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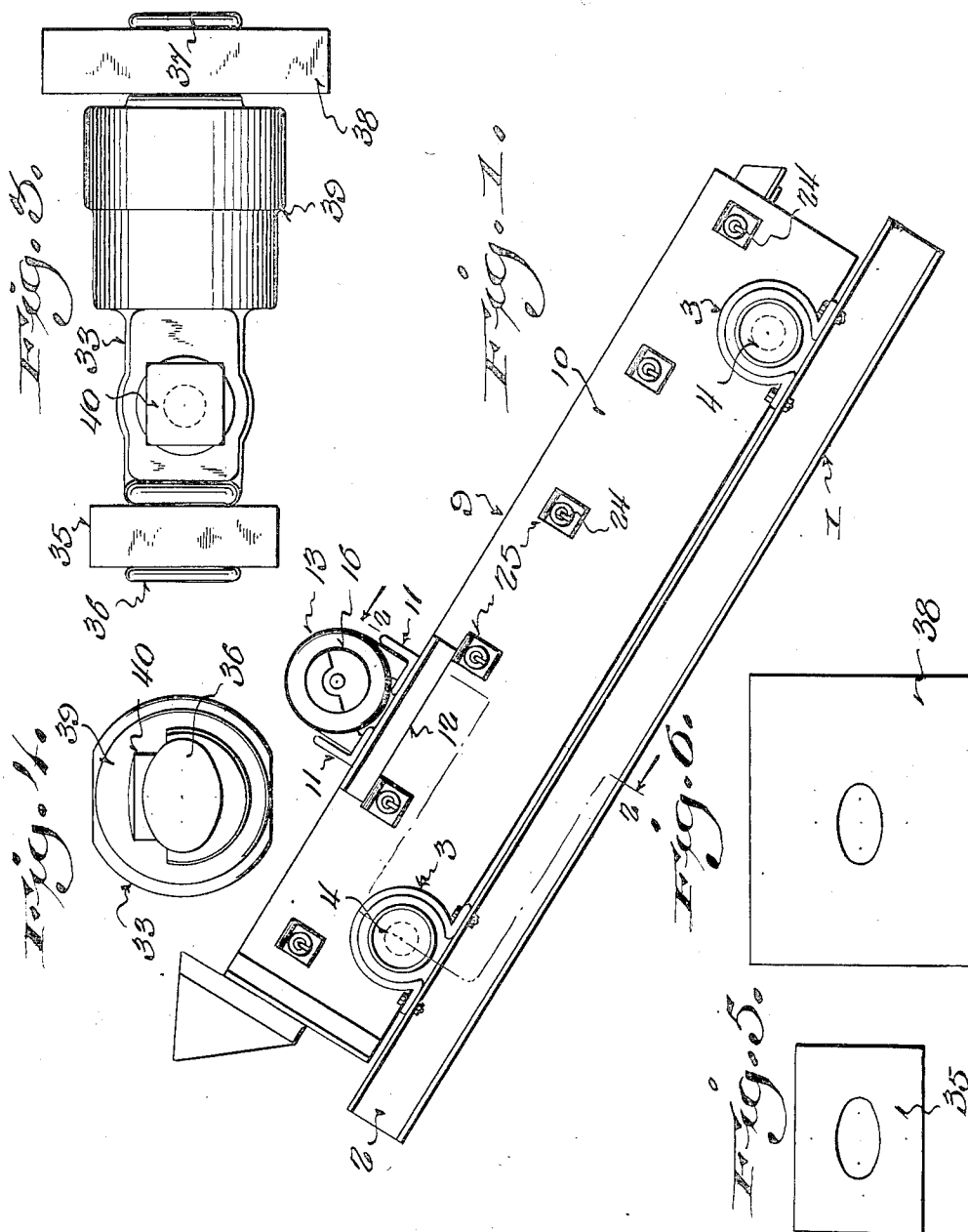
E. E. DEISTER ET AL

2,032,082

VIBRATORY SCREEN

Filed Feb. 16, 1933

3 Sheets-Sheet 1



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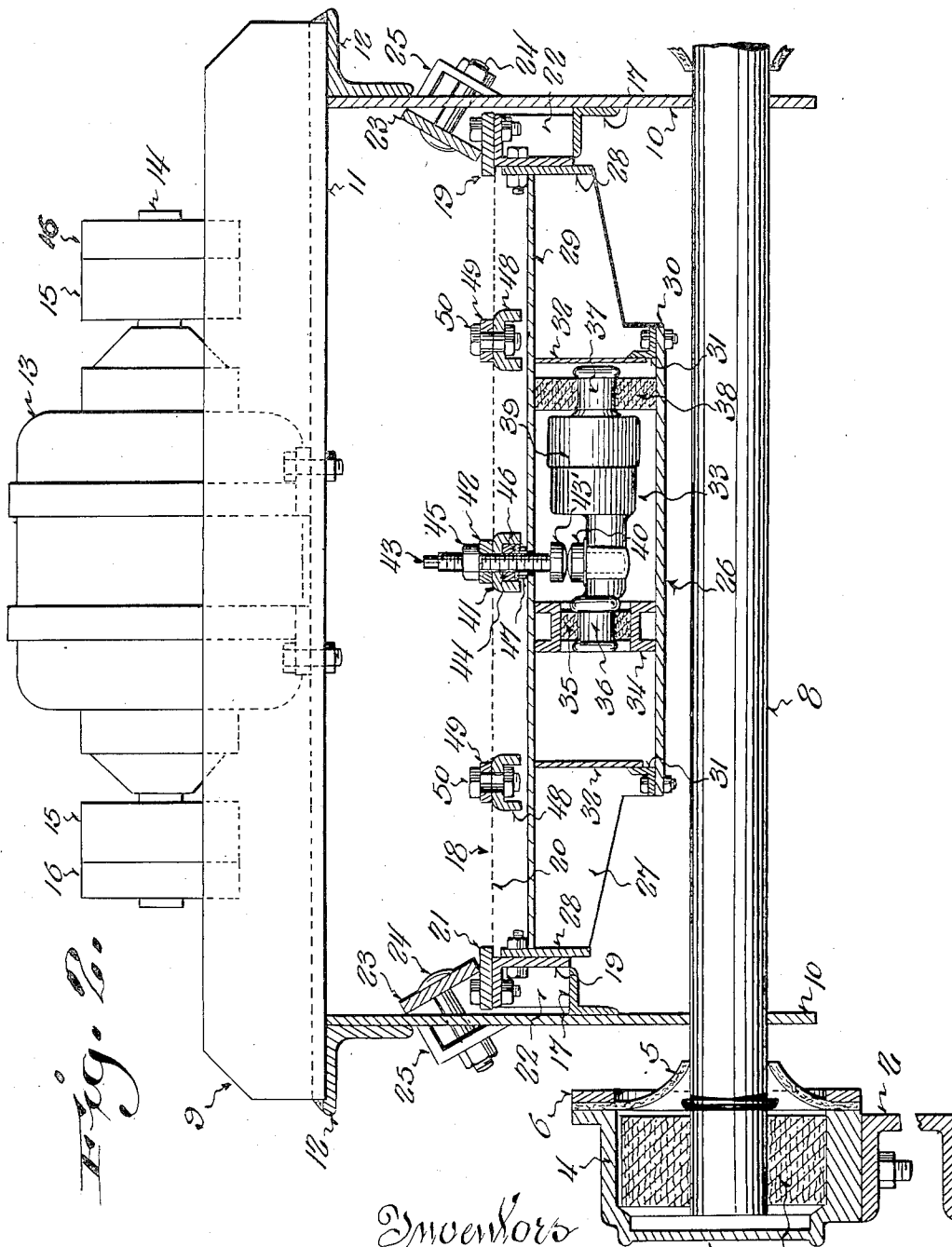
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Fig. 7.

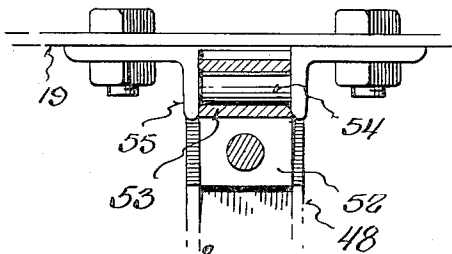
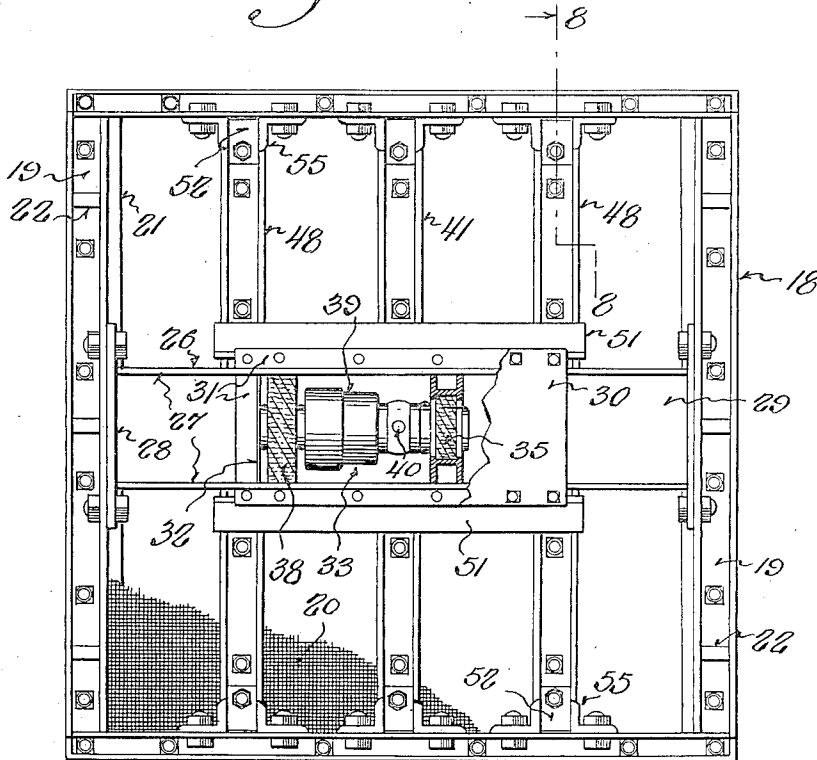
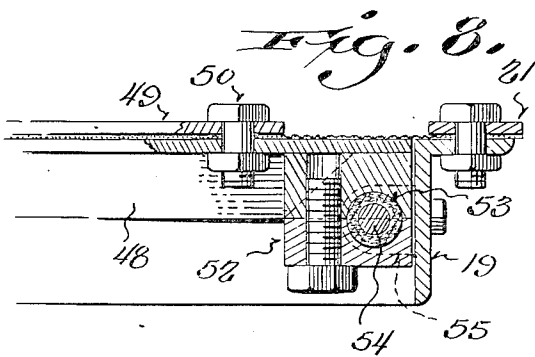


Fig. 9.



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UNITED STATES PATENT OFFICE

2,032,082

VIBRATORY SCREEN

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11 Claims. (Cl. 209—382)

This invention pertains to vibratory screens, and more particularly to a mechanism for imparting rapid tapping action to the screening medium, independent of the vibratory movement of the same.

Heretofore, various means have been employed for accomplishing the foregoing, including electro-magnets, cams, weighted strips and hammers, all working directly upon the screening medium. These various devices have been found objectionable for numerous reasons, primary of which is excessive cost, mutilation of the screening medium, and failure to obtain uniform tapping action over substantially the entire area of the screening medium.

The present invention has primarily for its object to overcome the foregoing objections by the provision of a novel form of striker receiving its impetus from the vibratory movement of the screen frame, and imparting a sharp tapping action to a supporting grill or lattice associated with the screening medium, to impart substantially uniform action throughout the entire area of the screening medium.

A further object resides in the provision of a striker, in which the springs and resilient arms, subject to breakage, are entirely eliminated, and which provides for a more definitely controlled action without necessitating delicate adjustment.

Incidental to the foregoing, a more specific object resides in the provision of a weighted striker, resiliently mounted at spaced points, and so designed as to produce vibratory movement, preferably in substantially a straight line at right angles to the plane of the screening medium, as a result of the orbital vibratory movement of the screen frame.

A still further object resides in the provision of a resiliently mounted vibrating grill for engagement with the screening medium, and effected by the striker to impart a sharp, controlled tapping action to the screening medium over substantially its entire area.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts, substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of

the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is an elevation of a screen embodying the features of the present invention.

Figure 2 is a transverse section taken on the line 2—2 of Figure 1.

Figure 3 is a detailed top plan of a striker constructed in accordance with the present invention.

Figure 4 is an end elevation of the same.

Figures 5 and 6 are elevations of the resilient bearing blocks.

Figure 7 is a bottom plan view of one of the removable screen panels, and

Figure 8 is a detailed section taken on the line 8—8 of Figure 7.

Figure 9 is a fragmentary detail of the resilient connection between one of the vibratory members and the screen frame.

As set forth in the preceding objects, the present invention is directed primarily to the striker mechanism for imparting a sharp tapping action to the screening medium during its vibratory movement, and for illustrative purposes the same is shown and will be described in connection with a specific type of resiliency mounted screen. However, it is to be understood that the invention is equally applicable to various other types of vibratory screens actuated by hammers, overbalanced pulleys, eccentrics, or other mechanical devices. Likewise, while the preferred form of the invention includes a specified type of screening medium, the same can be applied to other structures.

Referring now more particularly to the accompanying drawings, the numeral 1 designates a base comprising longitudinal channels 2, adapted to be supported upon a suitable foundation designed to position the frame at substantially the angle illustrated. Secured to the channels 2, adjacent their ends, are the journal housings 3, each of which comprises a casing 4 bolted or otherwise secured to the channel, and being open at its inner face, which is closed by means of a resilient disc 5 clamped to the casing 4 by a ring 6 bolted or secured to the flange of the casing in any other suitable manner.

Positioned within each of the housings 3 is a block 7 formed from rubber or similar resilient material, and having journaled therein the ends of the transverse tubular shaft 8, which is engaged by the resilient discs to prevent water and dirt from accumulating in the housings 3, and thus deteriorating the resilient journal blocks 7.

Supported by the transverse shafts 8 is the main vibratory frame 9, comprising longitudinal side plates 10, welded or otherwise secured to the shafts 8, and being suitably connected to their upper edges by transverse angle braces 11, and the usual end plates (not shown). In order to provide the desired rigidity, the transverse braces 11 are welded or otherwise secured to the longitudinal angle irons 12 welded to the outer faces of the side plates 10 adjacent their upper edges.

In order to impart vibratory movement to the main frame, a motor 13 is shown mounted upon two of the transverse braces 11, while mounted on each end of the motor shaft 14 is a fixed over-balanced pulley 15, which cooperates with an adjustable, over-balanced pulley 16 to control the vibratory movement of the main frame, as more fully described and illustrated in United States Letters Patent No. 1,879,923.

Here it is to be understood that the primary vibratory movement, imparted to the main frame 9, can be accomplished in numerous other ways without departing from the invention.

Secured longitudinally to the inner faces of the side plates 10 are angle iron tracks 17, which support the removable screen panels, designated generally by the numeral 18, and comprising an outer frame 19, consisting of angle irons secured together at their abutting ends. Secured on the frame 19 is a screening medium 20, which in the majority of cases is formed from wire mesh, although in some instances perforated sheets may be employed. In practice the desired tension is placed upon the screen 20, and the same is then clamped to the frame 19 by means of strips 21. Thus it will be seen that the screen is preferably formed of individual removable panels, one or more of which may be employed, depending upon the size of screen desired.

As best shown in Figures 2 and 7, the frame 19 is provided with spaced blocks 22 secured to the side stretches of the frame and engaging the longitudinal tracks 17 for supporting the screen frame thereon. The panels are then locked in assembled position by means of the longitudinal strips 23, engaging the straps 21 and the inner faces of the side plates 10. The strips 23 are then drawn into clamping engagement with the screen panel and main frame by bolts 24 passing through the side plates 10 and engaged with the angle brackets 25.

The foregoing is more or less conventional structure, and therefore forms no part of the present invention, other than in the general combination as hereinafter claimed, it being understood that the salient features of the invention are equally applicable to a screen attached directly to the main vibratory frame, as well as to removable screen panels of other construction.

Considering now the striker mechanism, which is the essence of the present invention, and with particular reference to Figures 2 and 7, it will be noted that a housing 26 is secured to the side stretches of the screen frame 19, centrally of the panel. The housing 26 comprises a pair of spaced transverse plates 27 welded or fastened to the end plates 28, which in turn are bolted to the side stretches of the frame 19.

The top of the housing 26 is closed by a transverse cover plate 29 secured to the side plates 27, and the end plates 28, while the bottom of the striker housing is closed by a plate 30 bolted to the angles 31 connecting the lower edges of the side plates 27. End partitions 32, secured to the

top plate 29, the sides 27, and the angles 31, form a complete housing for the striker 33, to be hereinafter described.

Positioned within the housing 26, between the walls thereof, is a bearing block 34 within which a resilient bearing 35, formed of rubber or similar material, is anchored for reception of the journal end 36 of the striker 33. The opposite journal end 37 of the striker is journaled in a somewhat larger resilient block 38 held between the walls of the housing 26. As will be best noted in Figure 2, the end of the striker 33, adjacent the journal 37 and the large resilient bearing block 38, is weighted at 39, and disposed between the weighted portion 39 and the journal end 36 is a striker button 40, threaded or otherwise secured to the striker.

Secured to the bottom of the screening medium 20, longitudinally and centrally thereof, is a vibrating channel strip 41, the screening medium being clamped to the vibrating channel by a strap 42 locked upon the threaded stud 43, which projects through the top 29 of the striker housing, and is provided with a head 43' engaged by the striker button 40 during vibration of the striker, as will be more fully described. The threaded stud 43 also passes through a block 44 welded to and forming an integral part of the vibrating channel 41. When the screw is adjusted within the block and vibrating channel to provide the desired contact with the striker button 40, the same is locked by a set nut 45. As best shown in Figure 2, the block 44 normally rests upon a resilient washer 46, supported upon a sleeve 47, surrounding the stud and in turn supported upon the cover plate 29 of the striker housing.

Secured to the screening medium 20 upon opposite sides of the vibrating channel 41 are the auxiliary vibrating channels 48, which are clamped to the screening medium by the straps 49 and the bolts 50. In order to transmit vibratory action to the auxiliary strips 48 from the striker 33 the main vibrating channel is connected with the auxiliary strips 48 by the transverse angles 51, welded or secured thereto.

In order to provide an even distribution of the vibratory action of the striker throughout the length of the vibratory channel 41, and the auxiliary vibratory channels 48, the ends of the channels have welded thereto split journal boxes 52 provided with transverse resilient bushings 53 for the reception of the studs 54 carried by the brackets 55, which in turn are bolted to the transverse stretches of the screen frame 19. Thus it will be seen that the screening medium is secured to and supported upon a lattice or grill, which in turn is resiliently carried by the screen frame, thus permitting uniform and even distribution of the tapping action of the striker over substantially the entire area of the screen, independent of its vibratory movement imparted through the action of the main vibratory frame. While the vibratory grill or lattice, supporting the screening medium, has a rubber or resilient connection with the screen frame, it is nevertheless sufficiently rigid to be amply stable and effective in preventing whipping of the screening medium.

From the foregoing explanation, considered in connection with the accompanying drawings, it is believed that the operation of the present invention will be quite apparent, in that the motor-driven, over-balanced pulleys 15 and 16 will impart vibratory movement to the main frame 9, which is supported in the resilient bearings 7.

This constitutes the primary vibration, and the tapping action or secondary vibration is independently imparted to the screening medium by the striker 33, which obtains its movement and impetus through the vibratory movement of the main frame, the striker being resiliently carried by the screen frame, which in turn is securely clamped on the main vibratory frame.

Here particular attention is directed to the fact that the journal ends 36 and 37 of the striker are elliptical in cross section, their longest axis being substantially parallel to the plane of the screening medium. The purpose of this, in conjunction with other features of the striker to be described, is to convert the orbital movement of the main frame 9 into a substantially straight line reciprocative movement of the striker, at right angles to the screening medium.

One of the primary advantages of the present striker mechanism resides in the elimination of springs or resilient arms, which are subject to breakage and require frequent replacement. Further, the resilient or rubber mountings for the striker provide an exceedingly simple and inexpensive means for imparting a definitely controlled impetus to the striker, thereby materially increasing the effective tapping action of the hammer upon the vibratory lattice or grill, and eliminating the delicate adjustment heretofore required in previous structures.

Due to the fact that the striker is weighted adjacent one end, and the striking button is positioned adjacent the opposite end, together with the fact that the light end of the striker is journaled in a relatively small rubber bearing, while the opposite end is journaled in an enlarged rubber block, the weighted end will have considerable more movement than the opposite end, the movement of which is restricted and therefore acts to a certain extent as a pivot, having a stabilizing effect on the vibratory action of the striker, particularly in instances where an extremely short stroke, with a resultant light tapping action is desired.

The journal ends of the striker are formed elliptical in cross section, with their longest axis substantially parallel to the plane of the screening medium, while the rubber bearing blocks 35 and 38 are rectangular, being elongated in the direction of the long axis of the elliptical journal ends. While this specific structure may not be essential under varying conditions, in practice the same has been found highly effective in conjunction with the structure and type of screens illustrated, in that the elliptical shape, having its greatest axis parallel to the screening medium, presents the greatest amount of surface for the components, operating at right angles to the plane of the screening medium, to act upon. Further, the rectangular shaped rubber bearing blocks provide more material to absorb the components working parallel to the plane of the screening medium, thus converting the primary orbital movement imparted to the main frame into a substantially straight line movement of the striker at right angles to the plane of the screening medium. In the event that a mechanism is employed for imparting primary straight line vibration to the main frame at right angles to the screening medium, instead of orbital movement, such as results from the present mechanism, then the specific structure of the striker, and its mounting, could readily be varied. Therefore, it is to be understood that the invention in its broadest sense is not to be so limited.

In the present structure it will also be appreciated that the elliptical journal ends of the striker prevent its rotation within the bearing blocks, which is essential where a striker button, such as illustrated and described, is employed. However, it will be quite obvious that an annular striking surface might be employed, in which instance the rotation of the striker would not be objectionable.

A still further advantage resulting from the elliptical shape of the striker ends resides in the fact that sharp corners are eliminated so that when the striker is in motion the rubber can flow freely around the rounded surfaces of the ellipse, which also eliminates cutting and heating of the rubber.

Attention is further directed to the fact that while the striker support or housing has been illustrated and described as being carried by the removable screen panel frame, in operation the same is rigidly connected with the main frame. Therefore, it will be quite obvious that the striker support could be directly connected to the main frame without affecting its operation or departing from the principles of the invention.

We claim:—

1. In a vibrating screen including a vibratory frame and a screening medium carried thereby, a striker carried by said vibratory frame and receiving its impetus from the vibratory action of said frame for imparting tapping action to said screening medium, said striker being weighted adjacent one of its ends and provided with a striker surface adjacent its opposite end, and blocks carried by said frame and formed of resilient material for supporting the ends of said striker, and controlling its movement in a definite path relative to the path of movement of said screening medium.

2. In a vibrating screen including a vibratory frame and a screening medium carried thereby, a striker carried by said vibratory frame and receiving its impetus from the vibratory action of said frame, for imparting tapping action to said screening medium, said striker being weighted adjacent one of its ends and provided with a striker surface adjacent its opposite end, and blocks carried by said frame and formed of resilient material for supporting the ends of said striker, said resilient block adjacent the weighted end being of greater dimensions than the opposite block.

3. In a vibrating screen including a vibratory frame and a screening medium carried thereby, a striker carried by said vibratory frame and receiving its impetus from the vibratory action of said frame, for imparting tapping action to said screening medium, said striker being provided with a striker button and having journal ends elliptical in cross section, and blocks formed of resilient material for receiving said elliptical journal ends.

4. In a vibrating screen including a vibratory frame and a screening medium carried thereby, a striker carried by said vibratory frame and receiving its impetus from the vibratory action of said frame, for imparting tapping action to said screening medium, said striker being weighted adjacent one of its ends and provided with a striker button adjacent its opposite end, the ends of said striker being elliptical in cross section, and bearing blocks formed of resilient material for receiving the elliptical ends of said striker.

5. In a vibrating screen including a vibratory frame and a screening medium carried thereby, a striker carried by said vibratory frame and receiving its impetus from the vibratory action of

said frame, for imparting tapping action to said screening medium, said striker being weighted adjacent one of its ends and provided with a striker button adjacent its opposite end, the ends of said striker being elliptical in cross section, and bearing blocks formed of resilient material for receiving the elliptical ends of said striker, said bearing block adjacent the weighted end of said striker being of greater dimension than the opposite bearing block.

6. In a vibrating screen including a vibratory frame, and a screening medium carried thereby, a plurality of substantially rigid connected vibratory strips secured to said screening medium, resilient connections between said vibratory strips and said frame to permit independent movement of said vibratory strips, and a striker carried by the main frame for imparting movement to said vibratory strips.

7. In a vibrating screen including a vibratory frame, a removable frame carried by said vibratory frame, a screening medium connected to said removable frame, a plurality of substantially rigid connected vibratory members secured to said screening medium, rubber connections between said vibratory members and said removable frame, and a striker carried by said removable frame for imparting a tapping action to said vibratory members.

8. In a vibrating screen including a vibratory frame, a removable frame carried by said vibratory frame, a screening medium secured to said removable frame, a plurality of spaced substantially rigid connected vibratory members secured to said screening medium, a housing carried by said removable frame centrally thereof, and a striker mounted in said housing for imparting tapping action to said vibratory members.

9. In a vibrating screen including a vibratory

frame, a removable frame carried by said vibratory frame, a screening medium secured to said removable frame, a plurality of spaced connected vibratory members secured to said screening medium, a housing carried by said removable frame centrally thereof, a striker mounted in said housing for imparting tapping action to said vibratory members, and means formed of rubber for supporting said striker, and controlling its movement in a definite path relative to the path of movement of said screening medium.

10. In a vibrating screen including a vibratory frame, a removable frame carried by said vibratory frame, a screening medium secured to said removable frame, a plurality of spaced connected vibratory members carried by said removable frame and engaged with said screening medium, a housing carried by said removable frame, a striker mounted in said housing for imparting tapping action to said vibratory members, and means formed of rubber for supporting said striker, and controlling its movement in a definite path relative to the path of movement of said screening medium.

11. In a vibrating screen including a vibratory frame, a removable frame carried by said vibratory frame, a screening medium secured to said removable frame, a plurality of spaced connected vibratory members engaged with said screening medium, resilient connections between said vibratory members and said removable frame to permit independent movement of said vibratory members, a housing carried by said removable frame centrally thereof, a striker mounted in said housing for imparting tapping action to said vibratory members, and means formed of rubber for supporting said striker in said housing.

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