Jan. 26, 1960 A. ZETTERLUND 2,922,510

SCREENING PLANT

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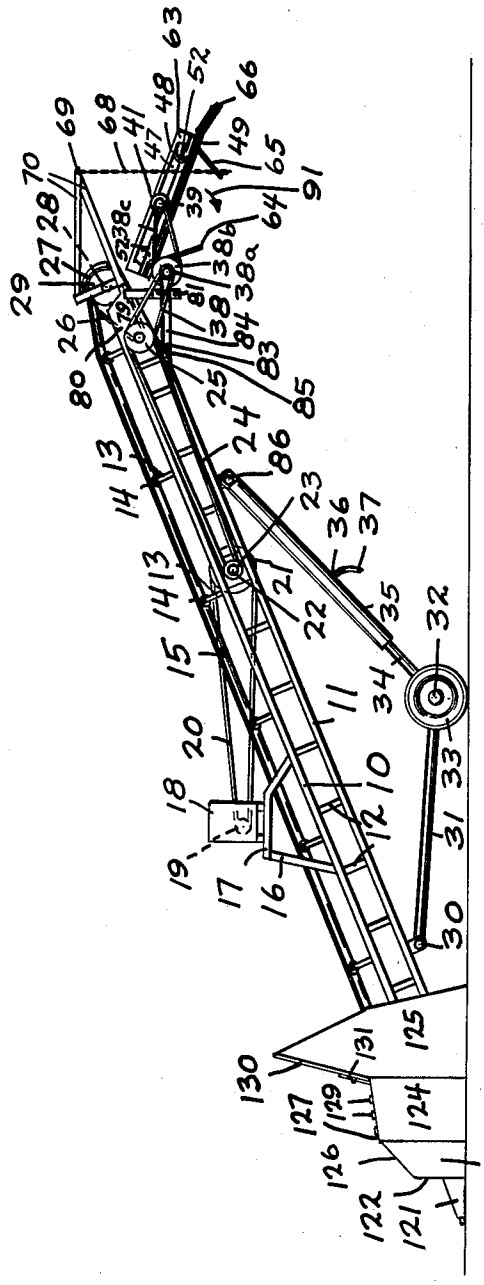


Fig. 1

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SCREENING PLANT

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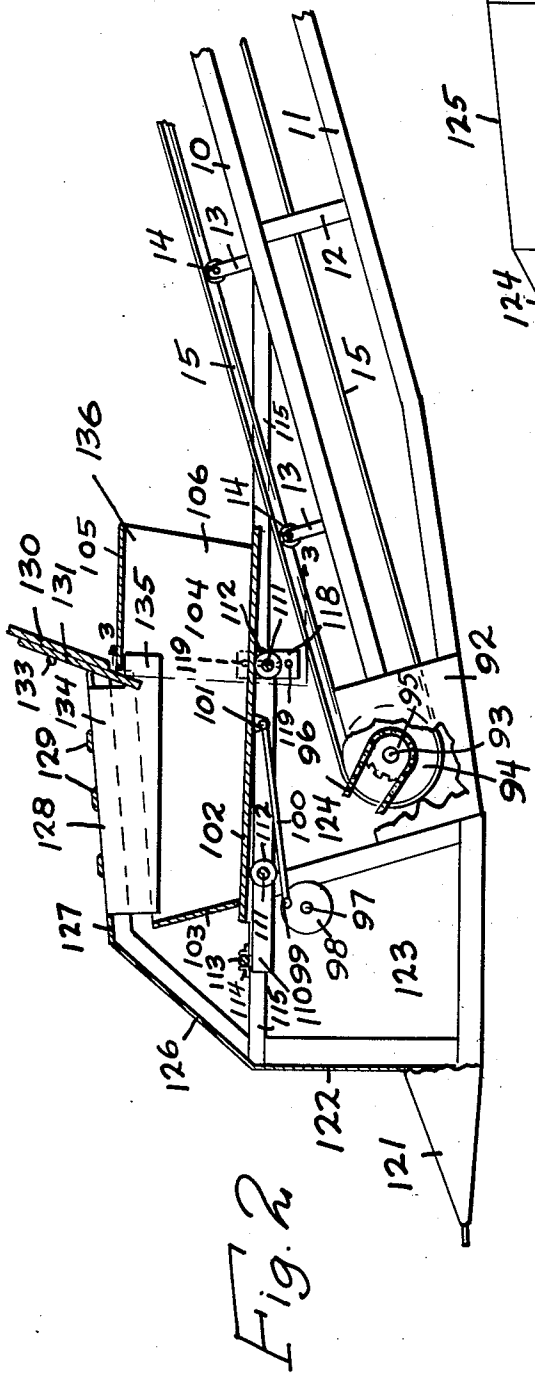


Fig. 2

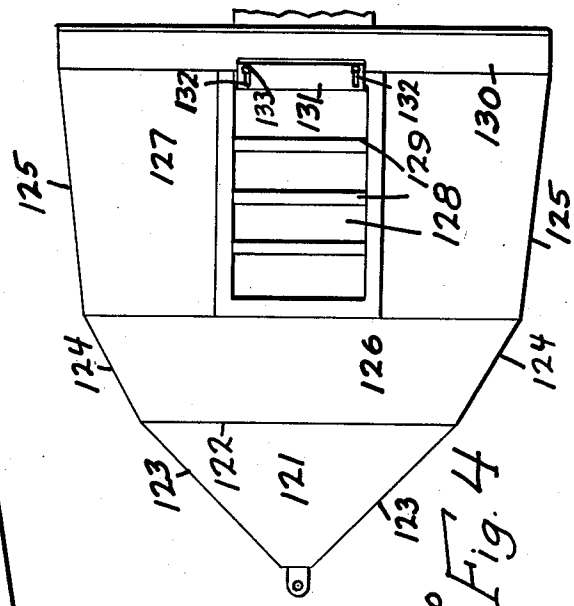


Fig. 4

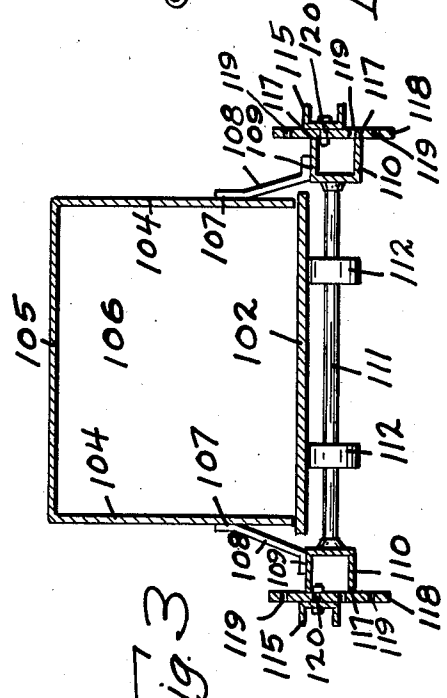


Fig. 3

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SCREENING PLANT

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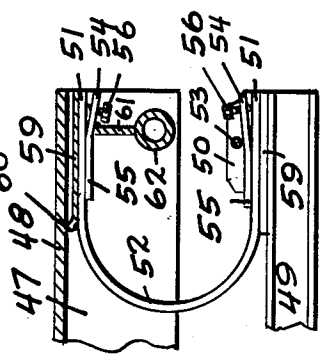


Fig. 6

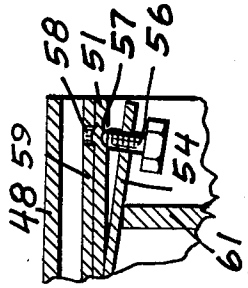


Fig. 7

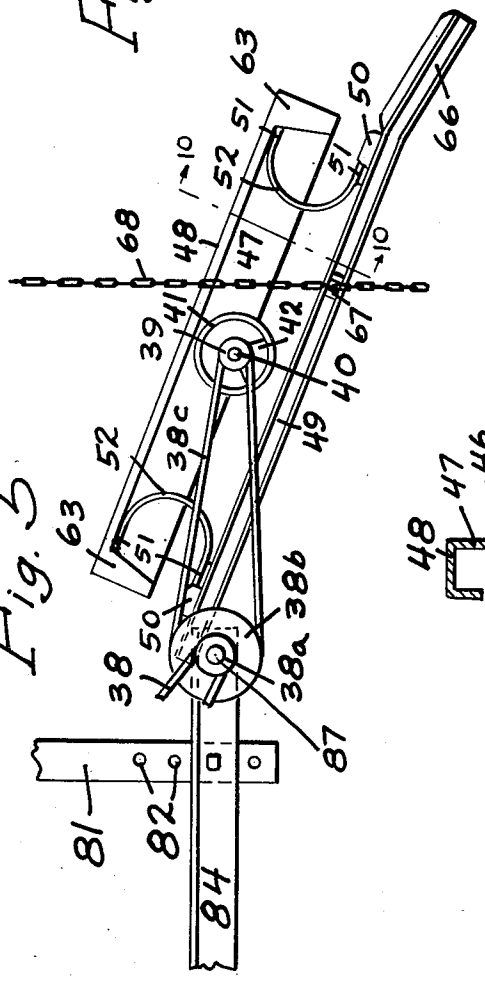


Fig. 5

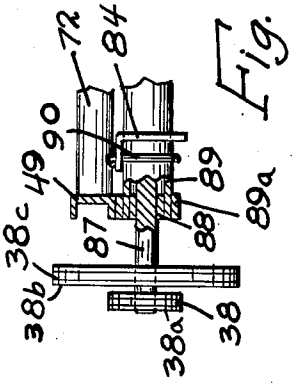


Fig. 9

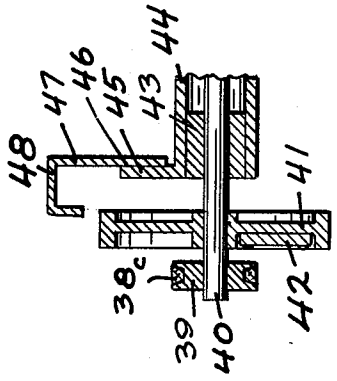


Fig. 8

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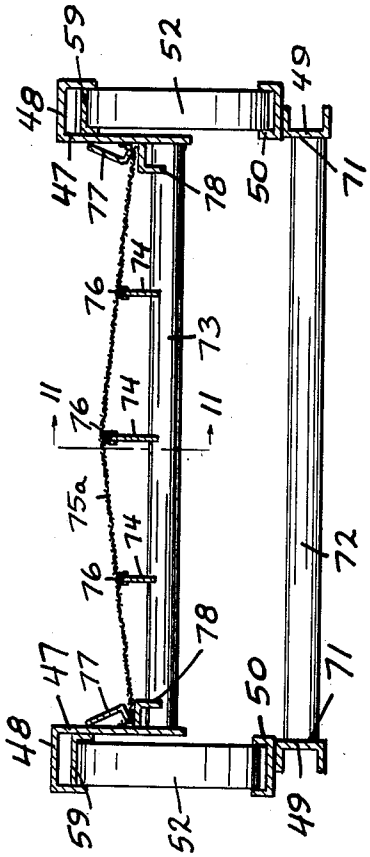


Fig. 10

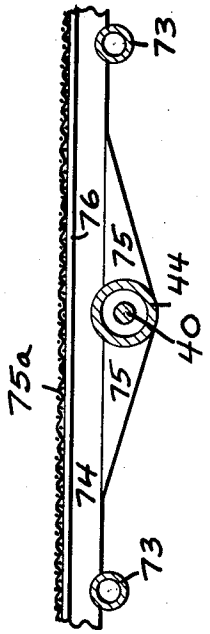


Fig. 11

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United States Patent Office 2,922,510 Patented Jan. 26, 1960

2,922,510

SCREENING PLANT

Arthur Zetterlund, Pipestone, Minn., assignor to Kolman Manufacturing Company, Sioux Falls, S. Dak., a corporation of South Dakota

Application May 18, 1956, Serial No. 585,675

1 Claim. (Cl. 198—60)

My invention relates to a screening plant.

An object of my invention is to provide unique features in a screening plant which will render the same more efficient in operation, which will provide a screening portion which is of maximum rigidity to thereby withstand vibration without deleterious effects, and to provide a screening member which can be swung inwardly when the arrangement is being transported.

A further object of my invention is to provide a feeder box arrangement which can be adjustably positioned, and which can be pivoted with respect to the boom portions so that regardless of the elevation of the boom, the feeder box can be adjusted to occupy a practically horizontal position, or which will tip slightly forwardly.

With these and other objects in view, my invention consists in the construction, arrangement, and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of the plant,

Figure 2 is a partially sectioned and detailed view of the feeder box,

Figure 3 is an enlarged sectional view of Figure 2 taken along the lines 3—3 thereof,

Figure 4 is a plan view of a portion of Figure 2,

Figure 5 is a side elevation of the screen,

Figure 6 is a detail,

Figure 7 is a further enlarged detail,

Figure 8 is a detail of a portion of the vibrating mechanism,

Figure 9 is a detail of a portion of the screen,

Figure 10 is a sectional view of Figure 5 taken along the lines 10—10 thereof, and

Figure 11 is a detail.

I have used the characters 10 and 11 to designate upper and lower boom portions which are standard members usable in screening plants, the character 12 indicating suitable braces, and I have further used the character 13 to indicate supports in which supports are journalled the rollers 14 over which rollers pass the conveying continuous belt 15, extra details of these portions not being necessary since they are well known in the art, except perhaps to mention that the rollers 14 are arranged in a depressed manner so as to allow the belt 15 to be substantially concave for conveying the material upwardly.

Suitably secured to this boom-like structure by means of the supports 16 is a platform 17 upon which is mounted an internal combustion engine 18 which drives the V-pulleys 19 which engage the belts 20 which in turn pass over the further pulleys 21 which drive a shaft 22, the shaft 22 driving the pulleys 23 which drive the belts 24 which in turn drive the pulleys 25, certain of the pulleys 25 driving further belts 26 which drive the pulleys 27, the pulleys 27 being secured to a shaft 28 which drives a large transversely positioned cylindrical drum 29 over which the belt 15 passes. Pivotally secured at 30 is the

bar 31 which is suitably secured to the transverse axle 32 upon which are journalled the transporting wheels 33, and also attached to the axle 32 is the expansible piston rod 34 which is received within the cylinder 35 which is fed at 36 with the tube 37 to provide a source of oil pressure into the cylinder 35. The pulleys 25 drive further belts 38 which drive further pulleys 38*a* which are secured to further pulleys 38*b*, the pulleys 38*b* engaging the further belts 38*c* which drive the pulleys 39, which pulleys 39 are attached to a shaft 40 to which shaft 40 are attached further circular wheels 41 having the off-center weights 42 attached thereto, the rotation of the wheels 41 by virtue of these weights 42 providing rapid vibration of the screen about to be described, it being understood that there will be a wheel 41 at either side of the arrangement. The shaft 40 is journalled within the bearings 43 which bearings are secured within the hollow pipe 44, and rigidly secured with the pipe 44 are the flanges 45 which are welded at 46 to the side screen members 47 having the upper channel portions 48, Figure 10 illustrating further details at this particular portion of the screen. Spaced downwardly from the portions 47 are the channel portions 49, and attached to the channel portions 49 are the keepers 50 in which are received the ends 51 of the looped or arcuate spring members 52.

Attached across the members 50 are the pins 53 which bear against the further angular portions 54 of the members 55, and threadably engaged with the portions 54 are the bolts 56 (see Figure 6). Also bearing against the upper portions 51 are similar members 54 and 55 also including the bolts 56, the bolts 56 (see Figure 7) being received in small depressions 57 which are provided in the spring portions 51, the depressions 57 being received within the openings 58 in the members 59 which are secured at 60. Bearing against the portion 54 is a transverse flange 61 which is attached to the transverse pipe 62. The construction using the various depressions 57, openings 58, etc. is also used at the lower portion of Figure 6, thereby providing means for securely attaching the spring members 52 and yet supplying a complete resilient structure, it being understood that there will be a similar structure at each corner of the screen.

The character 63 indicates flanges extending from the portions 48 to cover a portion of the spring structure. The screen also includes the further portions 64, 65, and 66 (see Figure 1) and attached to the channels 49 are the ears 67 which are adapted to selectively receive any of the links of the chains 68 so that the screen can be adjustably positioned, the chains 68 being secured at 69 to the bracing structure 70.

Attached to the channel members 49 at 71 (see Figure 10) are a series of laterally positioned parallel pipes 72, and also secured between the members 47 are a series of parallel laterally positioned further pipes 73, and attached to the pipes 73 and 44 are the ribs or flanges 74, and for additionally strengthening the central pipe 44 I provide the gussets 75.

The rib member 74 will appear substantially as shown in Figure 10 and of varying heights to thereby provide a slope at either side of the screen 75*a* which is placed thereagainst, with the small rubber channels 76 also being provided, the retaining members 77 being secured to the members 47, the character 78 indicating further bracing portions. It will be obvious from the foregoing construction that the screen is completely rigid both forwardly and laterally by virtue of the pipe and flange construction which is important in this type of vibrating screen.

Attached at 79 (see Figure 1) to the side plates 80 which are a part of the boom structure, are the vertically positioned straps 81 having the openings 82 therein, and

attached by means of the bolts **83** are the substantially horizontally positioned further angles **84** having the slots **85** for receiving the bolts **83** for adjustable positioning, the angles **84** being bolted through any of the openings **82** by means of suitable bolts, this arrangement thereby supporting the screen in pre-selected position and yet permitting vibratory driving of the screen.

The cylinders **35** are pivotally connected at **86** to the boom structure, and by virtue of this arrangement when oil is forced through the tube **37**, the expansion of the rod **34** will cause the boom to raise to a desired angle. The pulleys **38***a* and **38***b* are attached to a transverse shaft **87** which is journalled in the bearings **88**, being received within the transverse pipe **89**, the pipe **89** being received within the bearings **89***a* which are secured to the members **49**. The pipe **89** is secured by means of U-bolts **90** to the angle members **84**, the shaft **87** extending throughout the pipe **89**, this shaft and pipe arrangement serving to support the entire screen, and so that this arrangement will provide for operation of the screen, and will also allow the screen to be tipped to any angle desired, and will further allow the screen to be swung completely in the direction of the arrow **91** (see Figure 1) as far as desired so that the same can be in this position when transported.

Attached to the bottom of the boom structure are the plates **92** (see Figure 2) in which is journalled a shaft **93** to which is attached the lower drum **94** over which the conveyor belt **15** passes, and attached to the shaft **93** is a sprocket **95** which drives the sprocket chain **96** which drives a suitable sprocket attached to a further shaft **97** which drives the cam member **98** to which is pivoted at **99** a rod **100** which is pivotally secured at **101** to a plate **102**, the plate **102** providing the bottom of a feeder box having the end wall **103** and side walls **104**, and a top wall **105**, the end **106** being open. The sides **104** of this feeder box are attached at **107** to the braces **108** which are welded at **109** to the channel members **110**, and secured to the channel members **110** are the transverse rods **111** upon which are journalled the rollers **112**, which rollers support the plate **102**.

Attached to the members **110** are the transverse pins **113** (see Figure 2) which pivot within the further small angle members **114** which are secured to the further members **115**. Secured to the channel members **110** at **117** are the vertically positioned plates **118** having the spaced openings **119** adapted to receive the bolts **120**. The openings **119** are large enough to allow for radial alignment when the structure is pivoted at **114** as will be explained later.

Enclosing the bottom of the boom structure is the housing having the end portion **121** which is secured to a forward wall **122** which wall **122** merges with the side walls **123** which in turn merge with further walls **124** and still further walls **125**, the side walls **123** merging with the transverse wall **126** which merges with an upper wall **127**. The upper wall **127** includes the opening **128** therein, this opening including the bars **129**, and merging with the wall **127** is an upwardly inclined further wall **130** which is secured to the side walls **125**, an adjustable plate **131** including slots **132** through which pass the bolts **133** to provide adjustment of the opening **106**. Extending downwardly from the sides of the opening **128** are the flanges **134** (see Figure 2) which continue into the portions **135** to allow pivoting of the feeder box and yet to prevent escape of material between the same and the housing.

It will be noted that by moving the forward end **136** of the feeder box upwardly or downwardly and by relocating the bolts **120**, this feeder box can be positioned practically horizontally at all times regardless of the elevation of the boom members **10** etc., thereby providing an advantageous feature in keeping the feeder box at a substantially horizontal level or pitched slightly downwardly as shown, the cam **98** and rod **100** providing the reciprocating action whereby the material is fed uniformly onto the belt **15** as in the usual practice. If the pitch were too steep, or not great enough, disadvantageous results would occur, this arrangement thereby providing a desired advantage.

It should be clearly understood that there will be multiple pulleys etc. on either side of the arrangement, such as pulleys **39**, wheels **41**, pulleys **38***b* etc.

It will thus be noted from the foregoing description that I have provided a variety of unique features in a screening plant such as the adjustable feeder box, the rigid screen with the attendant structure thereof, the means for pivoting the screen to a transporting position and by pivoting on the same shaft as the driving shaft, together with unique features for mounting the resilient springs whereby the screen is vibrated, other advantages being also apparent.

Some changes may be made in the construction and arrangement of the parts of my invention without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claim any modified form of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

A screening plant comprising an elongated conveyor, a feeder box mounted on the lower end of said conveyor, said feeder box including a forward end receiving said conveyor lower end, means for angularly positioning said feeder box with respect to said conveyor including a framework, said feeder box being mounted within said framework, means for adjustably securing said forward end of said feeder box in pre-selected vertical position, including plates attached to said framework, said plates having vertically spaced openings, channels to which said feeder box is attached, said channels being attached to said plates, means for bolting any of said openings to said framework, said channels including transverse shafts attached thereto, rollers journalled on said shafts, said feeder box including a reciprocating plate bearing against said rollers.

References Cited in the file of this patent

UNITED STATES PATENTS

522,779	Carstens et al.	July 10, 1894
1,115,546	Janquart	Nov. 3, 1914
1,842,911	Manierre	Jan. 26, 1932
2,100,878	Shallock	Nov. 30, 1937
2,153,243	Flint	Apr. 4, 1939