July 8, 1924. 1,500,856

T. D. WALSH

VIBRATING SCREEN

Filed Feb. 5, 1921 2 Sheets-Sheet 1

Fig. 1

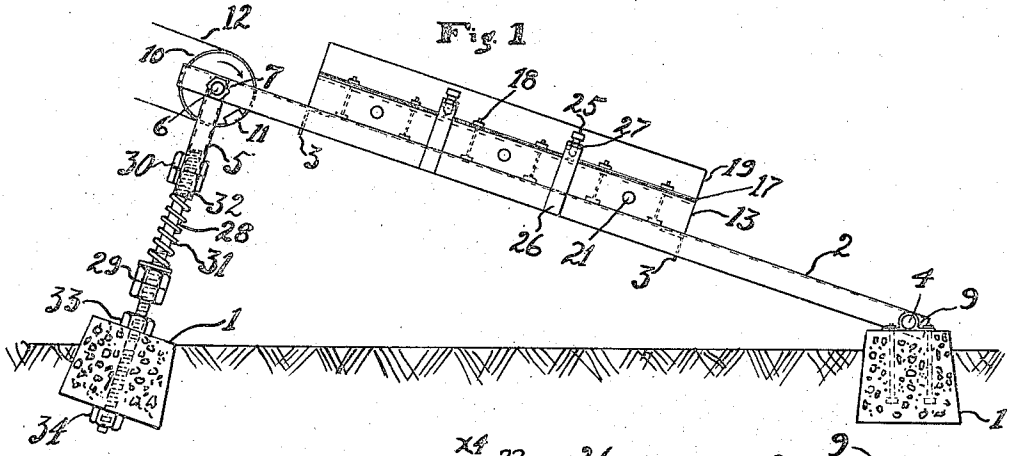


Fig. 2

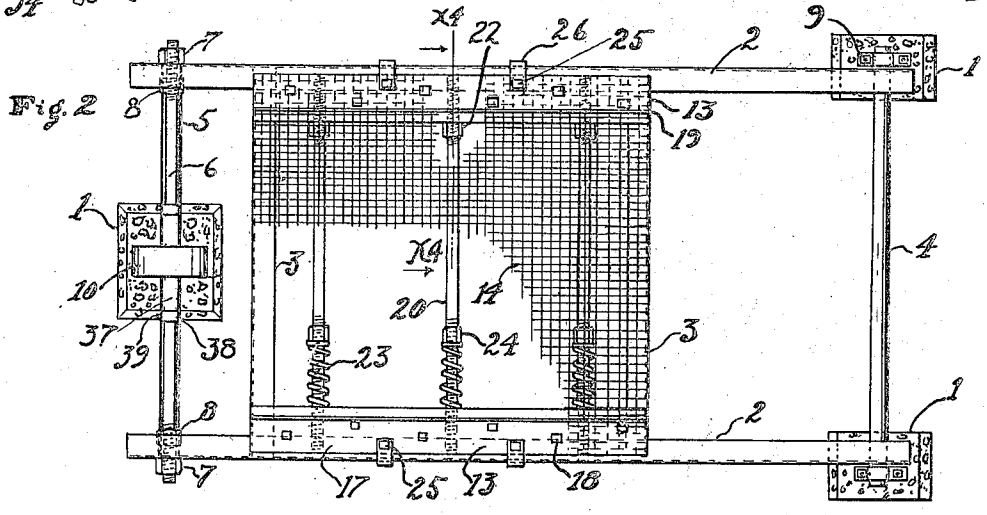


Fig. 3

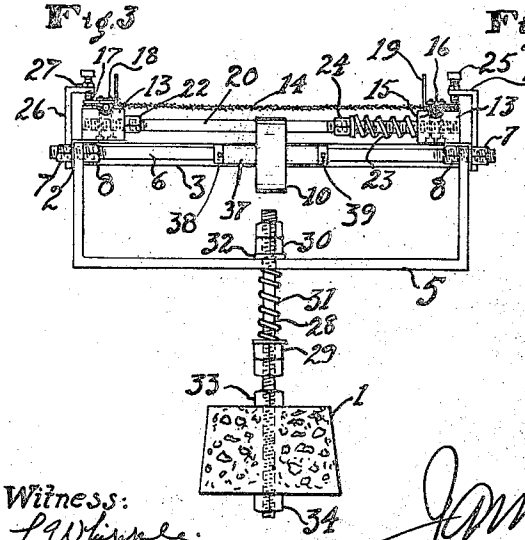
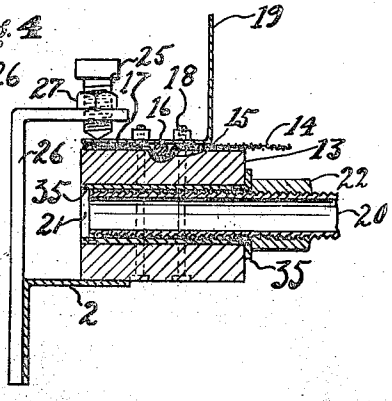


Fig. 4



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Inventor:
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Fig. 5

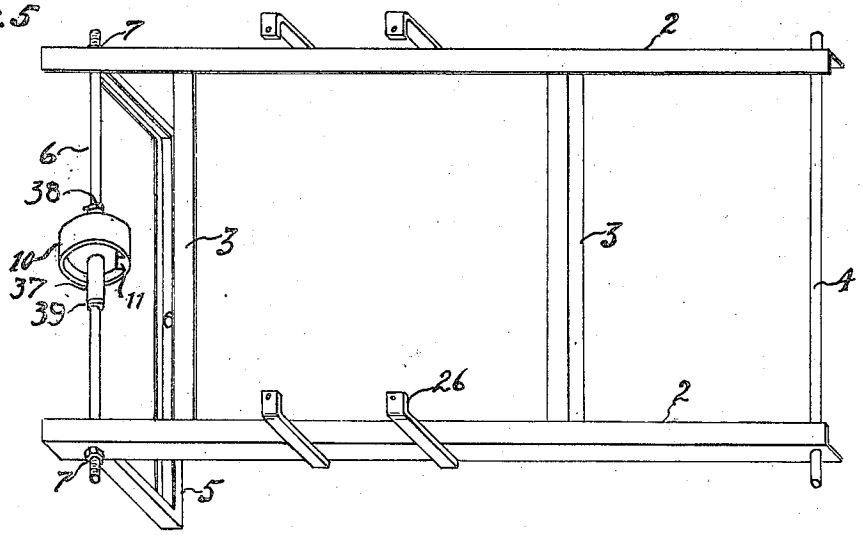
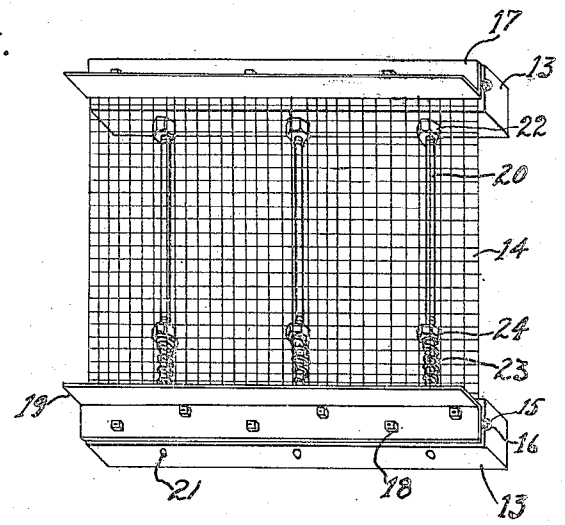


Fig. 6.



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Patented July 8, 1924. 1,500,856

UNITED STATES PATENT OFFICE.

TIMOTHY D. WALSH, OF LOS ANGELES, CALIFORNIA.

VIBRATING SCREEN.

Application filed February 5, 1921. Serial No. 442,728.

To all whom it may concern:

Be it known that I, TIMOTHY D. WALSH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Vibrating Screen, of which the following is a specification.

This invention relates to apparatus for sizing by gravity, granular material such as rock, gravel, coal, ore, etc.

In carrying out this invention I have made provision for oscillating a screen on an axis at a high rate of vibration with a yielding stop at one side and a bumping stop at the other side of the oscillation; and it is necessary in carrying out the invention that the structure of the screen shall be very strong and capable of sustaining rapid and severe shocks and vibrations continuously for long periods of time; and also that an automatic take-up be provided for tightening the wire cloth or other screen surface from time to time to correct the tendency of the same to sag under the load and strain placed upon it.

An object of this invention is to produce a comparatively cheap and simple screening apparatus of this character adapted to be readily adjusted to suit various requirements.

An object is to provide for ready and quick removal of worn out screen surfaces and replacement of the same with new.

Another object is to readily change the angle of inclination of the screen to suit different classes of material.

In carrying out this invention I employ an unbalanced rotor operating on an oscillating screen, and for convenience in changing the screens or the wire cloth or other screen material, the screen frame is detachably mounted on a frame oscillating on a pivotal axis and arranged to yieldingly hold the screen aslant with the unbalanced rotor at the upper end.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detail description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of the sizing apparatus constructed in accordance with this invention.

Fig. 2 is a view perpendicular to the plane of the screen further illustrating the apparatus shown in Fig. 1; omitting portions of the screen surface.

Fig. 3 is an end view of said apparatus in a plane perpendicular to the yielding support shown in Fig. 1.

Fig. 4 is a fragmental detail in section on line x^4, Fig. 2.

Fig. 5 is an isometric projection of the vibrating frame detached with rotor in place.

Fig. 6 is an isometric projection of the screen frame detached.

The support 1 may be concrete piers or heavy timbers or any character of construction adapted to withstand the vibratory strain of the apparatus.

The vibrating frame is shown as constructed of the side members 2, the cross members 3, the axis 4 and the yoke 5, all rigidly fixed together as by bolting or welding, and shaft 6 rigidly fixed in place by nuts 7, 8.

The axis 4 of the frame is journalled by bearings 9 to the support 1. The axis 4 and yoke 5 are widely separated.

The rotor is shown in the form of a pulley 10, mounted on the shaft 6, and unbalanced in a suitable manner as indicated by the eccentric weight 11; and driven by any suitable means as by the belt 12 which may be connected to a high speed motor or other suitable driving means.

The screen is mounted upon the frame members 2 and comprises two longitudinally grooved side rails 13 upon which is applied screen material 14 that may be wire cloth or other material of any desired character adapted to be used for sizing. Said screen material is depressed into the longitudinal grooves 15 which are on the top surface of the side rails and is secured in place by means of clinchers 16 clamped to the rails by angle irons 17 and carriage bolts 18. Said angle irons 17 have their flanges 19 adjacent to the screening surface 14 between the rails, and may serve, as, or as supports for, side boards for the screen.

The rails 13 are mounted in laterally adjustable relation to each other by means of adjusting rods 20 inserted into seats formed by holes 21 in the rails 13, which rails are yieldingly held apart by cooperation of the tension stop formed by a nut 22 engaging one of the rails 13, and a tension spring 23 operating between the other rail and a ten-

sion stop formed by the nut 24 on the adjusting rod 20.

Said stops 22 and 24 are threaded to the rod and are adjustable thereon to increase or relieve the tension of the screen. The tension of the screen surface 14 is maintained at any desired degree of stretch or tautness by screwing the nuts 24 along the adjusting rods 20.

The screen frame is fixed to the oscillating frame by pointed set screws 25 screwed through brackets 26 fixed to and extending upward from the oscillating frame above the side members thereof, and against the angle irons 17; and are fixed in place by the jam nuts 27. When the set screws 25 at one or both edges of the screen are unscrewed, the springs 23 spread the rails 13 apart thus tightening the screen surface. The adjusting rods 20 extending through the holes 21, hold the rails in true position. The oscillating frame and the screen slope downward from the rotor toward the pivotal axis 4.

The rotor end of the frame is supported by a pillar 28 having adjustable stops formed by the nuts 29 and 30, said pillar extends through the yoke 5 which is resiliently supported by a spring 31 surrounding the pillar and resting on the lower stop 29 and adapted to yieldingly drive and hold the cross-bar of the yoke up against the upper stop 30. A cushion 32 is preferably interposed between the upper stop 30 and the yoke. The pillar is held rigidly to the foundation by suitable means as the nuts 33, 34.

The threaded ends of the adjusting rods 20 are shown mounted in holes 21 by means of metal bushings 35 to avoid wear.

It is thus seen that in the preferred form the mechanism consists of a frame, supported at one end by a shaft 4 and bearings 9, and at the other end by a coil spring 31, and the frame is preferably vibrated by means of a weighted or unbalanced, belt-driven pulley located above the coil spring. The pulley may be keyed to a shaft revolving in bearings attached to the frame work, or it may revolve on a shaft fastened rigidly to the frame. The number of vibrations per minute of the frame varies directly as the speed of the pulley.

The centrifugal of the weight 11 on the pulley 10 causes an unbalanced radial pull away from the axis of the pulley that imparts a vibration to the frame; since the frame work at the opposite end from the pulley is rigidly attached to the shaft 4 supported by bearings 9, the resultant motion produced by revolving the weighted pulley, is in the arc of a circle. In other words the pulley end of the frame can only travel on the circumference of a circle whose center is the center of the shaft 4 at the bearing end.

The spring 31 supporting the pulley end of the vibrating frame, is preferably adjusted to yieldingly support the weight of the frame and its load at the upward limit of the frame travel. It has the additional function of assisting the unbalanced rotor in forcing the reciprocating end of the frame upward in the arc of travel lessening the effect of such force in the downward arc of travel of the frame. The spring is preferably held in place by the rod 28 anchored to a foundation and passing through the spring and through a yoke resting on the spring and rigidly attached to the frame work, and the tension on the spring is preferably regulated by the nut 30 on the upper end of the rod; said nut also acting as a bumper on the upward stroke of the frame.

The effect of stopping the screen with a bump, on the upward stroke of the frame is to allow the material being screened to jump away from the wire cloth for an instant; thus to free the wire cloth from any particles tending to clog it. The sharpness of the bump is regulated by the tension of the spring.

The screen frame is attached to the vibrating frame by means of set screws passing through clamps rigidly attached to the sides of the vibrating frame so as to securely hold the same, and yet allow quick change of screens as shown.

The screen frame is constructed so as to support the wire cloth or other screening material in such a manner that the cloth is held firmly in position and remains taut.

The rotor shown is in the form of a pulley having a long hub 37 journalled on the shaft 6 and held in place by the collars 38 fixed to said shaft by the set screws 39.

I claim:

1. A screen comprising a frame with a bump at the end of the relieving movement; rails supported by said frame, each having a longitudinal groove upon its top surface; transverse rods upon which the rails are mounted in a laterally adjustable relation to each other; a screen surface extending across the space between the rails and crimped into the longitudinal grooves; clinchers on the screen surface to compress it into said grooves; means fixed to the top of the rails to hold the clinchers in place to secure the screen surface to the rails; and automatic resilient means to normally spread the rails apart.

2. A screen comprising a frame; rails supported by said frame, each having a longitudinal groove upon its top surface; transverse rods upon which the rails are mounted in a laterally adjustable relation to each other; a screen surface extending across the space between the rails and crimped into the longitudinal grooves;

clinchers on the screen surface to compress it into said grooves; angle irons fixed to the rails to hold the clinchers in place and to form sides for the screen space between said rails; and automatic resilient means to normally spread the rails apart to tighten said screen.

3. The combination with a support; of a frame pivotally mounted on the support and adapted to oscillate; a pillar mounted on said support and extending toward the frame; a spring carried by the pillar and resiliently supporting the frame at a distance from the pivot; a bumper mounted on said pillar to stop the frame on its upward movement; and an unbalanced rotor connected to the frame to vibrate it on its axis of oscillation.

4. The combination with a frame pivoted at one end and provided at the other end with a yoke; of a pillar extending through the yoke; a spring carried by the pillar and adapted to resiliently support the yoke; a bumper carried by the pillar and adapted to stop the yoke at the end of the upward travel; and an unbalanced rotor on the frame.

5. The combination with a screen pivotally mounted at one end, of a spring arranged to normally hold the screen aslant, a cushion stop to limit the upward movement of the upper end of the screen; and an unbalanced rotor operable to vibrate the upper end of the screen to move the same away from and toward the stop.

6. In a screening apparatus comprising a frame pivotally mounted at one end and provided with a yoke at the other end, and being adapted to support a screen; a pillar extending through the yoke; a spring arranged to normally hold the frame aslant; a stop on said pillar adapted to engage said yoke; and an unbalanced rotor mounted on said frame above said spring to vibrate the upper end of the screen to move the same away from and toward the stop.

7. In a screening apparatus comprising a frame pivotally mounted at one end and provided with a yoke at the other end, and being adapted to support a screen; a pillar extending through the yoke; a spring arranged to normally hold the frame aslant; a stop on said pillar; a cushion interposed between said stop and said yoke; and an unbalanced rotor mounted on said frame above said spring to vibrate the upper end of the screen to move the same away from and toward the stop.

8. A screening apparatus comprising a frame pivotally and resiliently mounted on the support and provided with side and cross members; brackets fixed to and extending upward from said side members; a screen having side rails adjustable toward and from each other; screen material connecting said side members; means on said brackets adapted to fix the side rails of the screen to the side members of the frame; and means to vibrate said frame and screen for the purpose set forth.

9. In a screening apparatus comprising a frame pivotally mounted at one end and provided with a yoke at the other end, and being adapted to support a screen; a pillar extending through the yoke; a spring arranged to normally hold the frame aslant; and a stop on said pillar adapted to engage said yoke; and means to adjust the tension of the spring.

In testimony whereof I have hereunto set my hand at Los Angeles, California, this 28th day of January, 1921.

TIMOTHY D. WALSH.

Witness:
JAMES R. TOWNSEND.