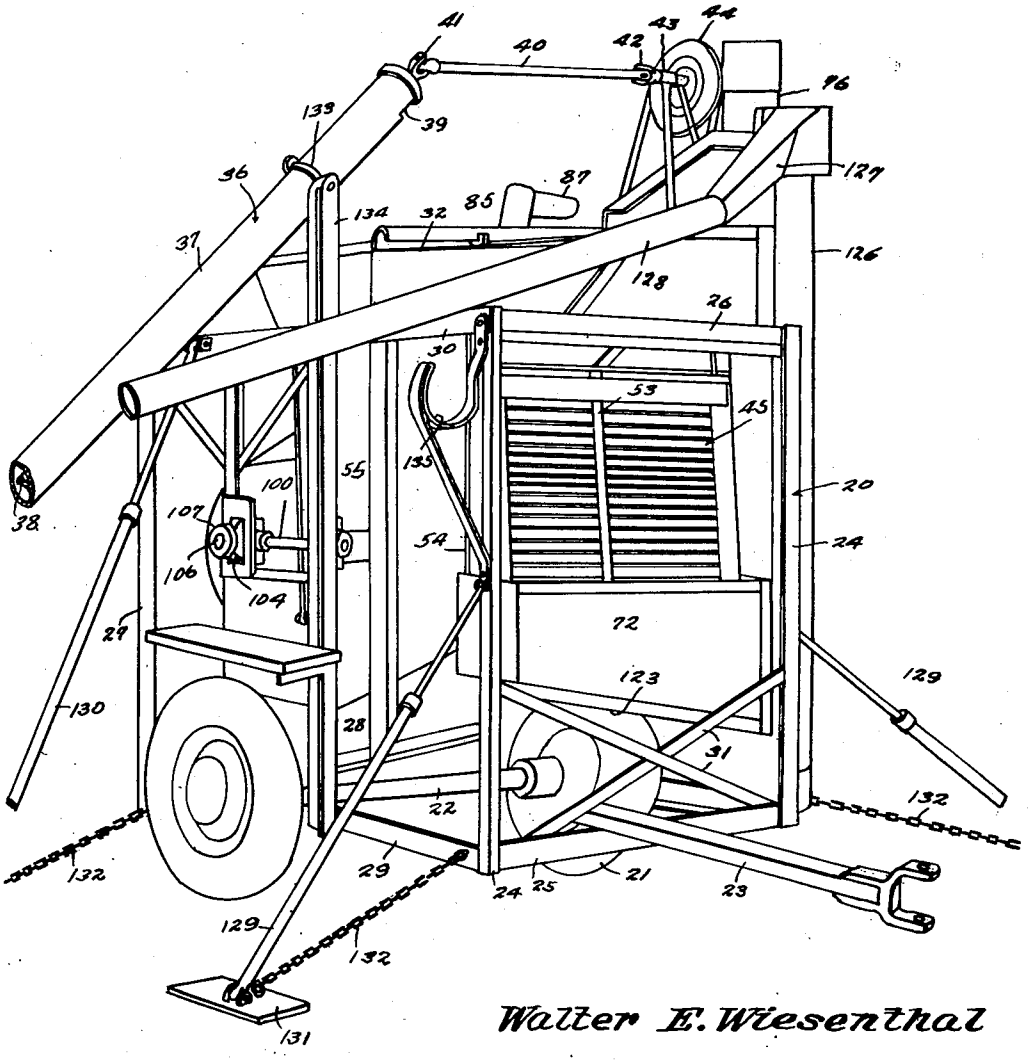
May 28, 1957 W. E. WIESENTHAL 2,793,749

MACHINE FOR CLEANING GRAIN

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Fig. 1.



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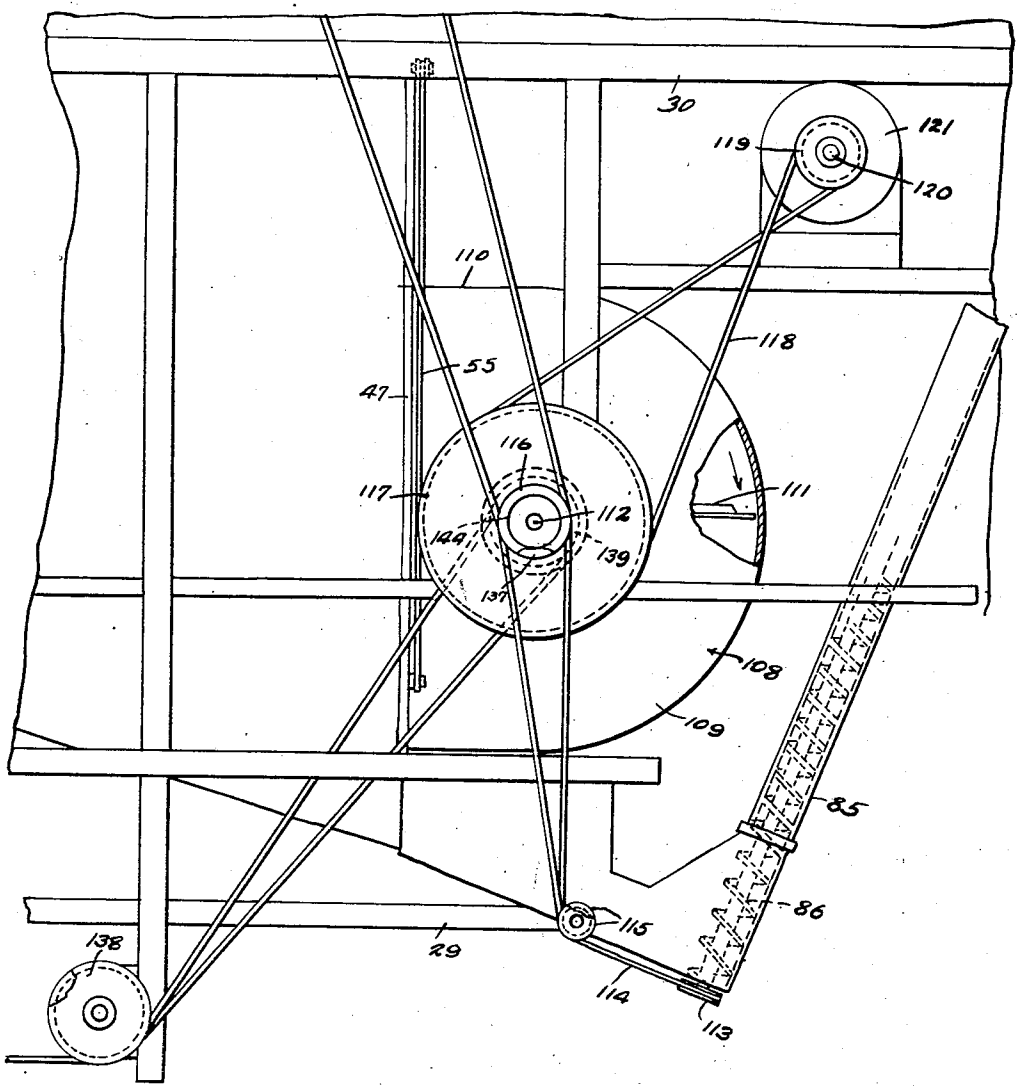


Fig. 2.

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May 28, 1957 W. E. WIESENTHAL 2,793,749

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Fig. 4.

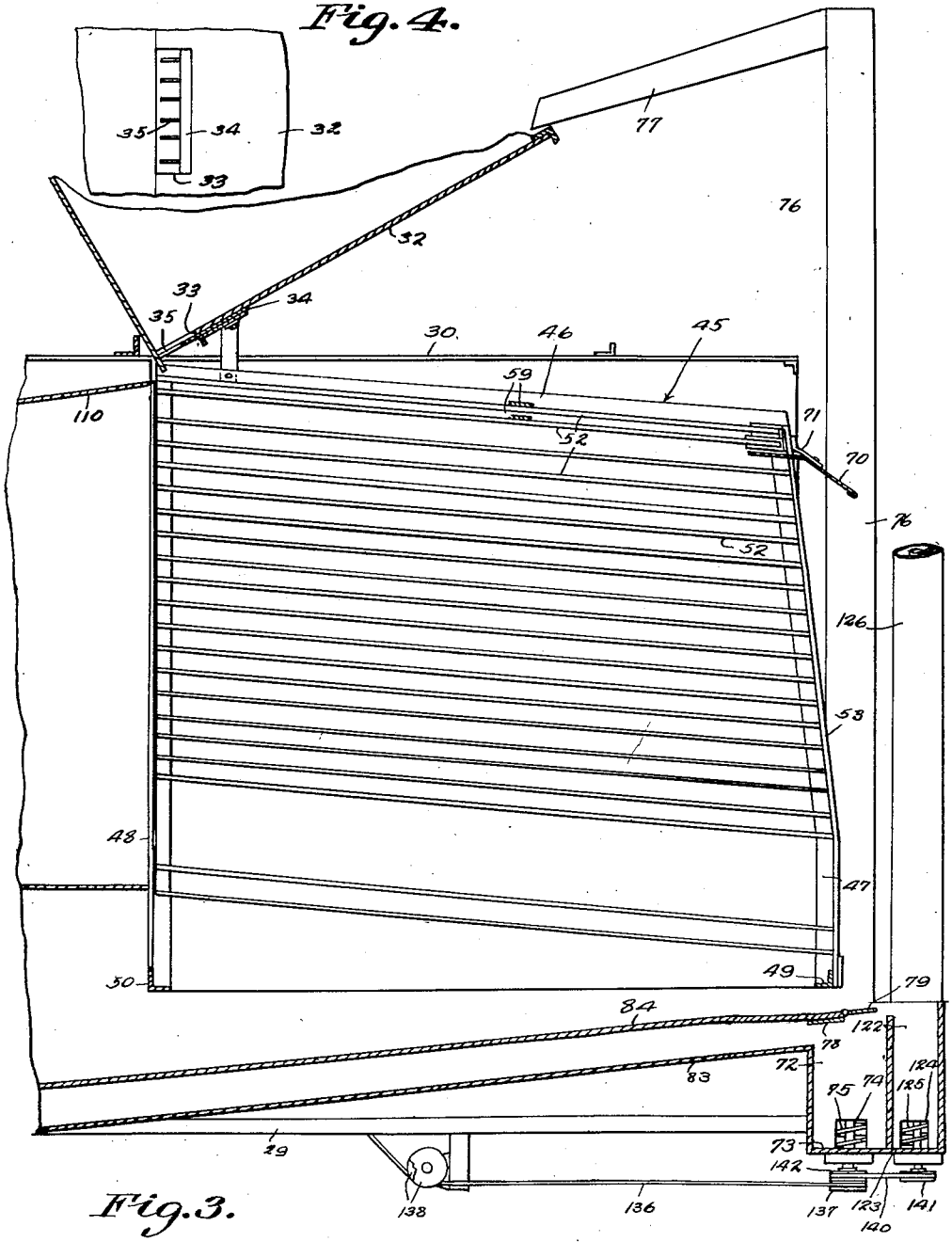


Fig. 3.

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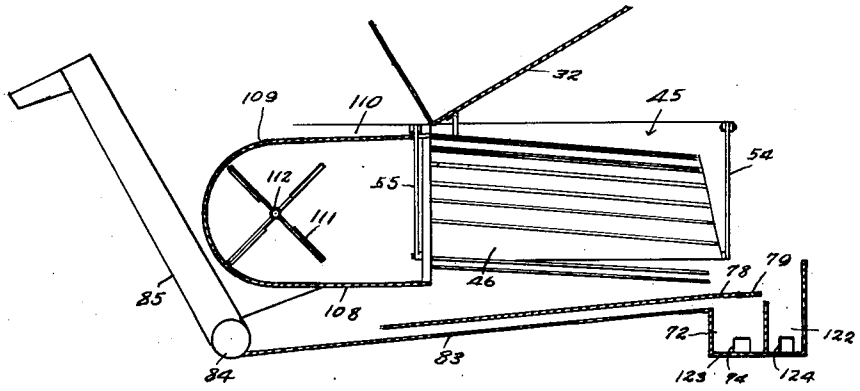
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MACHINE FOR CLEANING GRAIN

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Fig. 5.



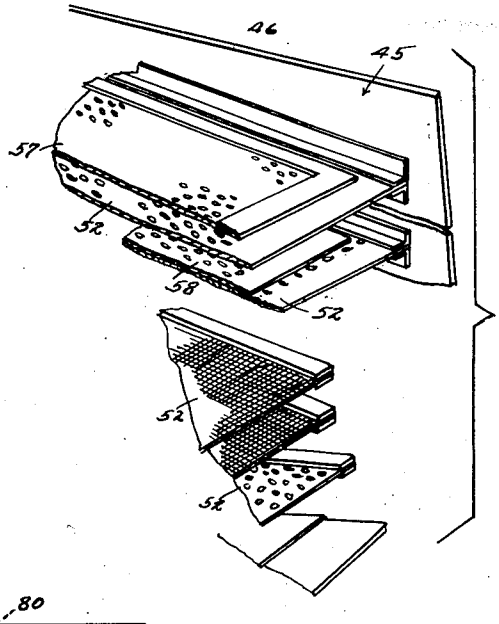


Fig. 6.

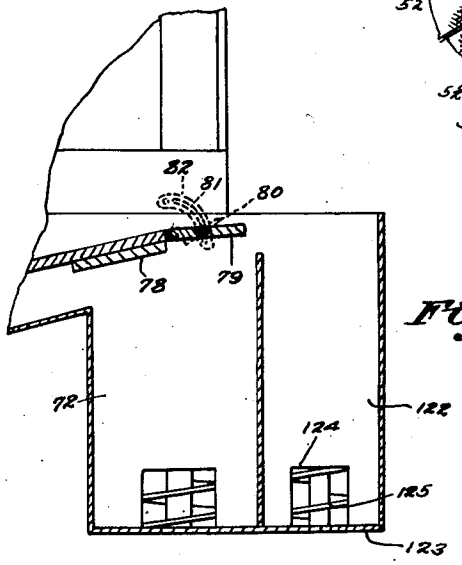


Fig. 7.

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MACHINE FOR CLEANING GRAIN

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Fig. 8.

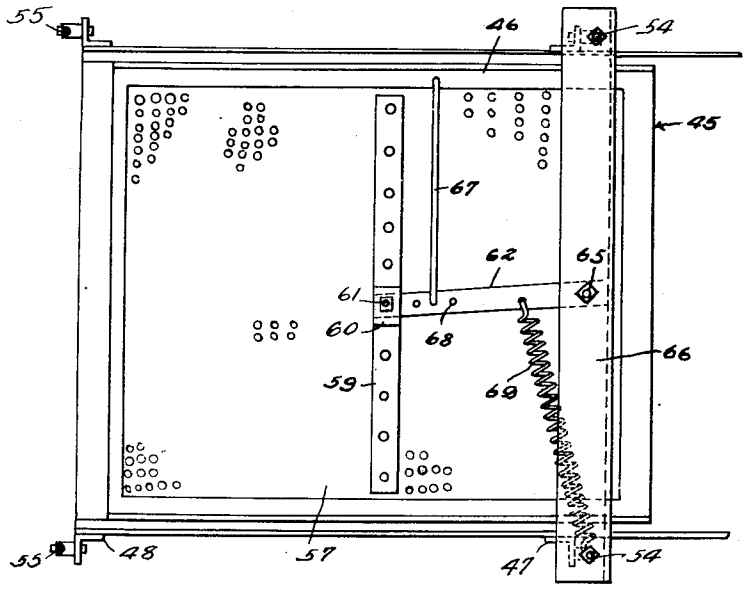


Fig. 9.

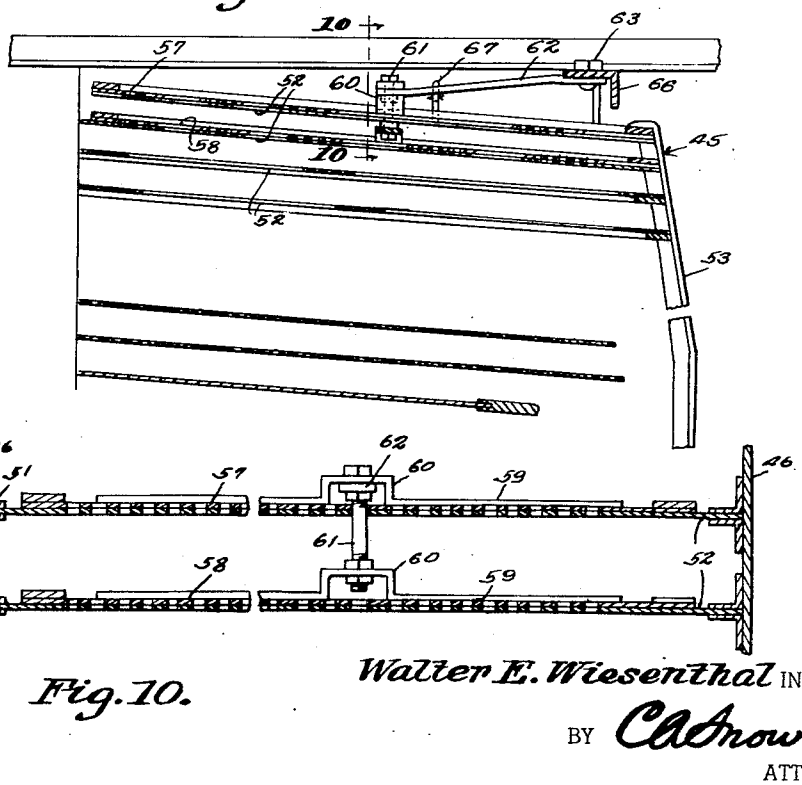


Fig. 10.

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MACHINE FOR CLEANING GRAIN

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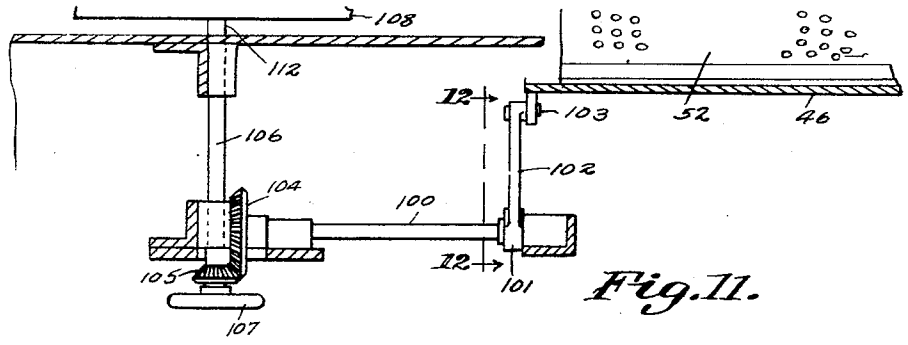
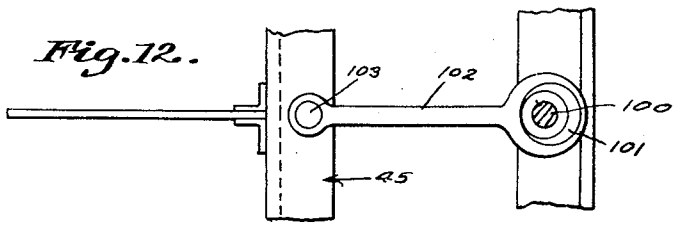


Fig. 11.

Fig. 12.



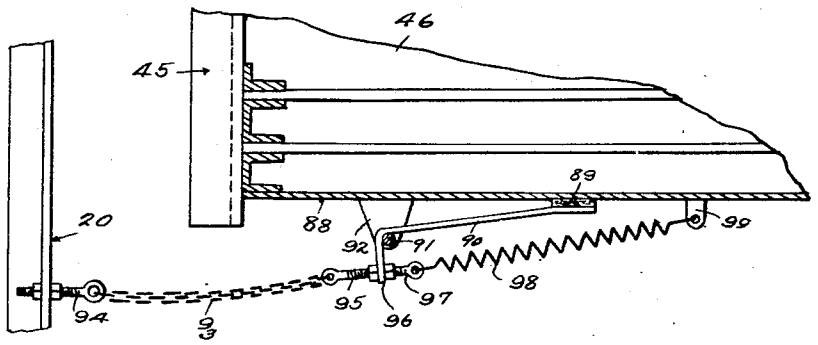


Fig. 13.

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United States Patent Office 2,793,749 Patented May 28, 1957

2,793,749

MACHINE FOR CLEANING GRAIN

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Application October 21, 1955, Serial No. 542,026

1 Claim. (Cl. 209—315)

This invention relates to a machine for cleaning grain.

An object of this invention is to provide a machine of the portable type which is capable of thoroughly cleaning grain, the machine being so constructed that it may be placed in a field or other location for operation thereof.

Another object of this invention is to provide in a grain cleaning machine an improved screening assembly whereby the grain is adapted to drop through a superposed series of screens in order to thoroughly clean the grain in the passage through the screens.

A further object of this invention is to provide in a grain cleaning machine a screen assembly which is disposed in front of a blower with the screen elements inclined downwardly and forwardly so that as the assembly is agitated, the seed or grain will drop through the screens and gradually move forwardly until the grain reaches the lowermost screen at which point the grain is discharged downwardly into either a return passage or a passage leading to a rearwardly disposed elevator.

A further object of this invention is to provide in a screening assembly a screen holding frame structure wherein a series of superposed screens are positioned, the assembly including one or more upper screens of a table character with means for moving an overlying screen with respect to the adjacent screen.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings:

Figure 1 is a perspective view from the front of a grain cleaning machine constructed according to an embodiment of this invention.

Fig. 2 is a fragmentary side elevation showing the driving means for the elevators and the screen assembly.

Fig. 3 is a fragmentary vertical section of the screen assembly.

Fig. 4 is a fragmentary plan view of the grain hopper showing the agitator in the discharge opening of the hopper.

Fig. 5 is a fragmentary longitudinal section showing the screen assembly suspension means for the hopper and the discharge means for the screened grain.

Fig. 6 is a fragmentary exploded view showing the screen assembly.

Fig. 7 is a fragmentary vertical section showing the receivers at the bottom of the machine.

Fig. 8 is a plan view of the screen assembly.

Fig. 9 is a fragmentary vertical section showing the agitating means for the table screen structure.

Fig. 10 is a fragmentary sectional view taken on the line 10—10 of Fig. 9.

Fig. 11 is a fragmentary horizontal section showing

the connection between the blower and the screen assembly for agitating the latter.

Fig. 12 is a fragmentary sectional view taken on line 12—12 of Fig. 11.

Fig. 13 is a fragmentary vertical section at the bottom of the screen assembly showing the agitating means for effecting movement of the grain at the bottom of the screen frame structure.

Referring to the drawings and first to Fig. 1, the numeral 20 designates generally a mobile frame structure which is mounted on wheels 21 carried by an axle 22. The frame structure 20 is adapted to be moved to a suitable location and is provided with a draw bar 23 whereby the frame structure may be coupled to a tractor. The frame structure 20 includes front upright angle bars 24 connected at the lower ends by a lower angle bar 25 and connected at their upper ends by an upper angle bar 26. The frame also includes rear upright bars 27 which are connected to upper and lower rear connecting bars 28. The front and rear upright bars 24 and 27 are connected together at the lower ends by lower side connecting bars 29 and upper side connecting bars 30. The frame structure at the front thereof is also braced by means of a pair of crossed bracing bars 31, secured between the uprights 24 adjacent the lower ends of the latter.

The frame structure 10 has mounted on the upper end thereof a hopper 32 which is formed with a delivery opening 33. An agitator 34 is disposed below the delivery opening 33 and includes a plurality of parallel pins 35 extending across the delivery opening 33 so that the grain at the bottom of the hopper 32 will be agitated and the grain may thereby evenly flow downwardly to the screening assembly, as will be hereinafter described. Grain in an unclean state is delivered to the hopper 32 by means of an elevator generally indicated at 36. The elevator 36 includes a tubular conveyor housing 37 having an elevator screw 38 rotatably mounted therein and the housing 37 is provided adjacent the upper end thereof with a delivery opening 39. The conveyor screw 38 is rotated by means of a drive shaft 40 connected to the conveyor 38 through a universal joint 41. The shaft 40 has a second universal joint 42 interposed therein adjacent a bearing 43, and a grooved pulley 44 is secured to the opposite end of shaft 40.

A grain screen assembly generally indicated at 45 is movably disposed in the frame structure 20. The screen assembly 45 includes vertical side plates 46 with front and rear angle members 47 and 48 connected together by transverse connecting bars 49 and 50, respectively. The screen structure 45 also includes opposed pairs of angle bars 51 forming a guide therebetween. The flat screen member 52 is disposed between the guide bars or angle members 51 and each screen member 52 is removable from the front of the frame structure. A vertically disposed screen locking bar 53 is fixed between the upper and lower portions of the frame midway between the side edges of the screen members so that the screen members will be held against outward movement when the assembly is operated and is being agitated. The screens 52 are disposed in spaced parallel relation with the upper screens of larger mesh or having larger interstices, so that the grain will be progressively passed through the screens and moved forwardly thereover until the grain drops over the forward edges of the screens. The screen assembly is swingably suspended from the frame structure 20 by means of front and rear pairs of suspension bars 54 and 55 which are pivotally secured at their upper ends to the frame 20 and are pivotally secured at their lower ends to the screen assembly structure 45. The rear of the screen assembly is disposed

below the discharge opening 33 and as shown in Fig. 3, the screens 52 are inclined downwardly and forwardly at a relatively slight angle. The angular position of the screen assembly is so arranged that when the screen assembly 45 is agitated or moved laterally back and forth with respect to the frame 20, the grain passing through the screens 32 will gradually work forwardly on the various screens until the grain finally reaches the lower one of the screens, at which time the grain will drop off of the upper side of the lower screen. The agitator 34 is moved back and forth with respect to the delivery opening 33 by means of a connecting bar 56 which is connected between the agitator 34 and the screen assembly 45, as shown in Fig. 3.

In order to provide a means at the upper end of the screen assembly to prevent clogging or piling up of the grain, I have provided a pair of movable screen members 57 and 58, which are slidably mounted on the upper side of the upper pair of screens 52. These movable screen members 57 and 58 have secured transversely thereof an elongated bar 59 formed midway of the length thereof with U-shaped member 60. The two movable screen members 57 and 58 are connected together by means of a connecting bolt 61 which extends through the U-shaped members, as shown in Fig. 10. The two screen members 57 and 58 are movable as a unit by means of a rock lever 62 which is pivotally secured at one end to the bolt 61 and is pivotally secured at its other or forward end to a pivot bolt 63 disposed through a transverse stationary bar 66 which is fixed between the upper side rails 30 of the frame 20. Relative movement of the members 57 and 58 with respect to the associated members 52 is effected by means of a link bar 67 which is pivotally secured at its outer end to the side plates 46 and is pivotally secured at its inner end to the lever 62 in a selected opening 68 formed in the bar 62. A spring 69 is connected between bar or lever 62 and the outer end of stationary bar 66. The large material which does not pass through the upper pair of screens 52 and which moves relatively quickly over the surfaces of screens 52 and the screens 57 and 58, is discharged downwardly over the front of the screen assembly 45 by means of a baffle or guide plate 70 which is secured by fastening means 71 to the screen assembly 45 at the front of the latter. As shown in Fig. 3 the screens 52 are arranged with their front edges on a downward and forward inclination and the grain dropping off of the screens 52 is discharged into a grain receiver 72. The grain receiver 72 is fixedly secured at the lower portion of the frame structure 20 and the bottom wall 73 of the receiver 72 is inclined downwardly and laterally to a discharge opening 74 which is positioned at the lower end of a return screw member or elevator 75. The screw member or elevator 75 is mounted in a vertically disposed elevator housing 76 and the housing 76 at the upper end thereof, is formed with a delivery nozzle 77 terminating over the top of hopper 32. The frame structure 20 includes a downwardly and rearwardly inclined baffle 78 which is fixed relative to the frame 20 and also includes an adjustable baffle member 79. The adjustable baffle 79 as shown in Fig. 7 has the bolt 80 at one end thereof which engages through an arcuate slot 81 of a pivoted lever 82. The bolt 80 has a conventional wing-nut on its outer end so that adjustable table 79 may be located in a position to substantially overlie the seed return chamber 72, or may be raised upwardly on an inclination to the vertical in order that the seed will be permitted to drop into the return chamber 72. When the baffle 79 is in the position shown in Figs. 3 and 7, the grain is in a relatively clean condition and this grain then moves rearwardly over fixed baffle 78 into a laterally and downwardly inclined guide chamber 83 which terminates in a downwardly and rearwardly inclined tube 84. The guide tube 84 guides the grain to the lower end of a rear elevator housing 85 having a screw elevator 86 rotatably disposed therein. The elevator housing 85 as shown in Fig. 1 is provided with an angularly disposed delivery nozzle 87, whereby the grain will be delivered into a hopper body or the like at the rear of the frame structure 20.

The screen frame structure 45 also includes bottom wall 88, and that in order to provide means whereby the grain or other material which drops through the lower ones of the screen members 52 will be agitated and thereby moved forwardly, I have provided a bottom wall agitator in the form of an impact member or hammer 89 mounted on one end of an L-shaped lever 90. The lever 90 is rockably mounted on a pin 91 extending between a pair of depending lugs 92 which are fixed to the lower side of the bottom wall 88. The lever 90 is rocked simultaneously with the transverse swinging or agitation of the screen assembly 45 by means of chain or flexible member 93 which is secured at its outer end to a bolt 94 secured to the frame 20. The inner end of the chain or flexible member 93 is secured to one end of a bolt 95 which is secured to the short side 96 of lever 90, and a second bolt 97 is also secured in the short side 96. A spring 98 is connected at one end to the bolt 97 and at the other end to a lug 99 extending downwardly from the bottom wall 88. As the screen assembly 45 swings to the right, as viewed in Fig. 13, lever 90 will be rocked downwardly and when the screen structure or assembly 45 moves to the left lever 90 will be rocked upwardly by means of a spring 98. The movement of the screen assembly 45 is a short jerky movement, effected by means of a cam shaft 100 having a cam 101 mounted on one end thereof. The cam 101 is connected with the screen frame structure or assembly 45 by means of a pitman 102, which engages about cam 101 and is rotatably mounted on a pivot member 103 carried by the frame structure 45.

The bottom shaft 100 has a bevel gear 104 mounted on the opposite end thereof and gear 104 meshes with a driving gear 105 mounted on a blower shaft 106. The outer end of the shaft 106 has a hand wheel 107 mounted thereon so that the shaft 106 and cam shaft 100 may be manually rotated in order that the oscillatory movement of the screens 57 and 58 may be determined before the machine is set in operation. A blower member 108 is carried by the frame 20 at the rear of the screen assembly and includes a lower housing 109 having a discharge neck 110 confronting the rear of the screen assembly 45. The blower 108 includes blades 111 mounted on a blower shaft 112. The lower end of the grain delivery conveyor or screw 86 has a grooved pulley 113 mounted thereon and about which a bolt 114 engages. The belt 114 is turned over a pair of idler pulleys 115 and then extended upwardly and turned about a grooved pulley 116 which is fixed to the blower shaft 112. The shaft 112 has fixed thereon a relatively large pulley 117 about which a belt 118 engages and the belt 118 engages about a driving pulley 119 which is mounted on a drive shaft 120. The drive shaft 120 is rotated by means of a power member 121. The light material or chaff which passes off of the screen members 52 being carried by the air stream which passes between the spaced screens 52 is discharged downwardly into a chaff collector 122 which is disposed forwardly of collector or receiver 72.

The chaff collector 122 is formed with a downwardly and laterally inclined bottom wall 123 and is also formed with a delivery opening 124 confronting a vertically disposed screw elevator member 125. The elevator member 125 is rotatably disposed in a tubular housing 126, and the housing 126 at the top thereof is provided with laterally extending delivery member 127. An elongated delivery pipe 128 is adapted to be pivotally coupled to the delivery member 127 and may be extended laterally as may be desired for discharging the chaff either into a second rotary body or onto the ground at one side of the frame structure 20. The frame structure 20 may be

uncoupled from the structure and firmly held in operative position by means of front and rear pairs of expansible bracing bars or legs **129** and **130** which are pivotally secured to the opposite sides of frame **20**. The legs **129** and **130** have pivotally secured to the lower ends thereof base plates **131**, as shown in Fig. 1, and the legs **129** and **130** are held against undue outward swinging by means of chains **132** secured at their inner ends to the side frame members **29** and secured at their outer ends to the base plates **131**. The pick-up member or grain delivery member **36** is supported from the upper portion of the frame **20** by means of a clamping member **133** secured to an upright post **134**.

When the machine is being transported by means of a tractor or the like, the tube **128** may be uncoupled from the delivery member **127** and engaged in a curved bracket or hanger **135** secured to the side of the machine frame **20**.

The elevator screw **75** is operated by means of an endless belt **136** which engages about a pulley **137** at the lower end of the screw **75**. The belt **136** also engages about a pair of idler pulleys **138** and is then extended upwardly and engaged about a driving pulley **139** fixed to blower shaft **112**. Screw member **125** is rotated with rotation of screw member **75** by means of a belt **140** which engages about a pulley **141** on the lower end of screw **125** and belt **140** also engages about a second pulley **142** fixed adjacent pulley **137** on the lower end of screw **75**. The pulley **44** which is fixed relatively to screw operating shaft **40** is rotated by means of an endless belt **143** which engages about a pulley **144** also fixed on shaft **112**.

In the use and operation of this machine the frame structure may be uncoupled from the structure and firmly secured by means of the supporting braces **129** and **130**. Operation of power member **121** which may be either an electric motor or an internal combustion engine will rotate the various screw shafts and elevators as hereinbefore described. Elevator housing or pick-up member **36—37** is extended at its outer end into a hopper body or receiver containing unclean grain. The grain moving upwardly through housing **37** is discharged from opening **39** into hopper **32**. At this time the screen assembly **45**, which is positioned below delivery opening **33** is agitated transversely relative to the frame **20** and at the same time agitator **34** is moved relative to the hopper delivery opening **33**. The grain dropping into the upper screen structure will partially fall through the upper screen and as these screens are inclined downwardly and forwardly the grain in dropping through the upper screens will move forwardly, being also carried partially by the draft of air which passes between the screens. Clogging of the upper pair of screens is eliminated by oscillation of the sliding screen members **57** and **58** with lateral oscillation of the screen assembly **45**. The light chaff is carried forwardly by the air stream from blower **108** and while some of this chaff will be discharged from the forward ends of the screen **32** a substantial amount of chaff will drop into the chaff receiver **122**. If the grain is in a relatively unclean condition when passing through the final or lower ones of the screens **52** baffle member **79** is raised upwardly to permit the grain to drop into the return chamber **72**. The grain will pass laterally in chamber **72** through delivery opening **74** and will then be raised upwardly in conveyor housing **76** by conveyor or elevator screw **75**. Delivery spout or nozzle **77** will discharge the partially cleaned grain back into the hopper **32**.

When the grain is in a final clean condition baffle **79** is lowered to the full-line position shown in Figs. 3 and 7. The clean grain then moves rearwardly into chamber **83** and is delivered to the forward end of the downwardly and rearwardly inclined conveyor tube **84**. The clean grain then is delivered to the lower end of conveyor or elevator housing **85** and is raised upwardly by the elevator screw **86** and discharged into the delivery spout **87** from which the grain is delivered into a hopper body or the like, which is at the rear of the machine.

What is claimed is:

A grain cleaning machine comprising a frame, a hopper disposed in the upper portion of said frame, a screen assembly comprising a frame, vertically spaced apart guide rails carried by said frame, said guide rails being inclined downwardly and forwardly, a plurality of superposed screens carried by said rails, an upper pair of screens slidably engaging the upper ones of said first named screens, means for agitating said frame, and means for agitating said pair of screens relative to said first named screens, disposed below said hopper, a screw elevator for delivering grain to said hopper, a chaff receiver below the forward end of said screen assembly, a grain receiver adjacent said chaff receiver, a second grain receiver adjacent said first named grain receiver, adjustable valve means between said first and second grain receivers whereby grain may be discharged into a selected grain receiver, a pair of traction wheels carried by said frame, front and rear pairs of collapsible bracing legs carried by said frame, an elevator connected to said chaff receiver for removing the chaff therefrom, a second grain elevator, and means connecting said second grain elevator with said second grain receiver.

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