

Nov. 16, 1948.

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2,453,883

VIBRATORY SCREEN

Filed Jan. 4, 1945

2 Sheets-Sheet 1

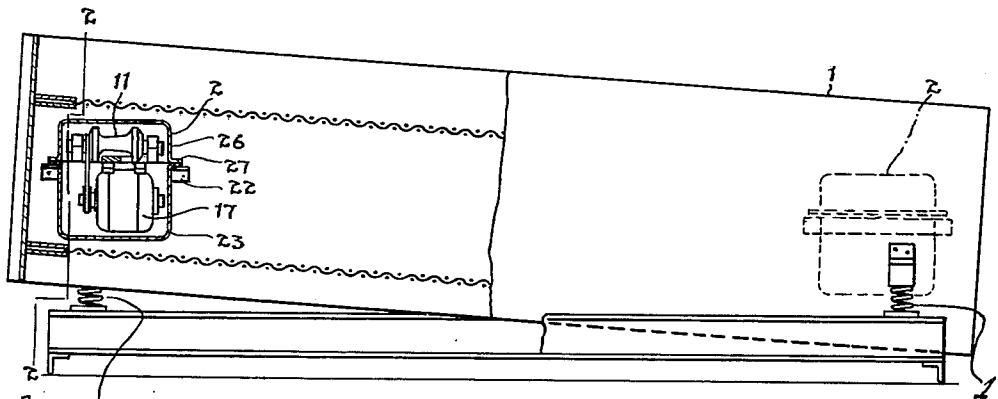


Fig. 1.

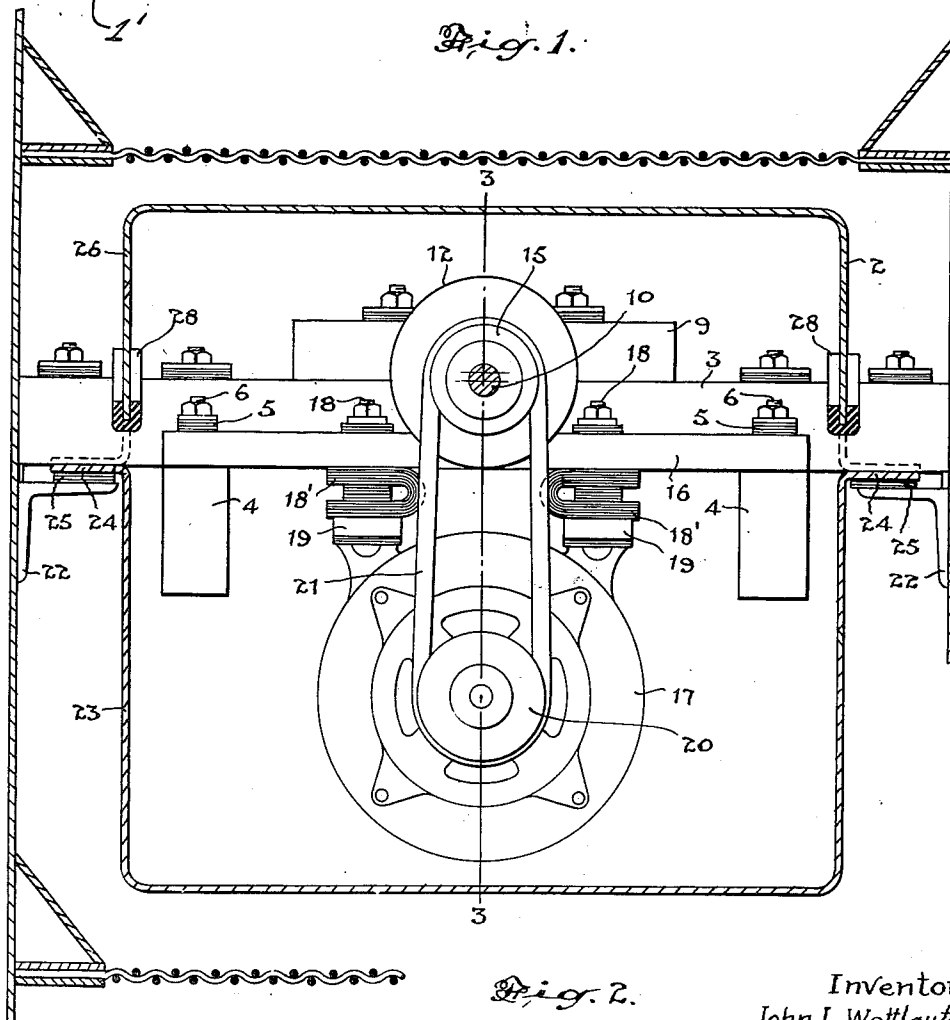


Fig. 2.

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2 Sheets-Sheet 2

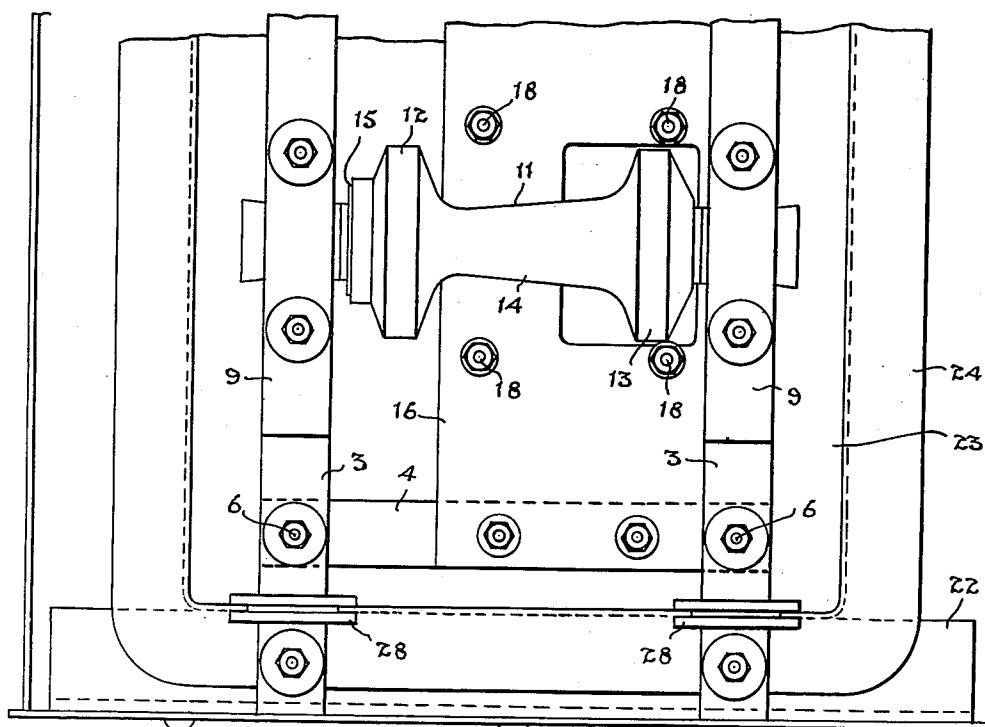


Fig. 4.

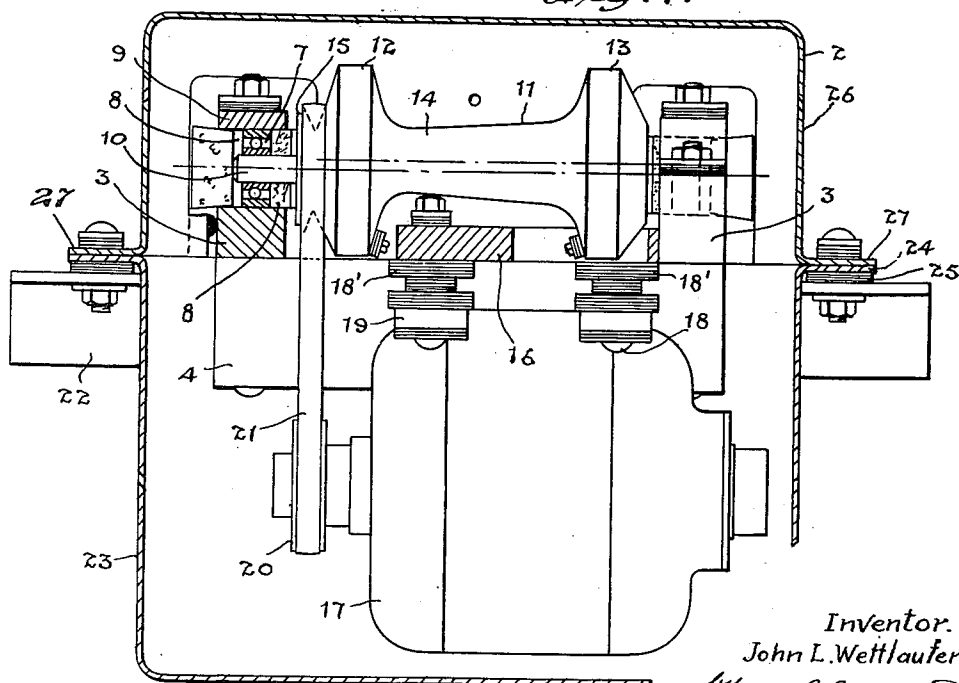


Fig. 3.

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UNITED STATES PATENT OFFICE

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VIBRATORY SCREEN

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Application January 4, 1945, Serial No. 571,311

3 Claims. (Cl. 209—326)

1

This invention relates to improvements in vibrating screens used for the grading or separation of mixed particles of material and the principal object of the invention is to provide a screening device having high efficiency in separation effect, and in screening devices having multiple screens providing means for operating the screens individually with selected vibratory qualifications.

A further object is to provide individual vibrating means which may be completely insulated from the detrimental effect of dust.

The principal feature of the invention consists in mounting upon a flexible supported screen frame an individual vibratory unit completely enclosed within a dust-proof casing, so that the vibratory action will be in a direction transverse to the screen, thereby causing the material being screened to travel back and forth across the screen as it travels from end to end.

In the accompanying drawings

Figure 1 is an elevational part longitudinal section of a screen device showing the improved application of the vibrating unit thereto.

Figure 2 is an enlarged part cross section through the screening device taken on the line 2—2 of Figure 1.

Figure 3 is a part sectional elevation of the device taken on the line 3—3 of Figure 2.

Figure 4 is a part plan view of the structure illustrated in Figure 3 with the cover removed.

In the crushing of ores and stone it is important that the maximum amount of separation of the crushed material passing over a screen be separated in each unit length of screen and it is found that very much improved results are obtained by applying vibration transversely of the screen which causes the materials being screened to zig-zag back and forth across the screen in their travel from end to end thereof.

In order to accomplish this result I have placed within the frame of a screen 1 mounted on springs 1', as illustrated in Figure 1, one or more enclosed vibrating units 2, such as is fully described in my co-pending application filed concurrently herewith, and numbered 571,310, dated January 4, 1945.

This unit, as illustrated in detail in Figures 2, 3 and 4, comprises a rigid frame formed of a pair of parallel spaced bars 3 rigidly connected across points adjacent to their ends by bars 4 which are preferably spaced by resilient washers 5 and secured by bolts 6.

Journal bearings 7 are mounted centrally of the length of the bars 3 in recesses 8 and they are

2

secured in position by short bars 9 rigidly bolted to the top thereof.

Within the bearings 9 are journaled the shaft extensions 10 which are eccentrically mounted in a unitary concentric spool-shaped member 11 which being eccentric to the shaft ends applies a vibratory effect to the frame formed by the bars 3 and 4 when rotated.

The vibratory member 11 is formed with a pair of spaced-apart bevelled disc-shaped portions 12 and 13 joined by a tapered hub 14, and a bevelled flange 15 bevelled inwardly toward the outward side of the disc 12 which forms a V-groove pulley, the periphery of said pulley being concentric to the shaft 10.

A plate 16, which may be wood or metal, is rigidly secured to the bars 4 of the frame, and to the underside of this plate is mounted a motor 17 which is hung on bolts 18, and resilient members 18' are mounted between the supporting lugs 19 and the underside of the plate and are adapted to partially absorb the sharp impact vibrations so that the journals of the motor shaft will not be injuriously affected by the vibrations.

The motor 17 is provided with a V-pulley 20 which is aligned with the pulley formed by the flange 15 and the disc 12 of the member 11 and a V-belt 21 is stretched between these pulleys.

It will be understood from this description that the eccentrically mounted member 11 journaled in bearings in the rigid frame to which the motor for driving the eccentric member is attached, forms a compact vibrating unit. This unit is placed within the screen structure 1 with the cross bars 3 extending transversely of the screen frame and having their ends supported by angle bars 22 secured to the inner side of the frame.

Surrounding the vibratory unit is a casing formed in two sections, the bottom section 23 having outwardly turned flanges 24 extending completely therearound, the flanges at one end extending between the cross bars 3, and resilient washers 25 arranged on the supporting bars 22.

A cover 26 extends over the top of the bottom section 23 and is provided with a lateral flange 27.

Suitable openings are cut to extend around the protruding ends of the bars 3 and these are sealed by grooved rubber gaskets 28.

The unit is thus completely enclosed within a dust-proof casing and it will be noted that the cross bars 3 of the rigid frame of this vibrating unit are mounted on brackets secured inside the walls of the screen frame 1.

Consequently the vibrations set up or generated

3

by the vibratory unit described will be imparted to the screen frame which is spring-mounted and will respond to such vibrations.

It will be noted that the bars 3 of the unit extending transversely of the screen frame will impart vibrations laterally, consequently the transverse vibrations imparted to the screen frame will cause the material placed on the screen to be shaken from side to side and as the screen is of course placed upon an incline the vibratory effect will cause the particles resting on the screen to travel back and forth in a zig-zag pattern over the face of the screen extending from the top to the discharge end.

In small screens a single unit may be utilized to impart the necessary vibration but as herein illustrated the screen 1 is provided with vibratory units arranged at the upper and lower ends thereof, and these units are placed so that the axis of the rotating vibratory element is arranged longitudinally of the screen frame. Consequently the vibrations generated will be applied transversely of the frame and as this effect is produced at both ends a most desirable result is achieved and the efficiency of a screen is greatly enhanced.

What I claim as my invention is:

1. A vibratory screen, comprising a resiliently supported screen inclined longitudinally, a pair of rigid frame bars extending transversely of the screen and rigidly connected to the frame of the screen, journal bearings mounted centrally of the length of said bars, an individual spool-shaped vibratory member extending transversely between said rigid frame bars and having eccentric shaft extensions journaled in said journal bearings, and a motor resiliently suspended from said frame bars and operatively connected to drive said vibratory member, said vibratory member having its axis extending longitudinally of the screen to impart its vibrations directly to said frame bars through said journal bearings and substantially in a direction longitudinally of said frame bars and transversely of the screen to direct the material being screened from side to side of the screen in its travel down the inclined screen surface.

4

2. A vibratory screen comprising a resiliently supported screen inclined longitudinally, a pair of rigid frame bars extending transversely of the screen and rigidly connected to the frame of the screen, journal bearings carried by said frame bars a spool shaped unitary rotatable weighted vibratory member extending between said bars and having eccentric shaft extensions journaled in said journal bearings, said spool member having mass concentrations adjacent said bars and having its axis parallel the longitudinal sides of said screen to impart vibrations directly to and principally longitudinally of said rigid transverse frame bars to vibrate said screen transversely, and a shock-mounted electric motor suspended from said rigid transverse frame and operatively connected with said vibratory member to rotate same.

3. A device as claimed in claim 2 in which the spool-shaped vibratory member is formed with an integral pulley portion eccentric to the axis of the spool member and concentric with said shaft extensions.

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