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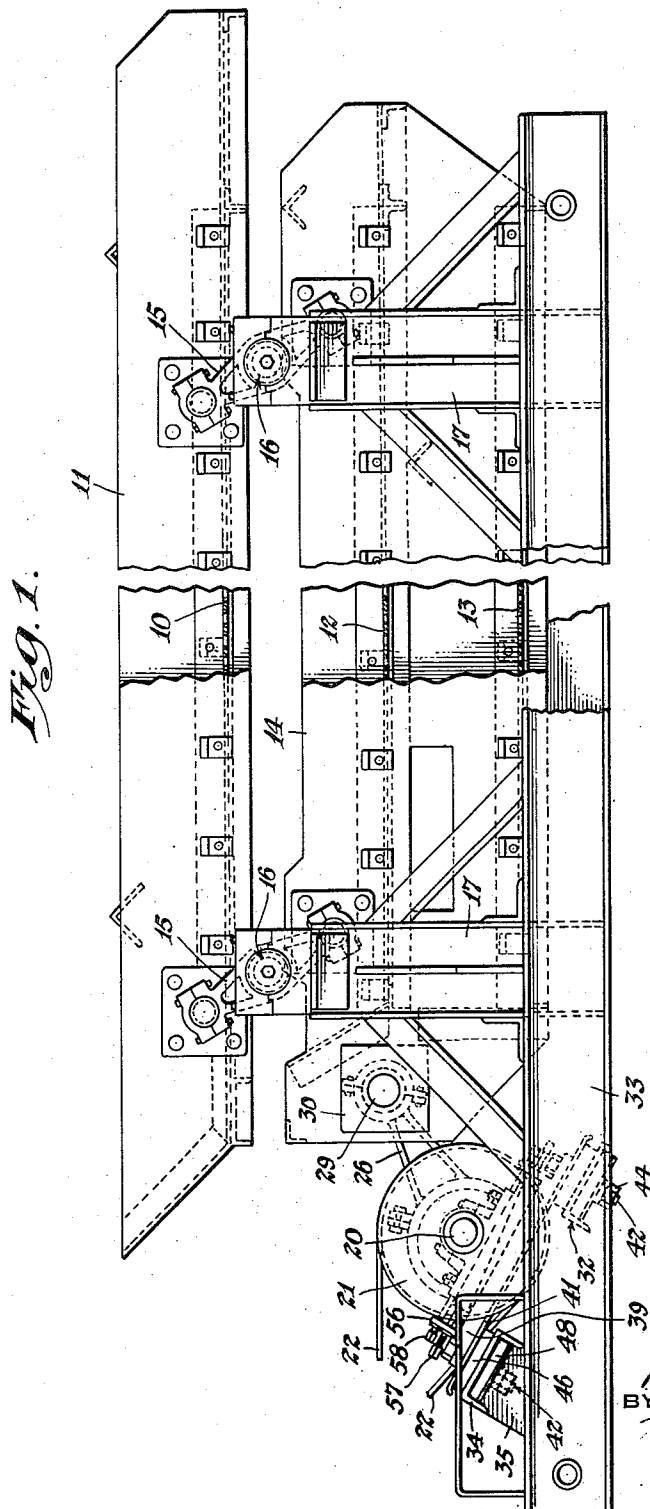
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1,979,791

SHAKING SCREEN

Filed May 16, 1933

4 Sheets-Sheet 1



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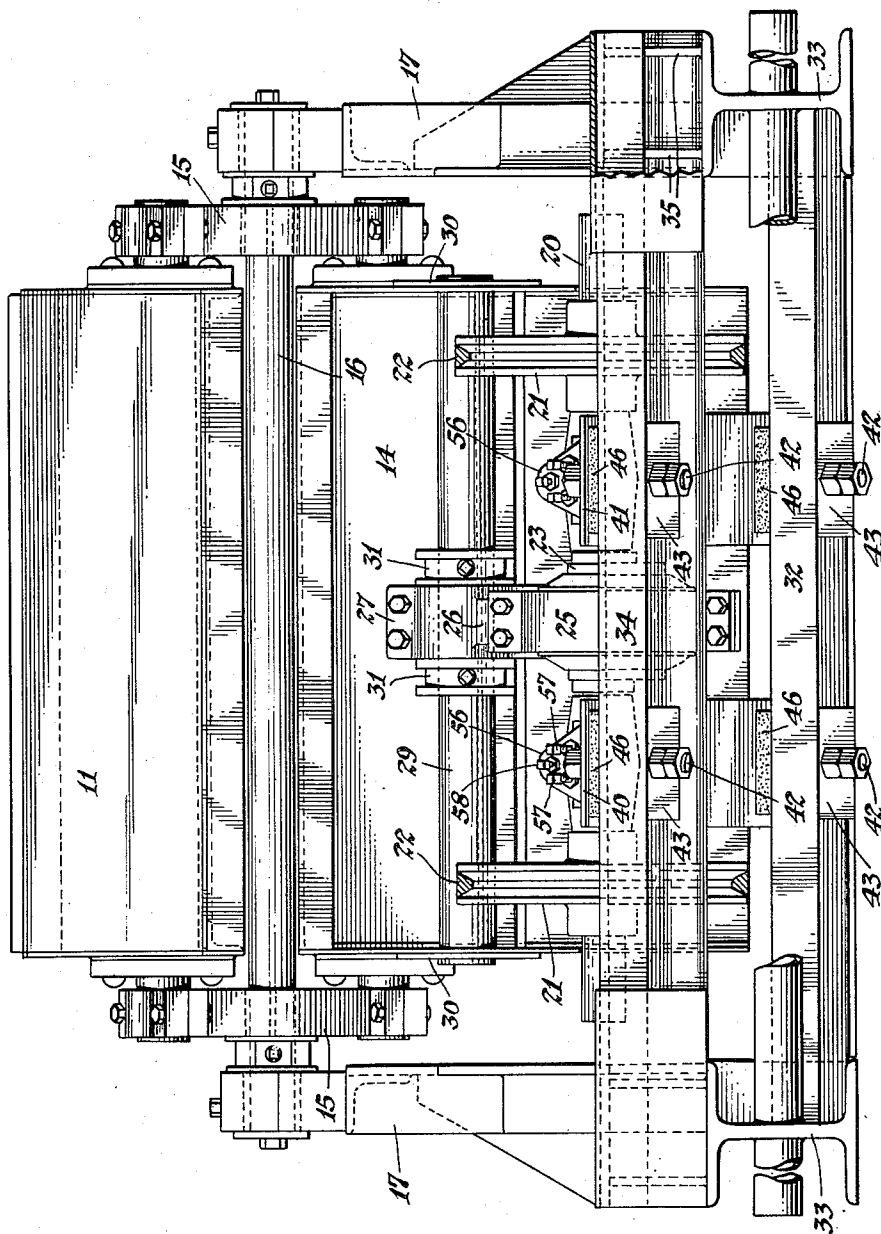
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Fig. 2.



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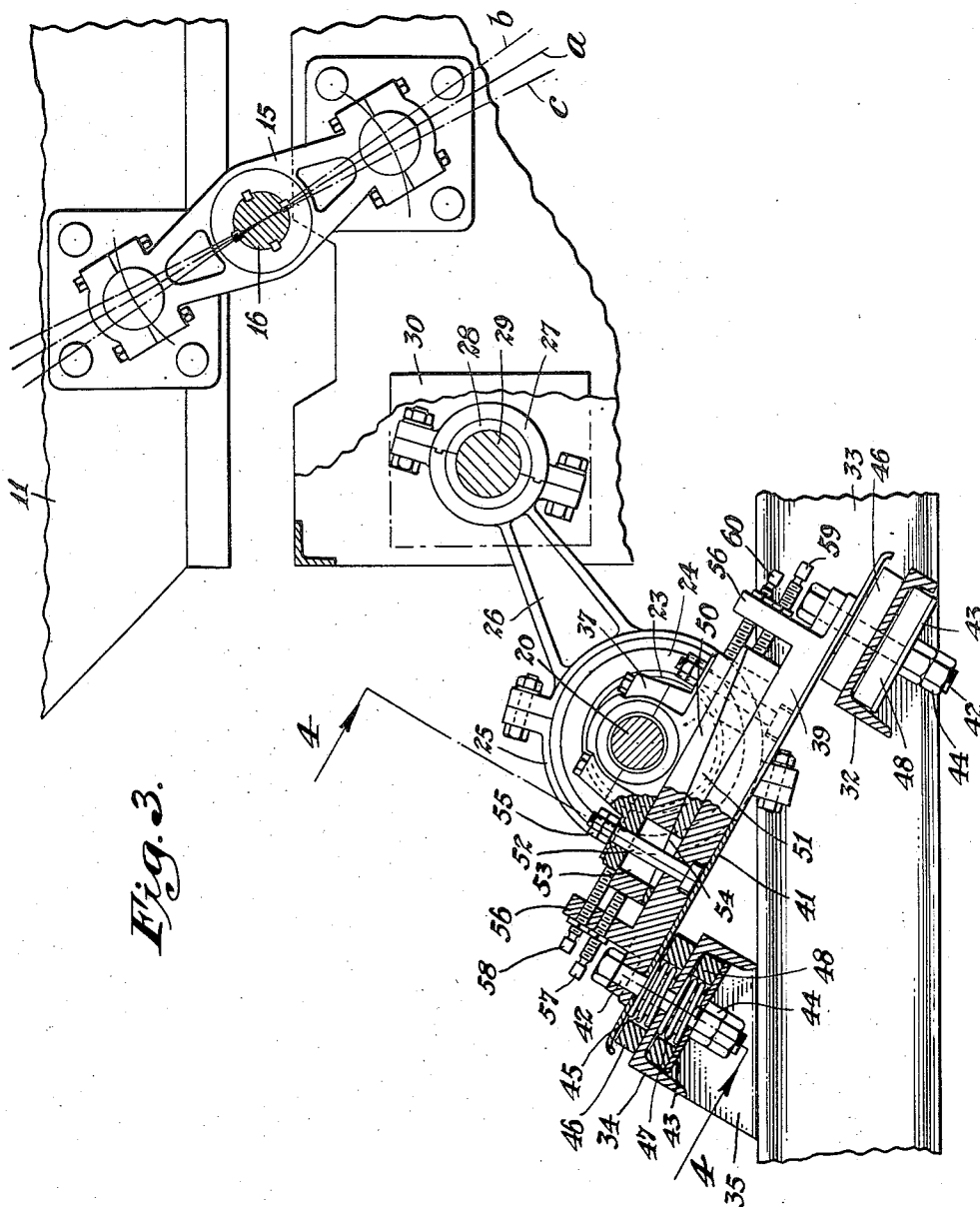
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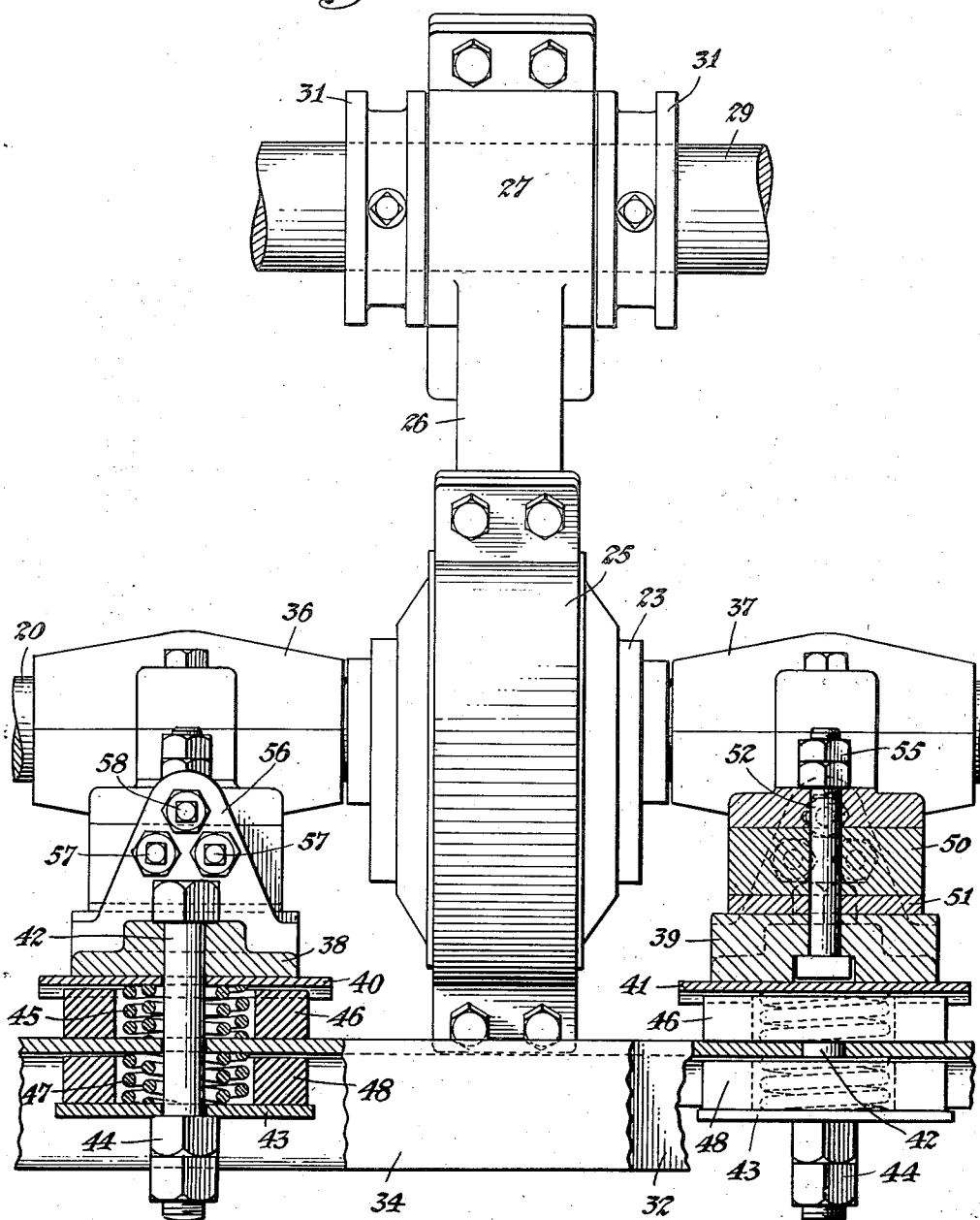
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Fig. 4.



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UNITED STATES PATENT OFFICE

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SHAKING SCREEN

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Application May 16, 1933, Serial No. 671,313

6 Claims. (Cl. 209—315)

This invention relates to shaking screens and more particularly to shaking screens of the power type.

It has been found that for the best and quickest results some materials require a more pronounced vertical movement in the screening motion than other materials and vice versa. In other words, some materials screen better and quicker with a quite pronounced vertical component in the screening motion and other materials screen better and quicker with a more horizontal or flat screening motion.

Heretofore it has been proposed to transmit the screening motion from the drive shaft to the screens through connecting rods so constructed as to be extensible and thereby permit adjustment of the pitch of the screening arc by varying the length of the connecting rods. Such rods, however, must comprise a plurality of parts or sections so as to be extensible and therefore have not been as strong, rigid, and durable as are connecting rods constructed in one piece. For this reason it has been suggested that a plurality of extensible connecting rods be employed.

The principal objects of this invention include the provision of a sturdy and durable power shaking screen wherein adjustment of the pitch of the rocking arc of the screen or screens may be made readily, easily and quickly without requiring any dismantling and reassembly operations and permitting the use of a one piece connecting rod of extremely sturdy, rigid and durable construction to transmit the screening motion from the drive shaft to the screen; and to provide a mounting for the drive shaft which is extremely sturdy and durable and effectively withstands the shocks and thrusts to which the mounting is subjected when the screen is operated even at very high speed.

A further object of this invention is to provide a power shaking screen and one not only in which the pitch of the screening arc may be adjusted easily and quickly, so that the best and quickest screening of materials of different character may be had but also one which may be operated at very high speed so that an increased output results and one which stands up efficiently under high speed operation for an extended period of time.

Other objects of this invention will be in part obvious and in part pointed out hereinafter.

In accordance with this invention instead of providing extensible connecting rods, whereby the pitch of the rocking arc of the screens may be varied, the bearing members which support

the drive shaft are adjustably mounted on a base plate so that the pitch of the rocking arc of the screens may be varied by adjusting the drive shaft and its bearing relatively to this base and to the rocking axis of the screen hangers. The base which supports the drive shaft is inclined toward the thrust of the connecting rod and is cushioned on a frame so as to withstand the shocks and thrusts much better than it could if it were not so inclined. Also the line of thrust of the connecting rod is arranged to be delivered at approximately right angles to the longitudinal axis of the screen hangers.

In order that a clearer understanding of this invention may be had, attention is hereby directed to the accompanying drawings forming a part of this application and illustrating certain possible embodiments of this invention and in which:

Fig. 1 is a side elevation of a shaking screen embodying this invention, certain parts being broken away, others shown in section, and others indicated by dotted lines to more clearly bring out certain details of the construction;

Fig. 2 is an elevation of the driving end of the machine, certain parts being broken away, and others shown in section;

Fig. 3 is an enlarged detail view of the drive mounting and its connection with the screens, the view being partly in section and partly broken away, and showing diagrammatically the range of adjustment of the pitch of the screen hanger; and

Fig. 4 is an enlarged sectional view of a detail and is taken on the staggered line 4—4 of Fig. 3.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, the construction as shown for the purpose of illustrating certain possible embodiments of this invention, includes an upper screen 10 supported by a suitable trough frame 11, and two lower screens 12 and 13, one above the other, and both supported in a suitable trough frame 14. Trough 11 is supported by the upper ends of hangers 15 which at their center are secured to rocking shafts 16 rotatably supported by vertical frame members 17 of the machine. Frame 14 is supported by the lower ends of the hangers 15.

The drive for the machine includes a suitable drive shaft 20 adapted to be rotated by means of a pair of pulley wheels 21 fixed to the shaft and driven by suitable belts 22 connected to a source of power, not shown. Toward or at the center of shaft 20 is secured an eccentric 23 which re-

involves in a circular bushing 24 housed in a two-piece rigid annular strap 25 which forms the lower end of a connecting rod 26. The upper end of connecting rod 26 has a rigid two-piece annular strap 27 housing a bushing 28 which surrounds a shaft 29 supported at opposite ends in plates 30 secured to opposite sides of the frame 14. The bushing 28 and strap 27 are prevented from side-wise movement on shaft 29 by means of collars 31 fixed on the shaft on opposite sides of these parts.

The mounting for the drive shaft 20 includes a lower cross channel 32 extending between the main side frames 33 of the machine and which in the embodiment shown are in the form of I-beams. The opposite ends of channel 32 abut and are welded to the inside surfaces of the webs of the I-beams 33, the lower edge of the channel 32 resting on the lower interior flanges of the I-beams. Channel 32 is tilted as shown. Another inverted channel member 34, tilted to the same degree as channel 32 and positioned so that the top surfaces of channels 32 and 34 lie in the same plane, is secured at each end to the top of the I-beams 33 by means of plates 35, which at their upper ends fit into the channel 34 and are welded thereto and at their lower edges seat on and are welded to the tops of the I-beams 33. The lower edge of the channel 34 also rests on the tops of the I-beams 33.

Resiliently mounted on channels 32 and 34 and in position to support pillow block bearings 36 and 37 on opposite sides of the eccentric 23 and strap 25 are base plates 38 and 39, one for each pillow block. The rear end of each base plate is resiliently mounted on the channel 34 and the forward end of each base plate is resiliently secured to the channel 32. Similar connections are used at each of these four points. A plate 40 is disposed beneath base plate 38 and a plate 41 is disposed beneath base plate 39. Each connection is made by means of a bolt 42 extending through aligned perforations in the plates 38, 40 or 39, 41, through the perforation in the top of the channel member and through a perforation in a plate 43 at the lower end of the bolt and engaged by the bolt nut 44. A compression spring 45 surrounds the bolt intermediate the plate 40 and the top of the cross channel and an annular rubber cushion 46 surrounds this spring. A compression spring 47 surrounds the bolt intermediate the plate 43 and the top of the channel, and an annular rubber cushion 48 surrounds this spring. Preferably the mounting is such that when the machine is at rest the extension of the parts caused by the springs 45 and 47 is such that a small space, say about $\frac{3}{4}$ or $\frac{1}{2}$ of an inch, is left between the top of each cushion and the adjacent surface. The purpose of these spaces is that when the machine is operating the pull and thrust will first act on one of the springs 45 or 47 and then be taken up by the cushions 46 or 48 in the manner of shock absorbers.

On each base plate 38, 39 is mounted a pair of complementary coacting wedge blocks 50 and 51 which have their inclined surfaces juxtaposed. On each pair of wedge blocks is positioned one of the pillow blocks 36 and 37. Bolts 52 extending upwardly through perforations in the base plates 38, 39 and having their heads counter-sunk therein extend upwardly through slots 53 and 54 provided in the wedge members 50 and 51 and through perforations in shoulders on the pillow blocks 36 and 37 and having nuts 55 whereby the pillow blocks, wedge members, and base plates may be tightly secured together.

Adjacent each end of each base plate is a shoulder 56. In each rear shoulder are two threaded perforations in which are seated adjusting screws 57 which bear against the adjacent end of the wedge members 50 of each pair, and each of these same shoulders has another threaded perforation in which is seated another adjusting screw 58 which bears against the rear edge of the pillow block. Each forward shoulder 56 is provided with three similar threaded perforations, two of which house adjusting screws 59 which bear against the adjacent surface of each wedge member 51 of each pair and the third threaded perforation housing an adjusting screw 60 which bears against the adjacent edge of the pillow block.

As represented in Fig. 3, the mounting is shown in central or median adjustment and the pitch of the hanger arm is indicated by the dot and dash line *a*. By loosening the bolts 52 and screwing up on the adjusting screws 57 and 59 the wedge blocks are moved inwardly of each other, thus raising the pillow blocks and projecting the drive shaft connecting rod toward the axis of the hanger arm. This will change the pitch of the hanger arm, for instance, into the position represented by dot and dash line *b* and will make the pitch of the rocking arc of the screens more vertical. Conversely, if the adjusting screws 57 and 59 are withdrawn from the positions shown in Fig. 3 and the wedge blocks 50 and 51 are separated accordingly, the pillow blocks and the drive shaft will be drawn toward the base plates and away from the axis of the hanger arms, thus changing the pitch of the hanger arms into the position represented by the dot and dash line *c* and will cause the pitch of the rocking arc of the screens to be more horizontal or flat than before.

From the above it will be readily apparent that the adjustment of the pitch of the rocking arc of the screens may be made readily and quickly and at the same time the construction permits the use of a rigid one-piece connecting rod of such strength and durability that a plurality of connecting rods are not required. It is also apparent that by reason of the improved mounting of the drive shaft high speed operation is possible and the construction will well withstand the severe strains and shocks incident to high speed use.

When the loading on different decks becomes unequal, a slight jar is apt to be imparted to the drive shaft. This, however, is absorbed by the resilient drive mounting.

The construction illustrated is obviously susceptible to considerable modification without departing from the scope of the invention. For instance, the connecting rod may be fastened to the upper deck screen frame instead of to the lower screen frame, thus allowing the head room required by the machine to be reduced. However, keeping the connecting rod at approximately right angles to the longitudinal axis of the hanger reduces vibration, reduces friction on the bearings of the connecting rod and is a feature which contributes to making high speed operation possible. Instead of three screens, one, two or any desired number may be provided. Also, the base member for the pillow block bearings may be an undivided member instead of comprising two separate sections or members, as shown, and may be of any suitable design or construction to support the drive shaft.

As many changes could be made in the above construction and as many apparently widely dif-

ferent embodiments of this invention could be made without departing from the scope thereof, it is understood that all matter contained in the above description or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate mounted on the support, bearing members for the drive shaft, adjustable spacing members intermediate the bearing members and base plate, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, and means for securing the bearing members, spacing members and base plate tightly together in adjusted position.

2. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate mounted on the support, bearing members for the drive shaft, adjustable spacing members intermediate the bearing members and base plate, means carried on the base plate and engaging the spacing members, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, and means for securing the bearing members, spacing members and base plate tightly together in adjusted position.

3. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate resiliently mounted in inclined position on the support, bearing members for the drive shaft, adjustable spacing members intermediate the bearing members and base plate, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, and means for securing the bearing members, spacing members and base plate tightly together in adjusted position.

4. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the

screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate mounted on the support, bearing members for the drive shaft, a pair of co-acting wedge members intermediate the base plate and each bearing member, and means for adjusting the wedge members of each pair relatively to each other and to the base plate to vary the spacing of the bearing members and drive shaft from the base plate, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, and means for securing the bearing members, wedge members and base plate tightly together in adjusted position.

5. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate mounted on the support, bearing members for the drive shaft, a pair of co-acting wedge members intermediate the base plate and each bearing member, means for adjusting the wedge members of each pair relatively to each other and to the base plate to vary the spacing of the bearing members and drive shaft from the base plate, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, and bolts engaging said bearing members and base plate and extending through slots in said wedge members for securing all of said members tightly together in adjusted position.

6. In a shaking screen of the character described, the combination with a hanger, means rockably supporting the hanger and a screen supported by the hanger to rock therewith, of a drive shaft having an eccentric, a connecting rod engaging said eccentric and connected to the screen whereby the screen and hanger are rocked as said shaft revolves, and a mounting for the drive shaft including a support, a base plate mounted on the support, bearing members for the drive shaft, a pair of co-acting wedge members intermediate the base member and each bearing member, and means for adjusting the wedge members of each pair relatively to each other and to the base member to vary the spacing of the bearing members and drive shaft from the base member, whereby the bearing members and drive shaft may be adjusted on the base plate toward and away from the rocking axis of the hanger to vary the rocking pitch of the hanger and to vary the swing of the screen accordingly, said means including adjusting screws adjustably carried on the base member and engaging the wedge members, and other adjusting screws adjustably carried on the base member and engaging the bearing members, whereby the bearing members may be centered on the base member.

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