that it is made of an elastic material and has a soft spring characteristic more particularly when vertical deflection occurs.

8. Screen cleaner according one of claims 1 to 7, characterised in that it is star-shaped in plan view.

9. Screen cleaner according to claim 8, characterised in that it is constructed as a three-pointed star.

10. Screen cleaner according to one of claims 1 to 9, characterised in that it is insertable in a screen frame which does not have a corrugated grid, for both cleaning the screening fabric and clearing the smooth bottom through a free wobbling migrating movement.



11. Plansifter with a screen part which part is adapted to be movable in circular vibratory movement and comprises a plurality of screen frames (14) stacked one above the other having in each case a screening fabric (24) and a smooth continuous bottom (36) and also a discharge slot (40) for the screen throughs, there being arranged in the screen frame below the screening fabric in each case a freely movable screen cleaner (58; 60) which is set off on a foot (62) and which carries out a wobbling movement with the shaking movement of the screen, characterised in that

- the screen frames(14) have no corrugated grids, and
- the screen cleaners are constructed as projecting arms (7), and engage in a bottom cleaner, such
- that the screen cleaners act both to clean the screening fabric and to clear the continuous bottom.