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3,297,147

SELF-CLEANING PULLEY SYSTEM

Original Filed Feb. 28, 1963

3 Sheets-Sheet 1

FIG. 1

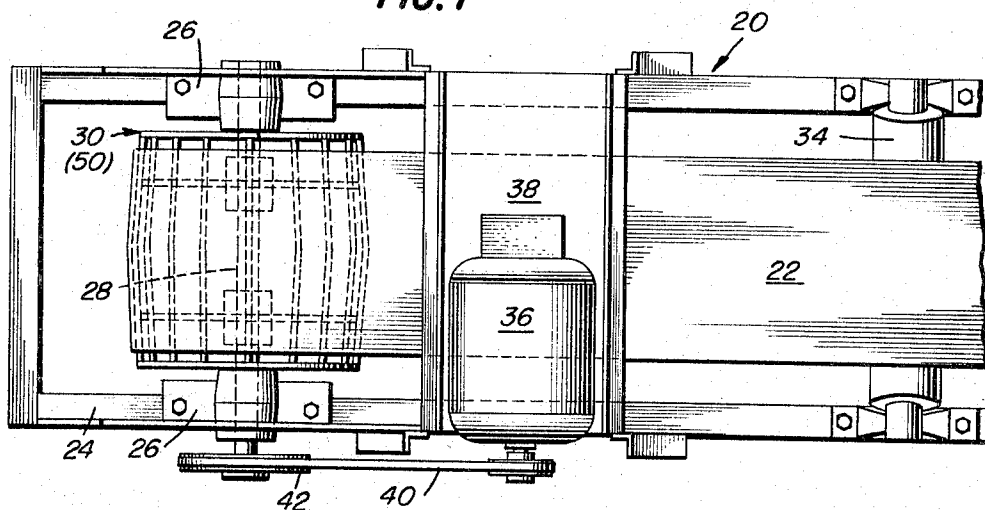
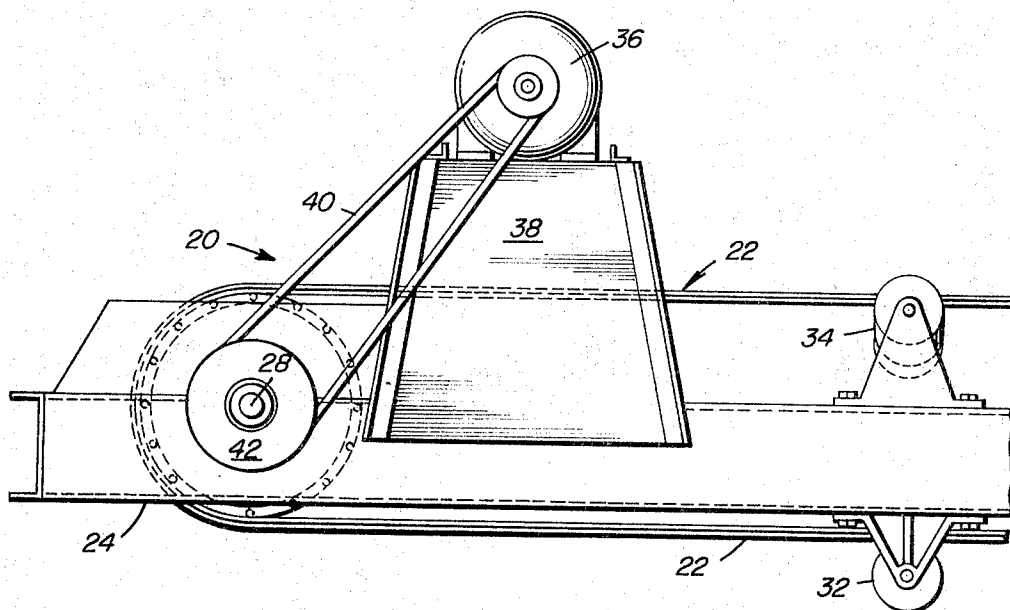


FIG. 2



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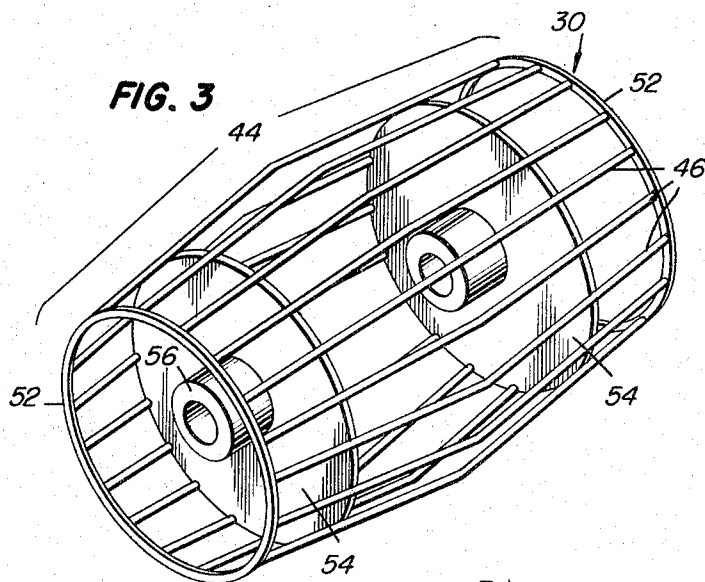
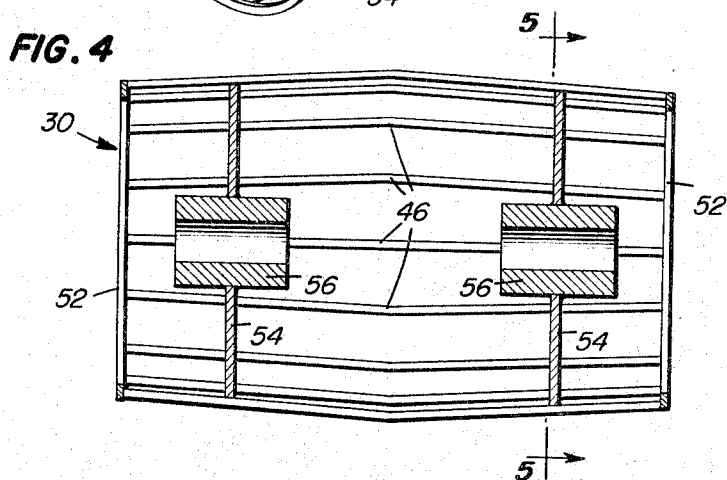
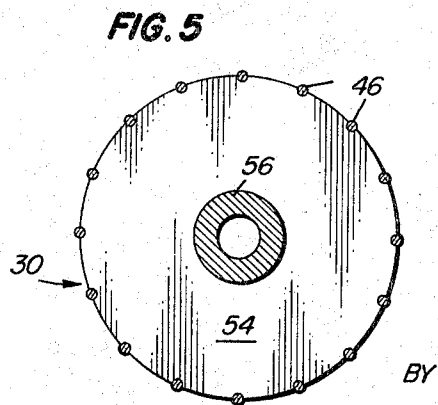
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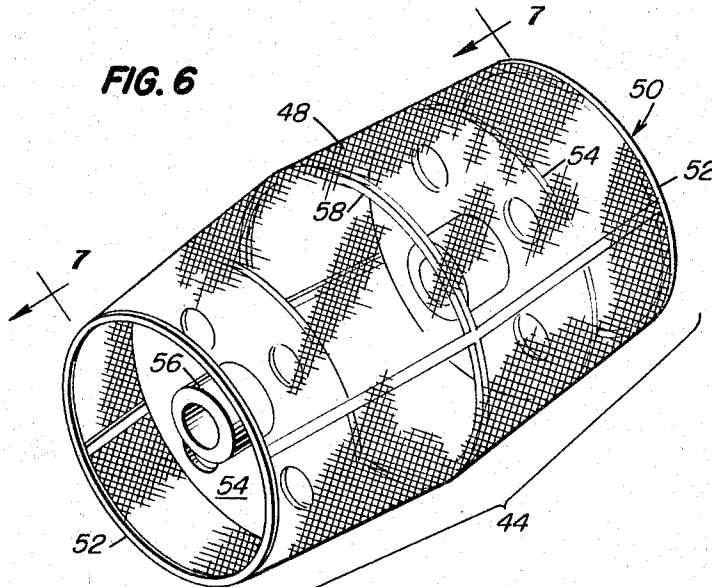
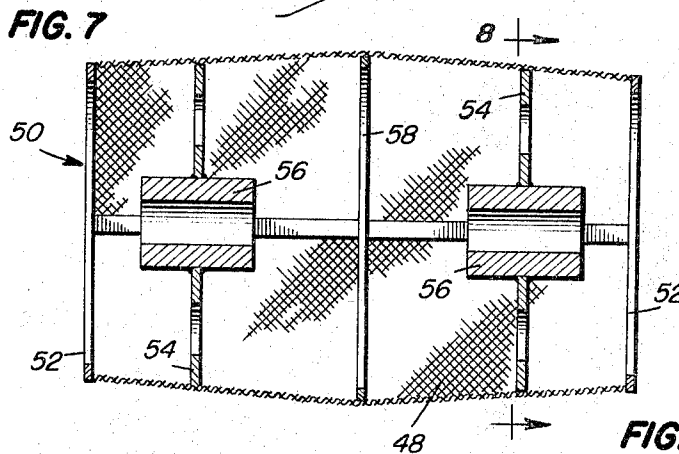
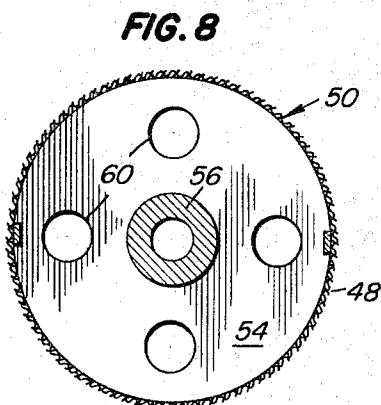
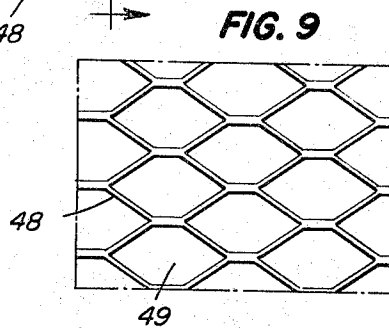
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SELF-CLEANING PULLEY SYSTEM

Original Filed Feb. 28, 1963

3 Sheets-Sheet 3



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SELF-CLEANING PULLEY SYSTEM

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Continuation of application Ser. No. 261,624, Feb. 28, 1963. This application May 25, 1965, Ser. No. 463,460
4 Claims. (Cl. 198—230)

This patent application is a continuation of U.S. patent application, Serial No. 261,624, filed by applicant on February 28, 1963, for "Self Cleaning Pulley System," now abandoned.

This invention relates generally to conveyors, and more particularly it pertains to an improved conveyor and a belt pulley therefor which aligns the belt and is self-cleaning.

Pulleys for driving and returning conveyor belts generally have solid surfaces. When such pulleys are used for handling pulverulent materials, for example, phosphated fertilizer chemicals, a compacted build-up of the conveyed material occurs on these pulleys. The resultant uneven layer thus built up on their surfaces causes damage to the belt and spillage of the material by the belt running to the sides of the pulleys.

Accordingly, it is an object of this invention to provide an improved belt conveyor which avoids frequent cleaning shutdowns and is more efficient in the handling of pulverulent materials.

Another object of this invention is to provide a belt pulley having a foramenated peripheral surface which is self cleansing.

Still another object of the invention is to provide a pulley for driving a conveyor belt with improved traction and tracking.

Yet another object of this invention is to provide a non-slipping, self-cleaning pulley which is smoother and quieter in operation and less wearing to the belt.

To provide a belt pulley of lighter weight and of less inertia than heretofore, is a further object of this invention.

Other objects and attendant advantages of this invention will become more readily apparent and understood from the following detailed specification and accompanying drawings in which:

FIG. 1 is a plan view of the drive end of an improved belt conveyor incorporating features of this invention;

FIG. 2 is a side elevation of the drive end of the improved belt conveyor shown in FIG. 1;

FIG. 3 is an enlarged perspective view of one embodiment of a pulley for the conveyor shown in FIGS. 1 and 2;

FIG. 4 is a longitudinal section of the pulley of FIG. 3 taken on the axis thereof;

FIG. 5 is a cross-section taken on the line 5—5 of FIG. 4;

FIG. 6 is a perspective view of a second embodiment of a pulley;

FIG. 7 is a longitudinal section of the pulley of FIG. 6 taken through the longitudinal axis thereof;

FIG. 8 is a cross-section taken on line 8—8 of FIG. 7; and

FIG. 9 is an enlarged detail view of the peripheral surface of the pulley shown in FIG. 6.

Referring now to the details of the drawings, there is shown depicted in FIGS. 1 and 2 a belt type materials conveyor.

This conveyor, designated generally by reference numeral 20, employs a wide endless conveyor belt 22 which operates in the rectangular window of a structural beam frame 24.

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Journals 26 are provided near each end of the frame 24 for a transverse shaft 28 upon which a large barrel shaped pulley 30 is secured for rotation thereon. The conveyor belt 22 passes around both these pulleys 30, namely the drive pulley and the return pulley. The belt 22 is supported against sagging intermediate these pulleys 30 by lower and upper rollers 32 and 34, respectively, mounted at spaced intervals on the frame 24.

A motor 36 is mounted on a bracket 38 at the driven end of the conveyor 20. The motor bracket 38 straddles the belt 22 and is fixed to both sides of the frame 24. This motor 36 is coupled to a drive belt 40 and thence to a drive pulley 42. The latter pulley 42 is secured to the end of the transverse shaft 28 and so rotates the conveyor pulley 30 to move the conveyor belt 22.

The conveyor pulley 30 differs from the predecessor types of pulleys in having a grill-like peripheral area of foramenous nature.

As shown in FIGS. 3, 4, and 5, this area 44 is made up of a plurality of spaced rods 46. The second embodiment 50 of the conveyor pulley, as illustrated in FIGS. 6, 7, 8, and 9, features an area 44 consisting of expanded metal screen or mesh 48, preferably with diamond shaped apertures 49.

In both cases, the peripheral areas 44 of the pulleys 30 and 50 depart from cylindrical in having a larger medial diameter than at the ends somewhat like a pair of truncated cones base-to-base. This is accomplished by outwardly bending the rods 46 slightly at their centers or by forming or expanding the tube of mesh 48 more near the center than at its ends.

Both embodiments of the pulleys 30 and 50 have light reinforcement rings 52 welded inside at or near their ends. A drive disc 54 having a hub 56 is similarly secured somewhat inwardly from each ring 52. The hubs 56 are suitably keyed for securement to the previously mentioned shaft 28.

It is obvious that neither the rod or the metal mesh peripheral area 44 is capable of retaining dust build-up which would interfere with the contour of the pulley 40 or 50. Further, because there is no build-up, the rods 46 or the mesh 48 provide a non-slipping surface having improved belt tracking qualities. To prevent the mesh 48 from collapsing on the medial diameter, a strengthening ring 58 is welded inside pulley 50 as best shown in FIGS. 6 and 7.

To reduce weight and inertia and to provide endwise egress of dust, the drive discs 54 may be provided with a plurality of apertures 60 as depicted in FIG. 8.

While excellent traction is obtained from either embodiment pulley 30 or pulley 50, it is noted that the equally spaced rods 46 of the former under some conditions of operation may tend to "gear" mark or emboss the conveyor belt. If this is important from a standpoint of belt wear, it may be preferable to use the mesh construction of pulley 50 which presents non-repetitive contact points to the belt.

Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In combination with a conveyor belt for conveying pulverulent materials, a self-cleaning pulley for said conveyor belt, comprising a cylindrical-like structure of expanded metal screening having a medial diameter larger than the diameter of each of its ends, said structure being self-supporting except for a disc member spaced inwardly from each said ends, each said disc member having a hub mounted thereon and apertures for providing sideways

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egress for pulverulent material entering said screening, and a reinforcement ring for each said ends, whereby said pulley is light in weight and therefore of low inertia.

2. A self-cleaning pulley for a belt which conveys pulverulent materials, comprising a cylindrical-like structure of expanded metal screening having a medial diameter larger than the diameter of each of its ends, said screening having as its sole support a disc member spaced inwardly from each of said ends, each said disc member having a hub mounted thereon and apertures for providing sideways egress for pulverulent material entering said screening, and a reinforcement ring for each said ends.

3. The self-cleaning pulley of claim 2 wherein said screening has diamond shaped apertures and presents non-repetitive contact points to said belt.

4. A self-cleaning pulley for a belt which conveys pulverulent materials, said pulley having its traction sur-

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face formed of expanded metal screening and having a medial diameter larger than the diameter of each of its ends, said screening having as its sole support a disc member spaced inwardly for each of said ends, each said disc member having a hub mounted thereon and apertures for providing sideways egress for pulverulent material entering said screening, and a reinforcement ring for each said ends.

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