W. J. BELL & T. L. & T. J. STURTEVANT.

VIBRATING SCREEN OR SEPARATOR.

APPLICATION FILED OCT. 4, 1907.

923,108. **Patented May 25, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.

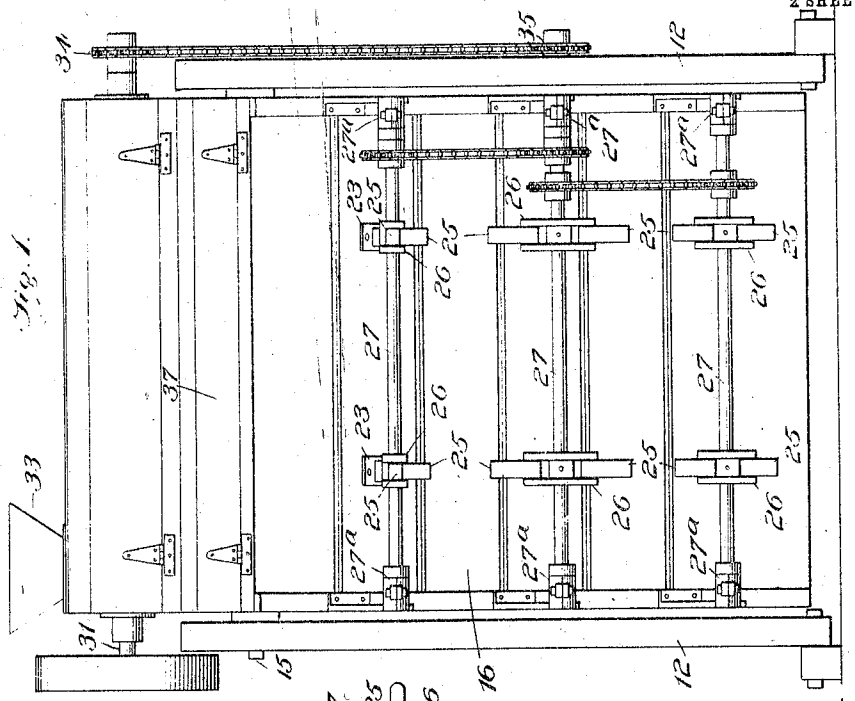
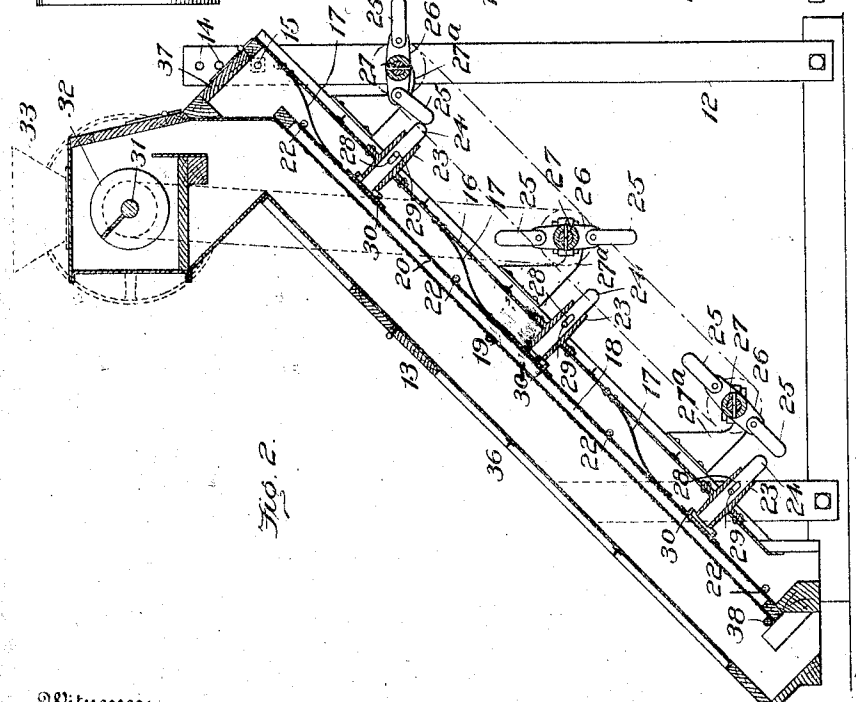


Fig. 2.



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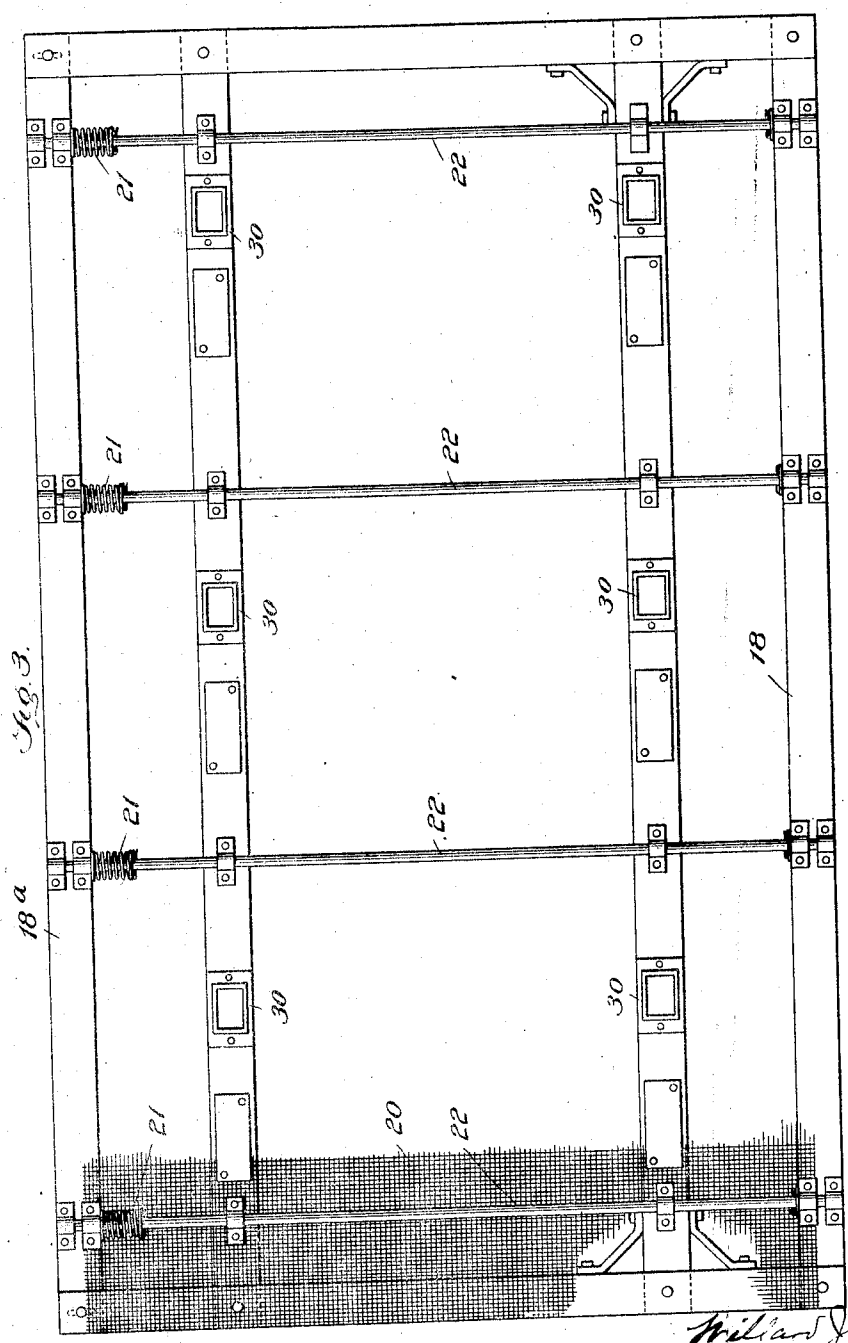


Fig. 3.

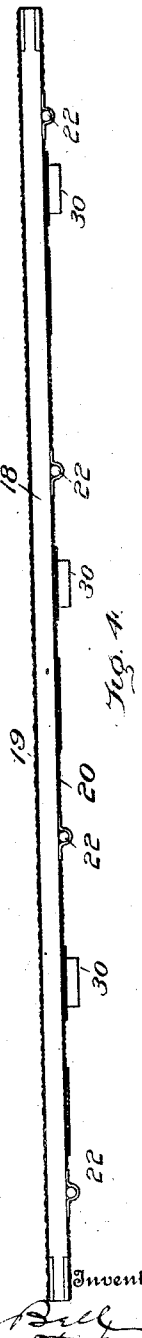


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLARD J. BELL, OF NEWAYGO, MICHIGAN, AND THOMAS LEGGETT STURTEVANT, OF QUINCY, AND THOMAS JOSEPH STURTEVANT, OF WELLESLEY, MASSACHUSETTS; SAID T. L. AND T. J. STURTEVANT ASSIGNORS TO SAID BELL.

VIBRATING SCREEN OR SEPARATOR.

No. 923,108. Specification of Letters Patent. Patented May 25, 1909.

Application filed October 4, 1907. Serial No. 395,935.

To all whom it may concern:

Be it known that we, WILLARD J. BELL, residing at Newaygo, in the county of Newaygo, State of Michigan; THOMAS L. STURTEVANT, residing at Quincy, county of Norfolk, State of Massachusetts, and THOMAS J. STURTEVANT, residing at Wellesley, in the county of Norfolk, State of Massachusetts, have invented certain new and useful Improvements in Vibrating Screens or Separators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain improvements on the vibrating screen or separator covered by U. S. Patent No. 754,839, dated March 13, 1904, the invention having for its object to provide a convenient screen device of such construction that the vibrations of the screen will be as free as possible, as also to protect the screen surface from being injured by the percussive vibrating mechanism, and to hold the screen surface at all times under an automatic elastic tension.

In the accompanying drawings Figure 1 is an elevation of the improved machine, and Fig. 2 a vertical section of the same. Figs. 3 and 4 are detail views of the screen frame and screen.

Referring to the drawings, 12 denotes a suitable framework on which the screen box 13 is suitably supported in an inclined position, provision being preferably made for changing the angle of inclination of the said screen box by providing the upper ends of the longer uprights or posts of the frame with a series of holes 14 in any one of which may be placed a cross bolt 15 which secures the upper end of the screen box to the said posts. To the bottom piece or frame 16 of the screen box suitable springs 17 are attached, said springs elastically supporting the screen frame 18. The said frame may be provided with an upper screen 19 and a lower screen 20, as in the construction shown by the patent referred to, said upper screen being coarser than said lower screen. It is, however, not essential that our improved construction should include two screens of different mesh, as for some classes of work only a single screen may be desired.

In order to secure the best possible vibrating results it is necessary that the wire cloth of the screen should be kept under an elastic tension, and to this end one of the side pieces 18^a of the screen frame, to which the wire cloth is attached, is preferably slidably mounted in the top and bottom piece of the said frame, and the wire cloth is kept under a strong elastic tension by springs 21 encircling cross rods 22 which push outward against the opposite side pieces of the frame, and by means of which springs and cross rods the wire cloth or screen proper attached to the frame will be stretched or kept automatically under a strong elastic tension. This automatic elastic tension of the screen we consider very important.

Attached to the bottom piece 16 of the screen box are hollow guides 23 in which are mounted sliding strikers or impact bars 24 by which percussive vibrations are imparted to the screen; said impact bars being acted on by swinging hammers 25 carried by rotating arms 26 driven from the shafts 27 journaled in suitable hangers 27^a depending from the bottom of the screen box. The impact bars 25 are provided with slots 28 through which pass pins 29 which will prevent said bars from sliding down and out of the hollow guides 23; said impact bars retiring or falling, by gravity, away from the screen after having been forced upward percussively by the rotating hammers 25. By arranging these sliding impact bars below the screens, instead of above the same, as in the construction of the patent hereinbefore mentioned, the said impact bars will not remain in contact with the screen under the influence of gravity, in such a manner as to check the vibrations or jarring movements thereof, but will retire therefrom immediately after the percussive strokes.

The jarring impulses of the strikers or impact bars are received by protecting metallic strips or parts 30 attached to the lower screen and against which strips or parts said strikers or impact bars can strike; said strips or parts being provided with depending flanges surrounding and overlapping the upper ends of the hollow guides 23, so as to prevent the screened material from passing into said guides. These protecting strips prevent the screen surfaces or delicate wire-cloth screens from being damaged by the

percussive hammer strokes acting through the impact bars.

The shafts 27 are driven from the main shaft 31 mounted in the upper portion of the screen box, and which serves to drive the feeder 32 by which the material from the hopper 33 is fed to the screen; the said shaft 31 being provided with a sprocket-wheel 34 suitably connected with a sprocket wheel 35 driving the central shaft 27 and from which central shaft the other shafts 27 are driven by suitable sprocket gearing.

In order that the hammers 25 may give sudden quick percussive strokes to the strikers or impact bars 24, and thus avoid drag of the said hammers over said strikers or bars, the lower ends of the latter will preferably be rounded and the ends of the hammers likewise rounded to enable or permit the said strikers or impact bars to drop by gravity or be otherwise caused to rebound, or be removed as by the action of springs, as soon as they have delivered their percussive blows.

The screen box 13 is preferably provided at its upper side with suitable hinged covers 36 to permit of access to the chamber of the said box; and the upper end of said box is also provided with a hinged door 37 through which the screen frame and screen may be inserted into or removed from the chamber of said box. To prevent the screen frame from lifting under the impulse of the vibrating posts or bars any suitable means, as the cross rod 38 at the lower end of the screen frame, may be provided.

By arranging the strikers or impact bars 24 and their operating mechanism below the screen frame, instead of above, as in the construction of the patent hereinbefore referred to, the percussive jarring or vibrating mechanism will be out of the way, so that the screen may be inserted into or removed from the screen box more conveniently than with the former construction.

Having thus described our invention we claim and desire to secure by Letters Patent:—

1. The combination with a wire cloth screen, of a frame on which said screen is mounted, means, comprising stretching springs mounted on the said frame, acting on said wire cloth screen and serving to hold the same under elastic tension in said frame and relative to the bars thereof, means for imparting percussive vibrating movements to said screen, and protecting means for preventing the screen surface from being injured by the percussive mechanism.

2. The combination with an inclined, wire cloth screen, of a frame-work on which the same is sustained, means for changing the angle of inclination of the said screen, means for imparting percussive vibrating movements thereto, and one or more stretching springs mounted on said frame and acting on the said wire cloth screen and serving to hold the screen surface under elastic tension relative to the bars of said frame.

3. In a separator, the combination with a wire cloth screen, of a frame to which said screen is attached, and which frame comprises a loosely mounted side member, one or more springs, coöperating with said side member, for automatically maintaining said screen under elastic tension, and percussive jarring means for vibrating said screen.

4. In a separator, the combination with a substantially rectangular frame having one of its side members slidably mounted on the two adjacent end members, one or more springs for exerting a yielding pressure upon said slidably mounted member, a wire cloth screen attached to said slidably mounted member and to the other members of said frame, and percussive jarring means for vibrating said screen.

5. The combination with an inclined, spring-supported, wire cloth screen, of mechanism arranged below the same and serving to impart percussive vibrating movements thereto, a frame on which said screen is mounted, and one or more stretching springs acting on the said wire cloth screen and serving to hold the same under elastic tension relative to the bars of said frame.

6. The combination with an inclined, spring-supported wire-cloth screen, of stretching springs for maintaining the screen surface under elastic tension, sliding impact bars for imparting percussive vibrating movements thereto, rotating and swinging hammers for intermittingly striking said impact bars, and protecting means for preventing the screen from being injured by the percussive action of said hammers and impact bars.

7. The combination with an inclined wire cloth screen, of stretching springs for holding the screen surface under strong elastic tension, means for vibrating the screen surface and comprising hammers and impact bars acting percussively on the screen from below the same, and means for protecting said screen from being damaged by the percussive hammer strokes.

8. The combination with an inclined, spring-supported screen, of means, comprising stretching springs, for maintaining the screen surface under elastic tension, sliding impact bars arranged below said screen, so as to retire therefrom by the action of gravity, for imparting percussive vibrating movements thereto, hammers arranged to strike said impact bars, and protecting means for preventing the screen from being injured by the percussive hammer strokes.

9. The combination with an inclined, spring-supported screen, of strikers or impact bars normally out of contact with said

screen, hammers for causing said strikers or impact bars to intermittingly act on said screen, hammers for causing said strikers and means for holding the said screen under elastic tension.

10. The combination with a spring-supported screen, of retiring strikers or impact bars normally out of contact with said screen, and hammers for causing said strikers or impact bars to act intermittingly on said screen for the purpose of vibrating or jarring the same.

11. The combination with an inclined, spring-supported screen, of retiring strikers or impact bars normally out of contact with said screen, and hammers for causing said strikers or impact bars to act on said screen for the purpose of vibrating or jarring the same, said impact bars and hammers having rounded ends to avoid drag of the said hammers over said bars.

12. The combination with an inclined, spring-supported screen, of retiring strikers or impact bars arranged below and normally out of contact with said screen, hammers for causing said strikers or impact bars to act on said screen for the purpose of vibrating the same, and means for holding the said screen under elastic tension.

13. The combination with an inclined, spring-supported screen, of means whereby the angle of inclination of said screen may be varied, retiring impact bars, arranged beneath and normally out of contact with said screen and acting percussively on said screen, for jarring or vibrating the same, and means for operating said impact bars.

14. The combination with an inclined, spring-supported screen, of means whereby the angle of inclination of said screen may be varied, sliding impact bars, arranged beneath and normally out of contact with said screen and acting percussively on said screen, for jarring or vibrating the same, means for operating said impact bars, and means for holding the screen surface under elastic tension.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLARD J. BELL.
THOMAS LEGGETT STURTEVANT.
THOMAS JOSEPH STURTEVANT.

Witnesses to the signature of Willard J. Bell:

LOUIS F. ECKARD,
ROY G. SCOFIELD.

Witnesses to the signatures of Thos. L. and Thos. J. Sturtevant:

RUBERT M. GAY,
HENRY A. TOMLINSON.