Jan. 29, 1957 W. R. WALTERS 2,779,470

SHAKER SCREEN CONSTRUCTIONS

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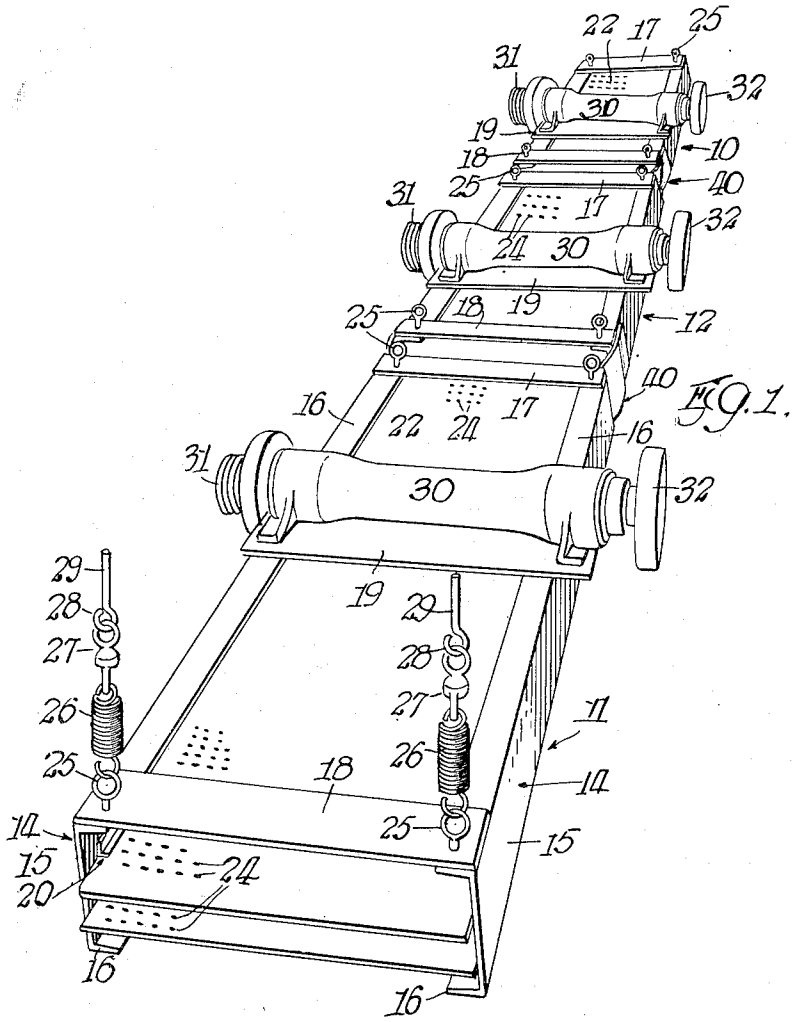


FIG. 1.

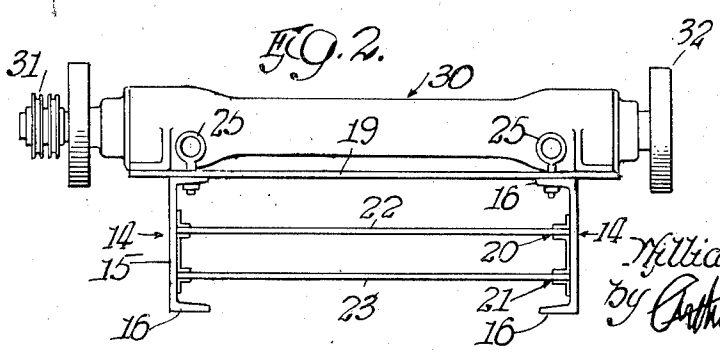


FIG. 2.

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FIG. 3.

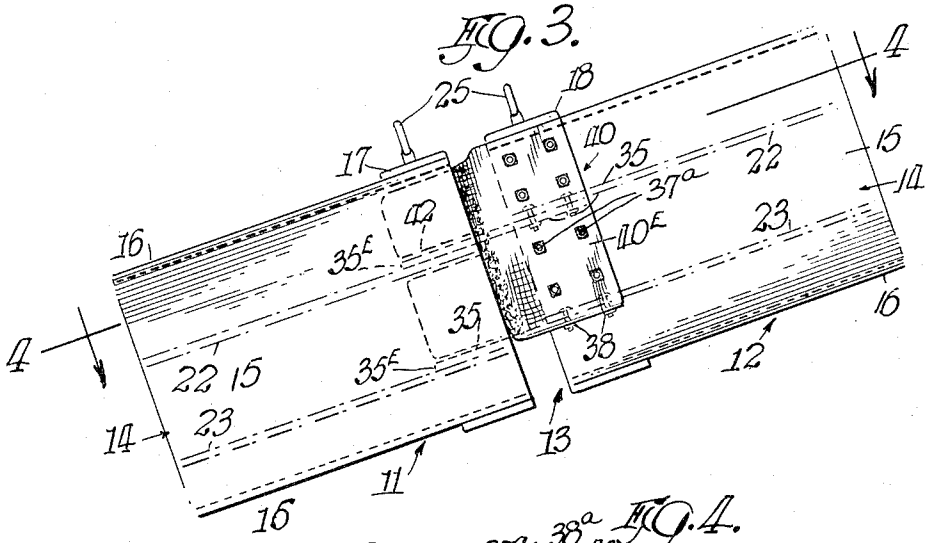


FIG. 4.

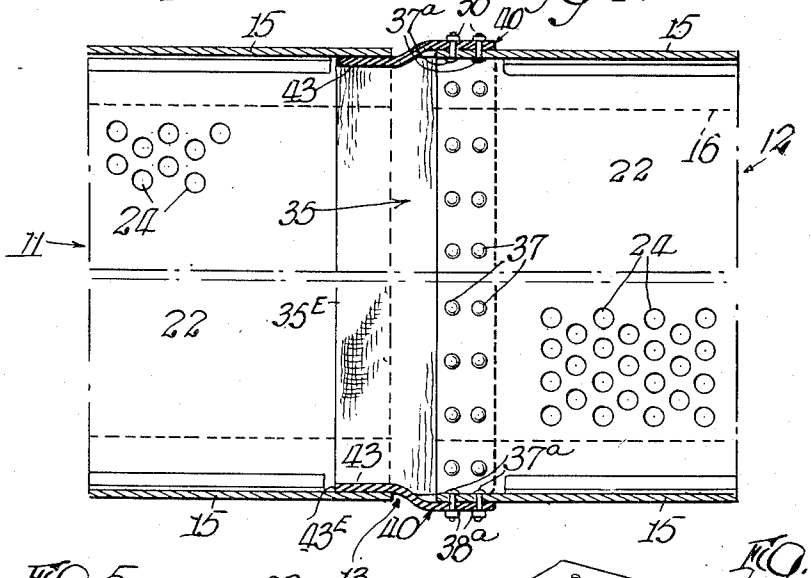


FIG. 5.

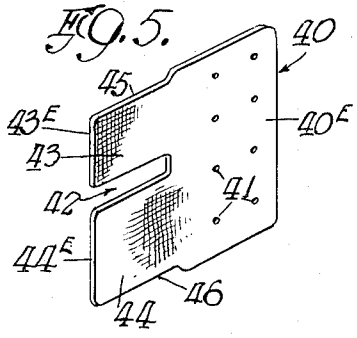
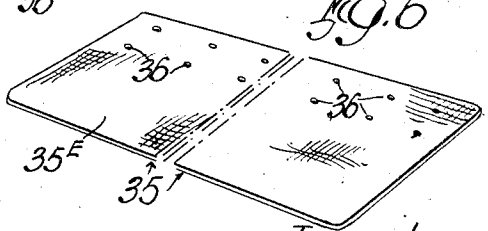


FIG. 6



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SHAKER SCREEN CONSTRUCTIONS

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14 Claims. (Cl. 209—313)

This invention relates to improvements in shaker screen constructions and it consists of the matters herein illustrated and described and more particularly pointed out in the appended claims.

This invention is more particularly concerned with the construction of an inclined shaker screen embodying a plurality of independently vibratable end to end arranged screen sections along which material moves from the higher inlet end toward the lower discharge end under the action of vibration imparted to the screen.

One of the objects of the present invention is to provide a simple and efficient articulated connection between the adjacent ends of the sections of the screen so that a continuity for the screen as a whole is provided while permitting independent vibration of the various sections.

Another object of the invention is to provide an articulated connection of this kind in which the parts are so positioned and are so disposed with reference to the inner surfaces of the screen sections as to avoid edges facing opposite the direction of movement of the material flow stream thereon so that said connections present no obstruction to such movement.

Again it is an object of the invention to provide an improved articulated sectional screen construction which shall have better wearing qualities resulting in longer useful life.

Also it is an object of the invetnion to provide an articulated connection for the adjacent ends of the screen sections which may be produced from readily obtainable materials, so that when worn out by the abrasives in the material being handled it may be readily replaced by new material with a minimum of labor and expense.

The above mentioned objects of the invention along with others together with the advantages thereof will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a perspective view of sectional shaker screen embodying the preferred form of the invention.

Fig. 2 is an end view of the improved screen.

Fig. 3 is a view in side elevation of adjacent ends of two sections of the screen.

Fig. 4 is a horizontal sectional view through the parts of the two sections appearing in Fig. 3 as taken on the line 4—4 thereof.

Figs. 5 and 6 are perspective views of certain flexible sealing members employed between the ends of the adjacent screen sections and which will be more fully described later, a central portion of the member in Fig. 6 being omitted.

Referring now in detail to that embodiment of the invention illustrated in the drawing, the improved construction is shown employed with a shaker screen composed of three counterpart upper and lower end sections 10 and 11 and an intermediate section 12 arranged end to end, with a space 13 (see Fig. 3) separating adjacent sections. As the various sections are counterparts as before mentioned a description of the structure of one of the same applies to the others.

Each screen section is longer than it is wide and deep, comprises a pair of side frame members 14—14 in the form of channels, with their webs 15 arranged vertically and with the flanges 16 arranged horizontally, the webs 15 of one member 14 facing those of the other member 14. The members 14 of each section are operatively secured together by means of end and intermediate bars 17—18 and 19 respectively and which appear best in Fig. 1.

The web 15 of each member 14 is provided on its inner face with vertically spaced inwardly opening grooves 20 and 21 in which the lateral margins of upper and lower screens 22 and 23 are engaged for support, the said margins being detachably fixed in the grooves in any suitable manner. Each screen is in the form of a metallic sheet having openings 24 therethrough. The openings in the upper plate are larger than those in the lower plate so that said openings "pass" different sizes of pieces in the material in the flow stream on the conveyor.

The various sections of the screen are herein illustrated as being adapted for support from above and when so supported an eye bolt 25 is fixed in each of the two ends of the end bars 17 and 18 of each section. These eyes have attached thereto the bottom ends of suspension springs 26, the top end of which engages in the bottom end of a swivel 27. The top end of said swivel is engaged with the bottom end hook 28 of a vertically arranged hanger bar 29.

On the intermediate bar 19 of each section is supported a mechanically driven vibrator 30 having a driving pulley 31 at one end and a fly wheel 32 at the other end, both mounted on a through shaft journalled in the casing of the vibrator and carrying off center parts in the casing. When its shaft is being mechanically driven through its pulley rapid vibration of the screen structure results.

The spaces 13 between the facing ends of adjacent sections are operatively connected for articulation so as to provide continuity for the upper surfaces of the adjacent screen end portions and over which surface the material being screened and graded may travel as a flow stream.

To bridge the space or gap between the facing ends of the screens of adjacent sections there is provided upper and lower bridging members 35, one of which best appears in Fig. 6. Since they are alike a description of one will suffice for both. The member 35 is preferably made of a flexible sheet of such thickness as to afford support for the flow stream of material as the same passes thereover from the lower end of one screen section to the upper end of the next lower section. This material may comprise a rectangular piece of rubber belting of a width corresponding to the inside width of the channel and of a length greater than the length of the spaces 13. Since the structure connecting sections 11 and 12 is the same as that connecting 12 and 10, a description of one connection will suffice for both. For illustrative purposes the connection between sections 11 and 12 will be explained. One end of the bridging member is provided with openings 36 that register with openings provided therefor in the lower end of the adjacent screen.

To apply member 35, say to span the space between the lower end portion of the upper screen 22 of section 12 and the upper screen 22 of section 11, the end of member 35 having the openings 36 therein is placed underneath the lower end portion of the screen 22 of section 12 and secured thereto by bolts 37 and nuts 38. Since the upper screen 22 of the section 12 is disposed in an inclined plane which is at a higher level than is the inclined plane in which the upper screen 22 of section 11 is located, the end 35E of the member 35 overlies the top surface of the upper screen 22 of section 11 as best appears in Fig. 3. A like member 35 is secured in like man-

ner to span the space 13 between the lower screens 23—23 of sections 12 and 11, to which it is to be attached.

To seal the sides of the spaces 13 upwardly of the plane of the lower screen plates 23 at the facing ends of adjacent sections, I provide two side sealing members of material of the same kind as that of pieces 35. One of said side sealing pieces best appears in Fig. 5, being therein indicated as a whole by the numeral 40. Since the pieces used on opposite sides are alike a description of one will suffice for both.

The member 40 is provided at one end 40E with a plurality of holes 41 which match with holes provided for that purpose in a portion of the web 15 of the lower end of the side member 14, above the level of the lower screen 23, to which member 40 is to be attached.

The sealing member 40 is provided in the end opposite 40E with a longitudinally extending slot or recess 42 and which divides the same into upper and lower portions 43 and 44 respectively. Longitudinal parts of the top and bottom margins of said portions are removed as at 45 and 46 respectively, as best appears in Fig. 5.

In applying the member 40, the end 40E having the openings 41 therein is applied to the outer face of the web 15 of the lower end of the section 12 with the said openings in register with the openings in said web. Thereafter bolts 37*a* are inserted through said openings from the inside of said webs, nuts 38*a* being applied to the bolts to engage the outside of the web.

Assume now members 40 have been applied to both sides and that sections 12 and 11 are in the same plane as shown in Fig. 3, but are separated a distance greater than shown so that the edges 43E and 44E of parts 43 and 44 are spaced upwardly of the uppermost end of section 11. Sections 11 and 12 are then moved relatively to the position shown in Fig. 3. As the parts 43 and 44 approach the upper end of section 11 they are pressed inwardly and will then straddle the upper screen plate 22 of section 11, the slot 42 accommodating the said screen plate. Since there is a like member 40 on each side it is obvious the two members 40 effectively seal the side openings 13 above the lower screen 23.

The bolts 37—37*a* that secure parts 35 and 40 in place are preferably of the so-called "button head" type and while round are relatively flat in depth.

With the arrangement of the parts described, it is obvious that as the members 35 and 40 are secured at one end to the outer faces of the associated parts at the lower end of one secreen section and overlie but are free or unattached to the upper end of the next lower screen section, the free edges of said members facing in the direction of the material flow on said shaker screen. Thus, in the relative movements of the adjacent ends of the screen sections as they are vibrated the free ends of said members 35 and 40 can move relatively to those parts of the screen section that they overlie or overlap.

As the edges of said overlying parts of the members 35 and 40 face in the direction of the material flow stream, the material flows easily over said edges and not against them. Hence, wear is reduced, the material as it flows does not tend to lift the edges upwardly, and the edges do not interpose opposition to the flow of the material stream.

While the improved construction may be applied to screen sections used for various purposes it is particularly advantageous as applied to screen sections located on a railroad work car.

I claim as my invention:

1. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members, foraminous screening means extending between and supported by said side frame members of both sections, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions positioned at least in part on the outer sides of one end of the frame members of the first section and at least in part on and in engagement with the inner sides of the adjacent end of the frame members of the second section and further positioned at least in part on the lower side of the screening means of the first section and at least in part upon the upper side of the screening means of the second section.

2. The arrangement set forth in claim 1 in which means are provided for removably affixing the flexible material in place.

3. The arrangement set forth in claim 1 in which affixing means are provided so that sliding movement may obtain between the parts of at least one of the conveyor sections and the adjacent portions of the flexible material.

4. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members, foraminous screening means extending between and supported by said side frame members of both sections, means closing the space between said ends of adjacent sections and embodying therein a plurality of pieces of flexible material bridging said space, certain of said pieces being positioned on the outer sides of one end of the frame members of the first section and on and in engagement with the inner sides of the adjacent end of the frame members of the second section and at least one piece positioned in part on the lower side of the screening means of the first section and upon the upper side of the screening means of the second section.

5. The arrangement set forth in claim 4 in which means are provided for removably affixing the flexible material in place.

6. The arrangement set forth in claim 4 in which affixing means are provided so that sliding movement may obtain between the parts of at least one of the conveyor sections and the adjacent portions of the flexible material.

7. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members, foraminous screening means extending between and supported by said side frame members of both sections, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions secured to the outer surfaces of one end of the frame members of the first section and engaged with the inner surfaces of the adjacent end of the frame members of the second section and further secured to the lower side of the screening means of the first section and engaging the upper surface of the screening means of the second section.

8. The arrangement set forth in claim 7 in which the means for securing the flexible material to the first section are removable.

9. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members and a plurality of foraminous screening means spaced apart vertically and extending between and supported by said side frame members of both sections, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions positioned at least in part on the outer sides of one end of the frame members of the first section and at least in part upon the inner side of the adjacent end

of the frame members of the second section and further secured to the lower side of the screening means of the first section and engaging the upper surface of the screening means of the second section, said side portions of the flexible material which is disposed on the inner sides of the frame members having slots there to slidably accommodate the upper of said screening means.

10. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members and a plurality of foraminous screening means spaced apart vertically and extending between and supported by said side frame members of both sections, means closing the space between said ends of adjacent sections and embodying therein a plurality of pieces of flexible material bridging said space, certain of said pieces being positioned in part on the outer sides of one end of the frame members of the first section and on the inner sides of the adjacent end of the frame members of the second section and further secured to the lower side of the screening means of the first section and engaging upon the upper sides of the screening means of the second section, said side portions of the flexible material which is disposed on the inners of the frame members having slots therein slidably to accommodate the upper of said screening means.

11. A vibratile shaker conveyor screening structure embodying therein at least first and second conveyor sections arranged in longitudinal alignment with a space between one end of the first section and the adjacent end of the second section, each section including longitudinally extending rigid side frame members, foraminous screening means extending between and supporting by said side frame members of both sections, the screening means of the first section being disposed in a plane higher than that of the second section, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions positioned at least in part on the outer sides of one end of the frame members of the first section and at least in part on and in engagement with the inner sides of the adjacent end of the frame members of the second section and further positioned at least in part on the lower side of the screening means of the first section and at least in part upon the upper side of the screening means of the second section.

12. The arrangement set forth in claim 11 in which the sections as a whole are inclined to the horizontal.

13. A vibratile shaker conveyor embodying therein a plurality of conveyor sections arranged in longitudinally

inclined succession, with a space between the lower end of one section and the higher end of the next succeeding adjacent section, each section including longitudinally extending rigid side frame members and foraminous screening means between and supported by said side frame members, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions engaged with the outer surface of the lower end of the frame members of one section and engaged with the inner surface of the higher end of the frame members of said next succeeding adjacent section and further engaged with the lower surface of the screening means of said one section and with the upper surface of the screening means of said next succeeding section, means for securing the material of said space closing means to parts of the frame members and to part of the screening means of said sections, and means supported by each screen section for imparting vibratory movement thereto.

14. A vibratile shaker conveyor embodying therein a plurality of conveyor sections arranged in longitudinally inclined succession, with a space between the lower end of one section and the higher end of the next succeeding adjacent section, each section including longitudinally extending rigid side frame members and foraminous screening means between and supported by said side frame members, means closing the space between said ends of adjacent sections and embodying therein flexible material bridging said space and including side portions engaged with the outer surface of the lower end of the frame members of one section and engaged with the inner surface of the higher end of the frame members of said next succeeding adjacent section and further engaged with the lower surface of the screening means of said one section and with the upper surface of the screening means of said next succeeding section, means for securing the material of said space closing means to parts of said frame members and to parts of said screening means of said sections, means connecting the ends of the frame members of each section together and including means for detachable connection with yielding supporting means.

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