Feb. 18, 1941. J. J. NEUMAN 2,232,623

SLATTED CONVEYER PULLEY

Filed Jan. 30, 1939 3 Sheets-Sheet 1

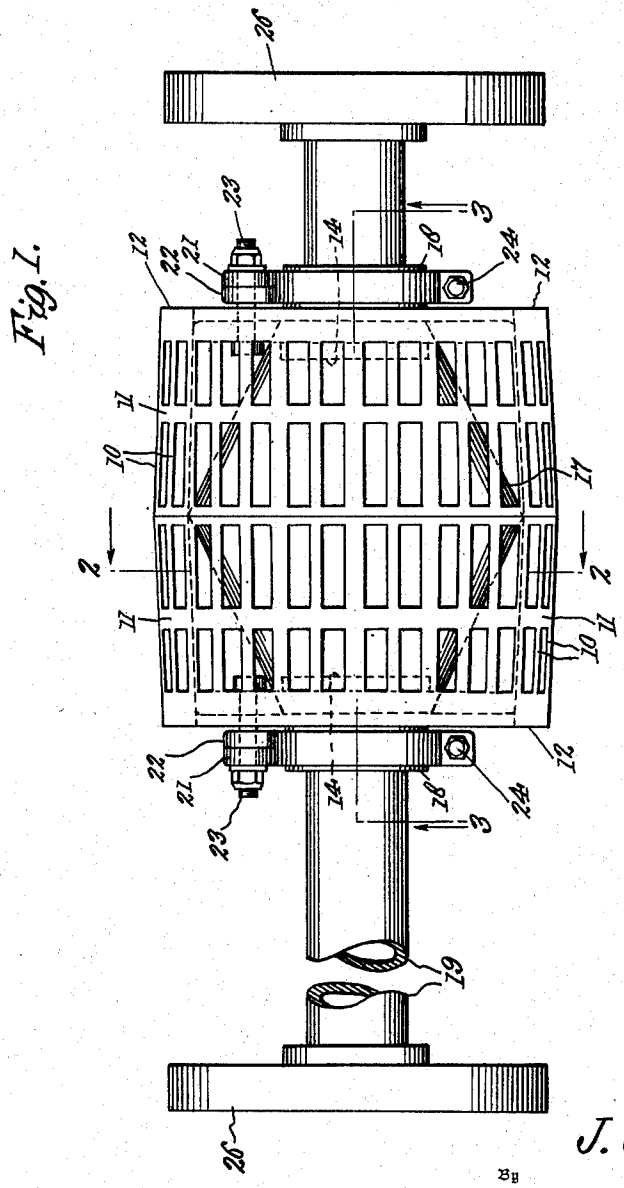


Fig. 1.

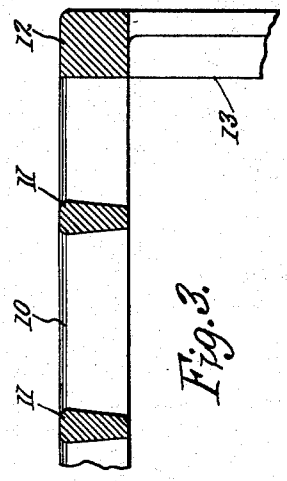


Fig. 3.

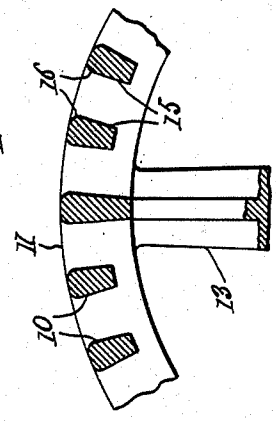


Fig. 2.

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SLATTED CONVEYER PULLEY

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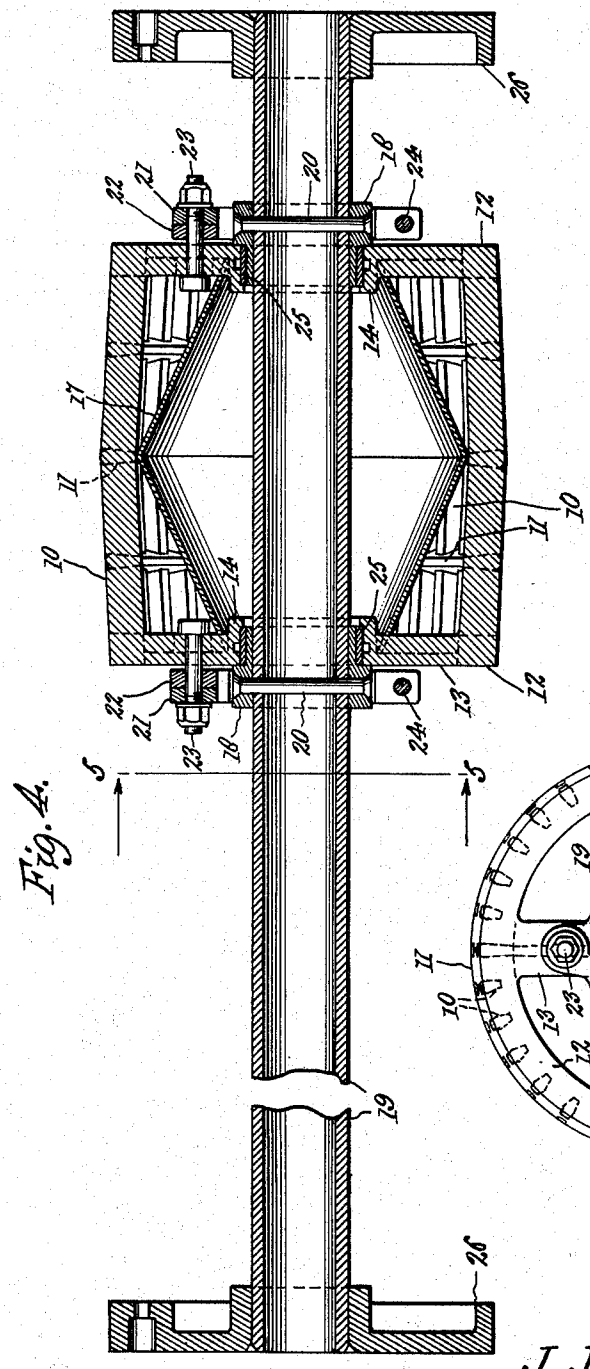


Fig. 4.

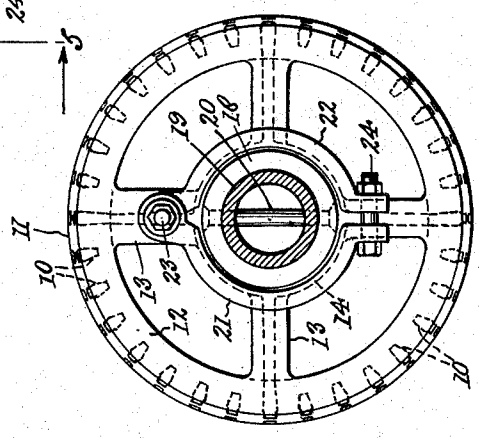


Fig. 5.

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SLATTED CONVEYER PULLEY

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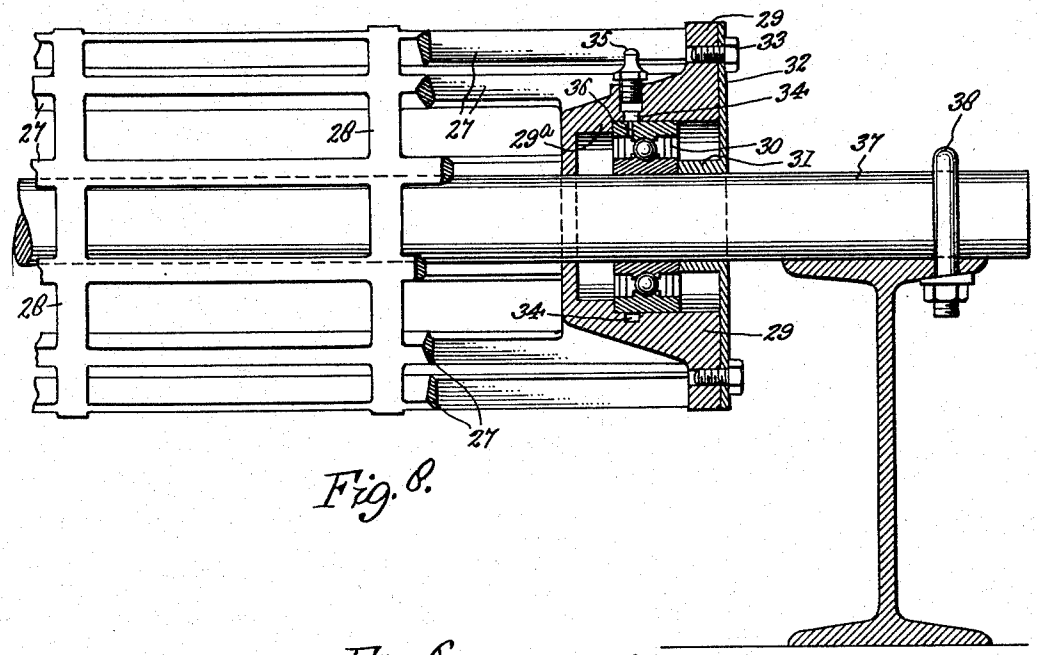
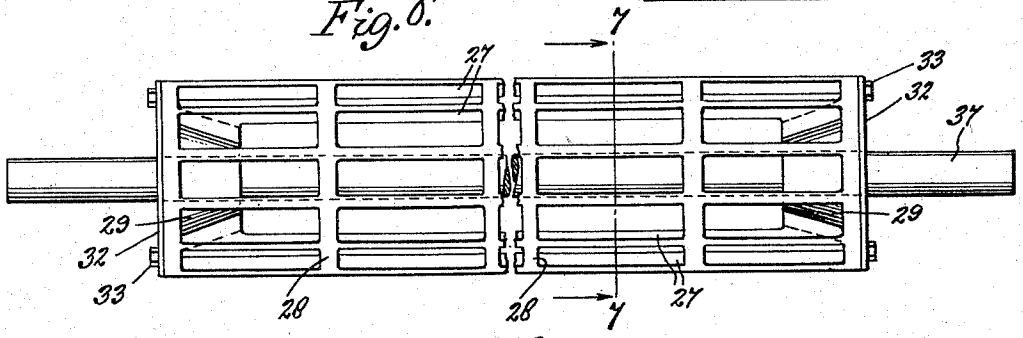


Fig. 8.

Fig. 6.



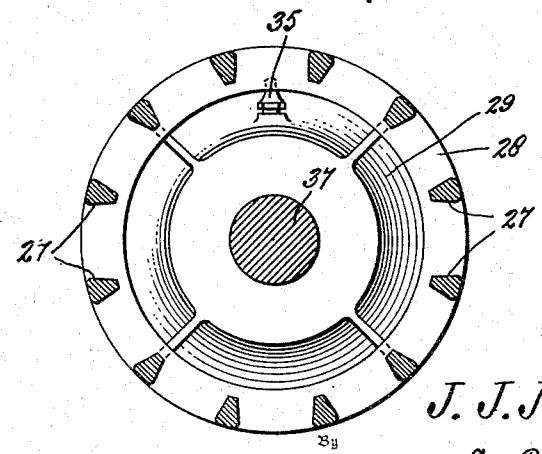


Fig. 7.

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UNITED STATES PATENT OFFICE

2,232,623

SLATTED CONVEYER PULLEY

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Application January 30, 1939, Serial No. 253,696

2 Claims. (Cl. 198—203)

The present invention relates to slatted conveyer pulleys and more particularly to slatted conveyer pulleys for use on belt conveyers handling bulk materials of a sticky nature, such as raw sugar.

Slatted pulleys in general are employed to prevent the adherence and subsequent building up of the material on both the surface of the belt and the pulleys, which is experienced with the non-slatted types. While the slatted pulleys which have been used in the past are successful with some types of material, it has been found that with materials of a particularly sticky nature, notably raw sugar, that unless frequent cleaning is resorted to, the material wedges in the spaces between the slats and the pulley and then presents a continuous surface to the belt and is in effect no longer slatted.

It is, therefore, the primary object of this invention to provide a slatted pulley so constructed that the material is prevented from wedging between the slats thereof.

A further object is to provide means for insuring positive lateral discharge of the material from the inside of the pulley to prevent material collecting therein and eventually filling up the space within the bars or slats.

Another object is to provide a slatted pulley of the idler type so constructed that the ball bearings thereof are totally enclosed and sealed from any possible contact with the material being conveyed, thereby prolonging their life, insuring efficient operation of the conveyers and guarding the material being conveyed from contamination by the lubricant.

A still further object is to provide a simple clutch means of disconnecting the pulley from the driving shaft to render the conveyer inoperative.

With the foregoing and other objects in view the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

Figure 1 is a side elevation of the driving type pulley.

Figure 2 is an enlarged fragmentary section taken on the line 2—2 of Figure 1 showing the construction of the slats.

Figure 3 is an enlarged fragmentary section taken on the line 3—3 of Figure 2 showing the construction of the end and reinforcing rings.

Figure 4 is an axial sectional view of the embodiment of Figure 1 showing the pulley mounted on a driving shaft.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a side elevation of the idler type embodiment of the pulley.

Figure 7 is a section on the line 7—7 of Figure 6.

Figure 8 is an enlarged fragmentary view partly in section of the idler of Figure 6.

Referring now to the drawings and more particularly Figures 1 to 5 thereof, the open-work facing of the pulley is made up of the lateral slats or bars 10 which are equally spaced around the periphery of the reinforcing rings 11 and the end rings 12 and are all cast as one unit. The pulley is supported concentrically on the shaft by the spoke 13 and the hubs 14 (Figs. 4 and 5) of the end rings 12. The bars 10 are so spaced and the thickness thereof so proportioned that the spaces between them are relatively large in proportion to the thickness of the bars. Furthermore, the thickness of the bars decreases inwardly toward the axis of the pulley said taper being so proportioned in relation to the overall diameter of the pulley that the width of the spaces at 15 is considerably greater than at 16. It is obvious that if the bars were of uniform thickness along their depth, as heretofore constructed, that the inverse would be true and the spaces between bars would be less at 15 than at 16. Since the pressure of the conveyer belt tends to force the material inwardly between the bars 10 it is easily seen that if the spaces decrease toward the axis of the pulley the material will tend to pack therein. However, if the bars are tapered as described, any pressure from without immediately dislodges such material and it falls into the space inside the lattice formed by the bars 10 and the rings 11. The rings 11 are also tapered toward their axis (Figure 3). In order to free the pulley of the material which would otherwise accumulate therein the conical pieces 17 are provided within the bars 10 and the rings 11. These conical sections 17 are constructed with the largest diameter thereof equal to the inside diameter of the middle ring 11 and thence taper towards the ends of the pulley and terminate at the hubs 14, having a diameter at said hubs equal to the outside diameter thereof. Any material forced between the bars 10 will thus strike the cones 17 and be laterally discharged thereby through the spaces between the spokes 13 of the end rings 12.

An added advantage of the cones 17 is that the material being conveyed is prevented from working into the bearings from the inside since they

entirely enclose the shaft on the inside of the pulley.

Both the bars 10 and the rings 11 are rounded at their outside edges (Figs. 2 and 3) to decrease the possibility of material caking thereon, and to reduce wear on the conveyer belt.

For added strength the bars 10 opposite each of the spokes 13 may be made larger as shown in Fig. 2.

The collars 18 (Figs. 4 and 5) are secured to the hollow shaft 19 by the pins 20 and conform to the inside curvature of the strap pieces 21 and 22 which are journalled on the bolts 23 each of which is in turn secured to one of the spokes 13. The opposite ends of the strap pieces 21 and 22 are formed to receive the clamping bolts 24. It is thus seen that when the bolts 24 are tightened the strap pieces 21 and 22 will act to clamp the pulley securely to the shaft 19 and when loosened allow it and the collars 18 to rotate freely within the hubs 14. Sleeves 25 of a suitable wear resistant bearing material are provided between and held in position by the hubs 14 and the collars 18. The clutch thus formed is especially well adapted to use where several parallel conveyers are driven from a single line shaft and it is desired to operate one or more of the conveyers at a time selectively. Also this clutch is particularly well adapted to use with conveyers carrying bulk materials of a sticky nature such as raw sugar since the very small number of limitedly moving parts prevents it from becoming clogged with the material as is the case with conventional clutches having a multiplicity of moving parts.

The line shaft 19 may be made up in short sections such as the ones shown and connected by the simple flexible coupling plates or discs 26 which compensate for shrinkage of the shaft metal, due to temperature changes, as well as bearing misalignment.

Referring now to Figures 6, 7 and 8 the invention is shown applied to a small diameter or so called belt idler pulley which in use is employed to support the top and return runs of the conveyer belt between the head and tail pulleys as embodied in Figures 1 to 5. The construction is substantially the same insofar as applies to the bars 27 and the rings 28, which are cast integrally with the hubs 29. The hubs 29 in this case however, have no spokes and are formed to enclose the ball bearings 30 totally which bearings are retained in position by the shoulder 29a (Fig. 8) and the sleeve 31. The hub 29 is provided with the plate 32 which is retained by the screws 33 and may be removed for bearing inspection or replacement. The bearings 30 are preferably of the enclosed type having grease retaining rings and a groove 34 is provided in the hub 29, through which additional grease may be added by means of the grease fitting 35 and the hole 36 in the outer raceway of the bearing 30. The shaft 37 is stationary and is mounted in any suitable manner such as by the U bolts 38.

In conventional types of idlers the bearings are usually mounted externally of the idler and the shaft and idler rotate as a unit. Such bearings are hard to keep in true alignment due to shifting of the steel supporting framework whereas with the bearings mounted in the idler itself, this difficulty is entirely obviated.

With the embodiment of Figures 6, 7 and 8 no discharge cones are necessary as the conveyer belt only rests tangentially on the top of the idler and any material forced through the bars by the belt readily falls out at the lower side. With the larger type end pulleys of Figures 1 to 5 the conveyer belt makes a complete half wrap and material falling to the bottom cannot escape and must be discharged laterally.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. A conveyer pulley comprising supports including hubs forming bearings for mounting on the pulley shaft, on open-work facing attached to and extending between said supports, said facing having openings therein of cross-sectional area increasing toward the axis of the pulley, said supports also having discharge openings disposed substantially at right angles to the openings in said facing, a cylindrical deflector between the hubs within the facing shaped to deflect material falling through the openings in said facing and out through the discharge openings, the longitudinal extremities of said deflector embracing the hubs to prevent material falling through the openings in said facing from entering said bearing-forming hubs, a collar secured to said shaft adjacent each of said supports and extending inwardly into the corresponding hub for supporting the same on the pulley shaft, the outer end of each of said collars terminating in a disc head adjacent the outer face of said supports, a pair of strap pieces mounted on said supports in line with said disc heads and adapted to embrace the same, and adjustable means for clamping said strap pieces about said disc heads to connect said pulley and shaft drivingly together.

2. A conveyer pulley for belt conveyers handling raw sugar and the like comprising supports including hubs forming bearings for mounting on the pulley shaft, an open-work facing attached to and extending between said supports, a deflector between the hubs within the facing, said deflector terminating at the hubs around said bearings to protect the latter from the raw sugar, a collar secured to the pulley shaft adjacent each of the hubs to provide a pair of disc heads disposed adjacent the outer faces of said supports, a pair of strap pieces mounted on said supports in line with respective disc heads and adapted to embrace the same, and adjustable means for clamping the strap pieces about said disc heads.

JACOB J. NEUMAN.