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SCREEN BOX WITH SEALING MEANS

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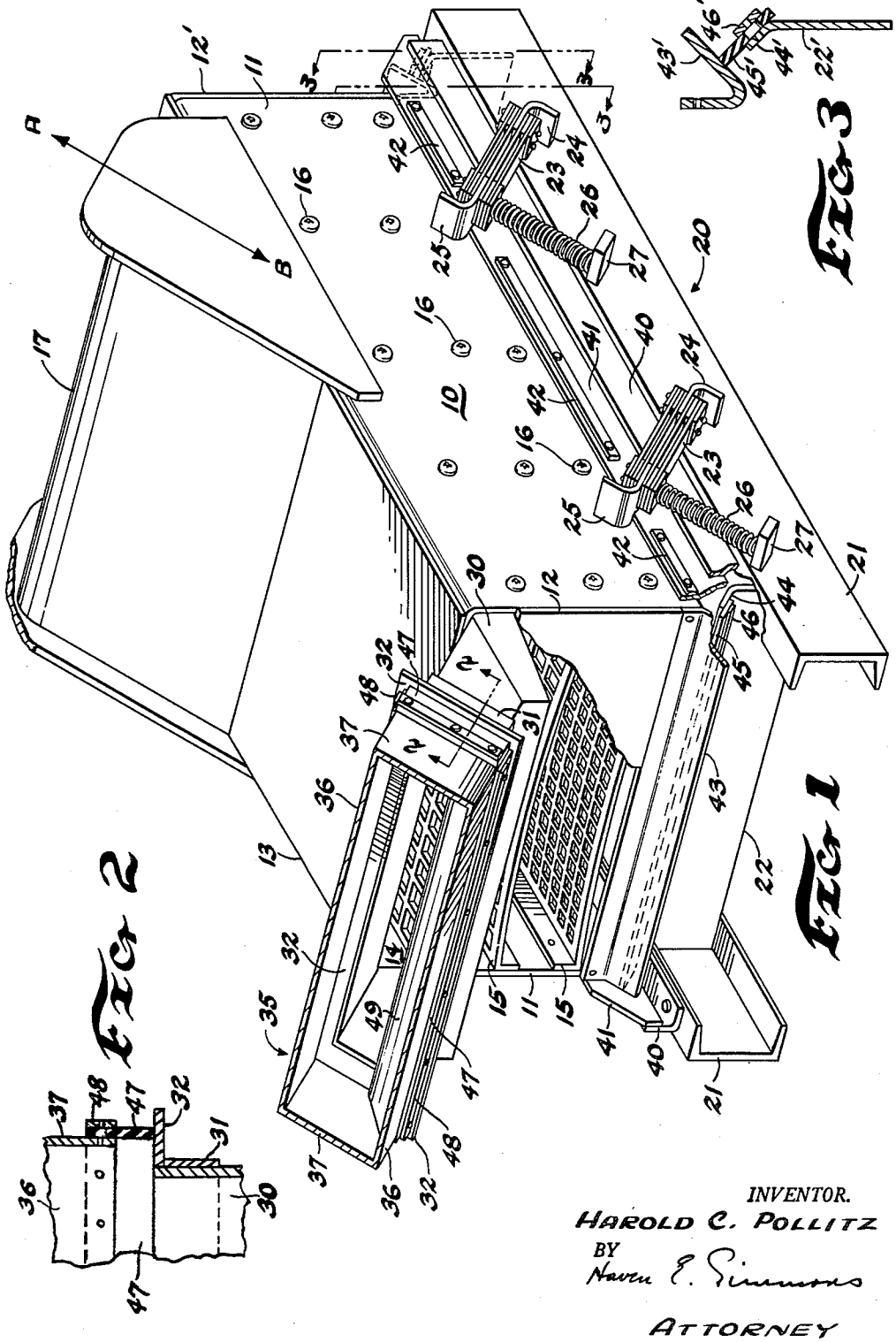


FIG 1

FIG 2

FIG 3

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SCREEN BOX WITH SEALING MEANS

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The present invention pertains to an improvement in material grading screens, particularly of the type having a screen assembly to which is imparted a predetermined vibratory motion relative to a stationary base.

Material grading screens with which the present invention is concerned are well known and have been in long use, a typical one, for instance, being shown in U.S. Patent 2,312,477 to Pollitz. Essentially, these employ one or more screen decks enclosed within a box-like structure having an open bottom. A suitable ingress, through which material from a feed source, such as a chute or elevator, may be passed to the screens, is located in the upper portion of the box above the screen decks. The screen box in turn is mounted above a base frame, having enclosed sides and an open top and bottom, in such a manner, usually by suitably positioned springs, that the entire screen box may be given a predetermined vibratory motion in a direction which will cause the material introduced therein to pass down through one or more screen decks, depending upon the number of sizes into which the material is to be graded, and into the base frame. The vibratory motion of the screen box is generally achieved by mounting suitable vibratory means thereon which act in a straight line in a plane substantially through the center of gravity of the box and in accord with the mounting of the box to the base frame. The underside of the base frame, into which the graded material falls, usually opens into a bin which is provided with one or more dividers, depending upon the number of sizes into which the material is graded, which cooperate with the screen decks to segregate the different sized materials.

Since the screen box vibrates relative to the base frame and feed chute or elevator there must be sufficient space between these respective parts to permit such motion. This space, however, permits a great deal of dust to escape during operation of the unit. Furthermore, when used in connection with a bituminous plant, heat from the aggregate can also escape through this space. In order to contain such dust and heat it has been the practice in the past to surround the entire screen box and vibratory assembly with a stationary metal housing secured to the base frame and into which the stationary feed chute or elevator opens at the appropriate place to cooperate with the feed opening in the screen box. These housings are necessarily heavy, bulky and expensive. The present invention eliminates the need for such a housing by utilizing resilient strips of flashing or similar means positioned between corresponding adjacent edges or lips of the stationary and vibratory portions of the screen assembly to maintain a constant seal therebetween during relative motion between the portions. The screen box, therefore, is not only a container for the screen decks but at the same time becomes a dust and heat-tight housing therefor.

Accordingly, the primary object of the present invention is the provision of a screen box assembly of the kind described wherein the screen box itself serves both as a support for the screen decks and as a dust and heat-tight housing therefor.

An additional object of the present invention is to provide a screen box assembly of the kind described with heat and dust-tight sealing means between the box and base frame but which at the same time permit movement of the box relative to the base frame.

A further object of the present invention is to provide a screen box assembly of the kind described having resilient means positioned between corresponding adjacent parts of the stationary and vibratory portions of the assembly in such a manner that a constant, sealing contact is maintained therebetween during oscillation of the portions relative to each other.

Another object of the present invention is the provision of a screen box assembly of the kind described having resilient flashing extending about either the stationary or vibratory portion of the assembly and constantly contacting the adjacent, corresponding portions of either the vibratory or stationary portion, respectively, of the assembly to maintain a heat and dust seal therebetween during movement of the portions relative to each other.

Other and further objects, features and advantages will be apparent from the description of the preferred form of the invention, read in conjunction with the drawings, in which:

FIGURE 1 is a perspective view of a material grading screen assembly, with certain portions cut away, incorporating the present invention;

FIGURE 2 is a section view taken along the line 2—2 of FIGURE 1; and

FIGURE 3 is a section view taken between the lines 3—3 of FIGURE 1.

In order to facilitate an understanding of the invention, reference is made to the embodiments thereof shown in the accompanying drawings and detailed descriptive language is employed. It will, nevertheless, be understood that no limitation of the invention is thereby intended and that various changes and alterations are contemplated such as would ordinarily occur to one skilled in the art to which the invention relates.

Referring now to the drawings, the screen box assembly, generally designated at **10**, is rectangular in shape and comprises essentially side walls **11**, end walls **12**, **12'** and cover **13**. End wall **12** stops short of cover **13** to provide an upper opening **14** into box **10** for the introduction of material to be graded and the bottom is left open for discharge of the graded material. Several vertically spaced screen decks **15** of the usual kind and mesh but of varying length are secured horizontally in box **10** between side walls **11** by bolts **16** or similar means with an end of each screen deck abutting end wall **12**. A vibratory inducing mechanism, indicated generally by **17**, is provided and is of the type which exerts a short, straight line reciprocating motion in a single plane. Such mechanisms are well known, a particularly suitable one being shown and described in the aforesaid U.S. Patent 2,312,477 to Pollitz. Vibrator **17** is positioned atop cover **13** adjacent end wall **12'** so that the plane of its vibrating motion is perpendicular to side walls **11**,

through the center of gravity of box 10 and along straight line A—B in FIGURE 1 parallel to side walls 11.

Screen box 10, in turn, is mounted spaced above base frame 20 comprising a pair of parallel channels 21, positioned on their sides beneath the lower edges of side walls 11 to extend beyond end walls 12 and 12', and cross braces 22, 22' secured tightly therebetween, the former being positioned just below end wall 12 and the latter just outwardly from end wall 12'. The mounts themselves comprise an equal number of relatively flexible stacks of spaced, leaf springs 23 attached to the outer face of each channel 21 by brackets 24 and extending obliquely upwardly therefrom in planes at right angles to the plane of vibration of box 10, their other ends in turn being secured to side walls 11 by brackets 25. Supporting coil springs 26 are interposed between the upper ends of springs 22 and seats 27 affixed to channels 21, the longitudinal axis of each spring 26 being parallel to the plane of vibratory motion of box 10. Since the reciprocating movement of vibration 17 is short, the movement of box 10 relative to base frame 20 is, despite springs 23, substantially mono-planar and straight line.

Material to be graded is fed into box 10 from spreader pan 30 of generally rectangular shape and attached to box 10 to occupy opening 14 so that pan 30 empties upon the uppermost of screen decks 15. The outer mouth of pan 30 is surrounded with flanges 31 having outer faces 32 all in a plane parallel to the plane of vibration of box 10. A conventional type of feed source, such as an elevator or chute, of which only a portion is shown in the drawings and generally indicated at 35, is employed with box 10 and has the lower ends of its opposite pairs of walls 36 and 37 adapted to be spaced evenly from faces 32 in order to permit vibration of box 10 and pan 30 relative thereto.

To prevent dust and heat from escaping from box 10 through the spaces between it and base frame 20, channels 21 are provided with vertically extending flanges 40 fixed to the tops thereof parallel to side walls 11 and spaced outwardly therefrom just enough so that the outer faces of strips of resilient flashing 41, adjustably secured by straps 42 along the lower edges of side walls 11, may extend downwardly from the latter to overlap and bear resiliently against the inner vertical faces of flanges 40. Both the latter and flashing 41 are carried well beyond end walls 12 and 12' on the extensions of channels 21, as shown in FIGURE 1. Abutting the lower edges of end walls 12 and 12' and between the extensions of flashing 41 are secured lips 43, 43' extending outwardly therefrom to form sealing surfaces parallel to the plane of vibration of box 10. Cross braces 22, 22' are carried up above channels 21 between the extensions of flashing 41 and turned to form lips 44, 44' in a plane perpendicular to the plane of vibration of box 10, the upper edges thereof being spaced below the horizontal mid-lines of lips 43, 43'. To the upper edges of lips 44, 44' additional strips of resilient flashing 45, 45' are adjustably secured thereto by straps 46, 46' and extend upwardly to abut the lower surfaces of lips 43, 43'. Flashing 45, 45' also extends laterally sufficiently so that the ends thereof slidingly abut the inner faces of the corresponding extended portions of flashing 41. It will, of course, be appreciated that box 10 must be mounted sufficiently above base frame 20 to permit the former to oscillate without it or flashing 41 striking channels 21. Likewise, flanges 40 and flashing 41 must overlap sufficiently so that contact between the two is not lost when box 10 is vibrating, and lips 43, 43' must extend outwardly enough from end walls 12 and 12' so that contact is not lost with flashing 45, 45'.

In a similar manner, the space between spreader pan 30 and feed chute 35 is also sealed to prevent escape of dust and heat. The lower edges of each pair of opposite walls 36 and 37 are provided with similar strips of resilient flashing 47, adjustably secured thereto by straps 48, which abut each other end-wise and also abut and bear upon faces 32 of flanges 31. A baffle 49 extending between walls 37, is attached to the interior of the lower one of walls 36 and carried into the mouth of pan 30 over the joint between the latter and feed chute 35 so that the seal between the two is not disturbed by stone rushing into pan 30.

The operation of grading screens is well known and to a large extent the operation of the sealing means between screen box assembly 10, base frame 20 and feed chute 35 is apparent from the foregoing description. It is necessary, therefore, to point out only the essential structure by which sealing is achieved. First, the seal between flanges 40 and flashing 41 is maintained by constant contact between the overlapping surfaces of the two during reciprocating motion of screen box assembly 10. This constant contact occurs owing to the fact that the motion of the assembly is substantially both in a plane perpendicular to side walls 11 (and thus flashing 41) and also along line A—B in that plane to which the overlapping surfaces of flanges 40 and flashing 41 are parallel. Likewise, since lips 43, 43' are parallel to the same plane and lips 44, 44' and flashing 45, 45' are perpendicular thereto, the latter maintain a dust seal owing to their constant wiping action upon lips 43, 43'. In the case of flashing 47 upon walls 36 of feed chute 35, a similar wiping action thereby upon the faces 32 of flanges 31 maintains a constant seal between pan 30 and feed chute 35, since faces 32 are also parallel to the plane of vibration of screen box assembly 10. For the same reason, faces 32 also move parallel to and bear against flashing 47 upon walls 37. Wear upon flashing 41, 45, 45' and 47 may be compensated by appropriate adjustment thereof on their mountings.

I claim:

In a vibrating material grading screen assembly including a generally rectangular, open-bottom screen box havin ga pair of parallel side walls, a pair of parallel end walls, and a top wall having a material ingress therein adjacent one of said end walls, a plurality of material grading screen decks enclosed within said box between said end and side walls in material grading relation to each other and to said ingress, a horizontal generally rectangular open base frame having a pair of enclosed side members and a pair of enclosed end members parallel to and spaced below said side and end walls respectively to form a structure having an open top and bottom generally congruent with said open bottom of said box and bounded by said frame member so that material graded by said box may fall through said frame, said box being mounted upon said frame to permit a material grading vibratory motion of said box relative to said frame in a predetermined linear direction both parallel to said side walls and inclined with respect to the open top of said frame, and means to induce said vibratory motion, the combination therewith of sealing means between said box and frame, said means comprising: a first pair of strips of horizontally extending sealing flashing, each strip being secured by its upper portion to and along the lower edge of the outer face of one of said side walls and having lower horizontally extending inner and outer sealing faces parallel thereto and resiliently movable from said upper portion outwardly and inwardly with respect to said wall, a first pair of sealing flanges, each flange etxending horizontally along the upper edge of one of said side members and having an upstanding inner sealing face parallel to and constantly overlapping and sliding on said outer face of one of said flashing strips during said vibratory motion of said box, said flanges preventing said resilient outward movement of said flashing with respect to said walls and said flashing and flanges together extending beyond each of said side walls, a second pair of sealing flanges, each flange being secured horizontally along and outwardly from the lower edge of the outer face of one of said end walls and provided with an inclined lower sealing face in a plane perpendicular to said side walls and parallel to said vibratory direction, a pair of support lips, each lip extending horizontally along and

upwards from one of said end members and provided with an inclined flashing support face perpendicular to and spaced below said face of one of said second pair of flanges, a second pair of strips of horizontally extending sealing flashing, each strip being secured by its lower portion to and along one of said supporting faces and having its upper portion extending above said face to one of said sealing faces of one of said second pair of flanges and resiliently movable from said lower portion with respect to said support face, each of said sealing and support faces and each of said second pair of flashing strips extending laterally of said box and frame directly between the opposed inner faces of the extended portions of said first pair of flashing strips at one end of said box, and each of said second pair of flashing strips having a sealing upper edge face and opposite sealing end faces parallel to and in constant sliding engagement with respectively said sealing surface thereabove and the opposed inner faces of said extended portions of said first pair of flashing strips during vibratory motion of said box.

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