



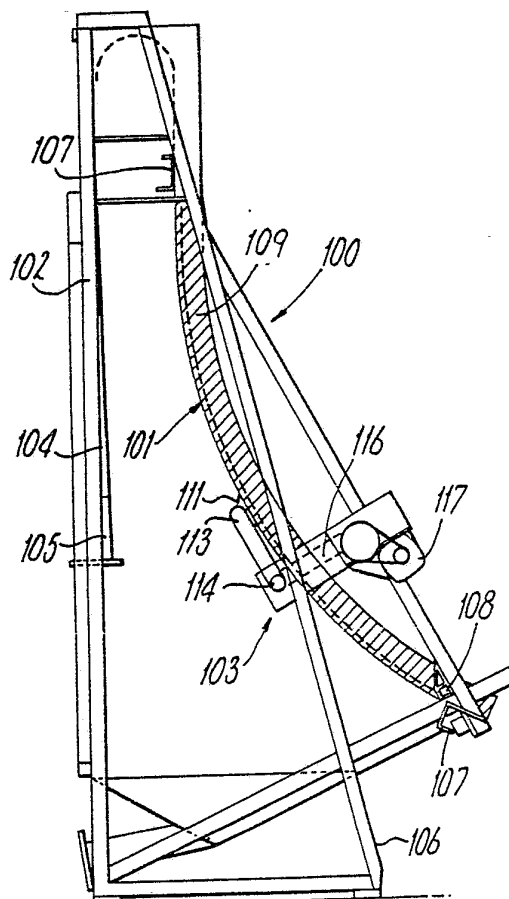
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(21) International Application Number: PCT/AU83/00062 (22) International Filing Date: 13 May 1983 (13.05.83) (71) Applicant: ILECARD PTY. LIMITED [AU/AU]; Ernst & Whinney, Chartered Accountants, 14th Level, C.B.A. Building, 80 Margaret Street, Sydney, NSW (AU). (72) Inventor: LEES, Jeremy, James ; 128 Louisa Road, Birchgrove, NSW (AU). (74) Agent: F.B. RICE & CO.; The Forth & Clyde, 101 Mort Street, Balmain, NSW 2041 (AU). (81) Designated States: AT (European patent), CH (European patent), DE, DE (Auxiliary utility model), DE (European patent), FR (European patent), GB (European patent), JP, NL (European patent), NO, SE (European patent).		Published <i>With international search report.</i>

(54) Title: SIEVE SCREEN DECK

(57) Abstract

A sieve screen deck (100), the screen (101) of which comprises a plurality of substantially parallel narrow slots, preferably formed by a parallel array of horizontal wedge wires connected to an array of backing bars (110) running longitudinally of the screen parallel to its fall line. The screen (101) is connected to frame members (107) at its two ends, at least one end being connected by resilient means (108) such that the screen (101) may vibrate and flex under the influence of rapping or vibrating means (103). Side walls (109) are provided along either side of the sieve screen (101), to prevent material flowing over the sides of the screen, the side walls (109) being formed of a resilient material in order that they do not substantially impede the ability of the sieve screen (101) to vibrate and flex under the influence of the rapping or vibrating means (103).



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SIEVE SCREEN DECK

The present invention relates to a sieve screen deck and more particularly to such a sieve screen deck having a self supporting sieve screen with side walls which sieve screen may
5 be vibrated over substantially its whole surface.

Screen decks are used to separate liquids from a wide range of solid particulate matter and to separate fines from flowable streams of particulate matter. A slurry or a mixture of particles is flowed onto the upper end of the screen deck. As
10 the mixture flows down a sieve screen in the deck the liquid or fines fall through the apertures in the sieve screen. In conventional screen decks the sieve screen is rigidly connected to a frame around its full periphery. In a planar screen this is usually done by clamping the sieve screen around its edges to
15 the screen while in the case of a curved sieve screen, i.e. a sieve bend, the curved edges are supported and stiffly held in place by radius bows which are generally wedged in place or firmly located by springs.

It has been found in certain situations that the sieving
20 action of such a screen deck may be enhanced by vibrating the screen or by rapping the screen i.e. by applying repeated impacts to one face of the screen or to the screen frame. Rapping is normally done by connecting a rapping bar to the underside of the sieve screen and positioning on the frame, or
25 on the ground beneath the frame a mechanical impacting means which imparts blows in rapid succession to the rapping bar or by vibrating the complete screen and holding frame. The application of the rapping or vibrating force to a curved sieve screen which is rigidly held around its sides to a frame results
30 in only a small part of the sieve screen actually moving.

It has been known to vibrate sieve screens formed of a fabric which is not self supporting. The fabric is held in a state of tension by being rigidly connected to a surrounding frame at its ends but not its sides. In this arrangement the
35 application of a vibrational force to sieve screens of this



type has not prevented blinding of the screen with fine particulate matter. It is believed this deficiency arises due to the nature of the apertures in the woven fabric sieve and due to the poor transmission of the vibrational forces throughout the screen due to its inherently non-rigid, i.e. non self supporting, nature.

The present invention consists in a sieve screen deck, comprising a self supporting sieve screen having two opposed end edges, rapping or vibrating means to cause the sieve screen to vibrate, and a frame to which the sieve screen is connected, the sieve screen including sieving means defining a plurality of substantially parallel narrow slots and an array of backing bars connected to the sieving means which render the sieve screen self supporting, the sieve screen being connected to the frame only at or adjacent its two end edges and at least one of the connections being through a resilient bush or like means allowing limited vibrational movement between the sieve screen and the frames, a side wall being provided substantially along the full length on each side of the sieve screen between its end edges so as to prevent material which is passing across the sieve screen between the two end edges from flowing over an edge of the sieve screen intermediate the said end edges, each side wall being formed of a resilient synthetic plastics material or rubber such that they do not impede substantially the ability of the sieve screen to vibrate and flex under the influence of the rapping or vibrating means.

Side walls to prevent material falling over the side edges of the sieve screen may be formed of a suitable synthetic plastics material or the like and connected to the side edges of the sieve screen. The plastics material should have sufficient resilience that the vibration of the sieve screen is not substantially impeded. In a preferred embodiment of the invention the side walls are cast in-situ on the side edges of the sieve screen. In other embodiments



they may be clipped on, screwed on or attached in any other suitable manner. It has been found suitable to form the side walls of a polyurethane material which may be cast in-situ or formed separately and attached.

5 It is believed that the provision of flexible cast in-situ side walls on the self supporting but flexible sieve screen prevents material flowing over the edges of the screen without impairing the ability of the screen to vibrate and flex. It is believed that the freedom of the sieve screen to
10 not only vibrate relative to its supporting frame but to also flex makes an important contribution to the efficiency of the seive screen.

The sieve screen is preferably formed of a parallel array of wedge wires lying at right angles to the slope of
15 the screen. The wedge wires are preferably connected to an array of backing bars running longitudinally of the screen parallel to its fall line. A rapping bar is preferably connected to the backing bars parallel to the wedge wires. The screen may be planar or may curve along its length to
20 form a sieve bend.

In an alternative embodiment the sieve screen comprises a sheet of metal into which an array of slots has been etched or otherwise formed. In this embodiment the sheet may be inherently self supporting or it may be supported by backing
25 bars as described above

The sieve screen is preferably formed with slots having a width of from 10 microns to 4mm, most preferably the slots have a width of from 100 microns to 1mm.

The frame of the sieve screen deck is of conventional
30 construction subject to the fact that the screen is only connected along its end edges to the frame. The frame may be welded up from steel or formed in any other suitable manner. In one embodiment of the invention the frame may completely surround the sieve screen however in other
35 embodiments a plurality of sieve screens may be disposed in



side by side array with a single frame supporting all of them in which case each sieve screen is not individually surrounded by the frames.

The sieve screen is connected at or adjacent its end edges to the frame. One or both of the ends of the sieve screen are connected to the frame through resilient bushes or like means which allow a limited amount of vibrational movement between the sieve screen and the frame. In a typical situation the bushes might allow a maximum movement of the sieve screen relative to the frames of 2 or 3mm, as compared with a maximum amplitude of vibration of the sieve screen of 5mm. If desired one end of the sieve screen may be rigidly connected to the frame. If the sieve screen is curved it may be desirable to provide adjustable connection means on the frame to attach the sieve screen to the frame. This is due to the fact that the exact curvature varies slightly between screens of the same nominal dimensions.

In one embodiment of the invention the impact means may be mounted directly onto a rapping bar and be pivotally connected thereto. This arrangement allows greater control to be effected over the vibrations of the sieve screen which can substantially alter the sieving action of the sieve screen deck. The impact means preferably comprises a double acting pneumatic ram having a lug at one end which may be bolted to a corresponding double clevis on the rapping bar. The angle of impact of the piston within the pneumatic ram may be varied by loosening the bolt connecting the ram to the rapping bar and rotating the pneumatic ram about the axis of the bolt. If desired the magnitude of the rapping force may be varied by adding weights to the free end of the piston rod projecting from the pneumatic ram. While a ram as described is the preferred method of applying a rapping force to the sieve screens according to this invention other mechanisms such as electric motors carrying eccentric weights or solenoid rappers could be used.



In another embodiment of the invention vibration of the sieve screen is brought about by the oscillation of a vibration bar connected to the underside of the sieve screen across its free width intermediate its ends. The vibration bar is pivotally connected to one end of each one of an array of fingers which are rigidly connected at their other end to, and extend radially from, a rod which is caused to reciprocate about its longitudinal axis by the action of a motor rotating an eccentric which actuates a further arm extending radially from the rod.

Hereinafter given by way of example only is a preferred embodiment of the present invention described with reference to the accompanying drawing in which:-

Fig. 1 is a side elevational view of a sieve screen deck according to this invention; and

Fig. 2 is a rear elevational view of the sieve screen deck of Fig. 1.

As seen in Figs. 1 and 2 the sieve screen deck 100 comprises a curved sieve screen 101 mounted in a frame 102 and a vibrating means 103.

The frame 102 includes a distribution box 104 on its rear side, which serves to distribute an incoming slurry entering the sieve screen deck 100 through inlet 105 evenly across the width of the sieve screen 101, a pair of side frame members 106 and transverse frame members 107. The sieve screen 101 is formed of a large number of horizontal wedge bars connected to an array of backing bars 110. The screen 101 is bolted at its upper end to an upper transverse frame member 107 while at its lower end the screen is connected to a lower transverse frame member 107 through rubber bushes 108.

The sieve screen 101 is formed on either side with a flexible side wall 109 which is cast in-situ on the sieve screen 101 from a flexible polyurethane resin. These side walls serve to prevent material being passed across the sieve



screen 101 from flowing off the sides thereof intermediate its ends.

A vibration bar 111 is connected to the backing bars 110 across the full width of the sieve screen 101. A plurality
5 of U-shaped saddles 112 are connected to the rear surface of the vibration bar 111. Each saddle 112 is pivotally connected to the face end of one of a plurality of fingers 113 which are welded to extend radially from a rod 114. The rod 113 extends transversely across the sieve screen deck 100
10 and is supported at either end by a bearing 115 such that it may rotationally oscillate about its longitudinal axis. A further arm 116 extends radially from rod 115 and at its free end has a bush which surrounds an eccentric cam (not shown) driven by motor 117 which is mounted on frame 102.

15 In use a slurry or like feedstock is fed into the distribution bar 104 through inlet 105 and flows evenly onto sieve screen 101. As the slurry flows down the sieve screen 101 the sceeen 101 is caused to vibrate due to the motor driven eccentric causing the rod 114 to rotationally
20 oscillate which in turn causes the vibration bar 111 to vibrate. It has been found that the vibrations applied to the sieve screen 101 are transmitted throughout the screen due to the manner in which it is mounted and due to its semi-rigid, self supporting nature. The sieve screen deck
25 100 has been found to be substantially less susceptible to blinding than any of the conventional sieve screen decks described in the preamble to this specification.



1. A sieve screen deck, comprising a self supporting sieve screen having two opposed end edges, rapping or vibrating means to cause the sieve screen to vibrate, and a frame to which the sieve screen is connected, the sieve screen including sieving means defining a plurality of substantially parallel narrow slots and an array of backing bars connected to the sieving means which render the sieve screen self supporting, the sieve screen being connected to the frame only at or adjacent its two end edges and at least one of the connections being through a resilient bush or like means allowing limited vibrational movement between the sieve screen and the frames, a side wall being provided substantially along the full length on each side of the sieve screen between its end edges so as to prevent material which is passing across the sieve screen between the two end edges from flowing over an edge of the sieve screen intermediate the said end edges, each side wall being formed of a resilient synthetic plastics material or rubber such that they do not impede substantially the ability of the sieve screen to vibrate and flex under the influence of the rapping or vibrating means.

2. A sieve screen deck as claimed in claim 1 in which the sieve screen is formed of a parallel array of wedge wires lying at right angles to the slope of the screen.

3. A sieve screen deck as claimed in claim 1 or claim 2 in which both ends of the sieve screen are connected to the frame through a resilient bush or like means.

4. A sieve screen deck as claimed in any one of claims 1 to 3 in which the sieve screen is curved along its length.

5. A sieve screen deck as claimed in any one of the preceding claims in which the side walls are cast in-situ on the sieve screen deck.

6. A sieve screen deck as claimed in any one of claims 1 to 5 in which the rapping or vibrating means comprised a vibration bar connected to the underside of the sieve screen



across the full width thereof intermediate the end edges thereof, the vibration bar being pivotally connected to the free ends of a plurality of arms extending radially from a rod, means being provided to cause the rod to oscillate about
5 its longitudinal axis.



Fig. 1.

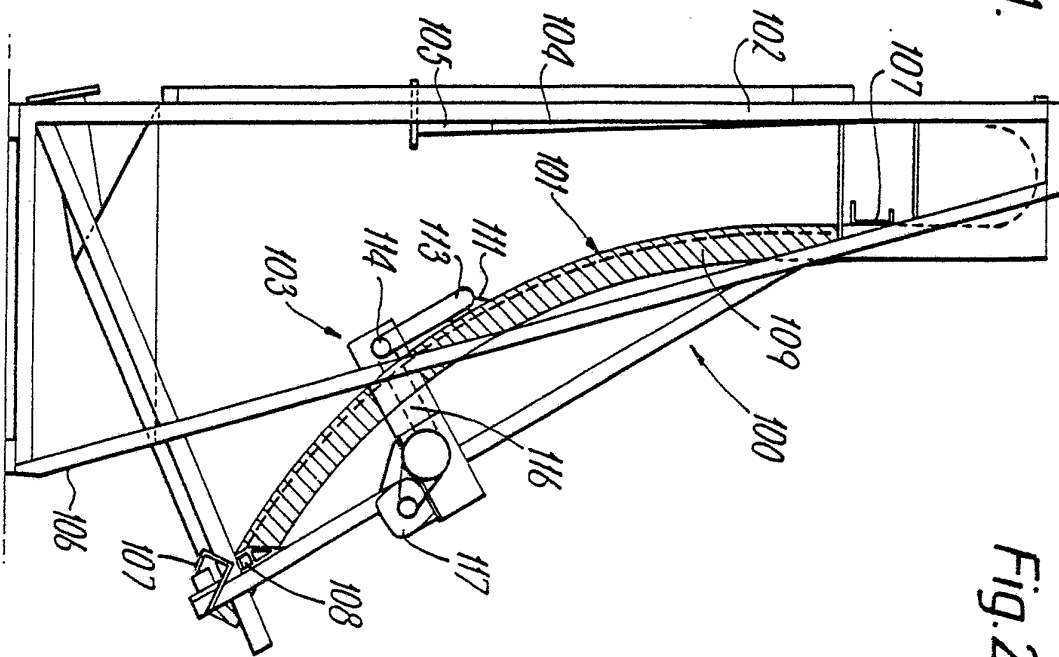
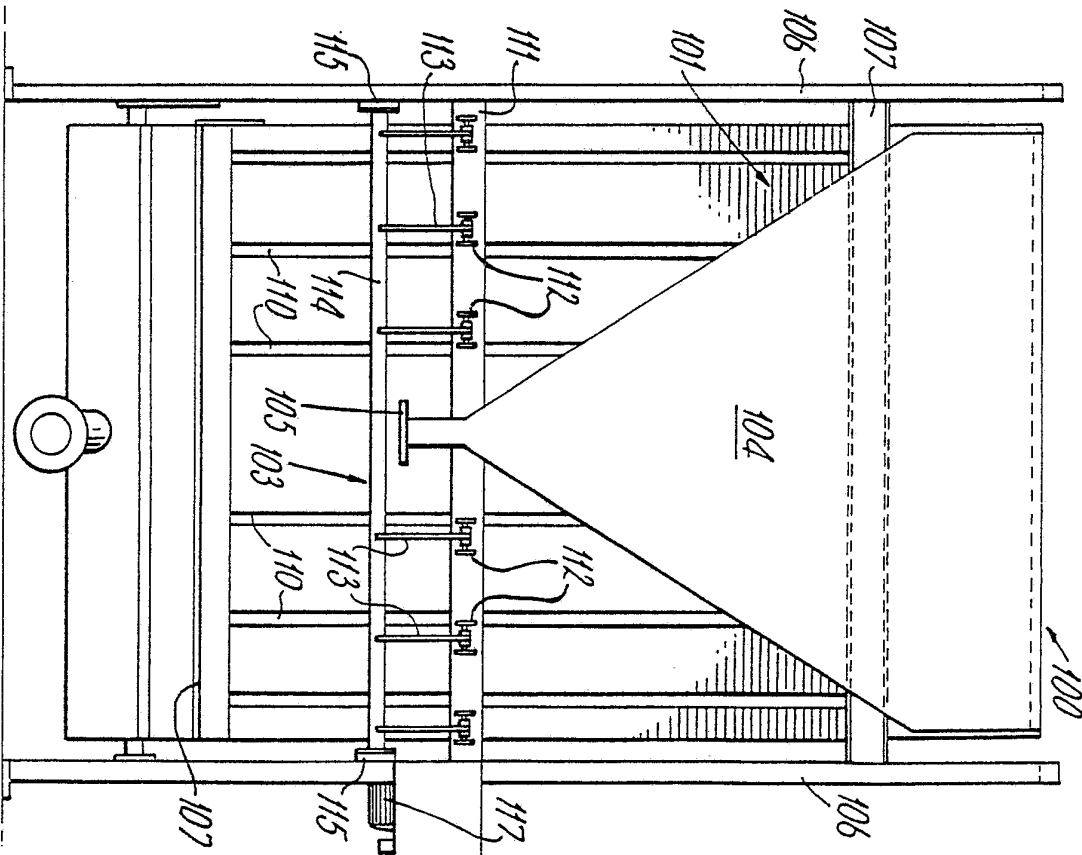


Fig. 2.



INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 83/00062

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ³ B07B1/34, 1/40		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC	B07B 1/34, 1/40	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁴		
AU: IPC as above, Australian Classification 11.33		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ⁵	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	AU, A, 61194/73 (THE BAUER BROS CO.) 10 April 1975 (10.04.1975)	(1-5)
X	AU, B, 28914/57 (222322) (THE W.S. TYLER COMPANY) 9 January 1958 (09.01.1958)	(1-3, 5-6)
X	FR, A, 2173063 (GOSUDARSTVENNY PROEKTNO-KONSTRUKTORSKY I EXPERIMENTALNY INSTITUT PO OBOGATITELNOMU OBORUDOVANIJU) 5 October 1973 (05.10.1973) (& DT, A, 2308307)	(1-3, 5-6)
X	DE, B, 1172101 (UEZ) 11 June 1964 (11.06.1964)	(1,3,5-6)
X	US, A, 1565883 (ADRIANSON AND BENGTON) 15 December 1925 (15.12.1925)	(1,3,5-6)
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>¹⁵ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ¹⁹	Date of Mailing of this International Search Report ²	
21 September 1983 (21.09.1983)	29 SEPTEMBER 1983 (29-09-83)	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
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