United States Patent

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[54] **TENSIONED SCREEN WITH SEAL**
10 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **209/404,** 209/319
[51] **Int. Cl.** **B07b 1/48**
[50] **Field of Search** 209/319, 403, 404, 408; 49/465, 466, 475, 483; 140/108; 160/378; 277/205

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ABSTRACT: A seal and screen combination including a hook strip along opposite edges of the screen. The screen is held taut between opposed support walls by T-shaped bolts extending through aligned apertures in the hook strip and screen and through the adjacent wall. Disposed between the hook strip edges of the screens and the walls are seal strips having concave surfaces facing the walls and including a portion for sealingly engaging the walls.

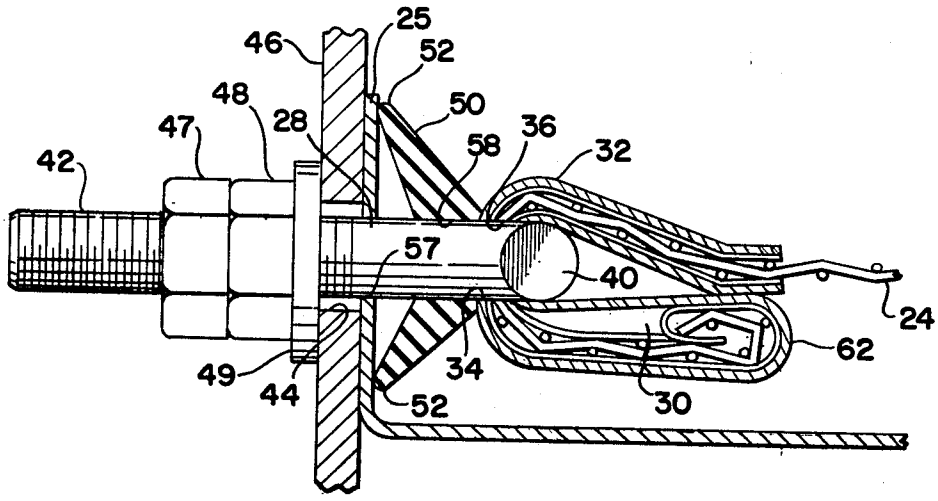
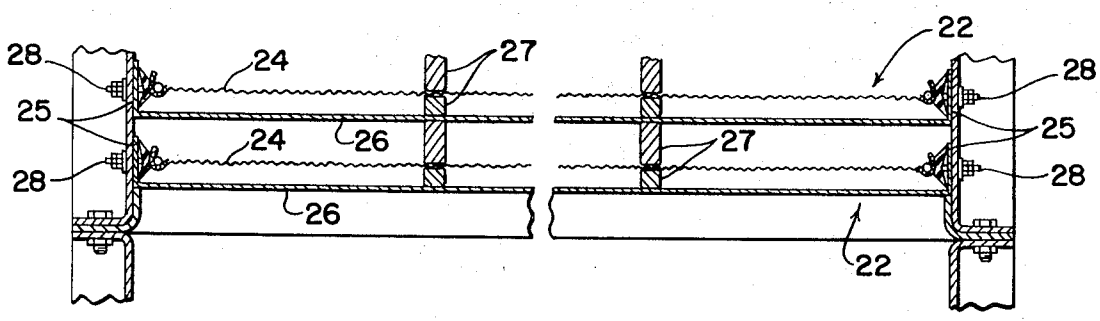


FIG. 2



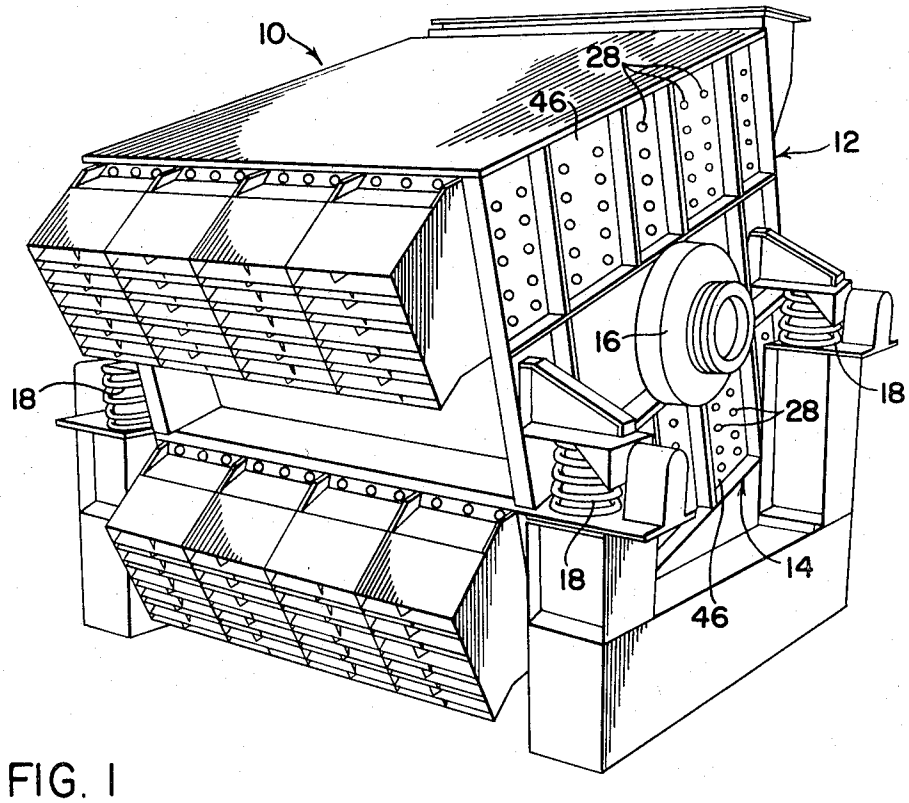


FIG. 1

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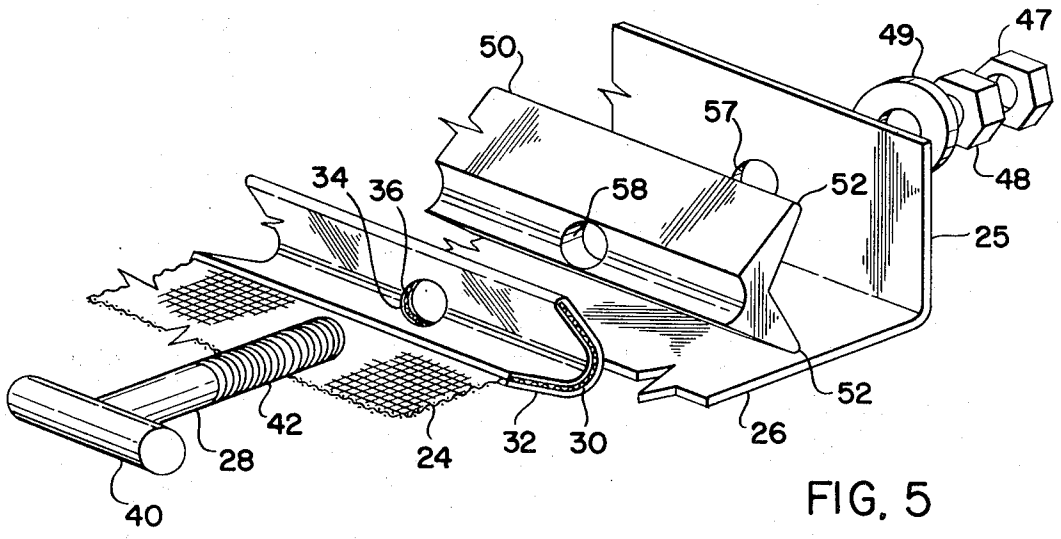


FIG. 5

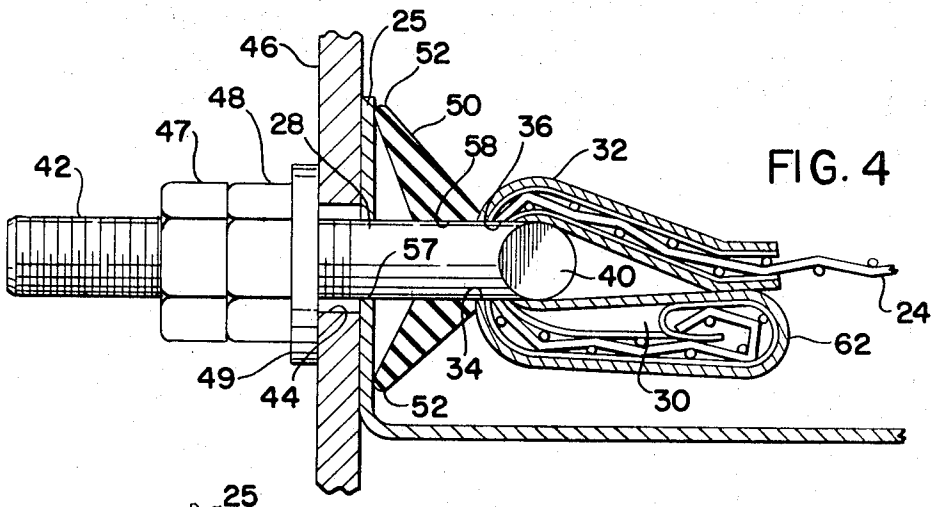


FIG. 4

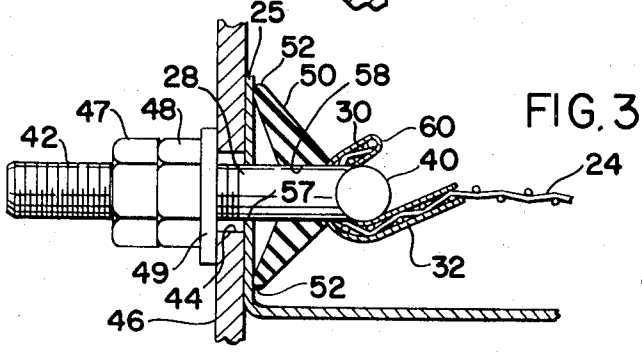


FIG. 3

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TENSIONED SCREEN WITH SEAL

BACKGROUND OF THE INVENTION

Machines for separating grain from fines are old in the art. A typical combination includes a plurality of decks of superposed screens and a separate grain inlet for each screen at the entrance end thereof. Each deck includes a porous screen and a nonporous pan and disposed at the discharge end of the screen and pan is a deflecting baffle to deflect the separated grain to one side and the foreign matter to the other side so that each deck will discharge its separated materials into separate vertically extending chutes.

Unfortunately, a plurality of problems have existed in the art which have made the separation of the materials difficult and the prior art devices inadequate for the desired degree of clean grain required by modern standards. One of the problems is that the sealing devices along the edges of the screens have been inadequate to keep the grain from flowing into the lower pan section. The instant invention has overcome this problem by providing a resilient seal of unique design for engaging the walls along the edges of the screen.

BRIEF DESCRIPTION OF THE INVENTION

The invention is two-fold, it includes a seal strip and a combination of the seal strip, a screen and tensioning means for the screen.

The seal includes an elongated strip of elastomeric material for abutting a substrate. The strip is substantially V-shaped in cross section and the projecting legs of the seal taper uniformly to greater widths as they converge toward the base of the V. The extremities of the V-shape serve as plural sealing surfaces. A plurality of apertures extend perpendicularly through the apex of the V to receive bolts which hold the seal strip in operative position.

The combination of the screen, tensioning means for the screen and the seals at each side edge of the screen includes the seal as described above. The combination is assembled in the following arrangement; a screen for separating grain is held taut between two walls of a vibrating apparatus; hook strips are formed as longitudinal sockets to receive the two side edges of the screen adjacent the walls; the hook strip is then folded to provide a clamping action on the screen edges; extending through the hook strip and the screen are a plurality of aligned apertures which in turn are aligned with the apertures in the seal strips and openings through the walls; and threaded T-bolts extend through the aligned apertures. Conventional nuts are threaded onto the shank of the T-bolts which extend through the walls. To make the screen more taut, one need only tighten the nuts on the various T-bolts against the walls.

It is an object of this invention to provide a seal having a concave surface and including two external sealing surfaces thereon.

It is another object of this invention to provide a seal having a concave surface facing the sidewall of a vibrating apparatus and located between a screen and the wall.

It is another object of this invention to provide a seal with an aperture therethrough for receiving an anchoring means such as a T-bolt.

It is another object of this invention to provide in combination a screen suspended between two walls, a V-shaped seal between the walls and the screen and means for tensioning the screen.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic view of a box and shaker apparatus in which the invention is incorporated;

FIG. 2 is a fragmentary elevational view showing the incorporation of the screen member in the plurality of decks in the box;

FIG. 3 is a cross-sectional elevational view in section of the tensioning means for the screen;

FIG. 4 is a modification of FIG. 3; and

FIG. 5 is an exploded view of the seating tensioning combination comprising the invention.

PREFERRED EMBODIMENT

In grain-separating apparatus a multideck separator incorporating this invention is indicated generally at **10** and includes two boxes or housings **12** and **14**. An eccentrically mounted shaker or vibrator means **16** is disposed between the housings and a plurality of resilient mountings **18** at the corners support the vibrating apparatus.

Disposed within each housing are a plurality of screening decks indicated generally at **22**. Each deck includes a screen **24** and a pan **26** with upturned edges **25**. Wooden spacer bars **27** extending the length of the screen are provided as needed. The means for vibrating **16** causes any grain deposited on the screen to be agitated whereby small grains, foreign matter and pieces of broken grain will pass through the pores of the screen and fall on the pan **26**.

As best seen in FIGS. **3**, **4** and **5**, the screen is held in tension between the sidewalls of the vibrating apparatus by a plurality of T-bolts **28**. While T-bolts are described and preferred, L-shaped bolts may be used satisfactorily. The edge of the screen **24** is confined in a pocket **30** formed by a hook strip element **32**. After the screen is received in the pocket **30**, the hook strip is folded to crimp the screen **24** therein.

Aligned apertures **34** and **36** in the hook strip and screen, respectively circumscribe the T-bolt **28** which includes a cross piece **40** and a threaded shank portion **42**. The shank extends through the screen and hook strip apertures **34** and **36**, respectively, and an aperture **44** in the sidewall **46**. Disposed in threaded engagement with the shank portion of the T-bolt adjacent the outer surface of the wall **46** are a tensioning nut **48**, a lock nut **47** and a washer **49**.

Because it is undesirable to have the whole grains on the upper portion of the screen passed to the pan **26** during the vibrating and shaking operation, an elastomeric seal strip **50** is provided at each edge of the screen. The seal strip is substantially V-shaped in cross section with the legs of the V tapering uniformly to greater widths as they converge inwardly toward the apex of the V and at their outer ends they terminate in rounded surfaces **52**. The rounded surfaces allow for easier translation along the wall **46** when the screen is tightened or loosened.

The drawings show the outer extremities of the seal **50** engaging the upturned edges **25** of the pan. This is the preferred embodiment. But, not withstanding the unitary nature of the preferred embodiment, the upturned edges **25** may be eliminated if desired and the seal **50** may directly contact the vertically extending sidewall or substrate **46** of the housing **12**. Such elastomeric strips **50** could also be provided between the pan **26** and the substrate **46**. In the embodiments illustrated, an aperture **57** through the upturned edge **25** is aligned with the hook strip and wall apertures.

Extending through the V-shaped seal **50** and perpendicular to apex of the V is an aperture **58** which circumscribes the T-bolt. The legs of the seal strip straddle the wall opening **44** and in this manner help to prevent any outside foreign matter from being incorporated in the cleaned grain or separated fines on the pan from escaping the boxes **12** and **14**. The improved benefits of the sealing apparatus are easily seen by observing FIGS. **3**, **4** and **5**. The V-shape of the seal allows for adjustment of the T-bolt for greater tensioning or for loosening, while the extreme ends of the V-shaped seal strips still engage and seal against the walls. The easy flexing of the elastomeric material allows for less stringent manufacturing tolerances as to the width of the screen and the crimping and folding of the hook strip.

FIG. **4** shows a modification of the shape of the hook strip. The preference as to shape usually depends upon the particular material to be separated. In FIG. **3** the edge **60** of the hook strip extends above the crosspiece **40** of the T-shaped bolt, while in FIG. **4** the fold of the hook strip material places the edge **62** below the crosspiece.

For ease of description the principles of the invention have been set forth in two embodiments. It is not intended that the illustrated embodiments nor the terminology employed to describe them be limiting. One having ordinary skill in the art will be aware of several modifications within the spirit of this invention. Rather it is intended that any restrictions on the invention be limited only by the appended claims.

We claim:

1. In a vibrating screening apparatus having a sidewall, screening means, a hook strip along one edge of said screening means, a screen tensioning means supporting and tensioning said screening means and connected to said wall and an elastomeric seal means for sealing between said screening means and the sidewall held in sealing engagement by said tensioning means, the seal comprising an elongated member having a concave surface facing the sidewall.

2. The screening apparatus of claim 1 wherein the screen tensioning means comprises a T-shaped bolt and a nut, the shank piece of the T extending toward the wall and engaging the nut.

3. The screening apparatus of claim 2 wherein the crosspiece of the T extends substantially parallel with the hook strip.

4. The screening apparatus of claim 2 wherein the seal in cross section is substantially V-shaped.

5. The screening apparatus of claim 2 wherein the seal member sealingly engages the sidewall in line contact both above and below the bolt.

6. The screening apparatus of claim 5 wherein the portions of the seal member engaging the sidewall comprise portions of two rounded convex surfaces.

7. The screening apparatus of claim 5 including a pan below the screening means, said pan including an upturned edge extending between the seal member and the sidewall.

8. The screening apparatus of claim 1 wherein the seal member sealingly engages the sidewall in line contact.

9. The screening apparatus of claim 8 wherein the portion of the seal member engaging the sidewall comprises a portion of a rounded convex surface.

10. The screening apparatus of claim 1 including a pan below the screening means, said pan including an upturned edge extending between the seal member and the sidewall.