

Aug. 20, 1929.

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1,725,511

APPARATUS FOR SCREENING GRANULAR MATERIALS

Filed Feb. 12, 1926

2 Sheets-Sheet 1

Fig. 1 -

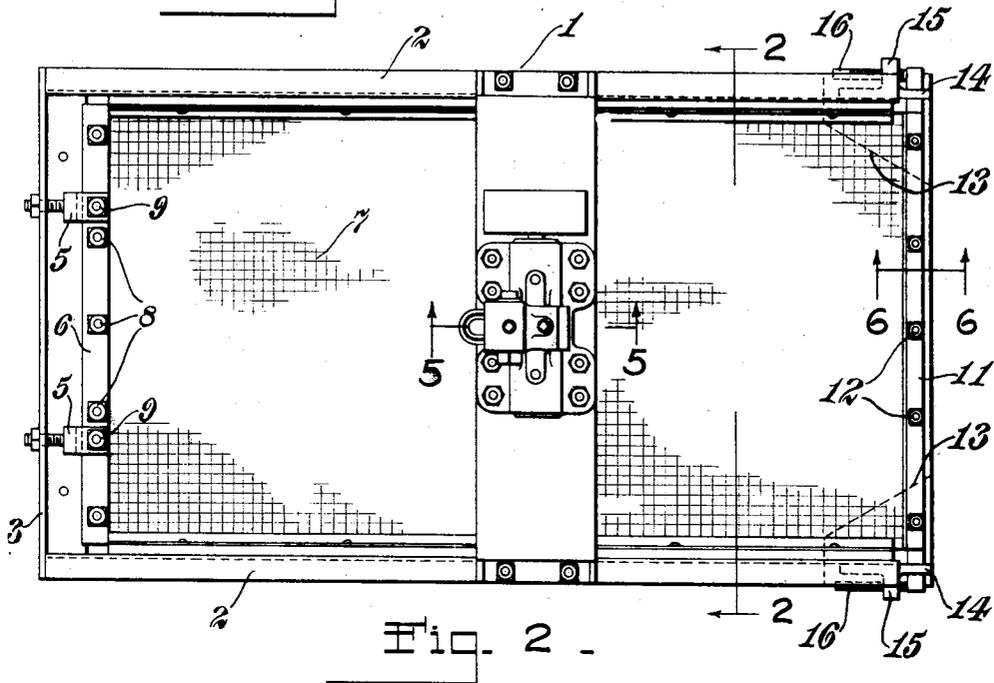


Fig. 2 -

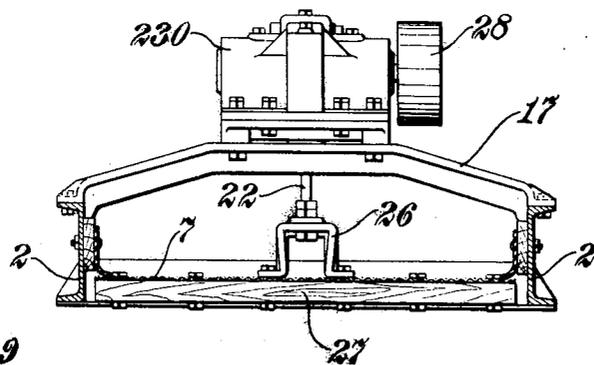
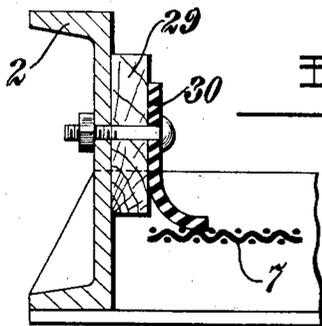


Fig. 3



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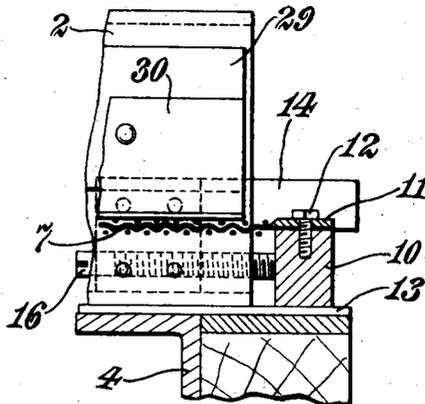
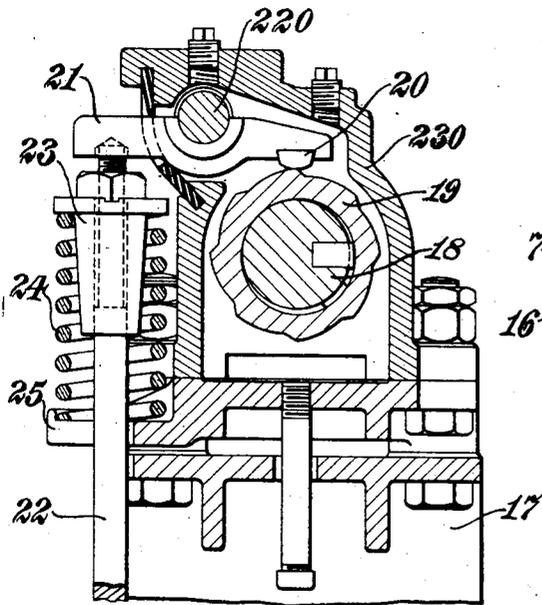
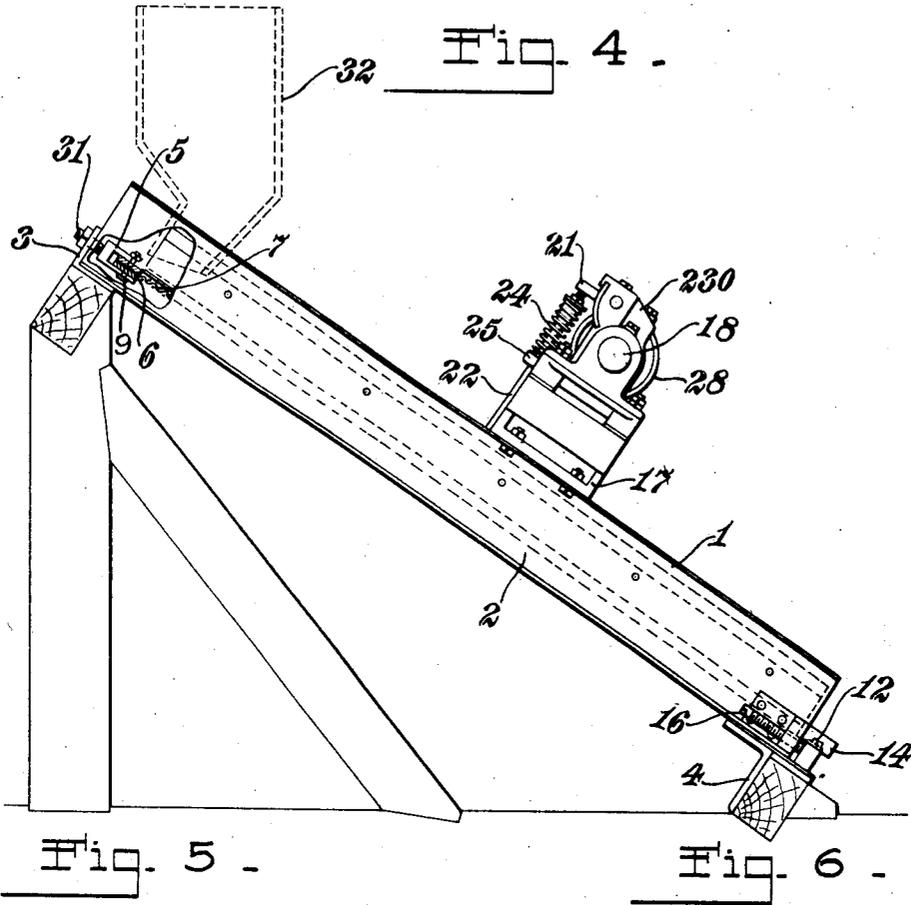
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APPARATUS FOR SCREENING GRANULAR MATERIALS

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2 Sheets-Sheet 2



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APPARATUS FOR SCREENING GRANULAR MATERIALS.

Application filed February 12, 1926. Serial No. 87,832.

This invention pertains to screening apparatus such as may be used for screening granular materials such as coal, gravel and the like.

5 In the type of screening apparatus in which the screening medium such as a wire mesh sheet is set in vibration and the material passed thereover to be screened, it is necessary to prevent the material passing off of the edges of the screening medium before traversing the full extent thereof. Numerous arrangements have been devised for retaining the material on the screen. All of these, however, present undesirable features. If the edges of the screen cloth are turned up these edges are not only rendered too stiff for proper vibration but on account of the continual flexure there is a tendency for the cloth to break at the bend.

20 One of the objects of this invention, therefore, is to provide effective means for retaining the material on the screening medium throughout its travel thereover.

Another object is to provide a guiding edge which will be flexible without danger of breaking.

It is also desirable to have the screening medium mounted so that its tension may be adjusted. Since the vibrating mechanism is connected with the screening mechanism, usually at some intermediate point it is desirable to provide adjustments for the screening medium such that no lateral strains are put upon the connections of the vibrating mechanism when such adjustments are made.

Another object of this invention, therefore, is to provide means for adjusting the screening medium without disturbing the vibrator connections.

Another object is to provide means for making such adjustments in different directions so as to neutralize strains on the vibrator connections.

Further objects will appear from the following description taken in connection with the accompanying drawing in which:

Figure 1 is a plan view of the screening apparatus embodying this invention;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is an enlarged detail of Figure 2;

Figure 4 is a side elevation of the screening apparatus shown in Figure 1;

Figure 5 is a section on line 5—5 of Figure 1; and

Figure 6 is an enlarged detail section taken on line 6—6 of Figure 1.

Referring to the accompanying drawing 1 designates a frame which may be constructed of structural iron or other suitable material and which is usually mounted at an inclination as illustrated in Figure 4. The frame illustrated in the drawings is constructed of channel iron side members 2 and angle iron cross members 3 and 4. Adjustably mounted on the upper cross member 3 are a number of clamping members 5 provided with forked ends or jaws as shown in Figure 4 adapted to receive therebetween a pair of clamping bars 6. The supporting medium 7 may be of screen cloth of any suitable mesh according to the size and kind of material to be operated upon. The end of the screen cloth 7 is placed between the clamping bars 6 which are securely clamped thereto by means of bolts 8. The bars 6 in turn are inserted in the forks of the members 5 and clamped therein by means of bolts 9.

The lower end of the screen cloth 7 is clamped between a rigid cross bar 10 extending across the lower end of the frame and an upper clamping strip 11 having its upper edge beveled as shown in Figure 6. Clamping screws 12 serve to clamp the strip 11 firmly to the bar 10 so as to clamp the screen cloth securely therebetween. The bar 10 rests at its ends upon a pair of plates 13 secured to the side members 2 and is retained in engagement with said plates by a guide bar 14.

Mounted on each of the side members 2 at its lower end is a bracket 15 into which an adjusting screw 16 is threaded to project therefrom so as to engage the end of the cross bar 10 as shown in Figures 1, 4 and 6. The guide bars 14 may be mounted upon or formed as extensions of the brackets 15. It will be seen that by manipulating the screws 16 the cross bar 10 may be slidably adjusted on the frame in order to adjust the tension of the medium 7.

Mounted on the side members 2 at an intermediate portion of the frame is a bridge 17 upon which is mounted the vibrating mechanism. The vibrating mechanism consists generally of a drive shaft 18 carrying a vibrator cam 19 which is adapted to be engaged by a follower 20 on the end of a lever 21 pivoted on a shaft 220 mounted in a housing 230 which encloses the shaft, cam and lever. The end of the lever 21 projects from

the housing and is provided with a socket adapted to receive one end of a vibrating stem 22. The stem 22 is provided with a head 23 resting on a spring 24 which in turn rests on an extension 25 of the housing 23. The spring 24, acting through the head 23, operates to retain the end of the stem 22 in engagement with the socket in the end of lever 21. The stem 22 has mounted on its lower end a bracket 26 to which is secured a cross bar 27 extending across and attached to the screening medium 7. A pulley 28 on the shaft 18 may be belted to any suitable source of power in order to drive the shaft 18. When this shaft is driven the cam 19 will cause the lever 21 to vibrate on its pivot 220 which in turn will cause the stem 22 and, therefore, the cross bar 27 to vibrate up and down. This causes that portion of the screening medium 7 to which the cross bar is attached to vibrate more or less rapidly according to the speed with the same is driven, such speed being adjusted according to the material operated upon.

Mounted on strips 29 on the side members 2 are strips 30 of flexible rubber whose lower edges turn inwardly and rest upon the screen medium 7. The strips 30 are preferably of flexible rubber and one-eighth of an inch in thickness. These strips serve as guides along the edges of the screen medium to prevent the material thereon from passing off of these edges. Being very flexible they vibrate with the screening medium.

In the operation of this device the shaft 18 is driven at a suitable speed so as to vibrate to screening medium. The tension of said medium may be adjusted so that it will take up just the vibration required. Adjustments may be made at either or both ends. Accordingly it is possible not only to adjust the tension of the screening medium but it may be adjusted both ways from the point of attachment of the vibrating mechanism so that the medium may be properly centered. The screws 16 serve for the adjustment of the lower end while the screws 31 by which the clamps 5 are adjusted, serve to adjust the upper end.

The material may be fed to the vibrating screening medium by any suitable means such as a hopper 32. The material passes downwardly over the screen which being in rapid vibration operates to agitate the material so as to cause stratification of the same, the smaller particles passing downwardly and through the meshes of the screening medium while the larger particles roll down the incline thereof. The material is retained on the screening medium by the strips 30 which vibrate in unison with the screen and, therefore, maintain their contact therewith. As the material approaches the point of attachment of the vibrating mechanism it is thrown into more and more violent agitation so that a thorough separation and grading of the

various sizes of particles is carried out. After passing this point the vibration become less violent until the material finally flows off of the screen and over the strip 11 to a suitable receptacle not shown. The thin strip 11 provides a low discharge sill for the material which may pass thereover in a smooth, quiet flow with practically no obstruction.

It will be seen, therefore, that in accordance with this invention a screening device is provided which not only can be adjusted in tension but which can be adjusted at either end so as to center the same and which is provided with guiding or retaining means at its edges which may vibrate with the screen, maintaining its contact therewith and, therefore, effectively prevent the passage of material over the said edges.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention; it is to be understood, therefore, that this invention is not to be limited to the specific details shown and described.

Having thus described the invention what is claimed is:

1. In an apparatus of the character described, a frame, a flexible screening medium, means connected to said medium intermediate its ends for vibrating the same, means for detachably clamping said medium to said frame at one end, a rigid bar movable on said frame at the other end, a thin plate clamping said medium against said bar, and means on said frame and bearing against the free ends only of said bar, adapted to tension said medium, said detachable clamping means being also adjustable whereby said medium may be tensioned from either end.

2. In an apparatus of the character described, a frame, a flexible screening medium mounted in said frame at an inclination, means connected to said medium intermediate its ends for vibrating the same, longitudinally adjustable means for detachably clamping the upper end of said medium to said frame and for tensioning the medium at said end, a rigid support mounted on said frame at the lower end of said medium, a thin plate clamping said medium to said support and adapted to provide a discharge sill for the discharged material, and means for adjusting said support in order to tension said medium at the lower end.

3. In an apparatus of the character described, a frame, a flexible screening medium mounted in said frame at an inclination, means connected to said medium intermediate its ends for vibrating the same, longitudinally adjustable means for detachably clamping the upper end of said medium to said frame, and for tensioning the medium to said end, a rigid support mounted on said frame at the lower end of said medium, and a thin plate clamping said medium to said support and

adapted to provide a discharge sill for the discharged material, and means to tension said medium at the lower end.

4. In an apparatus of the character described, a frame, a flexible screening medium, means connected to said medium intermediate its ends for vibrating the same, longitudinally adjustable means for clamping said medium to said frame at one end, a rigid bar movable longitudinally on said frame at the other end, a plate clamping said medium against said bar, and means on said frame and bearing against the ends of said bar beyond the edges of said medium to adjust said bar longitudinally, said clamping means and said bar being effective to tension the screening medium from opposite sides of said vibrating means.

5. In an apparatus of the character described, a frame, a flexible screening medium, means connected to said medium intermediate its ends for vibrating the same, longi-

tudinally adjustable means for detachably clamping said medium to said frame at one end, a bar movable longitudinally on said frame at the other end, and attached to said medium, and means on said frame and bearing against the free ends of said bar to adjust same longitudinally, said clamping means and said bar being effective to tension said medium from opposite sides of the vibrating means.

6. In an apparatus of the character described, a frame, a flexible screening medium, means for vertically vibrating same in degree varying along its length, longitudinally extending flexible guard strips connected to the frame and resting at their free edges upon the screening medium to yield in proportion to the vertical vibration at each point longitudinally of the screening medium.

In testimony whereof I affix my signature this 28th day of July, 1925.

VICTOR E. FLANAGAN.