March 29, 1927. 1,622,305

J. BLAND

SCREEN

Filed Nov. 13, 1924 2 Sheets-Sheet 1

Fig. 1.

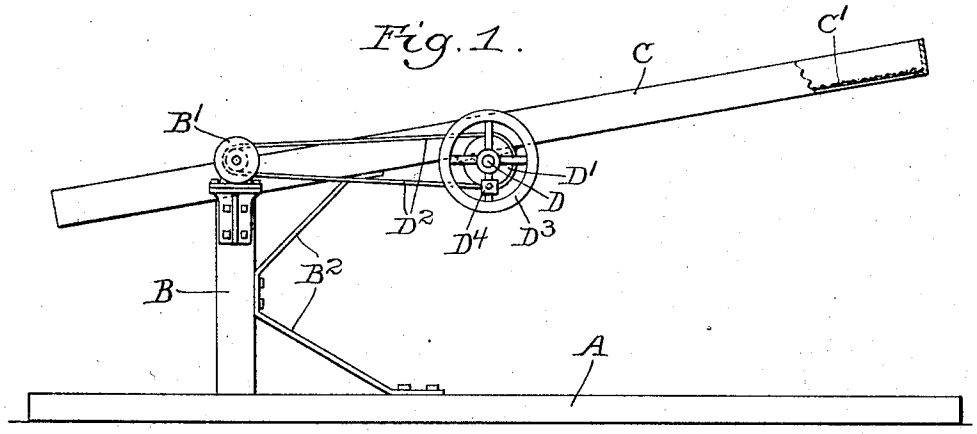
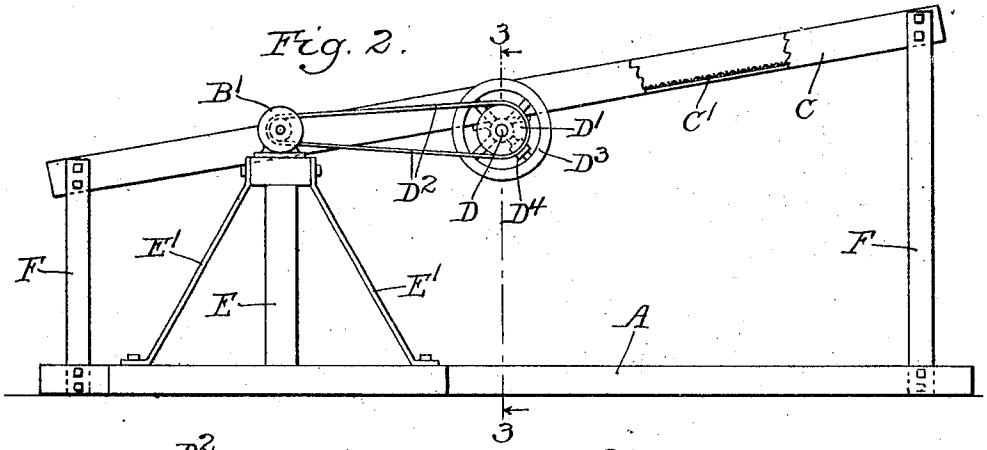


Fig. 2.



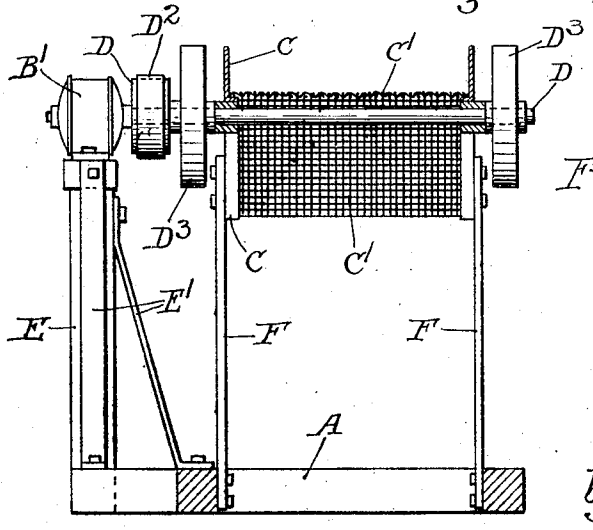


Fig. 3.

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Fig. 4.

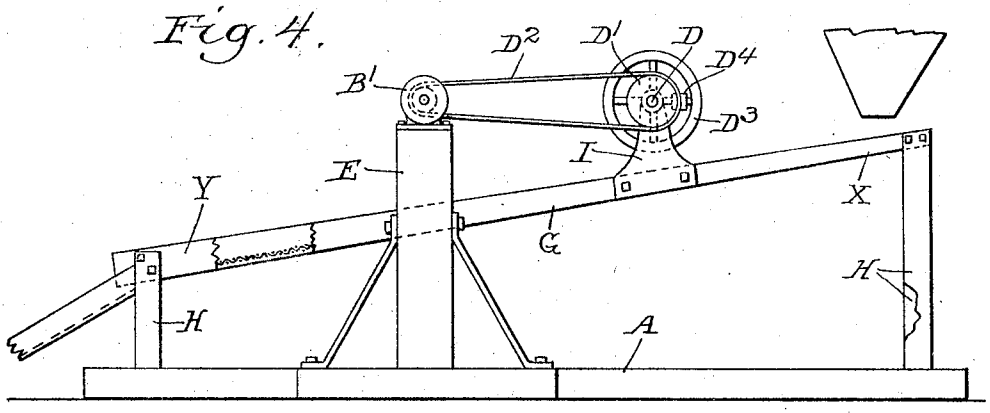
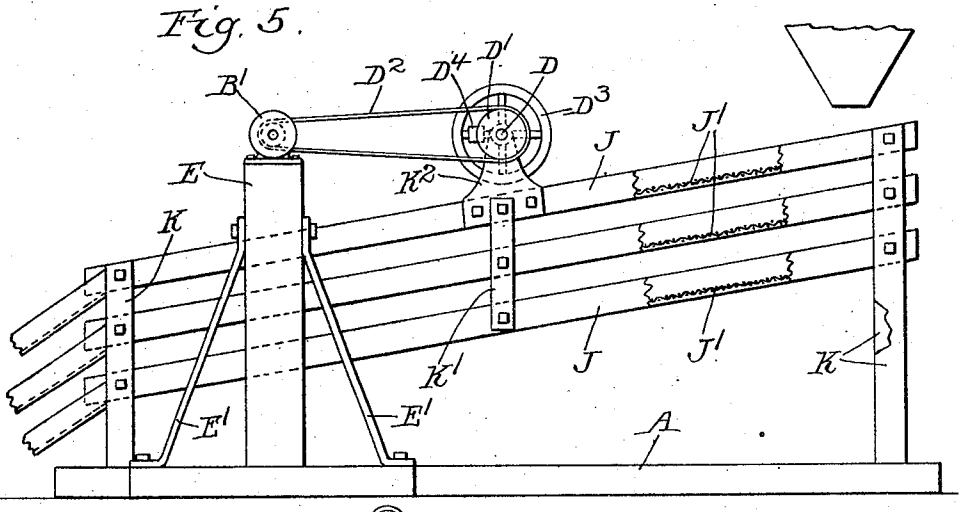


Fig. 5.



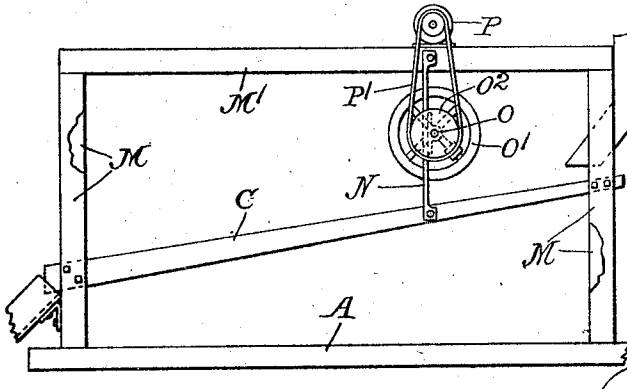


Fig. 6.

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Patented Mar. 29, 1927. 1,622,305

UNITED STATES PATENT OFFICE.

JOHN BLAND, OF CHICAGO, ILLINOIS.

SCREEN.

Application filed November 13, 1924. Serial No. 749,584.

This invention relates to a vibratory screen. The screen illustrated herewith appears in several modifications, but the one essential which is common to all of the forms is that the screen itself is rigidly mounted. The yielding or spring action which takes place to permit the vibrating is in the screen itself and not in its mounting. It is therefore one object of the invention to provide a vibratory screen of very high frequency of vibration in which the screen is rigidly mounted and in which vibration takes place by reason of the spring action within the screen itself. Other objects will appear from time to time throughout the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawing, wherein:

Figure 1 is a side elevation showing a screen which is rigidly mounted on a support intermediate its ends but is free at each end;

Figure 2 is a view similar to Figure 1 showing a modified form and having rigid mountings at each end;

Figure 3 is a vertical cross section on line 3—3 of Figure 2;

Figure 4 shows a form generally similar to that of Figure 2, but in which the thickness of the side member of the screen varies and thus the amplitude of vibration is greater at one end than at the other;

Figure 5 is a view showing a screen similar to that shown in Figure 2 but with three screens mounted one above the other.

Figure 6 is a further modification.

Like parts are designated by like characters throughout.

A is a foundation upon which the screen is mounted. The foundation may, of course, be separate from or may be a part of the building in which the screen is carried. B is an upright supporting member upon which the driving motor B^1 is carried. In the form shown in Figure 1 the screen itself is carried on a pair of such members B, and braces B^2 B^2 are provided.

C is the frame of the screen having secured within it a screen cloth C^1. Mounted in suitable bearings on the screen frame C is a shaft D. The shaft has on it a pulley D^1 adapted by means of the belt D^2 to be driven from the motor B^1. The shaft also carries a fly wheel D^3 which has on it an adjustable weight D^4. Thus the shaft and shaft assembly is out of balance and vibrations which affect the screen are set up as the shaft is rotated.

In the form shown in Figure 2 the motor B^1 is carried on an upright member E which has braces E^1 E^1 to steady it. The screen frame is the same as that shown in Figure 1. It is supported at each end preferably upon pairs of members F.

In the form shown in Figure 4 the motor support and arrangement is the same as that shown in Figures 2 and 3. The screen frame G is different, however. At its upper end where the material is first deposited on it as for example at X it is comparatively thin. Toward the lower end at Y it is thickened. By means of this arrangement the screen frame is stiffer at its lower end and more flexible toward its upper end. Thus the amplitude of vibration is greater at the upper end.

The screen is carried in supports H H at either end. The shaft D which is similar to that shown in Figures 1, 2 and 3 is carried on a raised bearing support I.

In the form shown in Figure 5 the screen is generally the same as that shown in Figure 2, but three screens are used. Each of the screen frames J carries a cloth or other screening surface J^1. They are all supported at each end by means of supports K. They are fastened together intermediate their ends by a link K^1. The shaft D is carried in a bearing support K^2 and by means of this out-of-balance rotation vibrates the upper screen and with it the lower screen.

Although I have shown an operative device, still it will be obvious that many changes might be made in size, shape and arrangement of parts without departing materially from the spirit of my invention; and I wish therefore that my showing be taken as in a sense diagrammatic.

In Figure 6 is shown a modified form in which the foundation A and the screens C are the same as shown in other figures. Instead of the other supporting members as shown for example in Figures 2 and 5, I use vertical members M, extending preferably at each corner of the screens. The screen is fastened rigidly to these members which are joined by top members M^1. Extending downwardly from the top members M^1 is one or more flexible members N having one end fastened to the top member M^1 and the other end fastened to the screen C. Mounted on this member or members for

rotation is a shaft O on which is mounted an out-of-balance wheel O^1 and a belt pulley O^2. P is a motor mounted on the frame M, M^1 by means of a belt P^1 which is about the belt pulley O^2 which is adapted to drive the shaft and the pulley on it.

While I have shown only one screen in the form shown in Figure 6, it will be obvious that more than one screen may be fastened together and vibrated by the type of spring shown.

The use and operation of my invention are as follows:

When the screen is to be operated, the motor or driving means is started. The shaft which is mounted on the screen frame is thus rotated, and being out of balance it sets up vibration, vibrating the screen generally vertically. The screen itself is, of course, rigidly mounted and therefore whatever yielding takes place, must take place through the spring action and yielding of the screen frame itself. Several forms have this feature in common. Since more than half of the screening takes place toward the upper end of the screen, it is desirable for some purposes to have a greater amplitude of vibration at the point where the material is deposited on the screen. For this reason in the screen shown in Figure 4, the screen frame member is made more flexible toward its upper end.

With respect to the form shown in Figure 6 a somewhat different type of spring action is provided from that shown in the other forms. In this case an out-of-balance shaft is rotated and it is mounted on a flexible element. Rotation of the out-of-balance shaft sets up generally horizontal vibration of the flexible member, and as this member vibrates laterally its vertical length is of course shortened and lengthened, and by this means the screen is caused to vibrate up and down.

I claim:

1. In a screening device, a screen and screen frame including transversely opposite holding parts other than springs for said screen, said holding parts being rigidly mounted and held against longitudinal movement, in combination with means for bending and vibrating all of such screen frame whereby said screen is vibrated.

2. In a screening device, a screen and screen frame including transversely opposite holding parts other than springs for said screen, said holding parts being rigidly mounted and held against longitudinal movement, in combination with means for bending and vibrating said transversely opposite screen holding parts whereby said screen is vibrated, said vibrating means including an out of balance member mounted for rotation on said screening device.

3. In a screening device, a screen and screen frame including transversely opposite holding parts other than springs for said screen, said holding parts rigidly mounted and being connected together, in combination with means for bending and vibrating said transversely opposite screen holding parts.

4. In a screening device, a plurality of screens and a screen frame including transversely opposite holding parts other than springs for them, said holding parts rigidly mounted and being connected together, in combination with means for bending and vibrating said screen holding parts, whereby said screens are vibrated in unison, said vibrating means including an out of balance member mounted for rotation on said screening device.

5. In a screening device, a plurality of screens mounted one above the other and holding frames for them, said holding frames rigidly mounted and held against longitudinal movement, and being connected together and constituting all of the screen holding parts, in combination with means for bending and vibrating said screen holding parts, whereby said screens are vibrated in unison.

6. In a screening device, a plurality of screens and transversely opposite holding frames for each of them, said holding frames rigidly mounted and held against longitudinal movement, and being connected together, in combination with means for bending and vibrating said screen holding parts, whereby said screens are vibrated in unison, said vibrating means including an out of balance member mounted for rotation on said screening device.

7. In a screening device, a rigidly held slightly flexible screen frame, such frame constituting the entire screen holding means, in combination with means for bending and vibrating said frame.

8. In a screening device, a rigidly held slightly flexible screen frame, such frame constituting the entire screen holding means, in combination with means for bending and vibrating said frame, said means including an out-of-balance member mounted for rotation on said screen.

9. In a screening device, a rigidly held slightly flexible screen frame, such frame constituting the entire screen holding means, in combination with means for bending and vibrating said frame, said frame held against longitudinal movement.

10. In a screening device, a rigidly held slightly flexible screen frame, in combination with means for bending and vibrating said screen, said frame varying in flexibility at different points throughout its length.

11. In a screening device, a rigidly held slightly flexible screen frame, in combination with means for bending and vibrating

said frame, said frame held against longitudinal movement, and varying in flexibility at different points throughout its length.

12. In a screening device, a rigidly held slightly flexible screen frame, such frame constituting the entire screen holding means, in combination with means for bending and vibrating said frame, said frame being rigidly supported at its ends.

13. In a screening device, a plurality of rigidly held slightly flexible screen frames, such frames constituting the entire screen holding means, in combination with means for bending and vibrating said frames.

14. In a screening device, a plurality of rigidly held slightly flexible screen frames, such frames constituting the entire screen holding means, in combination with means for bending and vibrating said frames and screens, said means including an out-of-balance member mounted for rotation on said screens.

15. In a screening device, a plurality of rigidly held slightly flexible screen frames, such frames constituting the entire screen holding means, in combination with means for bending and vibrating said frames and screens, said frames held against longitudinal movement.

16. In a screening device, a plurality of rigidly held slightly flexible screen frames, in combination with means for bending and vibrating said screens, said frames varying in flexibility at different points through their length.

17. In a screening device, a plurality of rigidly held slightly flexible screen frames, in combination with means for bending and vibrating said screens, said frames held against longitudinal movement, and varying in flexibility at different points throughout their length.

18. In a screening device, a plurality of rigidly held slightly flexible screen frames joined together, such frames constituting all of the screen holding parts, in combination with means for bending and vibrating said frames together, said frames being rigidly supported at their ends.

19. In a screening device a rigidly held slightly flexible screen frame in combination with means for bending and vibrating said frame, said means including a flexible member attached to one end of said frame and provided with an out-of-balance rotating member mounted upon it, the rotation of said member being adapted to set up transverse vibration of the frame flexible member whereby it and the screen are vibrated.

Signed at Chicago, county of Cook and State of Illinois, this 7th day of November, 1924.

JOHN BLAND.