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(54) **SCREENING APPARATUS**

SIEBVORRICHTUNG

APPAREIL A TAMISER

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(73) Proprietor: **CRS (NI) Limited**
Carrickmore, Omagh Tyrone BT79 9HW (GB)

(72) Inventors:
- **TAYLOR, Joseph**
  Omagh Tyrone BT79 9HW (GB)
- **CONLON, Sean**
  Omagh Tyrone BT79 9HW (GB)

(74) Representative: **Waller, Stephen**
FRKelly
4 Mount Charles
Belfast, Northern Ireland BT7 1NZ (GB)

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Description

[0001] This invention relates to a screening apparatus for screening, grading and/or sorting granular and/or particulate material.

[0002] It is known to provide a screening apparatus comprising a frame and a flexible screen attached at intervals to parallel screen supports which are mechanically driven so that adjacent supports alternately approach each other and recede from each other in such a way that the screen between them is alternatively flexed and stretched to produce stationary waves.

[0003] Screening machines of this kind are known from US 4,600,506 and US 2,980,254. The formation of stationary waves by the alternate flexing and stretching of the screen at various positions applies very high accelerations to the material being screened, assisting in separating the material and allowing particles below a certain size to pass through the screen. This effect is particularly marked when the screen vibrates locally between a strongly convex shape and a moderately convex or substantially flat shape, that is to say between a slack or flexed state and a taut or stretched state. In this vibratory movement it is important to ensure that the openings in the screen repeatedly change shape, because this tends to prevent them from becoming clogged with the material being screened and thus helps to keep them clear. Typically the screen is mounted at an inclined angled so that material is conveyed down the screen under the action of gravity as it is agitated by the vibratory motion of the screen.

[0004] In the known screening machines this vibration of the flexible screen is obtained by mounting the screen on supports which are alternately mounted on two separate frame systems mounted to permit linear motion with respect to each other. At least one of the frame systems is typically provided with an oscillating or eccentrically mounted mass which is driven to impart a vibratory motion to the frame system. The frame systems are typically mounted on a base frame by means of resilient mounts so that the base frame is isolated from the vibratory motion of the frame systems. Such known systems generally rely on resonance to create the desired out of phase movement between the two separate frame systems to create vibratory movement of the screen. However, variations in the mass of the two frame systems due to the application of varying loads on the screen and due to variations in the material to be screened makes it difficult to provide the required magnitude of relative movement between the two frame systems for a wide range of materials and often results in insufficient movement of the screen to ensure reliable operation of the screening apparatus.

[0005] Other known screening machines are disclosed in US 4 188 288 upon which the preamble of claim 1 is based or US 3 378 142, DE 22 16 130, US 2008/011652 and US 2 980 254.

[0006] According to a first aspect of the present invention there is provided a screening apparatus as claimed in claim 1.

[0007] Preferred embodiments of the invention are defined in the dependent claims.

[0008] The frame members of the first support frame may be arranged to lie between the frame members of the second support frame.

[0009] Preferably said second end of the connecting rod is connected to the respective support frame by a connection means comprising an outer polygonal member provided on one of said second end of the connecting rod and said respective support frame and an inner polygonal member provided on the other of the second end of the connecting rod and the respective support frame, said inner polygonal member being located within the outer polygonal member, said inner member being angularly offset with respect to the outer member to define a plurality of chambers between the walls of the inner and outer members, one or more resilient members, such as elastomeric blocks, preferably rubber blocks, being provided in said plurality of chambers, wherein said resilient members are placed under compressive strain during pivotal movement of the connecting rod with respect to a respective one of the first and second support frames to either side of a substantially central neutral position.

[0010] Both of said first and second support frames are coupled to the base frame via respective connecting rod journalled on a respective eccentrically arranged bearing surface of the shaft for imparting reciprocating motion to said first and second support frames, said respective bearing surfaces being angularly offset with respect to each other, preferably by 180° such that said first and second transverse members are linearly reciprocated in opposing directions.

[0011] The first support frame is mounted on the base frame via resilient mounting means permitting linear oscillating motion of said first support frame with respect to said base frame. Preferably said resilient mounting means comprise elastomeric blocks mounted between the base frame and the first support frame such that the elastomeric blocks are exposed to shear strain during said linear oscillating motion of the first support frame with respect to the base frame.

[0012] Each connection means comprises an outer polygonal member and an inner polygonal member, said inner polygonal member being located within the outer polygonal member and member being angularly offset with respect to the outer member to define a plurality of chambers between the walls of the inner and outer members, one or more resilient members, such as elastomeric blocks, preferably rubber blocks, being provided in said plurality of chambers, wherein said resilient members are placed under compressive strain during pivotal movement of the respective hanger member with respect to the first and second support frames to either side of a substantially central neutral position.

[0013] Embodiment of the present invention will now

be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a side view of a screening apparatus in accordance with an embodiment of the present invention;
Figure 2 is a plan view of the screening apparatus of Figure 1;
Figure 3 is an end view of the screening apparatus of Figure 1;
Figure 4 is a detailed view of the region marked "D" in Figure 2;
Figure 5 is a further side view of the screening apparatus of Figure 1;
Figure 6 is a sectional view on line A-A of Figure 5;
Figure 7 is a detailed view of the region marked C on Figure 5;
Figure 8 is a detailed sectional view of the region marked B on Figure 6;
Figure 9 is a plan view of a screening apparatus in accordance with a further embodiment of the present invention;
Figure 10 is a sectional view of the screening apparatus of Figure 9 on line C-C;
Figure 11 is a detailed view of region F of Figure 10; and
Figure 12 is a detailed view of region E of Figure 10.

[0014] A screening apparatus in accordance with a first embodiment of the present invention is s illustrated in Figures 1 to 8 and comprises a base frame 10 upon which is mounted first and second screen support frames 12,14. The first support frame 12 comprises a pair of parallel longitudinally arranged side beams 16,18 bridged by a plurality of mutually spaced apart first screen support members 20 extending transversely to the normal conveying direction of the material to be screened. The second support frame 14 comprises a pair of parallel longitudinally arranged side beams 22,24 spaced to be located on either side of the first support frame 12, said side beams 22,24 being bridged by a plurality of mutually spaced apart second screen support members 26 extending transversely to the normal conveying direction of the material to be screened, wherein the first and second support frames 12,14 are mounted on the base frame 10 such that said plurality of first screen support members 20 are interposed in alternating relationship between said plurality of second screen support members 26.

[0015] A flexible screen 28 is attached to and carried by said plurality of first and second screen support members 20,26, said screen 28 having apertures of predetermined size to allow particles smaller than said predetermined size to pass therethough whereby particles larger than said predetermined size are retained on the screen for screening material placed on the screen.

[0016] A discharge shoot 30 is mounted on a downstream end of the first support frame 12 for receiving material from the screen 28.

[0017] The first support frame 12 is mounted on the base frame 10 via four rubber mounting bushes 32 respectively located adjacent each end of the each side beam 16,18 of the first support frame 12 whereby the first support frame 12 is permitted to reciprocate in a linear fashion with respect to the base frame 10, the bushes 32 being exposed to a shear strain during displacement of the first frame 12 with respect to the base frame 10 thus providing a biasing force towards a neutral central position of the first support frame 12 and absorbing the kinetic energy of the first support member 12 as it approaches its limits of movement with respect to the base frame 10.

[0018] The second support frame 14 is suspended from the first support frame 12 by means of four elongate hanger members 34 respectively located adjacent each end of the side beams 16,18,22,24 of the first and second support frames 12,14. The ends of the hanger members 34 are pivotally connected to the side beams 16,18,22,24 of the first and second support frames 12,14 by connection means permitting relative movement between the first and second support frames 12,14 in the normal conveying direction of material to be screened, parallel to the longitudinal side beams 16,18,22,24 of the support frames 12,14, such that the second support frame 14 effectively swings from the first support frame 12.

[0019] As shown in Figure 7, each connection means comprises concentrically mounted outer and inner member 36,38, each outer member being mounted on a side beam of a respective support frame 12,14 and each inner member being mounted on an end of a respective hanger member 34. Both the outer and inner members 36,38 of each connection means have a square cross section and said inner member 38 being located within the outer member 36 and member being angularly offset with respect to the outer member by 45° to define a plurality of chambers between the walls of the inner and outer members 36,38, a rubber block 40 being provided in each chamber, wherein said rubber blocks are placed under compressive strain during pivotal movement of the respective hanger member 34 with respect to the first and second support frames 12,14 to either side of a substantially central neutral position during reciprocating motion of the support frames 12,14 relative to one another. Such connection means are similar to those used in simple trailer and caravan suspension arms and provide a reliable, robust and hard wearing pivot function while providing a resilient biasing action and good shock absorption.

[0020] A drive motor 42 is mounted on the base frame 10, preferably at a first end of the base frame 10 comprising an upstream end of the screening device in relation to the normal direction of travel of the material to be screened. An elongate shaft 44 is rotatably mounted on said first end of the base frame 10 to extend transversely across the width of the base frame 10, a drive belt (not shown) extending between respective pulleys 46,48 respectively mounted on the drive motor 42 and shaft 44

whereby the drive motor 42 can be driven to rotate the shaft 44.

[0021] A pair of spaced apart eccentrically arranged bearing surfaces are provided at each end of the shaft 44 upon which are journalled respective connecting rods 50,52,54,56 via suitable bearings. An inner pair of connecting rods 52,54 are connected to respective side beams 16,18 of the first support frame 12 while an outer pair of connecting rods 50,56 are connected to respective side beams 22,24 of the second support frame 14. The bearing faces associated with the outer pair of connecting rods 50,56, are offset from those of the inner pair of connecting rods 52,54 other by 180° so that the first and second frame 12,14 are moved in reciprocating manner with respect to the base frame 10 in opposite directions as the shaft 44 is rotated, causing the first and second screen support members 20,26 to move relative to one another so that adjacent pairs of first and second screen support members 20,26 alternately approach each other and recede from each other in such a way that the screen 28 between them is alternatively flexed and stretched to produce stationary waves.

[0022] Each connecting rod 50,52,54,56 is connected to a respective one of the first and second support frames 12,14 by a resilient connection means 58 similar to those used to connect the hanger members 34 to the first and second support frames 12,14. Each connection means 58 includes concentrically mounted inner and outer members defining chamber therebetween containing rubber blocks whereby the rubber blocks are placed under compressive strain during pivotal movement of the respective connecting rod 50,52,54,56 with respect to the first and second support frames 12,14 to either side of a substantially central neutral position during rotation of the shaft 44.

[0023] The rubber bushes 32 act to absorb the forces applied to the base frame 10 by the first support frame 12 due to the acceleration and deceleration of the first support frame 12 under the action of the connecting rods 42,44 while the rubber blocks of the connection means of each hanger member absorb the forces applied to the first and second frame members by the connecting rods and bias the frame members towards a central neutral position.

[0024] In use, the base frame 10 is mounted at a suitable inclined angle with the discharge chute 30 lowermost and positioned so that material to be screened is delivered onto an upstream end of the screen 28. Rotation of the shaft 44 causes the connecting rods 50,52,54,56 to drive the first and second support frames 12,14 backwards and forwards with respect to one another, causing adjacent first and second screen support members 20,26 to alternately approach each other and recede from each other in such a way that the screen 28 between them is alternatively flexed and stretched to produce stationary waves.

[0025] The rubber bushes 32 and resilient connection means of the hanger members 34 and connecting rods 50,52,54,56 act as shock absorbers, reducing the vibrations transmitted to the base frame 10 and preventing excessive loading on the components of the screening apparatus.

[0026] A screening apparatus in accordance with a further embodiment of the present invention is illustrated in Figures 9 to 12. The screening apparatus is very similar to that of the first embodiment, comprising a base frame 10 upon which is mounted first and second screen support frames 12,14. The screening apparatus of the second embodiment differs from the first embodiment in that it includes two vertically stacked flexible screens comprising an upper screen 28A and a lower screen 28B. The upper screen 28A is provided with apertures of a first predetermined size to allow particles smaller than said first predetermined size to pass therethrough, while larger particles are retained on the upper screen 28A, while the lower screen 28B is provided with apertures of a second predetermined size, smaller than said first predetermined size, to allow particles smaller than said second predetermined size to pass therethrough. As such, the stacked upper and lower screens 28A,28B provided a three stage separating process, larger particles being retained on the upper screen 28A to be collected from an upper discharge chute 30A, intermediate particles being retained on the lower screen 28B to be collected from a lower discharge chute 30B and the remaining smallest particles being collected below the second screen 28B.

[0027] The first support frame 12 comprises a pair of parallel longitudinally arranged side beams 16,18 bridged by upper and lower rows of mutually spaced apart first screen support members 20A,20B extending transversely to the normal conveying direction of the material to be screened. The second support frame 14 comprises a pair of parallel longitudinally arranged side beams 22,24 spaced to be located on either side of the first support frame 12, said side beams 22,24 being bridged by upper and lower rows of mutually spaced apart second screen support members 26A,26B extending transversely to the normal conveying direction of the material to be screened, wherein the first and second support frames 12,14 are mounted on the base frame 10 such that each of the upper and lower rows of first screen support members 20A,20B are interposed in alternating relationship between respective upper and lower rows of second screen support members 26A,26B.

[0028] The upper screen 28A is attached to and carried by said upper rows of first and second screen support members 20A,28A while the lower screen 28B is attached to and carried by said lower rows of first and second screen support members 20B,28B.

[0029] The screening apparatus of the second embodiment operates in the same way as that of the first embodiment, an electric drive motor 42 being mounted on the base frame 10 coupled to the support frames 12,14 to impart reciprocating motion to the support frames 12,14 relative to one another to produce stationary waves on each of the upper and lower flexible screens 28A,28B.

[0030] The invention is not limited to the embodiment(s) described herein but can be amended or modified without departing from the scope of the present invention.

Claims

1. A screening apparatus comprising a base frame (10);
a first support frame (12) comprising a pair of longitudinally extending frame members (16,18) bridged by a plurality of mutually spaced apart first screen support members (20) extending transversely to the conveying direction of the material to be screened;
a second support frame (14) having a pair of longitudinally extending frame members (22,24) bridged by a plurality of mutually spaced apart second screen support members (26) extending transversely to the conveying direction of the material to be screened;
said first and second support frames (12,14) being arranged such that said plurality of first screen support members (20) are interposed in alternating relationship between said plurality of second screen support members (26);
a flexible screen (28) being carried by said plurality of first and second screen support members (20,26), said screen (28) having apertures of predetermined size to allow particles smaller than said predetermined size to pass therethough whereby particles larger than said predetermined size are retained on the screen (28) for screening material placed on the screen;
a drive means (42) being provided for imparting a substantially linear reciprocating motion to the first support frame (12) with respect to the second support frame (14) to effect relative movement between said first and second screen support members (20,26), whereby adjacent pairs of said first and second screen support members (20,26) alternately approach each other and recede from each other in such a way that the screen (28) between them is alternatively flexed and stretched to produce stationary waves, wherein the drive means (42) comprises a rotatably driven shaft (44) having eccentrically arranged bearing surfaces upon which are journalled respective first ends of a respective connecting rod (50,52,54,56), a second end of the respective connecting rod (50,52,54,56) being connected to a respective one of said first and second support frames (12,14) such that rotary motion of the shaft (44) is translated into reciprocating motion of said respective support frame (12,14), wherein both of said first and second support frames (12,14) are coupled to the base frame (10) via respective connecting rods (50,52,54,56) journalled on a respective eccentrically arranged bearing surface of the shaft (44) for imparting reciprocating motion to said first and second support frames (12,14), said respective bearing surfaces being angularly offset with respect to each other, such that said first and second transverse members (20,26) are linearly reciprocated in opposing directions, **characterised in that** the first support frame (12) is mounted on the base frame (10) via elastomeric blocks (32) mounted between the base frame (10) and the first support frame (12) such that the elastomeric blocks (32) are exposed to shear strain during linear oscillating motion of the first support frame (12) with respect to the base frame (10), and the second support frame (14) being suspended from the first support frame (12) via a plurality of elongate hanger members (34) to allow relative movement between the first and second support frames (12,14) in the normal conveying direction of the material to be screened on the flexible screen (28), said elongate hanger members (34) extending between the longitudinally extending frame members (16,18) of the first support frame (12) and the longitudinally extending frame members (22,24) of the second support frame (14), whereby the second support frame (14) is supported by the first support frame (12), wherein upper and lower ends of each elongate hanger member (34) are pivotally connected to respective first and second support frames (12,14) by connection means permitting pivotal movement about a respective axis extending transverse to the longitudinal frame members (16,18,22,24) of the first and second support frames (12,14) and wherein each connection means comprises an outer polygonal member (36) and an inner polygonal member (38), said inner polygonal member (38) being located within the outer polygonal member (36) and being angularly offset with respect to the outer member (36) to define a plurality of chambers between the walls of the inner and outer members (38,36), one or more elastomeric blocks (40) being provided in said plurality of chambers, wherein said elastomeric blocks (40) are placed under compressive strain during pivotal movement of the respective hanger member (34) with respect to the first and second support frames (12,14) to either side of a substantially central neutral position.

2. An apparatus as claimed in claim 1, wherein the frame members (16,18) of the first support frame (12) are arranged to lie between the frame members (22,24) of the second support frame (14).

3. An apparatus as claimed in claim 1 or claim 2, wherein the second end of each connecting rod (50,52,54,56) is connected to the respective one of said first and second support frames (12,14) by a connection means (58) comprising an outer polygonal member provided on one of said second end of the connecting rod (50,52,54,56) and said respective support frame (12,14) and an inner polygonal mem-

ber provided on the other of the second end of the connecting rod (50,52,54,56) and the respective support frame (12,14), said inner polygonal member being located within the outer polygonal member, said inner member being angularly offset with respect to the outer member to define a plurality of chambers between the walls of the inner and outer members, one or more resilient members being provided in said plurality of chambers, wherein said resilient members are placed under compressive strain during pivotal movement of the connecting rod with respect to a respective one of the first and second support frames to either side of a substantially central neutral position.

4. An apparatus as claimed in claim 3, wherein said resilient members comprise elastomeric blocks.

5. An apparatus as claimed in claim 4, wherein said resilient members comprise rubber blocks,

6. An apparatus as claimed in any preceding claim, wherein said respective bearing surfaces of the rotatably driven shaft (44) are angularly offset with respect to each other by 180° such that said first and second transverse members (20,26) are linearly reciprocated in opposing directions.

Patentansprüche

1. Siebvorrichtung, umfassend einen Grundrahmen (10);
einen ersten Stützrahmen (12), umfassend ein Paar sich in Längsrichtung erstreckender Rahmenglieder (16, 18), die von mehreren, sich quer zur Förderrichtung des zu siebenden Materials erstreckenden, voneinander beabstandeten ersten Siebstützgliedern (20) überbrückt werden;
einen zweiten Stützrahmen (14) mit einem Paar sich in Längsrichtung erstreckenden Rahmengliedern (22, 24), die von mehreren, sich quer zur Förderrichtung des zu siebenden Materials erstreckenden, voneinander beabstandeten zweiten Siebstützgliedern (26) überbrückt werden;
wobei der erste und der zweite Stützrahmen (12, 14) derart angeordnet sind, dass die mehreren ersten Siebstützglieder (20) in abwechselnder Beziehung zwischen den mehreren zweiten Siebstützgliedern (26) angeordnet sind;
ein biegsames Sieb (28), das von den mehreren ersten und zweiten Siebstützgliedern (20, 26) getragen wird, wobei das Sieb (28) Öffnungen vorherbestimmter Größe aufweist, um zuzulassen, dass Partikel, die kleiner sind als die vorherbestimmte Größe dadurch hindurch gelangen, wodurch Partikel, die größer sind als die vorherbestimmte Größe auf dem Sieb (28) zurückgehalten werden, um auf das Sieb platziertes Material zu sieben;
wobei ein Antriebsmittel (42) vorgesehen ist, um eine im Wesentlichen lineare Hin- und Herbewegung in Bezug auf den zweiten Stützrahmen (14) auf den ersten Stützrahmen (12) aufzubringen, um Relativbewegung zwischen den ersten und den zweiten Siebstützgliedern (20, 26) zu bewirken, wodurch sich benachbarte Paare der ersten und der zweiten Siebstützglieder (20, 26) auf derartige Weise abwechselnd einander nähern und voneinander entfernen, dass das Sieb (28) zwischen ihnen abwechselnd gebogen und gestreckt wird, um stehende Wellen zu erzeugen, wobei das Antriebsmittel (42) eine drehbar angetriebene Welle (44) umfasst, die exzentrisch angeordnete Sitzflächen aufweist, auf die jeweilige erste Enden einer jeweiligen Pleuelstange (50, 52, 54, 56) aufgesetzt sind, wobei ein zweites Ende der jeweiligen Pleuelstange (50, 52, 54, 56) mit einem jeweiligen von dem ersten und dem zweiten Stützrahmen (12, 14) verbunden ist, so dass Drehbewegung der Welle (44) in Hin- und Herbewegung des jeweiligen Stützrahmens (12, 14) umgewandelt wird, wobei der erste und der zweite Stützrahmen (12, 14) über jeweilige Pleuelstangen (50, 52, 54, 56), die auf eine jeweilige exzentrisch angeordnete Sitzfläche der Welle (44) aufgesetzt sind, an den Grundrahmen (10) gekoppelt sind, um Hin- und Herbewegung auf den ersten und den zweiten Stützrahmen (12, 14) aufzubringen, wobei die jeweiligen Sitzflächen winklig in Bezug aufeinander versetzt sind, so dass die ersten und die zweiten Querglieder (20, 26) in entgegengesetzten Richtungen linear hin- und herbewegt werden, **dadurch gekennzeichnet, dass** der erste Stützrahmen (12) über zwischen dem Grundrahmen (10) und dem ersten Stützrahmen (12) angebrachte Elastomerklötze (32) an dem Grundrahmen (10) angebracht ist, so dass die Elastomerklötze (32) während linearer Schwingbewegung des ersten Stützrahmens (12) in Bezug auf den Grundrahmen (10) einer Schubbeanspruchung ausgesetzt sind, und der zweite Stützrahmen (14) über mehrere langgestreckte Aufhängeglieder (34) an dem ersten Stützrahmen (12) aufgehängt ist, um die Relativbewegung zwischen dem ersten und dem zweiten Stützrahmen (12, 14) in der normalen Förderrichtung des zu siebenden Materials auf dem biegsamen Sieb (28) zuzulassen, wobei sich die langgestreckten Aufhängeglieder (34) zwischen den sich in Längsrichtung erstreckenden Rahmengliedern (16, 18) des ersten Stützrahmens (12) und den sich in Längsrichtung erstreckenden Rahmengliedern (22, 24) des zweiten Stützrahmens (14) erstrecken, wodurch der zweite Stützrahmen (14) von dem ersten Stützrahmen (12) gestützt wird, wobei das obere und das untere Ende jedes langgestreckten Aufhängeglieds (34) durch Verbindungsmittel, die die Schwenkbewegung um eine jeweilige, sich quer zu den Längsrahmengliedern (16, 18, 22,

24) des ersten und des zweiten Stützrahmens (12, 14) erstreckende Achse zulassen, schwenkbar mit dem ersten bzw. dem zweiten Stützrahmen (12, 14) verbunden sind, und wobei jedes Verbindungsmittel ein äußeres vieleckiges Glied (36) und ein inneres vieleckiges Glied (38) umfasst, wobei sich das innere vieleckige Glied (38) innerhalb von dem äußeren vieleckigen Glied (36) befindet und winklig in Bezug auf das äußere Glied (36) versetzt ist, um mehrere Kammern zwischen den Wänden des inneren und des äußeren Glieds (38, 36) zu definieren, wobei ein oder mehrere Elastomerklötze (40) in den mehreren Kammern vorgesehen sind, wobei die Elastomerklötze (40) während der Schwenkbewegung des jeweiligen Aufhängeglieds (34) in Bezug auf den ersten und den zweiten Stützrahmen (12, 14) zu beiden Seiten einer im Wesentlichen mittleren Neutralstellung unter Druckbeanspruchung gesetzt werden.

2. Vorrichtung nach Anspruch 1, wobei die Rahmenglieder (16, 18) des ersten Stützrahmens (12) dazu angeordnet sind, zwischen den Rahmengliedern (22, 24) des zweiten Stützrahmens (14) zu liegen.

3. Vorrichtung nach Anspruch 1 oder Anspruch 2, wobei das zweite Ende jeder Pleuelstange (50, 52, 54, 56) durch ein Verbindungsmittel (58), das ein an einem von dem zweiten Ende der Pleuelstange (50, 52, 54, 56) und dem jeweiligen Stützrahmen (12, 14) vorgesehenes äußeres vieleckiges Glied und ein an dem anderen des zweiten Endes der Pleuelstange (50, 52, 54, 56) und dem jeweiligen Stützrahmen (12, 14) vorgesehenes innerres vieleckiges Glied umfasst, mit dem ersten bzw. dem zweiten Stützrahmen (12, 14) verbunden ist, wobei sich das innere vieleckige Glied innerhalb von dem äußeren vieleckigen Glied befindet, wobei das innere Glied winklig in Bezug auf das äußere Glied versetzt ist, um mehrere Kammern zwischen den Wänden des inneren und des äußeren Glieds zu definieren, wobei ein oder mehrere elastische Glieder in den mehreren Kammern vorgesehen sind, wobei die elastischen Glieder während der Schwenkbewegung der Pleuelstange in Bezug auf einen jeweiligen von dem ersten und dem zweiten Stützrahmen zu beiden Seiten einer im Wesentlichen mittleren Neutralstellung unter Druckbeanspruchung gesetzt werden.

4. Vorrichtung nach Anspruch 3, wobei die elastischen Glieder Elastomerklötze umfassen.

5. Vorrichtung nach Anspruch 4, wobei die elastischen Glieder Gummiklötze umfassen.

6. Vorrichtung nach einem der vorangehenden Ansprüche, wobei die jeweiligen Sitzflächen der drehbar angetriebenen Welle (44) winklig in Bezug auf einander um 180° versetzt sind, so dass die ersten und die zweiten Querglieder (20, 26) in entgegengesetzten Richtungen linear hin- und herbewegt werden.

Revendications

1. Appareil de tamisage comportant un cadre de base (10) ;
un premier cadre de support (12) comportant une paire d'éléments de cadre (16, 18) s'étendant dans le sens longitudinal reliés par une pluralité de premiers éléments de support de tamis (20) espacés mutuellement les uns par rapport aux autres s'étendant dans le sens transversal par rapport à la direction de transport du matériau devant être tamisé ;
un second cadre de support (14) ayant une paire d'éléments de cadre s'étendant dans le sens longitudinal (22, 24) reliés par une pluralité de seconds éléments de support de tamis espacés mutuellement les uns par rapport aux autres (26) s'étendant dans le sens transversal par rapport à la direction de transport du matériau devant être tamisé ;
lesdits premier et second cadres de support (12, 14) étant agencés de telle sorte que les éléments de support de tamis de ladite pluralité de premiers éléments de support de tamis (20) sont intercalés en une relation alternée entre ladite pluralité de seconds éléments de support de tamis (26) ;
un tamis flexible (28) supporté par ladite pluralité de premiers et seconds éléments de support de tamis (20, 26), ledit tamis (28) ayant des ouvertures de taille prédéterminée pour permettre à des particules de taille inférieure à ladite taille prédéterminée de passer à travers celles-ci, ce par quoi des particules de taille supérieure à ladite taille prédéterminée sont retenues sur le tamis (28) à des fins de tamisage du matériau placé sur le tamis ;
un moyen d'entraînement (42) mis en oeuvre pour communiquer un mouvement de va-et-vient sensiblement linéaire au premier cadre de support (12) par rapport au second cadre de support (14) pour effectuer un mouvement relatif entre lesdits premiers et seconds éléments de support de tamis (20, 26), ce par quoi des paires adjacentes desdits premiers et seconds éléments de support de tamis (20, 26) se rapprochent les uns par rapport aux autres et s'éloignent les uns par rapport aux autres en alternance de telle manière que le tamis (28) entre eux est fléchi et étiré en alternance pour produire des ondes stationnaires, dans lequel le moyen d'entraînement (42) comporte un arbre entraîné par rotation (44) ayant des surfaces d'appui agencées de manière excentrée sur lesquelles sont tourillonnées des premières extrémités respectives d'une bielle respective (50, 52, 54, 56), une seconde extrémité de la bielle respective (50, 52, 54, 56) étant raccordée à un cadre respectif desdits premier et second ca-

dres de support (12, 14) de telle sorte que le mouvement de rotation de l'arbre (44) se traduit en un mouvement de va-et-vient dudit cadre de support respectif (12, 14), dans lequel les deux cadres parmi lesdits premier et second cadres de support (12, 14) sont accouplés au cadre de base (10) par le biais de bielles respectives (50, 52, 54, 56) tourillonnées sur une surface d'appui respective agencée de manière excentrée de l'arbre (44) pour communiquer un mouvement de va-et-vient auxdits premier et second cadres de support (12, 14), lesdites surfaces d'appui respectives étant décalées de manière angulaire les unes par rapport aux autres, de telle manière que lesdits premiers et seconds éléments transversaux (20, 26) décrivent un mouvement de va-et-vient de manière linéaire dans des directions opposées, **caractérisé en ce que** le premier cadre de support (12) est monté sur le cadre de base (10) par le biais de blocs élastomères (32) montés entre le cadre de base (10) et le premier cadre de support (12) de telle sorte que les blocs élastomères (32) sont exposés à un effort de cisaillement lors d'un mouvement oscillant linéaire du premier cadre de support (12) par rapport au cadre de base (10), et le second cadre de support (14) étant suspendu depuis le premier cadre de support (12) par le biais d'une pluralité d'éléments de suspension allongés (34) pour permettre un mouvement relatif entre les premier et second cadres de support (12, 14) dans la direction normale de transport du matériau devant être tamisé sur le tamis flexible (28), lesdits éléments de suspension allongés (34) s'étendant entre les éléments de cadre s'étendant dans le sens longitudinal (16, 18) du premier cadre de support (12) et les éléments de cadre s'étendant dans le sens longitudinal (22, 24) du second cadre de support (14), ce par quoi le second cadre de support (14) est supporté par le premier cadre de support (12), dans lequel des extrémités supérieure et inférieure de chaque élément de suspension allongé (34) sont raccordées de manière pivotante aux premier et second cadres de support respectifs (12, 14) par un moyen de raccordement permettant un mouvement de pivotement autour d'un axe respectif s'étendant de manière transversale par rapport aux éléments de cadre longitudinaux (16, 18, 22, 24) des premier et second cadres de support (12, 14) et dans lequel chaque moyen de raccordement comporte un élément polygonal extérieur (36) et un élément polygonal intérieur (38), ledit élément polygonal intérieur (38) étant situé à l'intérieur de l'élément polygonal extérieur (36) et étant décalé de manière angulaire par rapport à l'élément extérieur (36) pour définir une pluralité de chambres entre les parois des éléments intérieur et extérieur (38, 36), un ou plusieurs blocs élastomères (40) étant mis en oeuvre dans ladite pluralité de chambres, dans lequel lesdits blocs élastomères (40) sont soumis à un effort de compression au cours du mouvement de pivotement de l'élément de suspension respectif (34) par rapport aux premier et second cadres de support (12, 14) de chaque côté d'une position neutre sensiblement centrale.

2. Appareil selon la revendication 1, dans lequel les éléments de cadre (16, 18) du premier cadre de support (12) sont agencés pour reposer entre les éléments de cadre (22, 24) du second cadre de support (14).

3. Appareil selon la revendication 1 ou la revendication 2, dans lequel la seconde extrémité de chaque bielle (50, 52, 54, 56) est raccordée au cadre respectif parmi lesdits premier et second cadres de support (12, 14) par un moyen de raccordement (58) comportant un élément polygonal extérieur mis en oeuvre sur l'un parmi ladite seconde extrémité de la bielle (50, 52, 54, 56) et ledit cadre de support respectif (12, 14) et un élément polygonal intérieur mis en oeuvre sur l'autre parmi la seconde extrémité de la bielle (50, 52, 54, 56) et le cadre de support respectif (12, 14), ledit élément polygonal intérieur étant situé à l'intérieur de l'élément polygonal extérieur, ledit élément intérieur étant décalé de manière angulaire par rapport à l'élément extérieur pour définir une pluralité de chambres entre les parois des éléments intérieur et extérieur, un ou plusieurs éléments élastiques étant mis en oeuvre dans ladite pluralité de chambres, dans lequel lesdits éléments élastiques sont soumis à un effort de compression au cours du mouvement de pivotement de la bielle par rapport à un cadre respectif parmi les premier et second cadres de support de chaque côté d'une position neutre sensiblement centrale.

4. Appareil selon la revendication 3, dans lequel lesdits éléments élastiques comportent des blocs élastomères.

5. Appareil selon la revendication 4, dans lequel lesdits éléments élastiques comportent des blocs en caoutchouc.

6. Appareil selon l'une quelconque des revendications précédentes, dans lequel lesdites surfaces d'appui respectives de l'arbre entraîné par rotation (44) sont décalées de manière angulaire les unes par rapport aux autres de 180° de telle sorte que lesdits premiers et seconds éléments transversaux (20, 26) décrivent un mouvement de va-et-vient de manière linéaire dans des directions opposées.

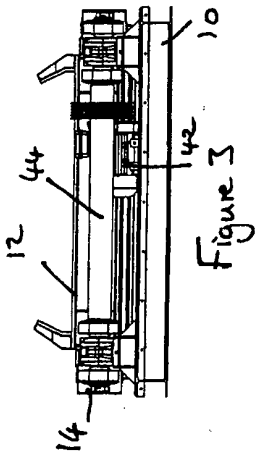


Figure 3

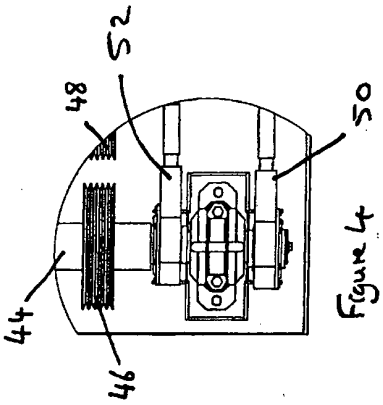


Figure 4

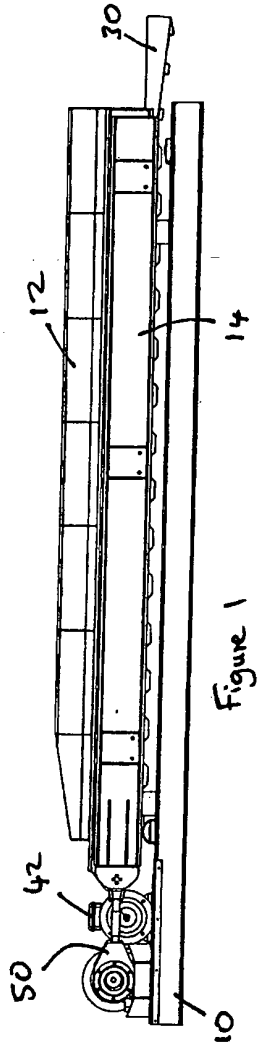


Figure 1

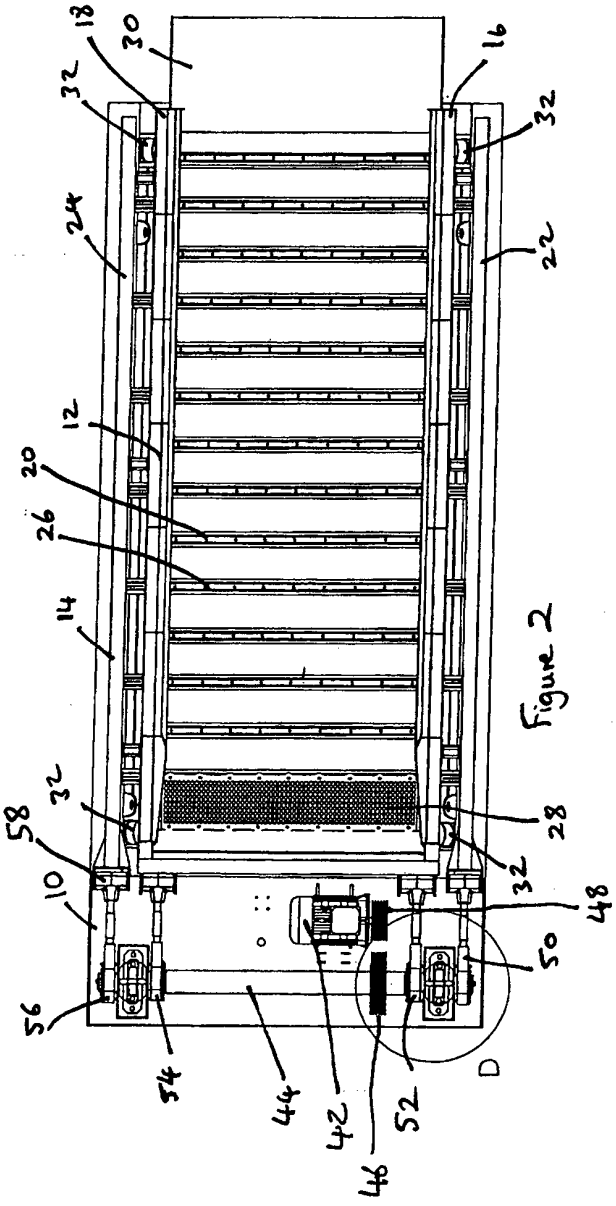


Figure 2

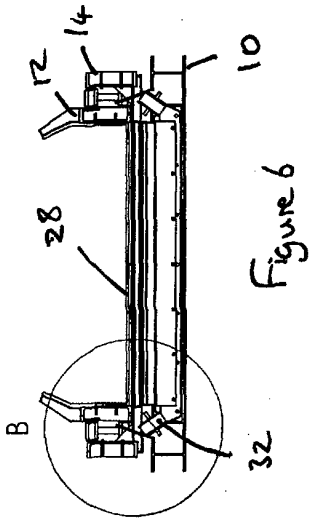


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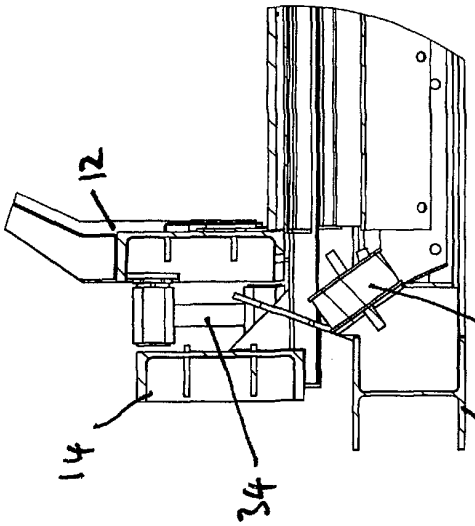


Figure 8

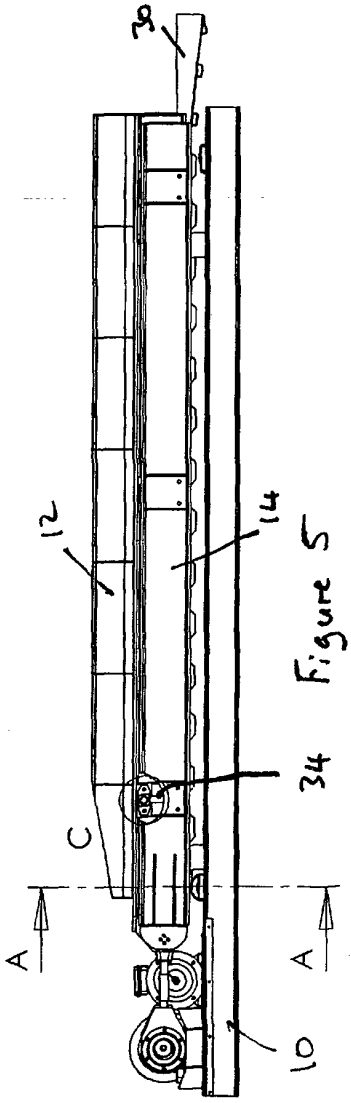


Figure 5

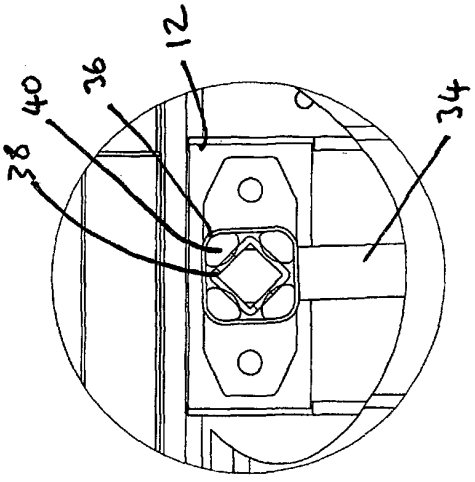


Figure 7

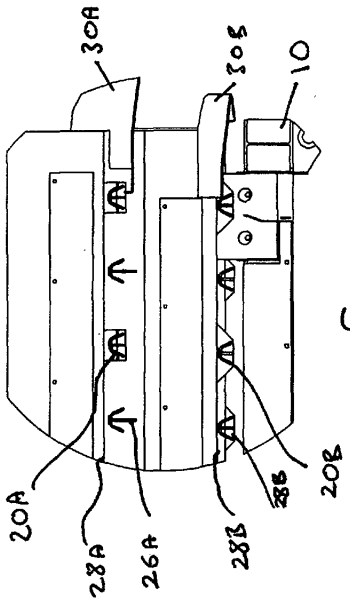


Figure 12

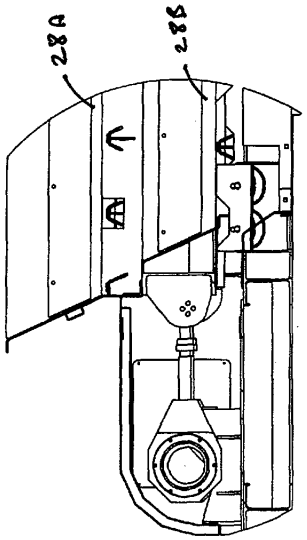


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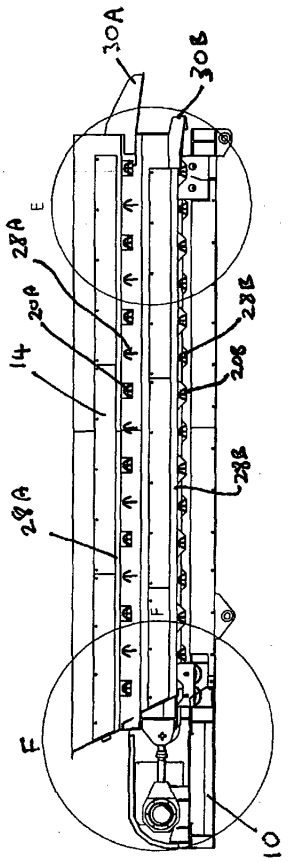


Figure 10

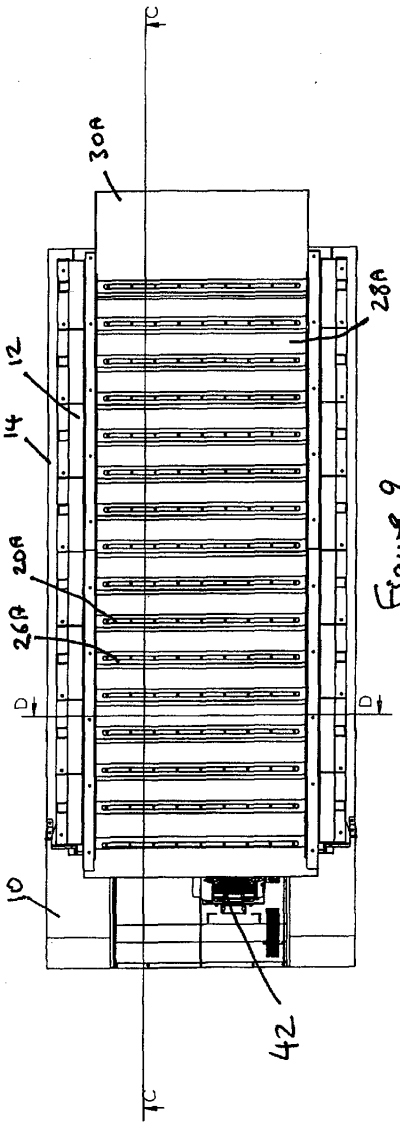


Figure 9

REFERENCES CITED IN THE DESCRIPTION

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