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SEPARATOR.

APPLICATION FILED JUNE 11, 1918.

1,353,549.

Patented Sept. 21, 1920.

4 SHEETS—SHEET 1.

Fig. 1

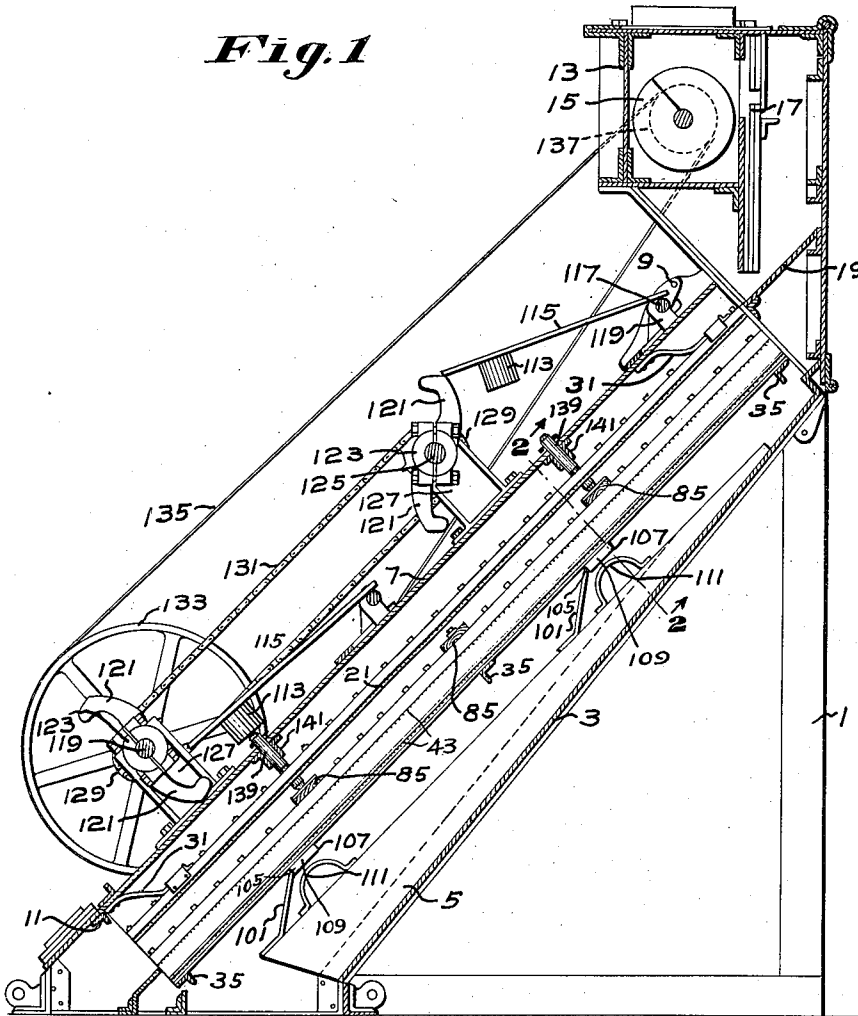
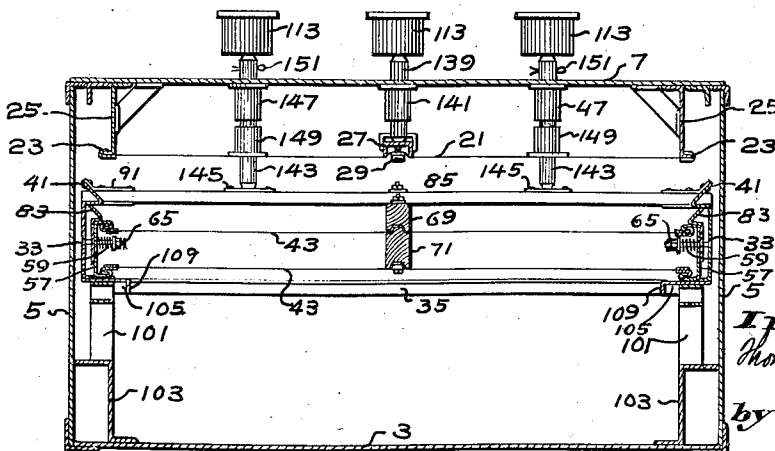


Fig. 2



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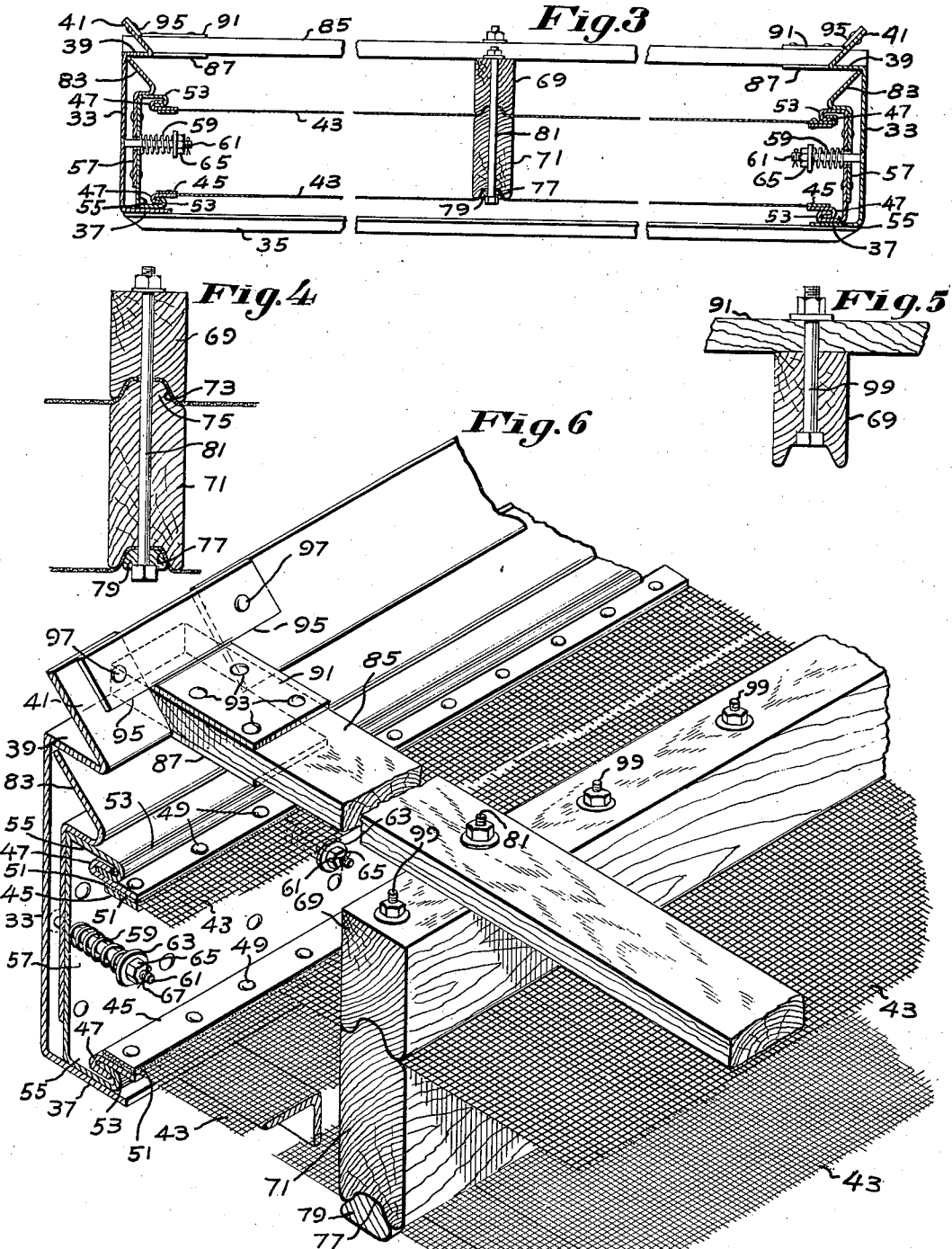
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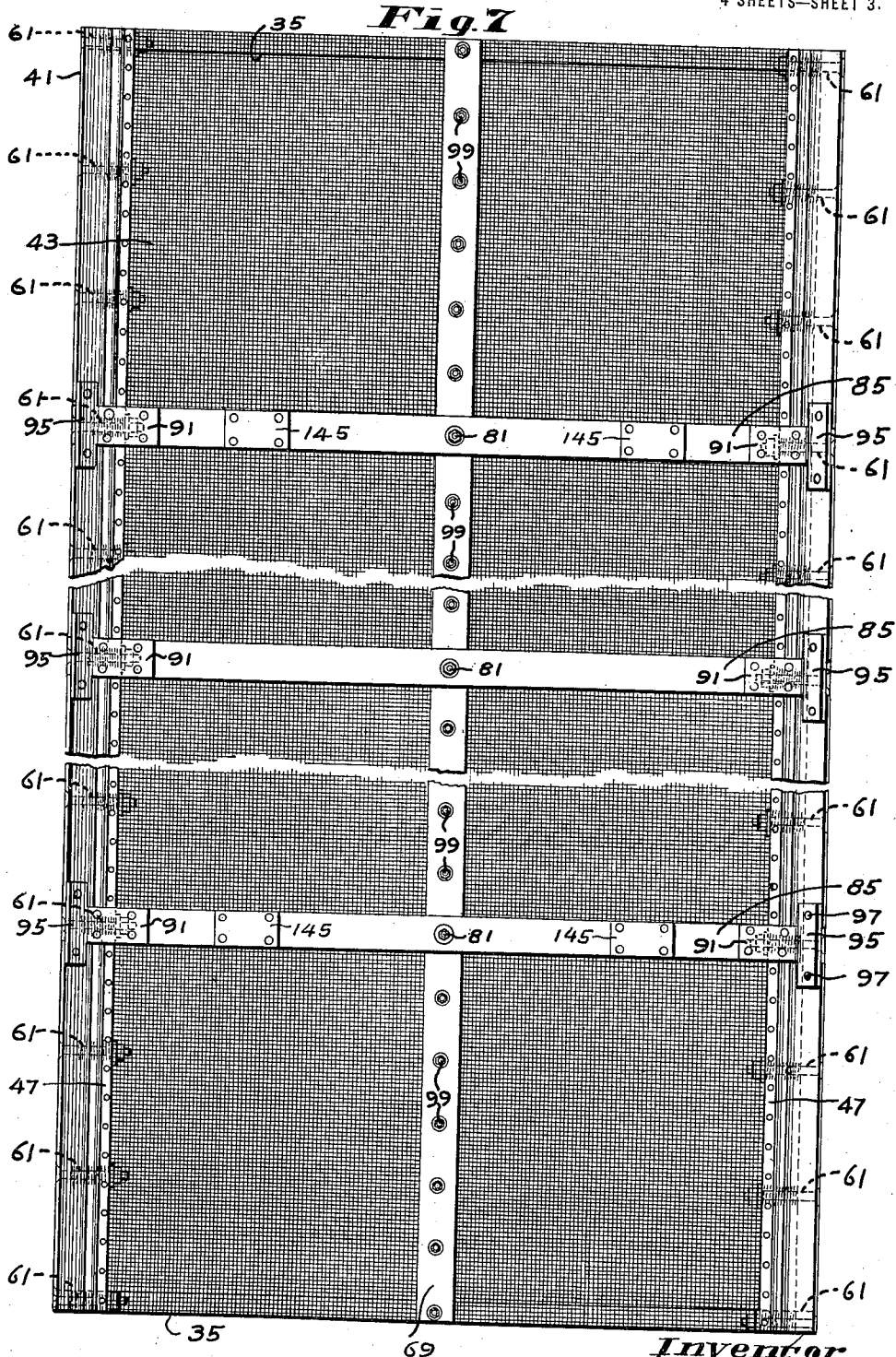


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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 8

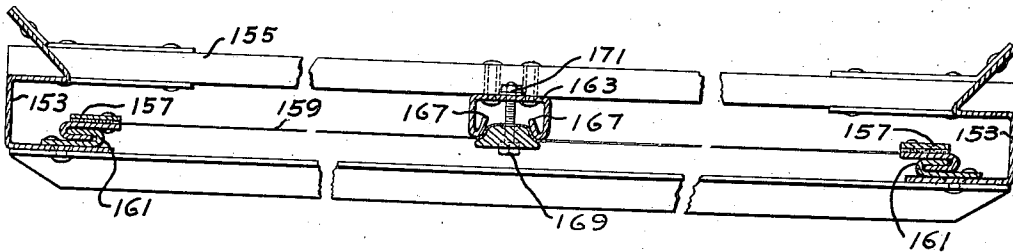


Fig. 9

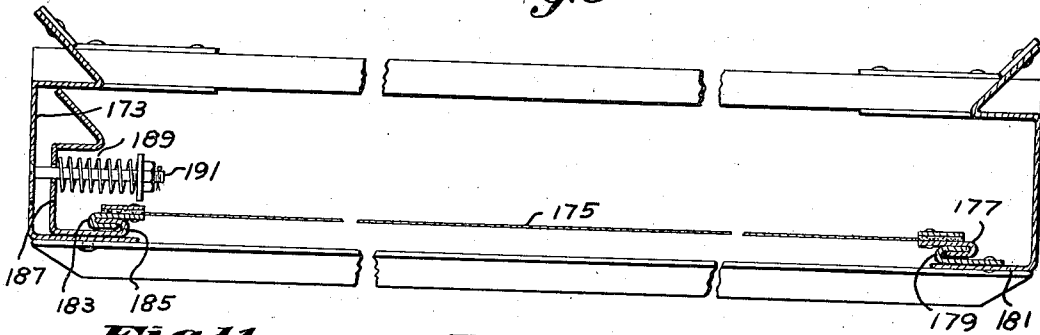


Fig. 11

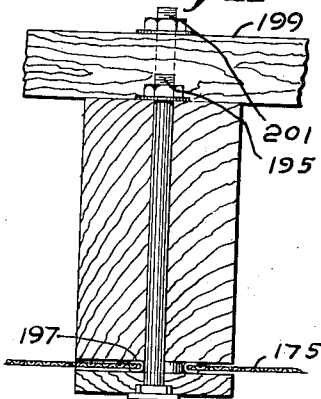
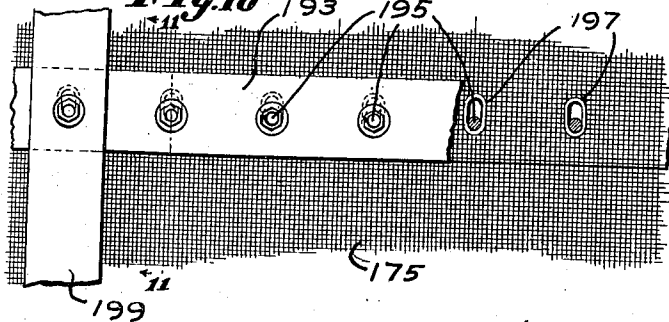


Fig. 10



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UNITED STATES PATENT OFFICE.

THOMAS J. STURTEVANT, OF WELLESLEY, MASSACHUSETTS, ASSIGNOR TO STURTEVANT MILL COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

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1,353,549.

Specification of Letters Patent. Patented Sept. 21, 1920.

Application filed June 11, 1918. Serial No. 239,431.

To all whom it may concern:

Be it known that I, THOMAS J. STURTEVANT, a citizen of the United States, residing at Wellesley, county of Norfolk, and State of Massachusetts, have invented an Improvement in Separators, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to separators for grading materials, and more particularly to separators having inclined vibrated screens. These screens should be maintained in proper stretched condition to produce the most efficient grading of the materials. An important feature of the invention, therefore, relates to means for automatically maintaining the clothing in proper stretched condition, the construction being such that any local wrinkling or bagging of the clothing is automatically taken up.

The screen clothing in use eventually becomes so worn from the work of grading materials, that it becomes necessary to substitute new clothing therefor. Another feature of the invention consists in the provision of means for detachably connecting the screen clothing to its stretching means, in order that the clothing may be removed and replaced as desired.

In certain classes of work a fine mesh screen clothing is employed. Care should be taken that this clothing is placed under the right degree of tension, in order that the clothing shall not become torn or injured. Another object of the invention is the provision of means for automatically tensioning the clothing a predetermined amount, so that when replaced by the user, it will receive correct stretching without mutilation.

Another object of the invention is the provision of carrier means for connection with margins of a plurality of screens, and equipped with spring means for automatically maintaining the plurality of screens under proper tension.

Another object of the invention is the provision of a master frame which may be mounted in the casing for the separator on suitable

springs. The screen or screens may be mounted on this frame, and the carrier for the screens may be adapted to slide or move with respect to the frame under the action of the springs for tensioning the clothing, the construction being such that the frame, the carriers, and the screens may be lifted from the springs on which the frame rests and removed as a unit from the casing, thereby enabling convenient access to the screens and the parts associated therewith, for the purpose of inspection, adjustment and repair.

And still another object of the invention is the provision of means for transmitting hammer blows indirectly to the screen clothing through the frame supporting the screens and their carriers, the construction being such that the screens are sufficiently vibrated without being punched or injured by the hammer blows.

With the aforesaid and other objects in view, the character of the invention may be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:—

Figure 1 is a vertical longitudinal section through the separator shown herein as embodying the invention;

Fig. 2 on an enlarged scale is a transverse section taken on line 2—2' of Fig. 1;

Fig. 3 is a transverse section through the frame, the carriers for a pair of screens, and the central tensioning device for the screens;

Fig. 4 on an enlarged scale is a detail of the central tensioning device for the screens;

Fig. 5 is a sectional detail of the upper bar of the central tensioning device, one of the transverse bridge bars, and the means for securing said bars together;

Fig. 6 on an enlarged scale is a perspective view of a portion of the unit comprising the removable frame, the spring-pressed carrier means sliding on said frame, and the screens detachably connected to said carrier means;

Fig. 7 on an enlarged scale is a plan of the unit shown in Fig. 6;

Fig. 8 is a transverse section of a modified

form of frame, screen and stretching device therefor;

Fig. 9 is a transverse section of another modified form of frame, screen and stretching device therefor;

Fig. 10 is a plan of a device which may be used to transmit vibrations to the screen in the modified form shown in Fig. 9; and

Fig. 11 is a transverse section taken on line 11—11 of Fig. 10.

Referring to the drawings, the separator shown therein as one good form of the invention comprises a frame 1 (Fig. 1) having an inclined casing mounted thereon provided with a bottom 3, side walls 5 and a movable cover 7, with its upper end, in the present instance, connected by hinges 9 with the body of the casing, and its lower end adapted to rest upon a transverse member 11 adjacent the lower end of the casing.

A trough or feed box 13 at the top of the casing may contain a screw conveyor 15 adapted to feed the materials to be graded along the box over a feed board 17. The material flowing over this feed board drops onto a deflecting plate 19 and is guided thereby to screening means mounted within the casing.

In the present instance of the invention, the screening means comprises an upper or scalper screen, and one or more lower or fine screens for grading the materials passing through the upper or scalper screen.

The upper or scalper screen, in the present instance, comprises screen clothing 21 (Figs. 1 and 2) detachably connected by hooks 23 on hangers 25 depending from the cover 7, said clothing being stretched by relatively adjustable channels 27 and 29 at opposite sides of the clothing, the channel 27 being supported by leaf springs 31 depending from the cover. The scalper screen and its mounting and stretching means may be substantially the same as shown, described and claimed in my copending application, Serial No. 239,482, filed June 11, 1918.

Next will be described the removable unit for supporting the fine screens. In the present instance, this unit comprises a frame 50 having side members or plates 33 (Figs. 2, 3 and 6) connected by transverse members or bars 35 conveniently of angle form, said bars being preferably riveted or otherwise secured rigidly to the side plates 33. The side plates of this frame may have intumed bottom flanges 37 and top flanges 39, the edge margins 41 of the latter being bent outwardly and upwardly obliquely to serve as deflecting plates, as more fully hereinafter described.

In the present form of the invention, a pair of screens are mounted on this frame, each comprising screen clothing 43 having its margins interposed between strips 45 and hooks 47, and secured thereto by rivets 49.

Strips of canvas 51 or other suitable cushion material may be interposed between the screen clothing 43 and the hooks 47.

The hooks for the screens may be connected to hooks 53 formed on intumed flanges 55 of carriers conveniently in the form of plates 57. These carriers may be movably mounted on the bottom flanges 37 of the side plates 33. Spring means may be provided tending to press the carriers outwardly toward said side plates to tension the screens. This spring means, in the present instance, comprises series of coil springs 59 encircling pins 61 projecting loosely through apertures in the side plates and the carriers. The springs may be confined between the inner faces of the carriers and washers 63 held in different positions of adjustment on said pins by nuts 65 secured by cotter pins 67. The construction is such that the springs when tensioned will tend to slide the carriers outwardly toward the side plates and stretch the screen clothing.

The screens connected to these carriers may have different degrees of fineness. For example, the lower screen may be finer than the upper screen. It is desirable that a greater degree of stretching should be produced on the coarser screen. To accomplish this, the coil springs and their pins may be located nearer the upper screen than the lower screen, as will be noted in Figs. 3 and 6.

Next will be described means for producing a predetermined tensioning of the coil springs. This means, in the present instance, comprises a pair of bars 69 and 71 (Figs. 4 and 6) of wood or other suitable material, the former having a channel 73 receiving a projection 75 on the latter. These bars may extend above and beneath the upper screen 43 longitudinally thereof and preferably midway between the margins of said screen. The bar 71 may have a channel 77 therein adapted to receive a bar 79. The bars 71 and 79 may be mounted on the opposite sides of the lower screen 43. Through bolts 81 may project through the bars 69, 71 and 79, the construction being such that when the bolts are tightened, the projection 75 will be pressed into the channel 73, and the bar 79 will be pressed into the channel 77, and thereby draw the hooks and carriers for the screens inwardly and compress the coil springs 59. Preferably the through bolts are tightened until the projection 75 and the bar 79 are drawn as far as possible into the channels 73 and 77, the latter serving as stops to limit the stretching of the clothing and tensioning of the coil springs. Thus, there can be no danger of producing a tension of the screens sufficiently great to rupture or injure the screen clothing.

The construction described enables ready removal of the screens when they become

worn. To accomplish this, the through bolts 81 are released, thereby relaxing the screen clothing and the tension of the coil springs. This will allow the hooks for the screens to be readily released from the hooks of the carriers, and will allow new screens to be readily substituted therefor.

Suitable means may be provided to prevent escape of the materials graded from the screens into the spaces between the carriers and the side plates 33. To accomplish this, in the present instance, deflecting plates 83 (Figs. 3 and 6) may be secured to the carriers and may extend obliquely upwardly and outwardly with their upper ends in engagement with the inturned upper flanges 39 of the side plates. The deflecting plates may have a resilience such that they tend to press against the flanges 39 and prevent any possibility of escape of the materials between them.

To strengthen the frame and transmit vibrations thereto from hammer means to be described, said frame may be provided with transverse bridge bars 85 (Figs. 3, 6 and 7) of wood or other suitable material. In the present instance, three such bars are shown distributed at suitable intervals, but the number thereof may be varied according to conditions as required.

Suitable means may be provided for rigidly connecting the ends of the bridge bars with the side plates 33 of the frame. To accomplish this, in the present instance, the deflecting flange 41 of each side plate may have a tongue 87 incised therefrom and bent downward to horizontal position. The end of the bridge bar may be inserted in the notch in the flange thus produced and rest upon said tongue. A tongue 91 may be mounted on the bridge bar in opposition to the tongue 87, and said tongues may be secured to said bar by rivets 93 extending therethrough. The outer end of the tongue 91 is bent upwardly presenting flanges 95 resting on the deflecting flange 41 and secured thereto by rivets 97. Thus, the ends of the bridge bars may be securely connected to the side plates of the frame and tend to resist skewing thereof, while admitting vibration of the bridge bars under the action of the hammer means, as more fully hereinafter described.

The stretching bars 69 and 71, referred to, may not only serve to stretch the screen clothing, but may also desirably serve to transmit vibrations thereto. Therefore, it is preferable that said bridge bars should be directly secured to said stretching bars. To accomplish this, the upper stretching bar 69 may be connected to the bridge bars by bolts 99 (Fig. 5) having their heads seated in counter-bores in the channel 73 so as to avoid interference with the entrance of the projection 75 into said channel.

The frame may be resiliently supported in

the casing. To accomplish this, leaf springs 101 (Figs. 1 and 2) may be mounted on Z-bars 103 resting on the bottom of the casing with their upper free ends engaging bearing plates 105 secured to the bottom flanges 37 of the side plates of the frame. These bearing plates have flanges 107 for engaging the free ends of the leaf springs to limit the frame against downward sliding movement in the casing, and said plates may have angular flanges 109 for guiding the frame into proper position on said leaf springs. Downward vibration of the frame may be limited by stops 111 mounted on the Z-bars beneath the bearing plates.

In my said copending application, the bearing plates on the leaf springs were secured to the hooks at the margins of the screen, so that in removing the screen, it was necessary to also remove the bearing plates, but in the present construction, since the bearing plates are secured to the frame, they are independent from the screen.

Suitable means may be provided for vibrating the screens. To accomplish this, in the present instance, hammers 113 (Figs. 1 and 2) may be secured adjacent the lower ends of arms 115, having their upper ends secured to studs 117 journaled in open bearings in brackets 119 secured to the cover of the casing. The hammers may be provided with actuators comprising cam fingers 121 having curved ends adapted to successively reach in and engage the under faces of the free ends of the hammer arms to lift the same. In the course of the rotation of these actuators, the cam fingers disengage the hammer arms, and allow the hammers to drop sharply downward. The cam fingers may project from split bosses 123 secured to shafts 125 journaled in bearings in brackets 127 secured to the top of the cover. The shafts may be rotated by sprocket wheels 129 fast on said shafts and connected by a sprocket chain 131. One of the shafts may have a pulley 133 fast thereon connected by a belt 135 with a pulley 137 fast on the shaft for the screw conveyer, referred to.

These hammers and the actuators therefor may be substantially the same as those shown, described and claimed in my copending application, Serial No. 218,649, filed February 23, 1918. To transmit the blows from the hammers to the scalper screen 21, pins 139 of wood or other suitable material may be provided having lower ends for engagement with the stretching channel 27, referred to, for the scalper screen. These pins may project through the cover 7 and may be guided by sleeves 141 secured to and depending from said cover.

To transmit the blows from the hammers to the lower screens 43, carried by the frame, pins 143 of wood or other suitable material may be provided having lower ends for en-

gagement with base plates 145 secured to the transverse bridge bars 85 of the frame. The pins 143 may project through the cover and be guided by sleeves 147 secured to and depending from the cover, and sleeves 149 mounted on and secured to the scalper screen.

The construction is such that the blows from the hammers will be transmitted by the pins 139 to the scalper screen to efficiently vibrate the same, and the blows will be transmitted from the hammers by the pins 143 to the bridge bars 85. The latter in turn will transmit their vibrations directly to the side plates of the frame resting on the leaf springs 101 and vibrate the frame as a whole. The bridge bars will also transmit their vibrations directly through the deflecting plates 83 to the carriers and vibrate the margins of the screen clothing. The bridge bars will also transmit their vibrations through the stretching bars 69 and 71 to the central portions of the screen clothing. Thus, the screen clothing is vibrated throughout, but without contact of the pins with the clothing. Thus, the latter is desirably relieved from punching by the hammer blows, and the life of the clothing is prolonged.

The screens 43 are provided with a strong frame for supporting the same, but the screen clothing is independent of the transverse bars connecting the side plates of the frame. As a consequence, the screen clothing may be stretched uniformly throughout the length thereof, and the stretching will be desirably maintained by the coil springs acting on the carriers connected to the margins of the screen clothing. In the event that the clothing should be stretched locally, the coil springs will automatically take up such local stretching and maintain the clothing in smooth, uniform stretched condition through without attention or adjustment on the part of the operator.

The pins 143 may be provided with cotter pins 151 (Fig. 2) spaced somewhat above the cover, but adapted to engage the cover when lifted to lift said pins from the bridge bars 85. When it is desired to inspect the screens, it is merely necessary to swing the cover upward, thereby carrying the scalper screen upward with it. Then the scalper screen and the lower fine screens are both desirably exposed for inspection, adjustment or repair. The frame and the fine screens may then be lifted as a unit from the casing to permit removal of the worn screen clothing and the substitution of new clothing therefor.

Referring to Fig. 8, a modified form of construction is shown therein comprising a frame 153 having bridge bars 155 substantially the same as already described, but in

this form of the invention the marginal hooks 157 of the screen clothing 159 are connected to hooks 161 fast on the inturned flanges of the side plates of the frame. To stretch the clothing, a channel bar 163 may be provided having inturned flanges 167, and a bar 169 is adapted to be adjusted upward between said inturned flanges by bolts 171. The construction is such that when the bolts are tightened, the clothing may be pressed upward into the channel bar between the flanges 167 and the bar 169 to produce the stretching of the clothing desired. The channel bar may be secured directly to the bridge bars, in order to transmit vibrations therefrom to the clothing.

Referring to Fig. 9, still another modification is shown therein comprising a frame 173 similar to the first frame described, but in this form of the construction, the screen clothing 175 has a marginal hook 177 connected to a hook 179 secured directly to one of the inturned flanges 181 of the frame. The opposite hook 183 of the screen clothing is connected to a hook 185 mounted on the carrier 187. The clothing is maintained in proper tensioned condition by a series of coil springs 189 on pins 191 similar to the coil springs 59 and pins 61 described. The construction is such that the springs 189 may be tensioned to produce the amount of stretching of the screen clothing required.

Referring to Figs. 10 and 11, a bar 193 is shown therein which may extend longitudinally of the screen clothing 175 of the modified form shown in Fig. 9. This bar may be secured to said clothing by bolts 195 which may be entered through elongated gromets in the screen clothing. The longitudinal bar 193 may be secured to the transverse bridge bar 199 by bolts 201. The construction is such that the bolts 195 may be released and then the springs 189 may be tensioned to stretch the clothing as required, the elongated gromets allowing movement of the clothing relatively to the bolts 195. Then said bolts may be tightened to connect the clothing with the bar 193 and enable the vibrations to be transmitted from the bridge bar through the longitudinal bar to the clothing.

It will be understood that the invention is not limited to the embodiments shown, but that various deviations may be made therefrom, without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. In a separator, the combination of a casing, a removable inclined master frame mounted in, but separate from said casing and comprising metal side plates, upper and lower transverse bars secured to said plates to hold the latter in spaced relation, a plurality of screens carried by, but separable

from said master frame and each comprising side bars and screen clothing for grading materials secured to said side bars with free ends between said side bars, spring means yieldingly to sustain said master frame in said casing, and means acting on said upper transverse bars to vibrate all of said screens through the master frame.

2. In a separator, the combination of a casing, a master frame removably mounted in said casing and comprising side members, upper and lower transverse members secured to said side members to hold the latter in spaced relation, a plurality of screens carried by, but separable from said master frame and each comprising side bars and screen clothing for grading materials secured to said side bars with free ends between said side bars, and spring means for urging said side bars toward the side members of the master frame to maintain the clothing of the screens in stretched condition.

3. In a separator, the combination of a casing, a master frame removably mounted in said casing comprising metal side plates of substantial depth, upper and lower transverse bars secured to said plates to hold the same in spaced relation, a plurality of screens carried by but separable from said master frame and each comprising side bars, and screen clothing for grading material secured to said side bars with free ends between said side bars, a support for said master frame in said casing, and means percussively to vibrate said master frame and the screens carried thereby including hammer means mounted on the casing, and pins to transmit blows from said hammer means to the upper transverse bars of said master frame.

4. In a separator, the combination of a casing, supporting springs mounted in said casing, a master frame adapted to rest on said springs and to be bodily lifted out of the casing, said master frame comprising side members and transverse members secured to said side members to hold the same in spaced relation, a plurality of screens carried by said master frame and adapted to be lifted therewith from the casing, means detachably to connect said screens with the side members of said master frame, and means acting on said transverse members to percussively vibrate the master frame and the screens carried thereby.

5. In a separator, the combination of a casing having a hinged cover, a master frame mounted in said casing and adapted to be lifted bodily therefrom, a plurality of superposed screens carried by said master frame and removable therewith from the casing, means detachably to connect said screens with said master frame, and means percussively to vibrate said master frame

and through it the screens carried thereby, said vibrating means being carried by the cover and movable away from the master frame on opening the cover to allow the master frame to be lifted from the casing.

6. In a separator, the combination of a casing having a cover hinged thereto, a support in said casing, a master frame adapted to rest on said support in said casing and bodily removable from said casing, said master frame comprising side members and transverse members secured thereto to hold the latter in spaced relation, a plurality of screens carried by said master frame and removable therewith from the casing, each of said screens comprising side bars and screen clothing having margins secured to said side bars, and free end edges between said bars, means connected to said side bars of the screens and said side members of the master frame to tension the clothing, and means percussively to vibrate said master frame and the screens carried thereby including hammer means mounted on the cover, and pins projecting through said cover toward the transverse members of the master frame to transmit blows from the hammer means to said transverse members.

7. In a separator, the combination of a casing, a master frame mounted therein comprising side plates and upper and lower transverse members secured to said plates to hold the same in spaced relation, carriers movable relatively to said side plates, a plurality of superposed screens, each comprising side bars connected to said carriers and screen clothing having margins secured to said side bars, and means connecting said side plates of the master frame with said carriers for spreading the side bars of the screens to tension the clothing thereof, said master frame and the screens carried thereby being bodily removable as a unit from the casing.

8. In a separator, the combination of a casing, a master frame mounted therein comprising side members and upper and lower transverse members secured to said side members to hold the same in spaced relation, channel carriers mounted on said master frame adjacent the side members thereof and having inwardly extending flanges, screens comprising screen clothing for grading materials and side bars detachably connected with the flanges of said channel carriers, and means connecting the side members of said frame with the channel carriers for tensioning the clothing of said screens, said master frame and screens being bodily removable as a unit from the casing.

9. In a separator, the combination of a casing, a master frame mounted therein comprising side members, and upper and lower transverse members secured to said side

members to hold the same in spaced relation, carriers mounted on the master frame, screens, each comprising screen clothing, and side bars secured to said clothing and connected to said carriers, and means including a series of coil springs cooperating with said carriers and the side members of said master frame to maintain the clothing of the screens in stretched condition, said master frame and screens being bodily removable as a unit from the casing.

10. In a separator, the combination of a casing, a master frame mounted therein comprising side members, and transverse members secured to said side members to hold the same in spaced relation, a plurality of screens carried by said master frame, each comprising screen clothing and side bars secured to said clothing, means including spring means cooperating with the side bars of said screens and the side members of the master frame to tension the clothing, and means applied to said screens intermediate the side bars thereof for tensioning said spring means.

11. In a separator, the combination of a casing, a master frame removably mounted therein comprising side plates and transverse members secured to said plates to hold the same in spaced relation, carrier plates mounted adjacent the side plates of the master frame, screens comprising screen clothing and side bars detachably connected to said carrier plates, deflecting members projecting from said carrier plates, and means operating on said carrier plates to tension the clothing and move said deflecting members toward the side plates of the master frame.

12. In a separator, the combination of a casing, a master frame mounted therein comprising side members and upper and lower transverse members secured to said side members to hold the same in spaced relation, a plurality of screens carried by said master frame between said upper and lower transverse members, members extending longitudinally of said screens between the side edges thereof, means connecting said longitudinal members, means connecting the upper transverse members of said master frame with said longitudinal members, and means percussively to vibrate said upper transverse members and through them said longitudinal members and said screens.

13. In a separator, the combination of a frame comprising side plates having deflecting portions, transverse bridge bars connected to said side plates, a screen for grading materials, means for stretching said screen, and means connecting said screen with said side plates.

14. In a separator, the combination of a frame having side plates provided with de-

flecting plates, transverse bridge bars, means connecting said bars with said deflecting plates, a screen carried by said frame, and means for stretching said screen thereon.

15. In a separator, the combination of a frame having side members provided with deflecting plates having notches therein, a transverse bridge bar seated in said notches, means securing said bar to said side members, and a screen for grading materials carried by said frame.

16. In a separator, the combination of a frame having side members provided with deflecting plates having notches therein, a transverse bridge bar seated in said notches, and means including plates at opposite sides of said bridge bar for connecting the same with said side members and deflecting plates.

17. In a separator, the combination of a frame, a screen mounted thereon, a carrier connected to said screen and movable relatively to said frame, spring means tending to move said carrier to stretch the screen, and means acting on a portion of said screen intermediate opposed edges thereof for tensioning said spring means a predetermined amount.

18. In a separator, the combination of a frame, a screen for grading materials, means for connecting the margins of said screen with said frame including a carrier movable relatively to said frame, spring means acting on said carrier to stretch the screen, and means applied to said screen intermediate its margins for tensioning said spring means.

19. In a separator, the combination of a frame, a screen for grading materials, a carrier connected to a margin of said screen, spring means tending to move said carrier relatively to said frame to stretch the screen, a channel extending longitudinally of the screen, and means for forcing a portion of the screen into said channel to tension said spring means.

20. In a separator, the combination of a frame, a transverse bridge bar connected thereto, a screen for grading materials mounted on said frame, a carrier connected to a margin of said screen, spring means tending to move said carrier relatively to said frame to stretch the screen, a bar connected to and extending longitudinally of the screen intermediate the edges thereof, means connecting said bar with said transverse bar, and means to impart blows to said transverse bridge bar to vibrate said frame and the screen carried thereby.

21. In a separator, the combination of a frame having side members, carriers movably mounted on said side members, screens connected to said carriers, spring means tending to spread said carriers on said side members to stretch the screens, a longitudinal bar above one of the screens, a longitudinal bar intermediate the screens, and means

to connect said longitudinal bars with the screens.

22. In a separator, the combination of a frame comprising side plates, one of the latter having upper and lower inturned flanges, transverse members secured to said side plates, a screen for grading materials mounted on said frame, a carrier movably mounted between the inturned flanges of said side plate and having a deflecting plate projecting toward the upper flange of said side plate, means connecting said screen with said carrier, and spring means tending to move said carrier outwardly to tension the clothing.

23. In a separator, the combination of a frame having side plates, hooks carried by said side plates, transverse members connected to said side plates to hold the same in spaced relation, a screen having hooks at the margins thereof for connection with the hooks carried by said side plates, a channel member extending longitudinally of the screen intermediate its margins, and means for forcing a portion of said screen into said channel to stretch the screen.

24. In a separator, the combination of a master frame comprising side members, upper and lower transverse members connected to said side members to hold the same in spaced relation, a plurality of screens carried by said master frame having screen clothing, members extending longitudinally of the clothing having tongue and groove means for receiving and stretching the clothing, and means operating through a transverse member to vibrate the clothing.

25. In a separator, the combination of a master frame comprising side members, up-

per and lower transverse members connected to said side members, screen clothing between said transverse members, means to connect said clothing to said side members, a channel having flanges presenting rounded portions to engage one surface of the clothing, a member opposed to said channel to engage the opposite surface of the clothing, and means relatively to adjust said channel and its opposed member to tension the clothing.

26. In a separator, the combination of a master frame comprising side members and upper and lower transverse members connected to said side members; a screen carried by said master frame comprising marginal members and screen clothing having opposed edges secured to said marginal members and free end edges between said marginal members; means to connect said marginal members to the side members of said frame, and means operating through a transverse member to vibrate the clothing.

27. In a separator, the combination of a casing, a master frame therein comprising side members and upper and lower transverse members connected to said side members; a screen carried by said master frame comprising marginal members, and screen clothing secured to said marginal members; means detachably to connect said marginal members with the side members of said frame, hammer means mounted on said casing, and a pin to transmit blows from said hammer means to one of said transverse members to vibrate the screen clothing.

In testimony whereof, I have signed my name to this specification.

THOMAS J. STURTEVANT.