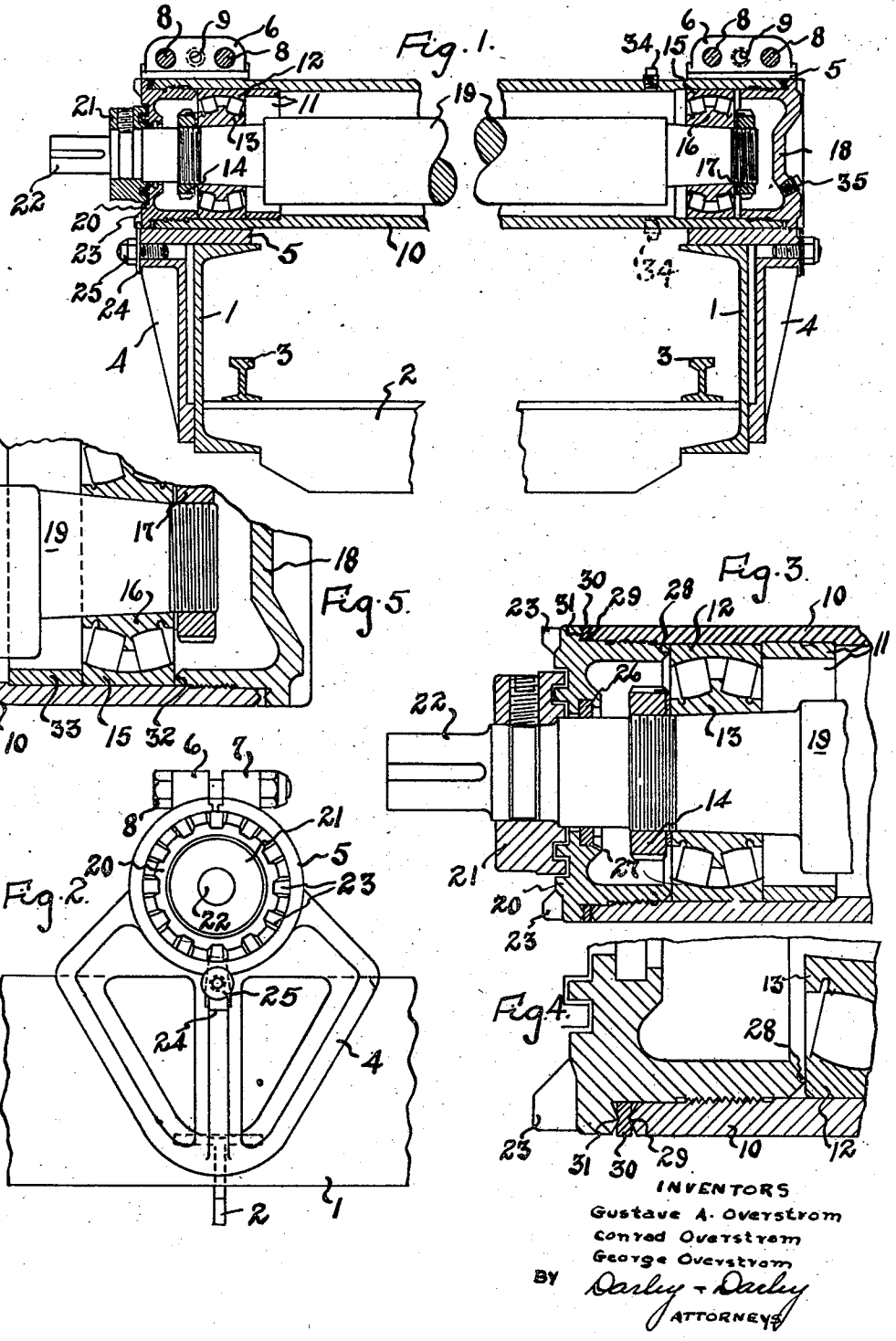
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BEARING AND SEAL CONSTRUCTION

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BEARING AND SEAL CONSTRUCTION

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1 Claim. (Cl. 308—187.1)

This invention relates to improvements in power drive vibrating screens of the type employed for sorting, grading and separating materials, including the treatment of rotary mud.

This invention is concerned with improvements in the construction and mounting of the vibrating unit when it is of the type which is mounted directly upon the screen box so as to move with it and is essentially a rotatable unbalanced weight.

An object of this invention is the provision of an improved form of mounting by means of which the vibrating unit may be quickly and easily mounted on the screen box and removed therefrom and is adapted for end to end reversal so that it may be driven from either the left or the right hand side of the screen.

A further object of the invention is the provision in a mounting of this type of means for insuring or locking the unit against undesired rotational movement and at the same time constructed and arranged to facilitate the removal thereof and angular adjustment when desired.

Another object of the invention is the construction of a housed vibrating unit and the mounting so that oil may be used for the lubrication thereof which may be easily removed for replacement and cleaning and the quantity of which may be readily gauged when refilling.

Among the other objects of this invention is the provision of an improved form of sealing means for the ends of the housing by which the leakage of oil therefrom is prevented.

Other more detailed objects of this invention will be apparent from the following description.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in full detail below.

This application is a division of our co-pending application Serial No. 290,726, filed August 18, 1939, now Patent No. 2,241,476 for Vibratory screen.

In the accompanying drawing,

Figure 1 is a vertical, transverse, cross-sectional view through a screen box in accordance with this invention, taken through the longitudinal axis of the vibrator unit;

Figure 2 is a left hand end elevational view of the vibrating unit and its mounting;

Figure 3 is an enlarged longitudinal-sectional view of the drive end of the vibrating unit, the shaft being held from endwise movement at this end only;

Figure 4 is a further enlarged, detailed, longitudinal-sectional view at the same end; and

Figure 5 is a longitudinal-sectional view of a vibrating unit in which the shaft is held from endwise movement only at the closed end of the housing.

As is notorious, power driven vibratory screens of the type disclosed herein and to which this invention refers when in use in the field are subjected to extremely destructive conditions. By way of example, when screens of this type are employed in the treatment of rotary mud it is apparent that the surface thereof becomes coated with the mud, causing the removable parts to become rusted and otherwise undesirably secured together. In the case of the treatment of dry materials it is apparent that great quantities of abrasive dust settle on the parts, which is not only destructive thereof but shortens the life of the structure if it gets between the removable parts. An object of this invention is to provide a vibrating unit of the type mounted on the screen box which may be readily mounted in place, removed for repair or reversal, and otherwise manipulated for maintenance purposes with ease, notwithstanding its condition resulting from use in the field.

It is common practice to lubricate devices of this type with a heavy grease which cannot be removed and replaced readily without completely disassembling the vibrating unit. Furthermore, no sure provision is made by means of which it can be determined when the proper amount of grease has been forced into the housing. The result is that it is common practice to employ a powerful grease-gun with which grease is forced into the casing until it oozes out of the labyrinth seals. The use of grease is disadvantageous for other reasons, such as in cold weather it is hard to get units of this type started, and in hot weather the grease tends to be beaten into a froth. In accordance with the construction of this invention, oil may be employed which can be easily removed and replaced, as will be explained later, by reason of the construction devised, and when replaced can be replaced in just the right amount.

Other objects of the invention include improved methods of sealing the vibratory unit housing and for holding the bearing members in place.

Referring to the drawing, a screen box is shown in transverse cross-section and is illustrated as including a pair of side walls 1, connected by means of cross-braces 2 secured thereto in any suitable manner and provided with longitudinally extending rails 3 for reinforcing

the structure and providing a support for the screen cloth which has been omitted from the drawing. Mounted on the outer faces of the screen box walls are a pair of brackets 4 which are secured thereto in any suitable manner, as for example by welding. At their upper ends these brackets terminate in split collars 5 which are provided with a pair of parallel lugs 6 and 7 at the opposite sides of the division line and extending throughout the length of the collars. These collars are provided with one or more holes, as shown, by means of which nuts and bolts 8 may be employed for locking the tubular housing 10 therein when the ends thereof lie in the collars. One of the lugs, such as the lug 6, on each collar is provided with a central threaded opening 9 into which one of the bolts 8 may be screwed to engage the opposite ear for expanding the split collar slightly to break it loose from the housing 10 when it is desired to remove the housing for any purpose or angularly adjust it. For example, it is frequently necessary to reverse the vibratory unit end for end so as to provide for either left hand drive, as shown, or right hand drive when reversed. This construction facilitates these operations and is particularly effective in the field as distinguished from the structures now commonly used where the tubular housing 10 is permanently secured to the brackets and the brackets are bolted to the screen box so that such a reversal involves a considerable operation.

As shown in Figure 1, the tubular housing 10 is counterbored to provide a shoulder against which a ring 11 is welded to provide a seat for the bearing comprising the outer race 12 and the inner race 13. The other end of the housing is counterbored and has fitted therein the outer race 15 for the bearing at that end so that it is free to move axially at all times. An unbalanced rotary shaft 19 has mounted thereon the inner races 13 and 16 of the bearings which are respectively locked thereon by means of the nuts 14 and 17. The right hand end of the housing is closed by means of a threaded cover plate 18 which is sealed against the end of the housing in the same way as is the cover plate 20 which is screwed into the other end of the housing. This latter cover plate is shown in greater detail in Fgures 3 and 4 and the manner in which the sealing is effected for both ends will be described in connection therewith. The shaft 19, as shown in Figure 1, is provided with a collar 21 held thereon by a set screw as shown and constructed to form a telescoping fit with the complementarily shaped outer face of the cover 20 to form a labyrinth which aids in keeping dust out of the housing. The end 22 of the shaft is adapted to receive a driving pulley or other operating device. The outer face of the end covers 18 and 21 are provided with a series of radial notches 23 which are adapted to receive a latch 24 which may be locked by means of a nut 25. The tubular housing 10 is provided with a threaded aperture which is closed by means of a plug 34 which is normally in the full line position shown in Figure 1.

When it is desired to empty the oil from the housing the collars 5 are loosened and expanded by a bolt 8, as previously explained, when necessary so that the housing may be readily rotated in the collar after the latches 24 have been withdrawn from the notches 23. The housing 10 is then rotated so that the plugged opening is in the dotted position, after which the plug is removed and the oil drained from the housing. It is then rotated back to its original position and the housing refilled with oil. To facilitate the gauging of the amount of oil in the housing a gauge plug 35 is provided in the end cover 18. This plug is removed during filling and when the oil appears at the opening the proper amount of oil is present. The two plugs are replaced and the tube locked by positioning it so that the latches 24 will fit into adjacent notches and the split collars are then drawn up tight.

In order to effect a good seal between the end covers and the housings, each end cover is provided with a flanged edge, see Figure 4, the face of which is provided with a sharp annular ridge 31 opposed to a similar ridge 29 formed on the ends of the housing. Interposed between these is a washer 30 of suitable material, such as fibre, which is squeezed between these ridges when the end cover is drawn up tight. In the construction illustrated in Figure 4, the inner terminal end of the end cover is also provided with an annular ridge, shown by the reference numeral 28, which engages the adjacent sides of the outer bearing race 12. These parts are so proportioned that just before the ridge 28 engages the bearing race the washer 30 is contacted by the ridges 29 and 31. As the end cover is drawn up to tightly engage the bearing race the washer 30 is tightly gripped between the ridges, as is clearly illustrated in Figure 4. As shown particularly in Figure 3, where the end of the unbalanced shaft 19 passes through the end cover 20, a sealing ring 26 of felt or other suitable material is positioned in a groove so as to bear on the shaft and serve to prevent the entry of dust and the escape of oil. A series of drainage holes 27 are provided so that as the absorbent ring 26 becomes saturated with oil the excess can drip back into the housing, minimizing its tendency to escape from it.

In the construction shown in Figure 1, the end cover 18, while sealed against the end of the housing 10, as explained in connection with the other end cover, does not have its inner terminal end engaging the adjacent bearing. This bearing is secured in the housing in any suitable way as by means of a push fit. However, when desired, the construction at the left hand end may be employed at the right hand end as employed in Figure 5. In this case a ring 33 is secured against a shoulder in the housing and the outer race 15 of the right hand bearing is held against it by means of the annular ridge 32 formed on the inner end of the right hand end cover 18. In this case the parts are proportioned as before to effect the desired functions, and room for shaft expansion or contraction is then provided for at opposite end.

A particular advantage of the construction as shown in Figure 3, where a sharp ridge in the end cover seals against the outer race of the bearing, is found in the fact that the ridge contact will flatten to some extent against the race, always assuring a perfect oil seal at the fibre gasket.

It is, of course, apparent that the rings 11 and 33 can be omitted when desired and a thicker tubular housing counterbored to form shoulders against which the end covers can force the outer races of the bearings to lock them in place.

By means of the constructions at the ends of the housing as explained it is possible to practically ensure against the seepage of oil from the housing and the entry of dust thereinto.

From the above description it will be apparent to those skilled in this art that the various details of construction disclosed herein as comprising this invention may be varied without departure from the novel ideas of this invention. We do not, therefore, desire to be limited to the specific forms illustrated in the drawing, but rather to the scope of the appended claim.

What is claimed is:

In a vibratory unit for screening apparatus, the combination including a tubular housing open at at least one end, a shoulder formed in the housing near the open end, a bearing member lying against said shoulder, a cover member for the open end of the housing having an annular ridge on its inner end and a flange at its outer end likewise formed with an annular ridge facing towards the end of the housing, the terminal end of the housing having an annular ridge opposed to the annular ridge of said flange, and a packing member gripped between the annular ridge on the flange and the annular ridge on the housing to form a seal, the annular ridge on the inner end of the cover member engaging the bearing to lock it in place and form a seal at the line of contact therebetween.

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